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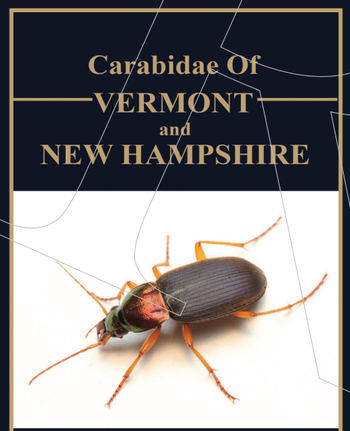

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This book includes species accounts and summaries of the natural history of the 495 known species of ground beetles (Coleoptera: Carabidae) of Vermont and New Hampshire. Under each species, the general and local ranges are described, along with habitat, life cycle, behavior and flight dynamics. Maps of species distributions are presented and overlaid by Biophysical Regions of Vermont and New Hampshire. Nomenclatural and distributional information follows Bousquet's (2012) *Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico* and complements the 2003 work of Larochelle and Larivière entitled *A Natural History of the Ground Beetles (Coleoptera: Carabidae) of America north of Mexico.*

Ross T. Bell

Carabidae of VERMONT and NEW HAMPSHIRE

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Ross T. Bell

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Carabidae of VERMONT and NEW HAMPSHIRE

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and
NEW HAMPSHIRE

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CARABIDAE OF VERMONT
and
NEW HAMPSHIRE

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Vermont Entomological Society

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TABLE OF CONTENTS

Introduction 5
Biophysical regions of Vermont and New Hampshire 12
Major mountain ranges, lakes, and rivers of Vermont and New Hampshire.....13
Acknowledgments 14
Organization of species accounts and distribution maps.....15
List of species known from Vermont and New Hampshire 16
List of Abbreviations 40
Species Accounts.....41
TRIBE NEBRIINI 41
TRIBE NOTIOPHILINI.....45
TRIBE CYCHRINI.....49
TRIBE CARABINI.....53
TRIBE CICINDELINI.....60
TRIBE LORICERINI 78
TRIBE ELAPHRINI.....79
TRIBE OMOPHRONINI.....86
TRIBE SCARITINI 87
TRIBE CLIVININI.....88
TRIBE DYSCHIRIINI.....93
TRIBE BROSCINI 98
TRIBE TRECHINI 100
TRIBE BEMBIDIINI.....102
SUBTRIBE BEMBIDIINA.....102
SUBTRIBE XYSTOSOMINA 139
SUBTRIBE TACHYINA.....139
TRIBE PATROBINI.....149
TRIBE BRACHININI 153
TRIBE PTEROSTICHINI 159
TRIBE ZABRINI.....178
TRIBE OODINI.....194
TRIBE CHLAENIINI.....196

TRIBE LICININI 203
TRIBE HARPALINI 209
SUBTRIBE ANISODACTYLINA 209
SUBTRIBE STENOLOPHINA 217
SUBTRIBE HARPALINA 233
TRIBE SPHODRINI 248
TRIBE PLATYNINI 252
TRIBE PERIGONINI 277
TRIBE ATRANINI 277
TRIBE PENTAGONICINI 278
TRIBE ODACANTHINI 279
TRIBE CYCLOSOMINI 279
TRIBE LEBIINI 280
SUBTRIBE CYMINDIDINA 280
SUBTRIBE DROMIINA 284
SUBTRIBE LEBIINA 287
SUBTRIBE CALLEIDINA 293
TRIBE GALERITINI 295
TRIBE HELLUONINI 295
References 297
Index to Scientific Names 307
Towns of Vermont and New Hampshire 323
Map plates 324

Introduction

My wife and I have been studying the Carabidae of Vermont and New Hampshire since 1955. It is time to share our results with other carabidologists, entomologists, naturalists, and collectors. It became evident that New Hampshire Carabidae have much in common with the Vermont fauna, and it made sense to include both states, although the New Hampshire fauna is somewhat less known.

Topography

Vermont and New Hampshire taken together form a roughly rectangular tract 270 km north to south. If the land were nearly level, one would expect an even gradient from south to north, but the situation is much complicated by the presence of mountains and large bodies of water.

The mountains consist of the Taconics and Green Mountains in Vermont and the White Mountains in New Hampshire. The important bodies of water are the Atlantic Ocean, which has a short border with southeast New Hampshire, and Lake Champlain, which forms over half the western border of Vermont.

Vermont Mountains

The Green Mountains form a barrier in the path of lowland beetles moving east or west. At the same time they form a pathway for beetles moving south or north, as well as a refuge for relict populations of cold-requiring species to survive on higher peaks. For beetles that can fly, the north-south barrier is not very formidable. For flightless species the situation is different. Passing over the Green Mountains means going through a narrow gap at 244 m minimum, and passing through 15-25 km of forested hills to the first major valley to the east. This may involve enduring colder, wetter weather and different vegetation. The highest point in the Greens is Mount Mansfield (1339 m). East of the main range of the Green Mountains is a parallel ridge. This is also cut through by the Winooski River. The part of the ridge north of the Winsooski River is called the Worcester Range, the highest points are Worcester Mountain (1082 m) and Mount Adams (980 m).

In the southern half of Vermont, the Greens are flanked on the west by the Taconic Range. Both younger and lower than the Greens, the Taconics do not pose an effective barrier to flightless beetles, as they are crossed by several water gaps, such as that between Rutland and

Castleton along US Highway 4. The highest of the Taconic Mountains in Vermont is Mount Equinox (1167 m).

Isolated mountains include Mt. Ascutney (954 m), an ancient volcano, and Redrock Hills. The latter are in the Champlain Valley. The highest and largest of these is the mesa-like Snake Mountain (392 m). Bald Mountain (330 m) in West Haven is a small fragment of the Adirondacks cut off from the rest of the range in New York by the narrow southern end of Lake Champlain and the state line.

In northeast Vermont, there is an area referred to in this text as the "Boreal Plateau," which encompasses the Northeastern Highlands biophysical region **(see page 12)**. It extends across the Connecticut River into New Hampshire north of the White Mountains, thus also includes the Connecticut Lakes and Mahoosuc Rangeley Lakes biophysical regions **(see page 13)**. The area has many smaller mountains. In Vermont these include Gore Mountain (1013 m) in Avery's Gore, Bald Mountain in Westmore (971 m), Burke Mountain (995 m) in East Burke, and Monadnock Mountain (957 m) in Lemington. South and slightly west of the Northeast Highlands are the Caledonia Mountains. The highest is Signal Mountain (989 m) in Groton, but there are a number of peaks around 884-945 m.

New Hampshire Mountains

The White Mountains contrast in many ways with the Green Mountains. The Whites are much taller. Mount Washington is 1917 m, almost 578 m taller than Mount Mansfield, the tallest of the Greens. This gives the Whites a much larger area of alpine vegetation. The Whites form a roughly rounded border, in contrast to the long narrow barrier of the Greens. Flightless lowland beetles can pass around the Whites to the east or west in northward and southward movements, as well as to the north or south in eastward and westward movements.

The Connecticut Lakes and Mahoosuc Rangeley Lakes biophysical regions north of the White Mountains are an eastward continuation of the Boreal Plateau (Northeastern Highlands) of Vermont. This area has many low mountains, mostly under 914 m elevation; it extends north to the Notre Dame Mountains, which form the border with Quebec. These highlands are interrupted by the deep valley of the Connecticut River (the Coös).

South of the White Mountains the state is of moderate to low elevation except for a few scattered mountains like Mount Sunapee (830 m), Mount Kearsarge (895 m) in southwestern New Hampshire, and the most important of the group, Mount Monadnock (965 m), in Jaffrey in extreme southern New Hampshire.

Lakes, rivers, and seashore

Lake Champlain forms much of the western boundary in Vermont. It lies close to sea level (mean level 28 m) in a deep valley, along which many plants and animals range far north of their otherwise northern limits. Lake Winnepesaukee in New Hampshire is a very complex body of water, and its relationship to beetle distributions remains to be studied.

The Connecticut River forms the boundary between New Hampshire and Vermont except at its source, which is entirely within New Hampshire. The actual border between the states is mean low water on the Vermont side. The Merrimack River drains an extensive area in the middle of New Hampshire.

New Hampshire has a short 30 km of seacoast in the southeast. The ocean beaches and saline marshes form habitat for a number of species. In addition, the coastal area has moderate temperatures, giving the longest growing season, with milder winters and cooler summers than inland areas.

Wetlands

Wetlands are characterized by the presence of water for part of the growing season, with land or at least emergent plants for the rest of the season. Wetlands are the habitat of a great number of ground beetles. There are many types of wetlands.

Shores of brooks, rivers, and lakes differ from one another, and each can be subdivided according to type of substrate, how much of the time the substrate is under water, and how the temperature varies with the season. The shores of Lake Champlain vary greatly in water level (up to 3 m) in the spring, inundating large areas, later in the season withdrawing from them, exposing areas of forest. A special feature of Lake Champlain is the development of a thick ice layer on the surface in the winter. This takes many weeks to melt in the springtime, delaying the warming of the lake water, and chilling the bordering lands. In the fall, the opposite condition occurs. The lake islands do not receive a killing frost until a

month or more after the lands away from the lake. I would expect similar effects from other large lakes, such as Winnipesaukee and Memphremagog, but not from smaller lakes and ponds. Some bodies of water get thick ice in the winter, but this ice melts more quickly in the spring and has much less effect on bordering land.

Rivers and larger lakes are bordered by floodplains (bottomlands). By Lake Champlain are extensive areas of forest that are flooded in the spring for varying periods of time, usually for several months. When the waters have receded, these forests might seem much like upland woods from the standpoint of a small invertebrate; however, they would be much different, as leaves are usually carried away by spring floods, or buried under silt deposits as the floods recede. In other words, the soil is quite different from that in the uplands. Bottomlands of rivers differ from those of lakes by being flooded for shorter periods in the spring, and often being reflooded temporarily by rainfall in summer and autumn.

Swamps are areas of forest which are flooded much of the growing season. Marshes are open treeless areas that have a covering of water for much of the year. Marshes have emergent plants of one sort or another (shrubs, bushes, herbs) sticking above the water.

Bogs and fens resemble marshes, except that they may have trees and bushes. True bogs have no inflows of water and have inputs of nutrients only from inblown dust. Bogs are more or less acid and have almost no calcium available to plants. They are covered by *Sphagnum* moss, which has great capacity for holding water. Wet *Sphagnum* will bulge upward, and, in favorable circumstances, also can expand sideways. Beneath the surface of living *Sphagnum*, there is an accumulation of dead *Sphagnum*, often deep. This accumulates with time, for the *Sphagnum* becomes acid and anaerobic, greatly limiting decay.

Fens form a transition between bogs and marshes. Thompson and Sorenson (2000) recognize three types of fens: poor, intermediate, and rich. Poor fens are much like bogs, but have some water inflow, making them less acid. Bog-bean (*Menyanthes*) is found here and in intermediate fens, but not in true bogs. Pitcher plant (*Sarracenia*) and sundew (*Drosera*) are shared with true bogs, but not intermediate fens. These are insectivorous plants, getting some nutrients by killing and digesting insects. Intermediate fens have more water flowing through, bringing some minerals in solution. They also have sweet gale (*Myrica gale*) and shrubby cinquefoil (*Potentilla fruticosa*). They have floating mats with a

few species of *Sphagnum*, but other genera of mosses are more abundant. Rich fens occur on soil derived from limestone. Like other fens, they have a peat layer, but in this case it consists of remains of sedges and mosses other than *Sphagnum*.

Vegetation, soils, and life zones

The natural vegetation in both states is northern hardwood forest (Thompson and Sorenson 2000). The prevailing trees are sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), and hemlock (*Tsuga canadensis*). Other species are abundant in spots, as a result of various local situations. Abandoned fields commonly grow up with white pines (*Pinus strobus*) or gray birches (*Betula populifolia*; the latter if the soil is shallow). More northern areas may grow up in red spruce (*Picea rubens*) or white spruce (*P. glauca*), balsam fir (*Abies balsamea*), or arbor-vitae (*Thuja occidentalis*).

After logging or natural blowdown (but not farming), yellow birch, white ash (*Fraxinus americana*), the aspens (*Populus*), pin cherry (*Prunus pennsylvanica*), and paper birch (*Betula papyrifera*) will grow. Red pine (*Pinus resinosa*), pitch pine (*Pinus rigida*), and several kinds of oak (*Quercus*) are signs that the area had a forest fire. All these types of forest are temporary. Unless further disturbance occurs, gradual processes result in the dominant trees (beech, sugar maple, yellow birch, and hemlock) reappearing and eventually becoming dominant.

More permanent features also result in unusual forest types. Bedrock exposures are of two types: calcareous and non-calcareous. Limestones have abundant calcium. Monkton quartzite (redrock) although derived from sand, contains enough calcium to favor some plants and animals, so constitutes an intermediate case. Most other sandstones and metamorphic rocks do not contain significant calcium, and have different and much sparser plants and animals.

Dunite, talc, and serpentine are peculiar kinds of rock which originated deep within the earth in the mantle layer. They represent an area where an arm of the deep ocean was squeezed out of existence when a large island fused with the eastern edge of North America. They contain much iron, nickel, magnesium and chromium, a mix that is lethal to many plants, while other plants are excluded by the absence of calcium, nitrogen, potassium, phosphorus, and molybdenum. Trees and shrubs are

scarce and not prosperous including red spruce (*Picea rubens)*, gray birch (*Betula populifolia*) and common juniper (*Juniperus communis*). Four species of herbs are confined to this habitat, two species of maidenhair fern (*Adiantum viridimontanum* and *A. aceuticum*) and two species of sandwort (*Arenaria macrophylla* and *A. marcescens*). This habitat is distributed along a line close to VT highway 100, from Wilmington to Troy. The effect of this belt on ground beetles has not yet been investigated thoroughly.

Although types of trees and species of ground beetles occur together, this doesn't imply that the beetles require the particular tree species. Both organisms may be responding to the same past history or set of ecological situations.

Sand and clay are unconsolidated materials imposing special conditions where not buried under well-developed soils. Sand areas occur along Lake Champlain near river mouths, also inland by former river mouths dating from times when the lake levels were higher, or from when Lake Champlain was an arm of the Atlantic Ocean. Similar sand deposits occur in the Connecticut Valley, where, thousands of years ago, there was another big lake (Lake Hitchcock), also near Lake Winnipesaukee, along the Merrimack River, and on the Atlantic Coast. Sand deposits become excessively dry and hot when dry conditions occur. In exposed sand areas there may be no layer of dead leaves to shelter ground beetles. On the other hand, sand is easy to burrow in and drains easily. Clay is harder to penetrate, although not impossibly so. Clay is relatively impervious to water. Clay underlies large areas in the Champlain Valley, although most all of these areas are farmed, with only tiny remnants remaining in a relatively natural state.

The life zone concept, developed by Merriam in the late 19th century (Merriam 1894), is useful for describing the distribution of biological communities, and is based primarily on climatic gradients. In parts of our states, the climate is different enough from the northern hardwoods to promote different forest types. In the north and above 900 m in the mountains to the south occurs spruce-fir forest, and in old burns, aspen, heart-leafed and yellow birch. This area belongs to the Hudsonian Zone, with long winters and lingering snow in the spring.

The highest localities are too exposed to cold for forest to survive, and are treeless. In Vermont, only Mount Mansfield and Camel's Hump are clearly in this Arctic/Alpine Zone. In the White Mountains of New

Hampshire, which are 650 m taller, there is a much more extensive Arctic/Alpine Zone, with many more alpine Carabidae. Where the Hudsonian and Alpine Zones border one another, there is a belt of dwarf trees, krummholz or tuckamore, only several centimeters high.

The Atlantic Coast, the lower valleys of the Merrimack and Connecticut Rivers, and the entire Champlain and Vermont Valleys have a warmer climate than the Canadian Zone or northern hardwood forest, and belong to the Transition Zone. This zone has eight kinds of oaks (only red oak, *Quercus rubra*, is in the Canadian Zone) and several hickory species.

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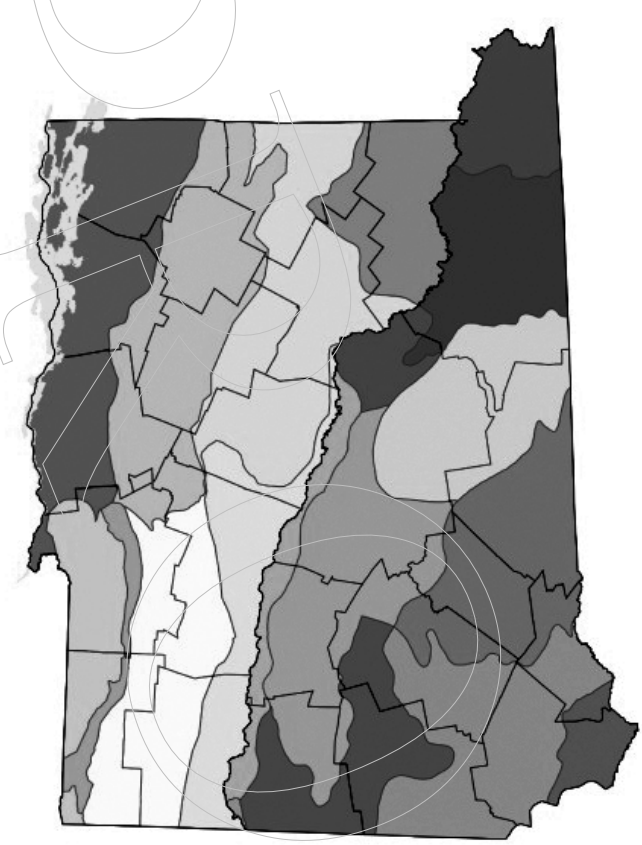
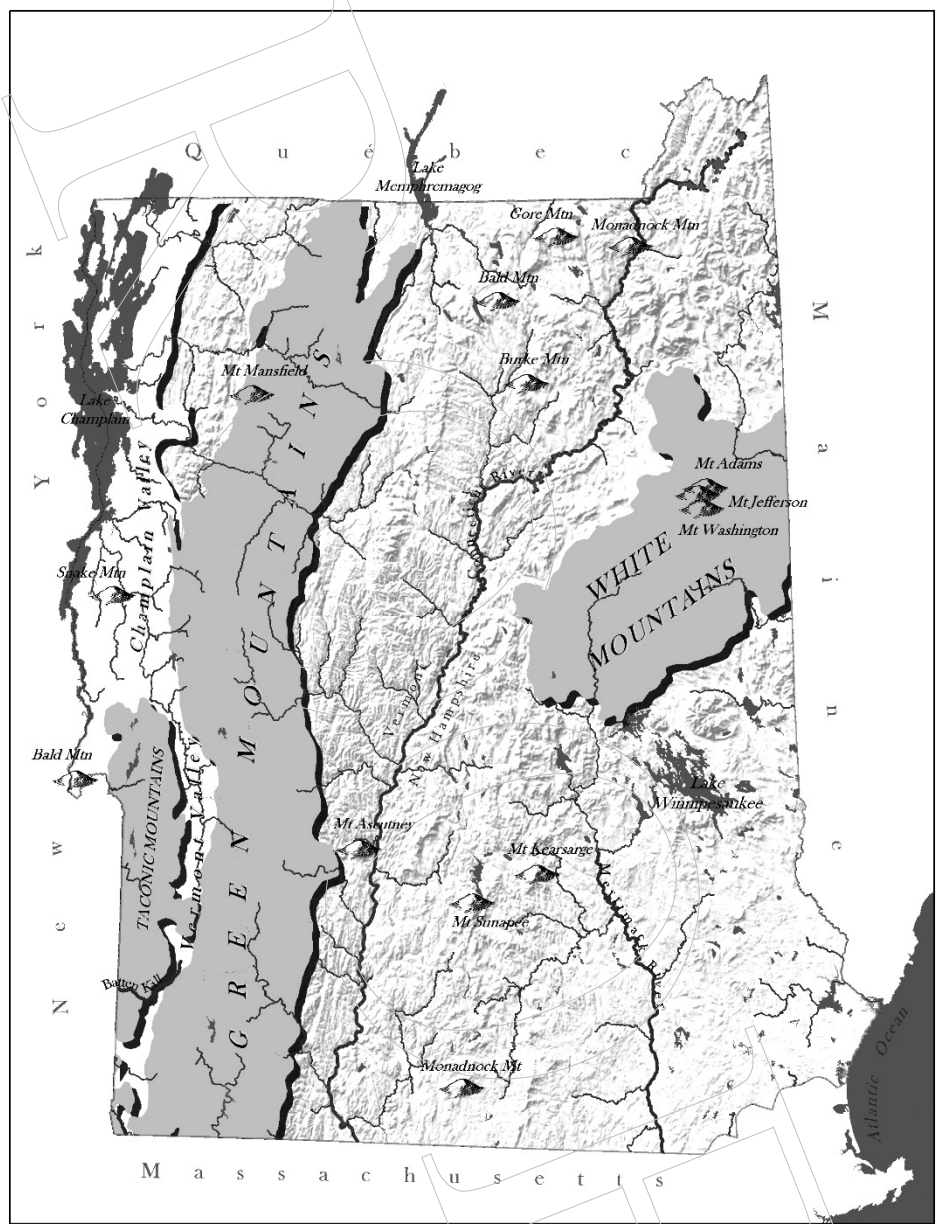
Biophysical regions of Vermont and New Hampshire



Major mountain ranges, lakes, and rivers of Vermont and New Hampshire



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First of all, acknowledgment is to my wife and research partner, Joyce, for all sorts of help including fifty-eight years of intensive beetle collecting, preparation and identification of species, useful discussions of taxonomy, ecology and natural history, and general encouragement of this effort. Without her contributions this work would not exist.

We are indebted to many people for our knowledge of the Vermont carabid fauna. The following is by no means a complete list: Yves Bousquet, Bart Chiolino, the late Paul Choate, the late Kenneth Cooper, Luke Curtis, Robert Davidson, Terry Erwin, Brian Farrell, Henri Goulet, Scott and Rachael Griggs, Erik Gronning, Trish Hanson, Jonathan and Denise Leonard, David Kavanaugh, André Larochelle, James Liebherr, David Maddison, Donald Miller, the late Robert Mills, Andrew Moldenke, the late Gordon Nielsen, the late Carl Parsons, Mark Rahill, Gerald Ravitz, Jessica Rykken, Michael Sabourin, John Spence, John Strazanac, and the late Donald Whitehead.

My knowledge of the New Hampshire fauna begins with the work of the late Philip Darlington at the Harvard Museum of Comparative Zoology. He did a thorough study of the Carabidae of the White Mountains in the 1930s. In his last years he supplemented this by collecting along the western and southern boundaries of New Hampshire. Donald Chandler has added greatly to this by collecting Carabidae extensively along with families of interest to himself. Others who have made important collections in New Hampshire include Robert Davidson, Gary Dunn, Brian Farrell, David Maddison, Paul Miliotis, and the late Marcel Reed.

For help in preparing the document, great thanks go to Trish Hanson and Luke Curtis for typing and editing the original manuscript. Then Jessica Rykken helped shape the manuscript into publishable form along with Robert Davidson of the Carnegie Museum of Natural History. Kent McFarland of the Vermont Center for Ecostudies digitized all the species maps with the help of Sarah Carline.

Most of the specimens listed in this publication are to be found in the Carl T. Parsons Entomology Collection in the Zadock Thompson Zoological Collection on the campus of the University of Vermont in Torrey Hall. Also Trish Hanson has added additional Vermont specimens which are to be found at their temporary location in Essex

Junction, Vermont, to be transferred to the state Entomology Laboratory in Randolph when their new building is completed.

Organization of species accounts and distribution maps

The taxonomic arrangement of species follows that of Bousquet 2012*a* to subgenus. Within each subgenus, species are listed alphabetically. Species are numbered consecutively in the List of Species; these numbers correspond to the associated species accounts. Each species account includes the following sections: **General Range** – Provides the known distribution in North America, including reference to Merriam's life zones (Merriam 1894), as well as in other parts of the world; **Local Range** – provides known collection sites in Vermont and New Hampshire; **Habitat** – describes the macro- and microhabitats in which the species is generally found; **Life Cycle** – includes known phenology of different life stages; **Behavior** – includes when the species is active, defensive behaviors, and feeding preferences; **Dynamics** – describes wing morphology and observed or suspected flight capability.

Species distribution maps are provided in the Appendix and are arranged numerically, following the arrangement of species accounts. There are 62 plates containing 495 maps depicting the known distribution of each species in Vermont and New Hampshire based on collections and reliable literature records. Black squares indicate approximate known location of records with an accuracy likely to be 2 km or better. Many of these locations were hand-plotted by the author on paper maps using township borders as a general reference for each location. All locations were accurately assigned to the township. These maps were then digitized in a GIS. Counties containing known records are shaded gray. Species reported from a state without any indication of exact location(s) (e.g., Bousquet 2012*a*) are indicated on maps with the entire state shaded gray. An underlying base map includes town boundaries and biophysical regions for each state.

List of species known from Vermont and New Hampshire

Taxonomic arrangement follows Bousquet 2012*a*.

Consecutive numbers correspond to species accounts.
Adventive species are followed by an asterisk (*).
New state records are underlined (VT or NH).
State records from specimens not confirmed by the author are footnoted with literature source.

Subfamily Nebriinae

Tribe Nebriini

1	*Nebria (Boreonebria) gyllenhali castanipes* (Kirby, 1837)	VT	
2	*Nebria (Boreonebria) lacustris* Casey, 1913	VT	NH
3	*Nebria (Boreonebria) nivalis gaspesiana* Kavanaugh, 1979		NH
4	*Nebria (Reductonebria) pallipes* Say, 1823	VT	NH
5	*Nebria (Reductonebria) suturalis* LeConte, 1850	VT	NH

Tribe Notiophilini

6	*Notiophilus aeneus* (Herbst, 1806)	VT	NH
7	*Notiophilus aquaticus* (Linnaeus, 1758)	VT	NH
8	*Notiophilus biguttatus* (Fabricius, 1779)*		NH
9	*Notiophilus borealis* Harris, 1869	VT	NH
10	*Notiophilus nemoralis* Fall, 1906	VT	NH
11	*Notiophilus novemstriatus* LeConte, 1847	VT	NH
12	*Notiophilus semistriatus* Say, 1823		NH

Subfamily Carabinae

Tribe Cychrini

13	*Sphaeroderus canadensis canadensis* Chaudoir, 1861	VT	NH
14	*Sphaeroderus nitidicollis* Guérin-Méneville, 1829	VT	NH
15	*Sphaeroderus stenostomus lecontei* Dejean, 1826	VT	NH
16	*Scaphinotus (Scaphinotus) elevatus elevatus* (Fabricius, 1787)		NH

17	*Scaphinotus (Irichroa) viduus* (Dejean, 1826)	VT	NH
18	*Scaphinotus (Nomaretus) bilobus* (Say, 1823)	VT	NH

Tribe Carabini

19	*Calosoma (Calosoma) frigidum* Kirby, 1837	VT	NH
20	*Calosoma (Calosoma) sycophanta* (Linnaeus, 1758)*	VT	NH
21	*Calosoma (Calodrepa) scrutator* (Fabricius, 1775)		NH
22	*Calosoma (Calodrepa) wilcoxi* LeConte, 1847		NH
23	*Calosoma (Callitropa) externum* (Say, 1823)	VT	
24	*Calosoma (Chrysostigma) calidum* (Fabricius, 1775)	VT	NH
25	*Carabus (Carabus) goryi* Dejean, 1831	VT	NH
26	*Carabus (Diocarabus) chamissonis* Fischer von Waldheim, 1820		NH
27	*Carabus (Homoeocarabus) maeander maeander* Fischer von Waldh., 1820	VT	
28	*Carabus (Hemicarabus) serratus* Say, 1823	VT	NH
29	*Carabus (Archicarabus) nemoralis nemoralis* Müller, 1764*	VT	NH
30	*Carabus (Tachypus) auratus auratus* Linnaeus, 1760*	VT	NH
31	*Carabus (Tanaocarabus) sylvosus* Say, 1823	VT[1]	NH

Subfamily Cicindelinae

Tribe Cicindelini

32	*Ellipsoptera marginata* (Fabricius, 1775)		NH
33	*Ellipsoptera puritana* (G. Horn, 1871)	VT	NH
34	*Cicindela (Cicindelidia) marginipennis* Dejean, 1831	VT	NH
35	*Cicindela (Cicindelidia) punctulata punctulata* Olivier, 1790	VT	NH
36	*Cicindela (Cicindelidia) rufiventris rufiventris* Dejean, 1825	VT	

37	*Cicindela (Cicindela) ancocisconensis* Harris, 1852	VT	NH
38	*Cicindela (Cicindela) duodecimguttata* Dejean, 1825	VT	NH
39	*Cicindela (Cicindela) formosa generosa* Dejean, 1831	VT	NH
40	*Cicindela (Cicindela) hirticollis* Say, 1817	VT	NH
41	*Cicindela (Cicindela) limbalis* Klug, 1834	VT	NH
42	*Cicindela (Cicindela) longilabris longilabris* Say, 1824	VT	NH
43	*Cicindela (Cicindela) patruela patruela* Dejean, 1825	VT	NH
44	*Cicindela (Cicindela) purpurea purpurea* Olivier, 1790	VT	NH
45	*Cicindela (Cicindela) repanda repanda* Dejean, 1825	VT	NH
46	*Cicindela (Cicindela) scutellaris lecontei* Haldeman, 1853	VT	NH
47	*Cicindela (Cicindela) sexguttata* Fabricius, 1775	VT	NH
48	*Cicindela (Cicindela) tranquebarica tranquebarica* Herbst, 1806	VT	NH

Subfamily Loricerinae

Tribe Loricerini

49	*Loricera (Loricera) pilicornis pilicornis* (Fabricius, 1775)	VT	NH

Subfamily Elaphrinae

Tribe Elaphrini

50	*Blethisa hudsonica* Casey, 1924	VT	NH
51	*Blethisa julii* LeConte, 1863	VT	NH
52	*Blethisa quadricollis* Haldeman, 1847	VT	NH
53	*Elaphrus (Neoelaphrus) cicatricosus* LeConte, 1847	VT	NH
54	*Elaphrus (Neoelaphrus) clairvillei* Kirby, 1837	VT	NH
55	*Elaphrus (Neoelaphrus) fuliginosus* Say, 1830	VT	NH

56	*Elaphrus (Neoelaphrus) olivaceus* LeConte, 1863	VT	NH
57	*Elaphrus (Elaphrus) americanus americanus* Dejean, 1831		NH
58	*Elaphrus (Elaphrus) californicus* Mannerheim, 1843	VT	NH
59	*Elaphrus (Elaphrus) ruscarius* Say, 1830	VT	NH

Subfamily Omophroninae

Tribe Omophronini

60	*Omophron (Omophron) americanum* Dejean, 1831	VT	NH
61	*Omophron (Omophron) tessellatum* Say, 1823	VT	NH

Subfamily Scaritinae

Tribe Scaritini

62	*Scarites (Scarites) subterraneus* Fabricius, 1775	VT	NH

Tribe Clivinini

63	*Clivina (Clivina) collaris* (Herbst, 1784)*		NH
64	*Clivina (Clivina) fossor fossor* (Linnaeus, 1758)*	VT	NH
65	*Clivina (Clivina) impressefrons* LeConte, 1844	VT	NH
66	*Clivina (Leucocara) americana* Dejean, 1831	VT	NH
	Paraclivina bipustulata (Fabricius, 1798)		NH[4]
67	*Paraclivina ferrea* (LeConte, 1857)	VT	
68	*Schizogenius (Schizogenius) amphibius* (Haldeman, 1843)	VT	NH
69	*Schizogenius (Schizogenius) ferrugineus* Putzeys, 1846	VT	NH
70	*Schizogenius (Schizogenius) lineolatus* (Say, 1823)	VT	NH
71	*Schizogenius (Schizogenius) sulcifrons* Putzeys, 1846	VT	NH

Tribe Dyschiriini

72	*Dyschirius affinis* Fall, 1901	VT	NH
73	*Dyschirius brevispinus* LeConte, 1878	VT	
74	*Dyschirius dejeanii* Putzeys, 1846	VT	NH
75	*Dyschirius erythrocerus* LeConte, 1857	VT	NH

76	*Dyschirius globulosus* (Say, 1823)	VT	NH
77	*Dyschirius haemorrhoidalis* (Dejean, 1831)		NH
78	*Dyschirius larochellei* Bousquet, 1988		NH
79	*Dyschirius pilosus* LeConte, 1857	VT	NH
80	*Dyschirius politus politus* (Dejean, 1825)	VT	NH
81	*Dyschirius setosus* LeConte, 1857	VT	NH
82	*Dyschirius sphaericollis* (Say, 1823)	VT	NH
83	*Dyschirius sublaevis* Putzeys, 1846		NH

Subfamily Broscinae

Tribe Broscinini

84	*Miscodera arctica* (Paykull, 1798)	VT	NH

Subfamily Trechinae

Tribe Trechini

85	*Blemus discus discus* (Fabricius, 1792)*	VT	NH
86	*Trechus apicalis* Motschulsky, 1845	VT	NH
87	*Trechus crassiscapus* Lindroth, 1955	VT	NH
88	*Trechus rubens* (Fabricius, 1792)*	VT	NH

Tribe Bembidiini

Subtribe Bembidiina

89	*Amerizus (Amerizus) wingatei* (Bland, 1864)	VT	NH
90	*Asaphidion curtum curtum* (Heyden, 1870)*		NH
91	*Bembidion (Hirmoplataphus) nigrum* Say, 1823	VT	NH
92	*Bembidion (Hirmoplataphus) salebratum* (LeConte, 1847)	VT	NH
93	*Bembidion (Hydriomicrus) quadratulum* Notman, 1920	VT	NH
94	*Bembidion (Hydriomicrus) semistriatum* (Haldeman, 1843)	VT	NH
95	*Bembidion (Odontium) confusum* Hayward, 1897	VT	NH
96	*Bembidion (Odontium) paraenulum* Maddison, 2009		NH
97	*Bembidion (Odontium) robusticolle* Hayward, 1897	VT	

98	*Bembidion (Bracteon) carinula* Chaudoir, 1868	VT	NH
99	*Bembidion (Bracteon) inaequale* Say, 1823	VT	NH
100	*Bembidion (Bracteon) levettei carrianum* Casey, 1924	VT	NH
101	*Bembidion (Bracteon) punctatostriatum* Say, 1823	VT	NH
102	*Bembidion (Ochthedromus) americanum* Dejean, 1831	VT	NH
103	*Bembidion (Ochthedromus) cheyennense* Casey, 1918	VT	NH
104	*Bembidion (Pseudoperyphus) antiquum* Dejean, 1831	VT	
105	*Bembidion (Pseudoperyphus) bellorum* Maddison, 2008	VT	NH
106	*Bembidion (Pseudoperyphus) chalceum* Dejean, 1831	VT	NH
107	*Bembidion (Pseudoperyphus) honestum* Say, 1823	VT	NH
108	*Bembidion (Pseudoperyphus) louisella* Maddison, 2008	VT	NH
109	*Bembidion (Pseudoperyphus) rothfelsi* Maddison, 2008	VT	NH
110	*Bembidion (Pseudoperyphus) rufotinctum* Chaudoir, 1868	VT	NH
111	*Bembidion (Ocydromus) scopulinum* (Kirby, 1837)	VT	NH
	Bembidion (Peryphus) bruxellense Wesmael, 1835*		NH[4]
112	*Bembidion (Peryphus) obscurellum obscurellum* (Motschulsky, 1845)	VT	NH
113	*Bembidion (Peryphus) petrosum petrosum* Gebler, 1833	VT	NH
114	*Bembidion (Peryphus) tetracolum tetracolum* Say, 1823*	VT	NH
115	*Bembidion (Asioperyphus) postremum* Say, 1830	VT	NH
116	*Bembidion (Peryphanes) grapii* Gyllenhal, 1827	VT	NH
117	*Bembidion (Peryphanes) lacunarium* (Zimmermann, 1869)	VT	NH

118	*Bembidion (Peryphanes) stephensii* Crotch, 1866*	VT	NH
119	*Bembidion (Bembidion) mutatum* Gemminger & Harold, 1868	VT	NH
120	*Bembidion (Bembidion) quadrimaculatum oppositum* Say, 1823	VT	NH
121	*Bembidion (Furcacampa) affine* Say, 1823	VT	NH
122	*Bembidion (Furcacampa) impotens* Casey, 1918	VT	NH
123	*Bembidion (Furcacampa) mimus* Hayward, 1897	VT	NH
124	*Bembidion (Furcacampa) versicolor* (LeConte, 1847)	VT	NH
125	*Bembidion (Diplocampa) transparens transparens* (Gebler, 1829)	VT	NH
126	*Bembidion (Semicampa) muscicola* Hayward, 1897	VT	NH
127	*Bembidion (Semicampa) nigrivestis* Bousquet, 2006		NH
128	*Bembidion (Semicampa) praticola* Lindroth, 1963	VT	NH
129	*Bembidion (Semicampa) semicinctum* Notman, 1919	VT	NH
130	*Bembidion (Notaphus) castor* Lindroth, 1963	VT	NH
131	*Bembidion (Notaphus) constrictum* (LeConte, 1847)		NH
132	*Bembidion (Notaphus) contractum* Say, 1823		NH
133	*Bembidion* (*Notaphus*) *cordatum* (LeConte, 1847)	VT	NH
134	*Bembidion* (*Notaphus*) *intermedium* (Kirby, 1837)	VT	
135	*Bembidion (Notaphus) oberthueri* Hayward, 1901	VT	NH
136	*Bembidion (Notaphus) patruele* Dejean, 1831	VT	NH
137	*Bembidion (Notaphus) rapidum* (LeConte, 1847)	VT	NH
138	*Bembidion (Notaphus) versutum* LeConte, 1878	VT	NH

139	*Bembidion (Trepanedoris) concretum* Casey, 1918	VT	NH
140	*Bembidion (Trepanedoris) fortestriatum* (Motschulsky, 1845)	VT	NH
141	*Bembidion (Trepanedoris) frontale* (LeConte, 1847)	VT	NH
142	*Bembidion (Trepanedoris) pseudocautum* Lindroth, 1963	VT	NH
143	*Bembidion (Plataphus) basicorne* Notman, 1920	VT	NH
144	*Bembidion (Plataphus) carolinense* Casey, 1924	VT	NH
145	*Bembidion (Plataphus) occultator* Notman, 1920	VT	NH
146	*Bembidion (Plataphus) rusticum rusticum* Casey, 1918	VT	NH
147	*Bembidion (Plataphus) simplex* Hayward, 1897	VT	NH
148	*Bembidion (Hydrium) levigatum* Say, 1823		NH[1]
149	*Bembidion (Hydrium) nitidum* (Kirby, 1837)	VT	NH
150	*Bembidion (Eupetedromus) graciliforme* Hayward, 1897	VT	NH
151	*Bembidion (Eupetedromus) immaturum* Lindroth, 1954	VT	NH
152	*Bembidion (Eupetedromus) incrematum* LeConte, 1860	VT	NH
153	*Bembidion (Eupetedromus) iridipenne* Bousquet & Webster, 2006	VT	NH
154	*Bembidion (Eupetedromus) variegatum* Say, 1823	VT	NH
155	*Bembidion (Trichoplataphus) fugax* (Leconte, 1848)	VT[1,2]	
156	*Bembidion (Trichoplataphus) planum* (Haldeman, 1843)	VT	NH
157	*Bembidion (Trichoplataphus) rolandi* Fall, 1922	VT	
158	*Bembidion (Phyla) obtusum* Audinet-Serville, 1821*	VT	

Subtribe Xystosomina

159	*Mioptachys flavicauda* (Say, 1823)	VT	NH

Subtribe Tachyina

160	*Tachyta (Tachyta) angulata* Casey, 1918	VT	NH
161	*Tachyta (Tachyta) inornata* (Say, 1823)	VT	NH
162	*Tachyta (Tachyta) kirbyi* Casey, 1918	VT	NH
163	*Elaphropus (Barytachys) anceps* (LeConte, 1848)	VT	NH
164	*Elaphropus (Barytachys) capax* (LeConte, 1863)	VT	
165	*Elaphropus (Barytachys) dolosus* (LeConte, 1848)	VT	NH
166	*Elaphropus (Barytachys) ferrugineus* (Dejean, 1831)		NH
167	*Elaphropus (Barytachys) granarius* (Dejean, 1831)	VT	NH
168	*Elaphropus (Barytachys) incurvus* (Say, 1830)	VT	NH
169	*Elaphropus (Barytachys) levipes* (Casey, 1918)	VT	NH
170	*Elaphropus (Barytachys) saturatus* (Casey, 1918)	VT	NH
171	*Elaphropus (Barytachys) tripunctatus* (Say, 1830)	VT	NH
172	*Elaphropus (Barytachys) vernicatus* (Casey, 1918)	VT	NH
173	*Elaphropus (Barytachys) vivax* (LeConte, 1848)	VT	NH
174	*Elaphropus (Barytachys) xanthopus* (Dejean, 1831)	VT	NH
175	*Pericompsus (Pericompsus) ephippiatus* (Say, 1830)	VT	NH
176	*Porotachys bisulcatus* (Nicolai, 1822)*	VT	NH
177	*Polyderis laeva* (Say, 1823)	VT	NH
178	*Tachys (Paratachys) oblitus* Casey, 1918	VT	NH
179	*Tachys (Paratachys) proximus* (Say, 1823)	VT	
180	*Tachys (Paratachys) pumilus* (Dejean, 1831)		NH[1]
181	*Tachys (Paratachys) rhodeanus* Casey, 1918	VT	NH

182	*Tachys (Paratachys) scitulus* LeConte, 1848	VT	NH

Subfamily Patrobinae

Tribe Patrobini

183	*Diplous (Platidius) rugicollis* (Randall, 1838)	VT	NH
184	*Patrobus foveocollis* (Eschscholtz, 1823)	VT	NH
185	*Patrobus longicornis* (Say, 1823)	VT	NH
186	*Patrobus septentrionis septentrionis* Dejean, 1828		NH
187	*Platypatrobus lacustris* Darlington, 1938	VT	NH

Subfamily Brachininae

Tribe Brachinini

188	*Brachinus (Neobrachinus) cordicollis* Dejean, 1826	VT	NH
189	*Brachinus (Neobrachinus) cyanipennis* Say, 1823	VT	NH
190	*Brachinus (Neobrachinus) cyanochroaticus* Erwin, 1969	VT	NH
191	*Brachinus (Neobrachinus) fulminatus* Erwin, 1969		NH
192	*Brachinus (Neobrachinus) fumans* (Fabricius, 1781)	VT	NH
193	*Brachinus (Neobrachinus) janthinipennis* (Dejean, 1831)	VT	NH
194	*Brachinus (Neobrachinus) medius* Harris, 1828	VT	NH
195	*Brachinus (Neobrachinus) ovipennis* LeConte, 1863	VT	
196	*Brachinus (Neobrachinus) patruelis* LeConte, 1844		NH
197	*Brachinus (Neobrachinus) quadripennis* Dejean, 1825		NH
198	*Brachinus (Neobrachinus) tenuicollis* LeConte, 1844	VT	NH
199	*Brachinus (Neobrachinus) vulcanoides* Erwin, 1969		NH

Subfamily Harpalinae
Tribe Pterostichini

200	*Poecilus (Poecilus) chalcites* (Say, 1823)	VT	NH
201	*Poecilus (Poecilus) lucublandis* (Say, 1823)	VT	NH
202	*Lophoglossus scrutator* (LeConte, 1846)	VT	
203	*Lophoglossus vernix* Casey, 1913		NH
204	*Gastrellarius honestus* (Say, 1823)	VT	NH
205	*Stereocerus haematopus* (Dejean, 1831)	VT	NH
206	*Myas (Trigonognatha) coracinus* (Say, 1823)	VT[1]	
207	*Myas (Trigonognatha) cyanescens* Dejean, 1828	VT	NH
208	*Pterostichus (Argutor) commutabilis* (Motschulsky, 1866)	VT	NH
209	*Pterostichus (Argutor) praetermissus* (Chaudoir, 1868)	VT	NH
210	*Pterostichus (Argutor) vernalis* (Panzer, 1795)*	VT	
211	*Pterostichus (Phonias) corrusculus* LeConte, 1873	VT	NH
212	*Pterostichus (Phonias) femoralis* (Kirby, 1837)	VT	NH
213	*Pterostichus (Phonias) patruelis* (Dejean, 1831)	VT	NH
214	*Pterostichus (Bothriopterus) adstrictus* Eschscholtz, 1823	VT	NH
215	*Pterostichus (Bothriopterus) mutus* (Say, 1823)	VT	NH
216	*Pterostichus (Bothriopterus) pensylvanicus* LeConte, 1873	VT	NH
217	*Pterostichus (Melanius) castor* Goulet & Bousquet, 1983	VT	NH
218	*Pterostichus (Melanius) corvinus* (Dejean, 1828)	VT	NH
219	*Pterostichus (Pseudomaseus) luctuosus* (Dejean, 1828)	VT	NH
220	*Pterostichus (Pseudomaseus) tenuis* (Casey, 1924)	VT	NH
221	*Pterostichus (Morphnosoma) melanarius melanarius* (Illiger, 1798)*	VT	NH

222	*Pterostichus (Euferonia) coracinus* (Newman, 1838)	VT	NH
223	*Pterostichus (Euferonia) lachrymosus* (Newman, 1838)	VT	NH
224	*Pterostichus (Euferonia) stygicus* (Say, 1823)	VT	NH
225	*Pterostichus (Lenapterus) punctatissimus* (Randall, 1838)	VT	NH
226	*Pterostichus (Lamenius) caudicalis* (Say, 1823)	VT	NH
227	*Pterostichus (Monoferonia) diligendus* (Chaudoir, 1868)	VT	NH
228	*Pterostichus (Cylindrocharis) rostratus* (Newman, 1838)	VT	NH
229	*Pterostichus (Hypherpes) adoxus* (Say, 1823)	VT	NH
230	*Pterostichus (Hypherpes) tristis* (Dejean, 1828)	VT	NH
231	*Pterostichus (Cryobius) arcticola* (Chaudoir, 1868)		NH
232	*Pterostichus (Cryobius) brevicornis brevicornis* (Kirby, 1837)	VT	NH
233	*Pterostichus (Cryobius) pinguedineus* (Eschscholtz, 1823)	VT	NH
234	*Cyclotrachelus (Evarthrus) sodalis sodalis* (LeConte, 1848)	VT	

Tribe Zabrini

235	*Amara (Curtonotus) alpina* (Paykull, 1790)	VT[1]	NH
236	*Amara (Curtonotus) aulica* (Panzer, 1796)*		NH[1]
237	*Amara (Curtonotus) carinata* (LeConte, 1847)	VT	NH
238	*Amara (Curtonotus) hyperborea* Dejean, 1831		NH
239	*Amara (Curtonotus) pennsylvanica* Hayward, 1908		NH
240	*Amara (Curtonotus) torrida* (Panzer, 1796)		NH
241	*Amara (Bradytus) apricaria* (Paykull, 1790)*	VT	NH

242	*Amara (Bradytus) avida* (Say, 1823)	VT	NH
243	*Amara (Bradytus) exarata* Dejean, 1828		NH
244	*Amara (Bradytus) latior* (Kirby, 1837)	VT	NH
245	*Amara (Percosia) obesa* (Say, 1823)	VT	NH
246	*Amara (Xenocelia) chalcea* Dejean, 1828	VT	NH
247	*Amara (Celia) bifrons* (Gyllenhal, 1810)*		NH
248	*Amara (Celia) musculis* (Say, 1823)	VT	NH
249	*Amara (Celia) rubrica* Haldeman, 1843	VT	NH
250	*Amara (Celia) sinuosa* (Casey, 1918)		NH
251	*Amara (Amarocelia) erratica* (Duftschmid, 1812E)	VT	NH
252	*Amara (Amarocelia) laevipennis* Kirby, 1837	VT	NH
253	*Amara (Amarocelia) patruelis* Dejean, 1831	VT	NH
254	*Amara (Amara) aenea* (DeGeer, 1774)*	VT	NH
255	*Amara (Amara) aeneopolita* Casey, 1918	VT[1]	NH[1]
256	*Amara (Amara) basillaris* (Say, 1823)		NH
257	*Amara (Amara) convexa* LeConte, 1847	VT	NH
258	*Amara (Amara) crassispina* LeConte, 1855		NH
259	*Amara (Amara) cupreolata* Putzeys, 1866	VT	NH
260	*Amara (Amara) familiaris* (Duftschmid, 1812)*	VT	NH
261	*Amara (Amara) impuncticollis* (Say, 1823)	VT	NH
262	*Amara (Amara) littoralis* Dejean, 1828	VT	NH
263	*Amara (Amara) lunicollis* Schiødte, 1837	VT	NH
264	*Amara (Amara) neoscotica* Casey, 1924	VT	
265	*Amara (Amara) otiosa* Casey, 1918	VT	NH
266	*Amara (Amara) ovata* (Fabricius, 1792)*	VT	NH
267	*Amara (Amara) tenax* Casey, 1918	VT[3]	
268	*Amara (Amara) turbata* Casey, 1918		NH
269	*Amara (Paracelia) quenseli quenseli* (Schönherr, 1806)	VT	NH
270	*Amara (Zezea) angustata* (Say, 1823)	VT	NH
271	*Amara (Zezea) angustatoides* Hieke, 2000	VT	NH
272	*Amara (Zezea) flebilis* (Casey, 1918)	VT[1]	NH[3]
273	*Amara (Zezea) pallipes* Kirby, 1837	VT	NH

Tribe Oodini

274	*Anatrichis minuta* (Dejean, 1831)		NH
275	*Lachnocrepis parallela* (Say, 1830)	VT	NH
276	*Oodes amaroides* Dejean, 1831		NH
277	*Oodes brevis* Lindroth, 1957		NH
278	*Oodes fluvialis* LeConte, 1863	VT	NH

Tribe Chlaeniini

279	*Chlaenius (Eurydactylus) tomentosus* (Say, 1823)	VT	NH
280	*Chlaenius (Anomoglossus) emarginatus* Say, 1823	VT	NH
281	*Chlaenius (Chlaenius) aestivus* Say, 1823		NH[1]
282	*Chlaenius (Chlaenius) laticollis* Say, 1823		NH
283	*Chlaenius (Chlaenius) sericeus* (Forster, 1771)	VT	NH
284	*Chlaenius (Lithochlaenius) cordicollis* Kirby, 1837	VT	NH
285	*Chlaenius (Chlaeniellus) brevilabris* LeConte, 1847	VT	NH
286	*Chlaenius (Chlaeniellus) impunctifrons* Say, 1823	VT	NH
	Chlaenius (Chlaeniellus) nemoralis Say, 1823		NH[4]
287	*Chlaenius (Chlaeniellus) pennsylvanicus pennsylvanicus* Say, 1823	VT	NH
288	*Chlaenius (Chlaeniellus) tricolor tricolor* Dejean, 1826	VT	NH
289	*Chlaenius (Brachylobus) lithophilus* Say, 1823	VT	NH
290	*Chlaenius (Agostenus) niger* Randall, 1838	VT	NH
291	*Chlaenius (Randallius) purpuricollis* Randall, 1838		NH

Tribe Licinini

292	*Diplocheila (Isorembus) assimilis* (LeConte, 1844)	VT	NH
293	*Diplocheila (Isorembus) impressicollis* (Dejean, 1831)	VT	NH

294	*Diplocheila (Isorembus) obtusa* (LeConte, 1847)	VT	NH
295	*Diplocheila (Isorembus) striatopunctata* (LeConte, 1844)	VT	NH
296	*Dicaelus (Paradicaelus) dilatatus dilatatus* Say, 1823	VT	NH
297	*Dicaelus (Paradicaelus) elongatus* Bonelli, 1813	VT	NH
298	*Dicaelus (Paradicaelus) politus* Dejean, 1826	VT	NH
299	*Dicaelus (Paradicaelus) teter* Bonelli, 1813	VT	
300	*Badister (Badister) neopulchellus* Lindroth, 1954	VT	NH
301	*Badister (Badister) notatus* Haldeman, 1843	VT	NH
302	*Badister (Badister) obtusus* LeConte, 1878		NH
303	*Badister (Baudia) grandiceps* Casey, 1920	VT	NH
304	*Badister (Baudia) micans* LeConte, 1844	VT	NH
305	*Badister (Baudia) transversus* Casey, 1920	VT	NH

Tribe Harpalini

Subtribe Anisodactylina

306	*Notiobia (Anisotarsus) nitidipennis* (LeConte, 1847)	VT	NH
307	*Notiobia (Anisotarsus) sayi* (Blatchley, 1910)	VT	NH[1]
308	*Notiobia (Anisotarsus) terminata* (Say, 1823)	VT	NH
309	*Xestonotus lugubris* (Dejean, 1829)	VT	NH
310	*Anisodactylus (Anisodactylus) agricola* (Say, 1823)		NH
311	*Anisodactylus (Anisodactylus) carbonarius* (Say, 1823)	VT	NH
312	*Anisodactylus (Anisodactylus) harrisii* LeConte, 1863	VT	NH
313	*Anisodactylus (Anisodactylus) kirbyi* Lindroth, 1953	VT	NH

	Anisodactylus (Anisodactylus) melanopus (Haldeman, 1843)	VT[5]	
314	*Anisodactylus (Anisodactylus) nigerrimus* (Dejean, 1831)	VT	NH
315	*Anisodactylus (Anisodactylus) nigrita* Dejean, 1829	VT	NH
316	*Anisodactylus (Anisodactylus) pseudagricola* Noonan, 1996		NH
317	*Anisodactylus (Gynandrotarsus) merula* (Germar, 1824)	VT	NH
318	*Anisodactylus (Gynandrotarsus) rusticus* (Say, 1823)	VT	NH
319	*Anisodactylus (Anadaptus) discoideus* Dejean, 1831	VT	NH
320	*Anisodactylus (Anadaptus) sanctaecrucis* (Fabricius, 1798)	VT	NH
321	*Anisodactylus (Spongopus) verticalis* (LeConte, 1847)	VT	NH
322	*Geopinus incrassatus* (Dejean, 1829)	VT	NH
323	*Amphasia (Pseudamphasia) sericea* (Harris, 1828)	VT	NH
324	*Amphasia (Amphasia) interstitialis* (Say, 1823)	VT	NH

Subtribe Stenolophina

325	*Stenolophus (Stenolophus) carbo* Bousquet, 1993		NH
326	*Stenolophus (Stenolophus) fuliginosis* Dejean, 1829	VT	NH
327	*Stenolophus (Stenolophus) fuscatus* Dejean, 1829	VT	NH
328	*Stenolophus (Stenolophus) humidus* Hamilton, 1893	VT	NH
329	*Stenolophus (Stenolophus) megacephalus* Lindroth, 1968		NH
330	*Stenolophus (Stenolophus) ochropezus* (Say, 1823)	VT	NH
331	*Stenolophus (Stenolophus) plebejus* Dejean, 1829	VT	NH
332	*Stenolophus (Agonoderus) comma* (Fabricius, 1775)	VT	NH

333	*Stenolophus (Agonoderus) lecontei (*Chaudoir, 1868)	VT	NH
334	*Stenolophus (Agonoderus) lineola* (Fabricius, 1775)	VT	NH
335	*Agonoleptus conjunctus* (Say, 1823)	VT	NH
336	*Agonoleptus rotundicollis* (Haldeman, 1843)	VT	
337	*Agonoleptus thoracicus* (Casey, 1914)	VT	NH
338	*Bradycellus (Catharellus) lecontei* Csiki, 1932	VT	NH
339	*Bradycellus (Stenocellus) congener* (LeConte, 1847)	VT	NH
340	*Bradycellus (Stenocellus) insulsus* (Casey, 1914)	VT	NH
341	*Bradycellus (Stenocellus) neglectus* (LeConte, 1847)	VT	NH
342	*Bradycellus (Stenocellus) nigriceps* LeConte, 1869	VT	NH
343	*Bradycellus (Stenocellus) rupestris* (Say, 1823)	VT	NH
344	*Bradycellus (Stenocellus) tantillus* (Dejean, 1829)	VT	
345	*Bradycellus (Lipalocellus) nigrinus* (Dejean, 1829)	VT	NH
346	*Bradycellus (Lipalocellus) semipubescens* Lindroth, 1968	VT	NH
347	*Bradycellus (Triliarthrus) atrimedius* (Say, 1823)	VT	NH
348	*Bradycellus (Triliarthrus) badipennis* (Haldeman, 1843)	VT	NH
349	*Bradycellus (Triliarthrus) kirbyi* (Horn, 1883)	VT	NH
350	*Bradycellus (Triliarthrus) lugubris* (LeConte, 1847)	VT	NH
351	*Dicheirotrichus (Trichocellus) cognatus* (Gyllenhal, 1827)	VT	NH
352	*Acupalpus (Acupalpus) canadensis* Casey, 1924	VT	NH
353	*Acupalpus (Acupalpus) carus* (LeConte, 1863)	VT	NH
354	*Acupalpus (Acupalpus) hydropicus* (LeConte, 1863)	VT[1]	NH

355	*Acupalpus (Acupalpus) nanellus* Casey, 1914	VT	NH
356	*Acupalpus (Acupalpus) pumilus* Lindroth, 1968	VT	NH
357	*Acupalpus (Tachistodes) partiarius* (Say, 1823)	VT	NH[1]
358	*Acupalpus (Tachistodes) pauperculus* Dejean, 1829	VT	NH
359	*Acupalpus (Tachistodes) testaceus* Dejean, 1829		NH[1]
360	*Philodes (Philodes) alternans* (LeConte, 1853)	VT	NH
361	*Philodes (Goniolophus) rectangulus* (Chaudoir, 1868)	VT	NH

Subtribe Harpalina

362	*Ophonus (Metophonus) puncticeps* Stephens, 1828*	VT	NH
363	*Harpalus (Pseudophonus) compar* LeConte, 1847	VT	NH
364	*Harpalus (Pseudophonus) erythropus* Dejean, 1829	VT	NH
365	*Harpalus (Pseudophonus) faunus* Say, 1823	VT	NH
366	*Harpalus (Pseudophonus) pensylvanicus* (DeGeer, 1774)	VT	NH
367	*Harpalus (Pseudophonus) rufipes* (DeGeer, 1774)*	VT	NH
368	*Harpalus (Pseudophonus) vagans* LeConte, 1865	VT	
369	*Harpalus (Megapangus) caliginosus* (Fabricius, 1775)	VT	NH
370	*Harpalus (Plectralidus) erraticus* Say, 1823	VT	NH
371	*Harpalus (Opadius) fulvilabris* Mannerheim, 1853	VT	NH
372	*Harpalus (Opadius) indigens* Casey, 1924	VT	NH
373	*Harpalus (Opadius) laevipes* Zetterstedt, 1828		NH
374	*Harpalus (Opadius) laticeps* LeConte, 1850	VT	NH

375	*Harpalus (Opadius) lewisii* LeConte, 1865	VT	NH
376	*Harpalus (Opadius) nigritarsis* Sahlberg, 1827		NH
377	*Harpalus (Opadius) providens* Casey, 1914	VT	NH
378	*Harpalus (Opadius) reversus* Casey, 1924	VT	NH
379	*Harpalus (Opadius) spadiceus* Dejean, 1829		NH
380	*Harpalus (Harpalus) affinis* (Schrank, 1781)*	VT	NH
381	*Harpalus (Harpalus) herbivagus* Say, 1823	VT	NH
382	*Harpalus (Harpalus) opacipennis* (Haldeman, 1843)	VT	
383	*Harpalus (Harpalus) plenalis* Casey, 1914	VT	NH
384	*Harpalus (Harpalus) rubripes* (Duftschmid, 1812)*	VT	NH
385	*Harpalus (Harpalus) solitaris* Dejean, 1829		NH
386	*Harpalus (Harpalus) somnulentus* Dejean, 1829	VT	NH
387	*Harpalus (Harpalobius) fuscipalpis* Sturm, 1818		NH
388	*Selenophorus (Celiamorphus) ellipticus* Dejean, 1829		NH
389	*Selenophorus (Celiamorphus) granarius* Dejean, 1829		NH
390	*Selenophorus (Selenophorus) gagatinus* Dejean, 1829	VT	NH
391	*Selenophorus (Selenophorus) hylacis* (Say, 1823)	VT	NH
392	*Selenophorus (Selenophorus) opalinus* (LeConte, 1863)	VT	NH
393	*Discoderus parallelus* (Haldeman, 1843)		NH
394	*Trichotichnus (Trichotichnus) dichrous* (Dejean, 1829)	VT	NH
395	*Trichotichnus (Trichotichnus) vulpeculus* (Say, 1823)	VT	NH

396	*Trichotichnus (Iridessus) autumnalis* (Say, 1823)	VT	NH

Tribe Sphodrini

397	*Pseudamara arenaria* (LeConte, 1847)	VT	NH
398	*Calathus (Neocalathus) gregarius* (Say, 1823)	VT	NH
399	*Calathus (Neocalathus) ingratus* Dejean, 1828	VT	NH
400	*Calathus (Neocalathus) opaculus* LeConte, 1854	VT[1]	NH[1]
401	*Calathus (Acalathus) advena* (LeConte, 1846)		NH
402	*Synuchus impunctatus* (Say, 1823)	VT	NH

Tribe Platynini

403	*Olisthopus micans* LeConte, 1846	VT	NH
404	*Olisthopus parmatus* (Say, 1823)	VT	NH
405	*Sericoda obsoleta* (Say, 1823)	VT	NH
406	*Sericoda quadripunctata* (DeGeer, 1774)	VT	NH
407	*Tetraleucus picticornis* (Newman, 1844)	VT	
408	*Oxypselaphus pusillus* (LeConte, 1854)	VT	NH
409	*Agonum (Platynomicrus) nigriceps* LeConte, 1846		NH
410	*Agonum (Europhilus) anchomenoides* Randall, 1838	VT	NH
411	*Agonum (Europhilus) canadense* Goulet, 1969	VT	NH
412	*Agonum (Europhilus) darlingtoni* Lindroth, 1954	VT	NH
413	*Agonum (Europhilus) gratiosum* (Mannerheim, 1853)	VT	NH
414	*Agonum (Europhilus) lutulentum* (LeConte, 1854)	VT	NH
415	*Agonum (Europhilus) palustre* Goulet, 1969	VT	NH
416	*Agonum (Europhilus) picicornoides* Lindroth, 1966	VT	NH
417	*Agonum (Europhilus) retractum* LeConte, 1846	VT	NH
418	*Agonum (Europhilus) sordens* Kirby, 1837	VT	NH

419	*Agonum (Europhilus) superioris* Lindroth, 1966	VT	NH
420	*Agonum (Europhilus) thoreyi* Dejean, 1828	VT	NH
421	*Agonum (Agonum) muelleri* (Herbst, 1784)	VT	NH
422	*Agonum (Agonum) piceolum* (LeConte, 1879)		NH
423	*Agonum (Agonum) placidum* (Say, 1823)	VT	NH
424	*Agonum (Olisares) aeruginosum* Dejean, 1828	VT	NH
425	*Agonum (Olisares) affine* Kirby, 1837	VT	NH
426	*Agonum (Olisares) albicrus* Dejean, 1828		NH
427	*Agonum (Olisares) corvus* (LeConte, 1860)	VT	
428	*Agonum (Olisares) crenistriatum* (LeConte, 1863)	VT	NH
429	*Agonum (Olisares) cupripenne* (Say, 1823)	VT	NH
430	*Agonum (Olisares) deceptivum* (LeConte, 1879)		NH
431	*Agonum (Olisares) decorum* (Say, 1823)	VT	NH
432	*Agonum (Olisares) errans* (Say, 1823)	VT[1]	NH[1]
433	*Agonum (Olisares) excavatum* Dejean, 1828	VT	NH
434	*Agonum (Olisares) extensicolle* (Say, 1823)	VT	NH
435	*Agonum (Olisares) ferreum* Haldeman, 1843	VT	NH
436	*Agonum (Olisares) fidele* Casey, 1920	VT	NH
437	*Agonum (Olisares) harrisii* LeConte, 1846	VT	NH
438	*Agonum (Olisares) melanarium* Dejean, 1828	VT	NH
439	*Agonum (Olisares) metallescens* (LeConte, 1854)	VT	NH
440	*Agonum (Olisares) moerens* Dejean, 1828	VT	
441	*Agonum (Olisares) mutatum* (Gemminger & Harold, 1868)	VT	NH
442	*Agonum (Olisares) nutans* (Say, 1823)	VT	NH
443	*Agonum (Olisares) octopunctatum* (Fabricius, 1798)	VT	NH

444	*Agonum (Olisares) propinquum* (Gemminger & Harold, 1868)	VT	NH
445	*Agonum (Olisares) punctiforme* (Say, 1823)	VT	NH
446	*Agonum (Olisares) rufipes* Dejean, 1828		NH
447	*Agonum (Olisares) tenue* (LeConte, 1854)	VT	NH
448	*Agonum (Olisares) trigeminum* Lindroth, 1954	VT	NH
449	*Platynus (Platynus) decentis* (Say, 1823)	VT	NH
450	*Platynus (Platynus) indecentis* Liebherr & Will, 1996	VT	NH[1]
451	*Platynus (Platynus) opaculus* LeConte, 1863	VT	NH
452	*Platynus (Platynus) daviesi* Bousquet, 2012	VT	NH
453	*Platynus (Platynus) tenuicollis* (LeConte, 1846)	VT	NH
454	*Platynus (Batenus) cincticollis* (Say, 1823)	VT	NH
455	*Platynus (Batenus) hypolithos* (Say, 1823)	VT	
456	*Platynus (Batenus) mannerheimii* (Dejean, 1828)	VT	NH

Tribe Perigonini

457	*Perigona (Trechicus) nigriceps* (Dejean, 1831)*	VT	NH

Tribe Atranini

458	*Atranus pubescens* (Dejean, 1828)	VT	NH

Tribe Pentagonicini

459	*Pentagonica picticornis* Bates, 1883	VT	NH

Tribe Odacanthini

460	*Colliuris (Cosnania) pensylvanica* (Linnaeus, 1758)	VT	NH

Tribe Cyclosomini

461	*Tetragonoderus (Crossonychus) fasciatus* (Haldeman, 1843)	VT	NH

Tribe Lebiini

Subtribe Cymindiina

462	*Cymindis (Tarulus) americana* Dejean, 1826	VT	NH
463	*Cymindis (Tarulus) borealis* LeConte, 1863	VT	NH
464	*Cymindis (Tarulus) cribricollis* Dejean, 1831	VT	NH
465	*Cymindis (Tarulus) neglecta* Haldeman, 1843	VT	NH
466	*Cymindis (Tarulus) pilosa* Say, 1823	VT	NH
467	*Cymindis (Tarulus) unicolor* Kirby, 1837		NH
468	*Cymindis (Pinacodera) limbata* Dejean, 1831	VT	NH
469	*Cymindis (Pinacodera) platicollis* (Say, 1823)	VT	NH

Subtribe Dromiina

470	*Dromius (Dromius) piceus* Dejean, 1831	VT	NH
471	*Microlestes linearis* (LeConte, 1851)	VT	NH
472	*Apristus latens* (LeConte, 1846)	VT	NH
473	*Apristus subsulcatus* (Dejean, 1826)	VT	NH
474	*Syntomus americanus* (Dejean, 1831)	VT	NH
475	*Axinopalpus biplagiatus* (Dejean, 1825)	VT	NH

Subtribe Lebiina

476	*Lebia (Loxopeza) atriventris* Say, 1823	VT	NH
477	*Lebia (Loxopeza) grandis* Hentz, 1830	VT	NH
478	*Lebia (Loxopeza) tricolor* Say, 1823	VT	NH
479	*Lebia (Lebia) analis* Dejean, 1825	VT	
480	*Lebia (Lebia) fuscata* Dejean, 1825	VT	NH
481	*Lebia (Lebia) moesta* LeConte, 1850	VT	NH
482	*Lebia (Lebia) ornata* Say, 1823	VT	NH
483	*Lebia (Lebia) pectita* Horn, 1885		NH
484	*Lebia (Lebia) pleuritica* LeConte, 1846	VT	
485	*Lebia (Lebia) pulchella* Dejean, 1826		NH
486	*Lebia (Lebia) pumila* Dejean, 1831	VT	NH
487	*Lebia (Lebia) solea* Hentz, 1830	VT	NH
488	*Lebia (Lebia) viridipennis* Dejean, 1826	VT	NH
489	*Lebia (Lebia) viridis* Say, 1823	VT	NH
490	*Lebia (Lebia) vittata* (Fabricius, 1777)	VT	NH

Subtribe Calleidina

491	*Plochionus (Menidius) timidus* Haldeman, 1843		NH
492	*Calleida (Calleida) punctata* LeConte, 1846	VT	NH
493	*Calleida (Calleida) purpurea* (Say, 1823)		NH

Tribe Galeritini

494	*Galerita (Progaleritina) janus* (Fabricius, 1792)	VT	NH

Tribe Helluonini

495	*Helluomorphoides praeustus bicolor* (Harris, 1828)		NH

[1]Recorded in Bousquet 2012*a*.
[2]Recorded in Hayward 1897.
[3]Recorded in Hieke 2003.
[4] Recorded from NH in Bousquet 2012*a* with a note that the NH record "needs confirmation." The species is not included in the following accounts.
[5]Recorded from VT in Bousquet 2012*a*, but record is suspected to be based on misidentified specimens. The species is not included in the following accounts.

List of Abbreviations

Canadian provinces:
(Newfoundland and Labrador comprise one province but are separated here).

AB	Alberta
BC	British Columbia
LB	Labrador
MB	Manitoba
NB	New Brunswick
NF	Newfoundland
NS	Nova Scotia
NT	Northwest Territories
NU	Nunavut
ON	Ontario
PE	Prince Edward Island
QC	Quebec
SK	Saskatchewan
YT	Yukon Territories

States and districts:

AK	Alaska	LA	Louisiana	OH	Ohio
AL	Alabama	MA	Massachusetts	OK	Oklahoma
AR	Arkansas	MD	Maryland	OR	Oregon
AZ	Arizona	ME	Maine	PA	Pennsylvania
CA	California	MI	Michigan	RI	Rhode Island
CO	Colorado	MN	Minnesota	SC	South Carolina
CT	Connecticut	MO	Missouri	SD	South Dakota
DC	Dist. of Columbia	MS	Mississippi	TN	Tennessee
DE	Delaware	MT	Montana	TX	Texas
FL	Florida	NC	North Carolina	UT	Utah
GA	Georgia	ND	North Dakota	VA	Virginia
IA	Iowa	NE	Nebraska	VT	Vermont
ID	Idaho	NH	New Hampshire	WA	Washington
IL	Illinois	NJ	New Jersey	WI	Wisconsin
IN	Indiana	NM	New Mexico	WV	West Virginia
KS	Kansas	NV	Nevada	WY	Wyoming
KY	Kentucky	NY	New York		

Species Accounts

SUBFAMILY NEBRIINAE

TRIBE NEBRIINI

Genus *Nebria*

Adults live along stream margins or in alpine habitats. They are predatory, preying on small arthropods such as Collembola, small spiders, Diptera and larvae. They bolt pieces of prey so it can be partly identified by studying crop contents. Local species are fully-winged but none have ever been recorded in flight. Some species in Europe have been recorded in flight so our species may fly also only in rare circumstances. These beetles are specialized runners and are poorly adapted for wedge pushing. They are active at night and hide by day under flat rocks, gravel or drift wood. The defensive secretion oozes out of pygidial glands and is of unsaturated acids (Moore 1979). The larvae are cold-adapted and are active in fall and winter. Collembola are an important part of the diet and are captured by a "snap-trap" mechanism (Spence and Sutcliffe 1982). Larvae also scavenge dead insects.

1. *Nebria (Boreonebria) gyllenhali castanipes* (Kirby, 1837)

General Range – Lower Arctic and Hudsonian Zones. East to NF, in LB to northern tip, in QC north to Povungnituk (60º N lat.) north to Norman Wells, NT, Mason Creek, YT (63º N lat.), northwest to Circle, AK and west to Marshall, AK, south in mountains to OR, northern WY and SD Black Hills, in northern MN and MI, in QC south to Valdor, Baie Saint Paul, and south shore of Gaspésie. Isolated in higher mountains of northern New England including Mount Katahdin, ME and Mount Marcy, NY. Other subspecies in southwestern mountains and northern Asia and Europe. **Local Range** – Vermont, no records; New Hampshire, in Presidential Range from 1200 m to summits. **Habitat** – Darlington (1931) found it limited to wet places, following trickles a short distance into coniferous forests. The absence of reliable running water and not low altitude *per se* probably excludes it from Mount Mansfield and other high peaks in Vermont. **Life Cycle** – Larochelle (1977*a*) recorded tenerals June 14- July 25. Darlington (notes) recorded tenerals in the fall from the White Mountains. **Behavior** – Forsythe (1982) made a study of the feeding mechanism of this species and found that it bolts pieces of

food and does not regurgitate defensively and that it eats mainly small flies and Collembola. **Dynamics** – Fully-winged, no flight records.

2. *Nebria (Boreonebria) lacustris* Casey, 1913

General Range – Lower Canadian Transitional and Upper Austral Zones. Northeast to NB, in QC northeast to Chute-aux-Outardes, north to southern ON, in MI north to Lake Superior, MN and southern MB, west to eastern IA and central IL (Danville area), south to the Kentucky River and MD, south in the mountains to TN, NC and VA. Another subspecies in the southern Appalachians. **Local Range** – Both states are within the general range. Vermont, 88 localities. New Hampshire, 22 localities, no records from the Merrimack Valley or coastal area. In VT the species occurs in two ecologically distinct forms which look like separate species. A smaller narrower form occurs along mountain brooks and reaches higher elevation than *N. pallipes*. The second form is larger and broader, especially the females. It occurs on the shores of Lake Champlain and larger rivers. Interpretation of these two forms is difficult. In spite of a lack of anatomical differences (other than size and proportions) and lack of genitalic characters, one might interpret them as two very similar species, if only the VT populations were known or if the differences held up in other areas. However, they appear not to, according to Kavanaugh (pers. comm.) in other regions. Kavanaugh et al. (2011) finds the two forms not differing in DNA and hence, not belonging to separate species. This is surprising, since the two forms differ in seasonality and temperature requirements. This problem merits more study. It is evident that more detailed studies using different approaches will be necessary to solve this question. It is curious that *N. pallipes*, although not closely related to these forms, is intermediate ecologically. In IL, where I first encountered *Nebria*, the *N. lacustris* were the broad form inhabiting sand bars along the rivers while *N. pallipes* were confined to cool, shaded ravines. This is exactly the opposite of the situation along the Winooski River in VT, with *pallipes* along the rivers and *lacustris* in shaded ravines on mountain brooks. VT distribution is as follows: the broad form, eight localities, (shores of Lake Champlain from Highgate south to at least Charlotte and islands in the lake from Isle La Motte to South Hero and in southern VT, along the Battenkill River in Arlington); narrow form, 80 localities, (most of VT, but probably absent from Champlain Valley). **Habitat** – Broad form: common on beaches composed of shale fragments below shale bluffs. Narrow form: along shaded mountain brooks, highest recorded elevation 1175 m near the site of the former Mount Mansfield Hotel. **Life Cycle** –

Broad form: mating in late September and small larvae appearing by October 17; adults appear in summer and disappear about October 6. Narrow form: mating in August and small larvae appearing in late August Adults appear in late May and disappear by September 6. Tenerals are present from June 9 to early July. According to Spence (1979) larval development of the narrow form is 3-4 weeks before *N. pallipes*, in contrast to the broad form which is later than *N. pallipes*. **Behavior** – Spence (1979) found that the adult diet is similar to that of *N. pallipes* except that there was more predation on Collembola and spiders and less scavenging. **Dynamics** – Fully-winged, no flight records.

3. *Nebria (Boreonebria) nivalis gaspesiana* Kavanaugh, 1979

General Range – High Arctic Zone. In NF, in the northern peninsula at Saint John's Bay and the southwest corner, in QC at Gaspésie and the summit of Mont Albert , in ME at Mount Katahdin. Other subspecies are on Baffin Island and the north shore along the Hudson Straits, Southampton Island, in NU inland to Baker Lake, in NT at Aklavik, in YT and AK both on the north coastal tundra and the mountains, Saint Paul and Saint Matthew Islands, in the tundra of Siberia south to Sakhalin Island and the Altai Mountains, in the Ural Mountains, the Arctic coast of Norway and south in the Norwegian Mountains and the Scottish highlands. **Local Range** – Vermont, no records; New Hampshire, one locality, Mount Washington, collected by Larochelle and Larivière (this represents a NEW STATE RECORD). **Habitat** – Not recorded for NH specimen, elsewhere particularly prone to live by glaciers and streams that drain them. On Saint Paul Island it was common on bare, dry sand (Lindroth 1961*a*). **Life Cycle** – Tenerals in QC, Jul23-August 8; a gravid female was collected in late July, adults present in northern QC from June 20-August 11 (Larochelle 1974). Various authors think it possible that the life cycle takes several years. **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

4. *Nebria (Reductonebria) pallipes* Say, 1823

General Range – Lower Canadian to Transitional Zones. East to NS, northeast to QC (south shore of Gaspésie), and northeast in the St Lawrence valley to Saguenay River, in ON to Ottawa, MI, WI, west to IL and KS, south to KY, VA and DE, extending in the mountains to northern GA. **Local Range** – Both states are entirely within the general range. Vermont, 95 localities; New Hampshire, 38 localities. **Habitat** –

On bare sand and gravel banks along rivers and brooks. Along major rivers it is most common below steep or overhanging banks. It also occurs under driftwood on sand bars or gravel mixed with mud. It is on smaller streams of almost every description, as long as there is a definite current in the water. In wet weather it follows temporary brooks, including those formed in eroded trails. The highest elevation in Vermont is 850 m at the foot of a temporary waterfall in Smuggler's Notch. **Life Cycle** – Eggs are laid in early September and larvae emerge in about 18 days. Third instar larvae are active in cold temperatures well into December and then disappear. Teneral adults appear in June. Adults disappear by early October. Old overwintering adults reappear as early as May 22. **Behavior** – The comparative ecology of this species and *N. lacustris* was studied in detail by Spence (1979). He found that the diet of adults of both species included many dipteran and lepidopteron adults (probably scavenged) plus fair numbers of spiders and Collembola. **Dynamics** – Fully-winged, no flight records.

5. *Nebria (Reductonebria) suturalis* LeConte, 1850

General Range – Arctic and Hudsonian Zones. North in QC to Ungava Bay, west to Inoucdjouac on Hudson Bay, south in coastal tundra to southern LB, south to Black Bay, ON on Lake Superior, relict on high mountains in northern New England including Mount Katahdin in ME and Mount Marcy in the Adirondacks (NY). Also found in highest peaks of CO, WY, and AB. **Local Range** – Vermont, one locality (Mount Mansfield); New Hampshire, one locality (Mount Washington). **Habitat** – Darlington (notes) says it lives "under stones where water is seeping or trickling down the mountain side in open places above the tree line. It may occasionally occur a little below tree line along brooks but this seems to be unusual." In VT, it is confined to the area above 1200 m elevation on the Chin of Mount Mansfield, an area about 40 ha. In warm or dry weather the beetles are confined to a series of deep joint crevices ("The Subway") but in cool, wet weather they spread to a fell field higher up and to some talus just below the crevices. The beetle was once taken under the bark of a spruce log in the talus. The larva has been found in the crevices where snow lingers until early summer. **Life Cycle** – Larvae August 30 (first instar). Tenerals July 29-August 6. It spends the first winter as larva and the second as adult. The adults remain in pupal cells until the following spring. Adults active June 22-August 30. **Behavior** – Nocturnal. Adults observed to eat beetles (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

TRIBE NOTIOPHILINI

Genus *Notiophilus*

Adults are small with enormous stereoscopic eyes. Diurnal predators adapted for fast running, particularly adapted for preying on Collembola, which they catch with a sudden run or spring. They also take mites and other small arthropods. Some species are constantly fully-winged, others are dimorphic. An introduced species has been recorded in flight in Europe. The defensive secretion consists of higher saturated acids (Moore 1979) released in an oozing discharge. Larvae are similar to those of *Nebria* but are usually not by water courses. They probably have a similar snap-trap mechanism for catching Collembola.

6. *Notiophilus aeneus* (Herbst, 1806)

General Range – Lower Canadian to Upper Austral Zones. East to NS, northeast in QC to Baie Chaleur, Lac Saint Jean, Hull, in ON north to Toronto, in MI north to Marquette, northwest to MN, west to IA and MO, south in mountains to TN and GA. **Local Range** – Vermont, 36 localities, throughout the state except in higher mountains. New Hampshire, 18 localities throughout the state except in higher mountains. **Habitat** – In the leaf litter of deciduous forests. **Life Cycle** – Adults, March 27-November 1; tenerals were found on September 10. The species overwinters as an adult. **Behavior** – The beetle is most obvious in the spring before new leaves have developed on the trees where it is active in full sunlight. In the warm months it becomes crepuscular. The beetles are sometime seen running where the leaf litter is absent or very thin as around the bases of trees. Many Vermont forests have hummocky ground, usually the result of wind thrown trees. This species is especially characteristic where it will be found under the thin leaf layer near but not at the top. It is rarely found beneath flakes of wood or bark. R. Mills (pers. comm.) once found an aggregation of five individuals under a single rock at Brookline, VT. **Dynamics** – Fully-winged, no flight records.

7. *Notiophilus aquaticus* (Linnaeus, 1758)

General Range – A circumpolar species. Arctic, Hudsonian and Canadian Zones. Widely distributed in the northern tundra but not confined to it. East to NS, NF, and LB, north to the Arctic Ocean, south to BC extending down the Rocky Mountains to AZ and NM, south to

MN, IA, northern IL, mountains of PA, NY, and MA. In the Eastern Hemisphere south to Scandinavia, European Russia and Siberia to Kamchatka and isolated in the British Isles, Iceland, Faeroe Islands, the Pyrenees Mountains, Spain, mountains of southern Italy, Sicily, Sardinia, Macedonia, Iran, Caucusus, Kazakhstan, and Japan. **Local Range** – Vermont, two localities, Mount Mansfield in alpine tundra zone above 1200 m, and Shoreham, elevation less than 100 m. New Hampshire, seven localities, Mount Washington (Green's Grant near Pinkham Notch), Jefferson (near Cherry Pond), Shelburne on a sandy path, also on Monadnock Mountain in Jaffrey, Pack Monadnock mountain in Temple, and Washington (on the Monadnock Plateau south of Lake Sunapee). **Habitat** – Relatively dry open ground in the alpine tundra on Mount Mansfield, also in opening below the tree line, at less than 100 m elevation on bare soil in apple orchard near Lake Champlain. At Shelburne, NH taken on sandy path at edge of dry forest near Androscoggin River. In QC, reported from moraines, waste ground, sand pits and roadsides (Larochelle 1975). **Life Cycle** – Overwinters as adult, adults in QC from March 26-November 22. **Behavior** – Adults from Mount Mansfield were active in full sunlight, running among tundra plants. **Dynamics** – Wings dimorphic, flight has been observed in Europe.

8. *Notiophilus biguttatus* (Fabricius, 1779)

General Range – A Eurasian species, widespread in Scandinavia, south to Portugal, Italy, Sardinia, Bulgaria, Caucusus, east to the Ob River valley. Introduced into North America presumably in ballast before 1955. In NF and BC, it spread to ME and NH by 1980, to QC (near Rimouski) by 1989, and Dartmouth NS by 1987 (LeSage 1996). **Local Range** – Vermont, no records. New Hampshire, four localities (Durham, Seabrook, Portsmouth and Dover). **Habitat** – Lindroth (1961*a*) says it is usually a forest species but it may occur in the open in humid coastal areas, e.g., the first US find, by Brian Farrell (1980) in Kittery, ME, was in a flower bed by a house. In North America it would seem to be a competitor with *N. aeneus*, perhaps the latter species prevents *biguttatus* from spreading inland. **Life Cycle** – Studied in Europe; it breeds in the spring, tenerals in late June to early September. **Behavior** – Mostly diurnal, active in sunshine; gregarious (Larochelle and Larivière 2003). **Dynamics** – Dimorphic, the long-winged form found in drift but no direct flight records.

9. *Notiophilus borealis* Harris, 1869

General Range – Arctic Zone. North American tundra including coastal and mountain tundra. In QC north to Ungava Bay, in MB north to Fort Churchill, in NT to the Mackenzie Delta, northwest to AK at Rampart on the Yukon River, south to Jasper, AB but not extending further south into the Rockies, in QC south to Abitibi and Grandes Bergeronnes, in the East, isolated populations exist on Mont Albert in Gaspésie and in the high mountains of northern New England and NY, also in northeast Siberia. **Local Range** – Vermont, one locality, Mount Mansfield. New Hampshire, two localities, Mount Washington and Mount Lafayette (Darlington 1931). **Habitat** – Found running on the tundra in company of *N. aquaticus*, which outnumbers it. Darlington (notes) says that it can be treaded from dry moss. **Life Cycle** – Tenerals in late August and the first half of September. In northern QC, Larochelle (1975) collected adults from June 21- August 21. **Behavior** – Mostly diurnal, active in sunshine. Escapes danger by running (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic, fully-winged individuals are rare and known only from the northwest part of its range.

10. *Notiophilus nemoralis* Fall, 1906

General Range – Hudsonian Zone. Limited to the high mountains of northern New England, outside of our states, recorded only from MA (probably Mount Graylock), NY (Adirondacks). **Local Range** – Vermont, nine localities (in the main range of the Green Mountains, from Mount Mansfield to Lincoln Mountain and from Stratton Mountain in the south, also from Mount Equinox in the Taconic Range and isolated on Mount Ascutney). New Hampshire, three localities listed by Darlington (1931); Presidential Range, Carter Dome, and Moosilauke. **Habitat** – The beetle is found amid litter and mosses in the spruce-fir forest, 900-1200 m. It can be found among the peeling outer layers of wet logs and sticks and can sometimes be tramped out of wet moss. **Life Cycle** – Adults in VT June 12-September-10, Darlington (notes) collected tenerals on August 25. **Behavior** – Mostly diurnal, active in sunshine. Escapes danger by running (Larochelle and Larivière 2003). **Dynamics** – Vestigial wings, incapable of flight (Larochelle and Larivière 2003).

11. *Notiophilus novemstriatus* LeConte, 1847

General Range – Transitional, Upper and Lower Austral Zones. Northeast to ME, north to NH, VT, NY, OH, MI and SD, west to NE, KS, OK, NM and AZ, south to TX, FL, and LA. **Local Range** – Vermont, one locality (Mount Philo, Charlotte). New Hampshire, three localities (Fabyan, Carroll (just north of the White Mountains), Farmington, and Seabrook in the southeast). **Habitat** – The Vermont specimens were collected on quartzite ledges above the west cliffs of Mount Philo. In IL I collected it in oak forest at the edge of shale bluffs along river valleys. The general habitat seems to be dry forest edges. **Life Cycle** – In Vermont, adults, April 11-October 13. **Behavior** – The beetles at Mount Philo hide in tufts of grass near the cliff edge, from which they occasionally dash across open soil or rocks. **Dynamics** – Dimorphic, fully-winged specimens rare, no flight records.

12. *Notiophilus semistriatus* Say, 1823

General Range – Hudsonian to Upper Austral Zones. East to NS, in QC north to Ungava Bay, northwest to AK (Tanana, Rampart House, Denali National Park), south to BC, MT, CO, NM, SD (Black Hills), MN, MO, AR, KY and GA. In NY the records are all from the eastern part of the state, from Long Island, Staten Island, Nyack, and the Adirondacks region including up to 600 m on Mount Whiteface. **Local Range** – Vermont, no records; New Hampshire, one locality, Rye (Richard and Larochelle 1978). **Habitat** – It is hard to see a pattern in the various reports. Larochelle (1975) lists vacant lands and roadsides, Ciegler (2000) caught the species in a pitfall trap in a clump of broomsedge (*Andropogon*). Darlington (1931) caught this species among dead leaves in deciduous forest. I caught it in IL under willows (*Salix* sp.) on a gravel bank bordering a river, Lindroth (1961*a*) wrote that in northern Canada "it is found on open, gravelly rather dry ground, often moraine with thin, low vegetation." **Life Cycle** – Activity observed in all months; tenerals mid-May and mid-June (Larochelle and Larivière 2003). **Behavior** – Mostly diurnal, active in sunshine; gregarious. Escape danger by running. Occasional climbers on trees (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic, no flight records.

SUBFAMILY CARABINAE

TRIBE CYCHRINI

Both adults and larvae are specialized predators on snails. The adults have the elytra firmly locked together in such a way that they do not separate even in death, and such conjoined elytra are commonly found under leaf litter or debris. The adults practice extraoral digestion and swallow only liquids. They use the long slender mandibles to extract the snail from its shell. The terminal palpal segments are broadly triangular and have apical sensory areas which facilitate the beetle's following a slime track left by the snails. Cychrines also feed on occasion on slugs, caterpillars and moth pupae. They shelter by day in mammal burrows where they are protected from mammals by the secretion of the pygidial glands.The secretion is a spray and contains unsaturated aliphatic acids. Cychrines are adapted for rapid walking and are not good wedge-pushers. The larvae are also specialized snail predators. The body segments are bordered by broad flanges overhanging the spiracles, protecting the latter from the slime exuded by the prey (Zetto Brandmayr et al. 1998).

Genus *Sphaeroderus*

13. *Sphaeroderus canadensis canadensis* Chaudoir, 1861

General Range – Lower Canadian Zone. North to NS, in QC north to Saguenay River (not in Gaspésie), in ON northwest to Newmarket (north of Toronto), west to eastern OH, south to VA, SC, WV, NY except for the lower Hudson Valley, northwest CT and MA. A probable subspecies in the high mountains of GA, NC, and TN. **Local Range** – Our states are at or near the southern limits of the species. Vermont, 27 localities, throughout the state; New Hampshire, 12 localities, south at least to Durham. **Habitat** – Strictly a deciduous forest species up to 1160 m on Mount Mansfield. It is commonest on slopes. It has not been taken in the Champlain Lowlands except on Snake Mount near Addison, nor is it found in bottomland forest. Larochelle (1975) gave the habitat as deciduous or sometimes mixed but never coniferous forest. **Life Cycle** – Larochelle (1977*a*) reports teneral specimens from May 5. On the other hand Lindroth (1961*a*) cites one from late September, it presumably can overwinter as an adult or larva. **Behavior** – Shelters by day in and under fallen logs and in piles of dead leaves. MacLean and Usis (1992) found that in contrast to *S.stenostomus lecontei*, this species fed extensively on

gypsy moth larvae (*Lymantria dispar*) as demonstrated by antigen analysis. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

14. *Sphaeroderus nitidicollis* Guérin-Méneville, 1829

General Range – Canadian Zone. In QC, with roughly the same northern limits as *S. stenostomus lecontei*, north in ON to Timagami and Sioux Lookout, northwest to Lake Winnipeg and southern SK, south to London, ON, in QC, south to Rigaud and Quebec City and south of the Saint Lawrence only to Rivière du Loup. In ME, in the northern half and reaching the coast at Lubec. Relict populations in the Adirondacks and New England mountains. **Local Range** – Vermont, six localities, two on Mount Mansfield, two on Camel's Hump, one on General Stark Mountain in Fayston, and one from Victory in the northeast. New Hampshire, five localities, Mount Lafayette, Mount Garfield, Carter's Notch in the Presidential Range, Mount Moosilauke, and Oliverian Bridge in Haverhill. **Habitat** – Coniferous and mixed forest. Green Mountain specimens are from 600-750 m elevation. These populations seem precariously situated above the elevations where *S. stenostomus lecontei* and *S.canadensis canadensis* are common and below the altitude limit for snails which must not be very much higher. In the Camel's Hump area they share this habitat with another relict, *Scaphinotus bilobus*. One can speculate that a series of hot, dry years might suffice to obliterate both species. **Life Cycle** – Larochelle (1976*a*) observed mating on July 20. **Behavior** – Larochelle (1975) discovered this species feeding in the daytime on rainy days. The specimen from General Stark Mountain was feeding on a snail, *Zonitoides arboreus*, which is almost the only snail in the high spruce-fir forest. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

15. *Sphaeroderus stenostomus lecontei* Dejean, 1826

General Range – Canadian and Transition Zones. The species ranges in the north to NF, QC at Gaspésie, the north shore of the Gulf of Saint Lawrence, and north to the southern tip of James Bay, across northern ON to the southeast corner of SK, west to eastern MT, IA, MO, MS and the Gulf of Mexico. This subspecies occupies most of the range except for that of another subspecies from southern NY, PA, WV, VA, and NC. **Local Range** – Throughout both states. Vermont, 68 localities; New Hampshire, 28 localities. **Habitat** – Common in both upland and floodplain forests, also among shrubs along streams and fence rows and small isolated groves. In wet weather it can be found underneath cover

in wet pastures. Allan Strong (pers. comm.) has collected many specimens at 1000 m on Mount Mansfield. **Life Cycle** – Adults, March 2- November 14. Bousquet (1987) found that copulation and egg laying occur in the spring and that new adults are active in the fall. **Behavior** – Bousquet (1987) made a study of this species and records the following details. Copulation on the average lasts 72 hours and the female is active and feeds during this time. The eggs are laid singly each in an isolated cavity 2-12 mm deep in the soil and hatch in a minimum of 13 days. The larvae eat snails, slugs, and sometimes the cocoons of sawflies. Grooming behavior in the adults involves five steps. One is cleaning the tarsi and tip of the front tibia with the mouthparts; two is brushing the antenna through the cleaning organ on the front tibia; three is cleaning the palpi, sides of head and mandibles, against the cleaning organ; four is brushing the cleaning organ against the tip of the middle tibia; and five is cleaning the middle tibia against the femur and tibia of the hind leg. If disturbed, adults freeze for up to 15 minutes. As a defense, they may lower the head and raise the tip of the abdomen but do not seem to secret any fluid in this position. With a less drastic disturbance, the individuals scatter and stridulate three or four times. The sound is audible at a meter's distance. I have found this species on warm days during the spring thaw under flat stones resting on ledge rock where the beetle can gain heat from the sun and this may occur even when most of the surrounding area is still snow-covered. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

Genus *Scaphinotus*

16. *Scaphinotus (Scaphinotus) elevatus elevatus* (Fabricius, 1787)

General Range – Transitional to Lower Austral Zones. The species range is north to southern ME and southern NY, OH, IL, MN, MB, west to the base of the Rocky Mountains in CO and NM, south to TX and FL. This subspecies occurs east of the Appalachians and along the Gulf Coast to LA. **Local Range** – Vermont, no records; New Hampshire, two localities, Durham and Concord. **Habitat** – I have taken the midwestern subspecies *Scaphinotus elevatus flammeus* Haldeman 1844 in bottomland woods, often in largely open country. **Life Cycle** – Teneral specimens in May (Lindroth 1961*a*). **Behavior** – Graves and Graves (1978) reported an aggregation in a mouse burrow. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

17. *Scaphinotus (Irichroa) viduus* (Dejean, 1826)

General Range – An Appalachian species. Lower Canadian and Transitional Zones. North to NS and southern QC (only south of the Saint Lawrence, where it is known as far north as Bellechasse). West to eastern OH and south along the mountains to GA. **Local Range** – Our states lie within the general range. Vermont, 21 localities; New Hampshire, nine localities from Pittsburg in the far north to the coastal plain at Durham and Somersworth. **Habitat** – A deciduous forest species. In VT from lake level at 30 m to 825 m on a south facing mountain slope. **Life Cycle** – Adults, May 14- October 15. A very large larva of *Scaphinotus* which, from its size and locality can only be this species, was taken on a south-facing mountain slope in Johnson, VT in October. **Behavior** – Although this is a large and spectacular beetle it is rarely collected underneath superficial cover. It has been taken in mouse burrows, seemingly, the usual shelter during the day. If disturbed, it produces a loud stridulating sound resembling that of a rattlesnake. If further molested, it squirts droplets of a defensive fluid from the pygidial glands. These adaptations have been shown to protect it against small mammals. Captive beetles cannot stridulate if the 5th and 6th abdominal segments are restrained. R.L. Davidson (pers. comm.) has pointed out that most finds of this species under logs and pieces of bark, occur in late afternoon, as though the beetles are moving from the mouse burrows into position for the night's hunting. My experience confirms this. Once I captured a specimen under a flat board in the ruins of a house on May 5. In this locality, Bolton Notch at 390 m, the season was still early spring so this is probably a case of "basking" (sheltering under an object that transmits heat when the sun is out). I have found the fused elytra in the feces of a black bear. An adult female specimen on Worcester Mountain was feeding on a snail *Triodopsis dentifera*. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

18. *Scaphinotus (Nomaretus) bilobus* (Say, 1823)

General Range – Canadian and Transitional Zones. North to NS, in QC north to Lac Saint Jean and Abitibi (but absent from Gaspésie), ON north to Cochrane and Sioux Lookout, north to southern MB, south to KS, MO, northern IL and OH, in NY only in the Adirondacks, Catskills, and near Buffalo. **Local Range** – Vermont, two localities, Camel's Hump and Maidstone Lake. New Hampshire, three localities, Darlington (1931) listed it from Mount Moosilauke and the Presidential Range, also known from Haverhill (Oliverian Bridge). **Habitat** – Generally spruce forests. The Camel's Hump specimen was in a yellow birch log. Various authors

have cited thin spruce forest on gravel. **Life Cycle** – Tenerals in July. Both Vermont specimens are teneral and both were taken on July 11, although in different years. **Behavior** – The Maidstone Lake specimen was found on the underside of a piece of firewood that was recently distributed in the campground, seemingly as reported above for *S. viduus*, this beetle had moved into a starting position for the night's hunting. The specimen from Camel's Hump would seem to represent a very small population; despite much pitfall trapping in the area by many researchers, only the one specimen has been found over a 30 year period. **Dynamics** – Vestigial-winged. Elytra fused at suture, flightless.

TRIBE CARABINI

These are mostly very large species. They practice extraoral digestion and swallow only liquids. They are strictly predatory; caterpillars are the most common prey. These beetles are specialized for rapid walking, searching long distances for prey. They are also good wedge pushers. Some are good climbers. The defensive fluid is a directed spray of unsaturated aliphatic acids. Larvae are large with heavily sclerotized plates and with rigid urogomphi, and are adapted for burrowing.

Genus *Calosoma* are fully-winged and strong fliers, using flight to supplement climbing as they forage in tree canopies. They converge sometimes in large numbers at caterpillar outbreaks. It is not known how they locate them. Genus *Carabus* normally have vestigial wings but one local species has a rare fully-winged morph and such forms may exist undetected in other species. Members of both genera have been introduced from Europe in the effort to combat the gypsy moth (*Lymantria dispar*).

Genus *Calosoma*

19. *Calosoma (Calosoma) frigidum* Kirby, 1837

General Range – Lower Canadian, Transitional, and Upper Austral Zones. East to NS, north to QC (Saguenay, Abitibi and Magdalen Islands), ON north to Lake Nipigon, AB, north to McMurray, and northern BC (Terrace, on the Skeena River), south to UT, CO, TX, LA, and GA. **Local Range** – Vermont, 21 localities (northeast to Greensboro, highest altitude is Underhill State Park at 610 m). New Hampshire, six localities (north to Mount Washington, also Ellsworth, Eaton, Dover, Hampton, Charlestown). Darlington (1931) states that it is common

above the tree line in the Presidential Range; these must be strays from a large population south of the White Mountains There are no specimens from the Boreal Plateau of either state. **Habitat** – Deciduous forest. **Life Cycle** – Tenerals in late May (QC) to mid-September (NS; Larochelle and Larivière 2003). **Behavior** – A climbing species from deciduous forest. It concentrates at outbreaks of caterpillars, notably the forest tent caterpillar (*Malacosoma disstria*) and the maple prominent caterpillar (*Heterocampa guttavitta*). Landry (1975*a*) gives an account of "innumerable individuals arriving at twilight at Levis, Quebec, June 15, 1975." These beetles helped to control this outbreak of the maple prominent. **Dynamics** – Fully-winged, a frequent powerful flier.

20. *Calosoma (Calosoma) sycophanta* (Linnaeus, 1758)

General Range – Widespread Palearctic species. South to Mediterranean Sea and North Africa, also Syria, Turkmenistan, Uzbekistan and western China (Xinjiang Province), east to Tomsk, Siberia. Introduced into North America, recorded from all New England States, NY and NJ, also WA. **Local Range** – Vermont, four localities (Fairfield, Arlington, Rockingham and Brattleboro). New Hampshire, five localities (Alton, Dover, Newton, Durham and Hampton), all in the southeast. The New Hampshire specimens might represent a breeding population but the Vermont ones are more likely stray migrants. **Habitat** – Deciduous forest. **Life Cycle** – Eggs are generally laid June 10-August 10. The larval development takes two weeks in very warm weather but nearly four weeks in colder weather. Both new and old adults become dormant around August 1 and do not reappear until May or June the following year. Adults may live more than one season if circumstances prevent reproduction. They have lived up to four years in captivity. Adults have been shown to survive for 15 days in cold water (Burgess 1911). **Behavior** – The species was introduced to try to control two introduced moths, the gyspy moth (*Lymantria dispar*) and the brown tailed moth (*Euproctis chrysorrhoea*). Both adults and larvae are good tree climbers which has made this species more successful against the gypsy moth since among native *Calosoma*, only the adults can climb trees. The larvae of *C. sycophanta* can molt in tree crevices or under loose bark and do not have to descend to the ground. **Dynamics** – Fully-winged, a frequent and powerful flier. It comes to lights.

21. *Calosoma (Calodrepa) scrutator* (Fabricius, 1775)

General Range – Transitional to Tropical Zones. North to NH, southern QC (Sorel, Montreal) and ON, MI, SD, west to KS, OK, NM, AZ and CA, south to FL, Mexico and Venezuela. Range boundaries become nebulous in this genus in which most species (including all local ones) are very powerful fliers, traveling long distances in search of caterpillar outbreaks. Such flights carry individuals far beyond the successful breeding range of the species, especially when assisted by storms which deposit some of them on mountain peaks or drop them into lakes or the ocean. Sometimes great numbers are washed up on beaches. When more is known about the larvae of C*alosoma* it will make it possible to delineate the breeding ranges more exactly. For the present, I postulate that areas in which a species of *Calosoma* is represented by only a few specimens or where most of them are from beaches or mountain tops, are probably beyond the breeding range. Such is the situation of *C. scrutator*. **Local Range** – Vermont, no records; New Hampshire, five localities, Mount Washington (the northernmost), Alton, Exeter, Hampton and Newcastle. **Habitat** – Deciduous forest. **Life Cycle** – Active March-November; lay eggs early-June to mid-July in MA (Larochelle and Larivière 2003). **Behavior** – Preys on caterpillars, especially forest tent caterpillar (*Malacosoma disstria*), gypsy moth (*Lymantria dispar*), and occasional records on adult June beetles, 17-year cicadas (Balduf 1935) and nestling cardinals (Herman 1910). **Dynamics** – Fully-winged, frequent powerful flier.

22. *Calosoma (Calodrepa) wilcoxi* LeConte, 1847

General Range – Eastern North America. Transitional and Upper Austral Zones. North to CT, NY (occasional in NH, QC, and ON), MI, WI, MN, west to IA, KS, TX, south to MS, GA. **Local Range** – Vermont, no records. New Hampshire, one specimen from Mount Washington in American Museum of Natural History, according to Darlington (notes). **Habitat** – Deciduous forests. **Life Cycle** – Beetles feed and reproduce in June and enter aestivation in July. **Behavior** – As far as is known, similar to *C. scrutator.* **Dynamics** – Fully-winged, a frequent flier.

23. *Calosoma (Callitropa) externum* (Say, 1823)

General Range – Upper and Lower Austral (strays north). North to MA, southern ON (only in drift from the shore of Lake Erie), west to NE, KS, OK, TX, south to LA, MS, AL, and GA. **Local Range** – Vermont, one

record (Burlington, Centennial Woods, September 13, 1978, S. O'Connor); New Hampshire, no records. **Habitat** – Deciduous forest and open country (Lindroth 1961*a*). **Life Cycle** – Active April-November; mating early July (MA); lay eggs early-June to mid-July in MA (Larochelle and Larivière 2003). **Behavior** – Adults prey on caterpillars, grasshoppers, and scarab beetles. Occasional climber on trees. Mostly nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, a frequent, powerful flier.

24. *Calosoma (Chrysostigma) calidum* (Fabricius, 1775)

General Range – Lower Canadian Transitional and Upper Austral Zones. Northeast to NF and Miquelon, in QC north to Magdalen Islands, Gaspésie, and Abitibi, in ON north to Atawapiskat River (52° N lat.), in MB north to Riding Mount, in SK north to White Fox (53° 40' N lat.), in AB, north to Edmonton, in BC north to Fort Saint John, in NT at Norman Wells, west to WA and OR, south to UT, CO, NM, KS, AR, MS, AL, and GA. **Local Range** – Vermont, nine localities (Burlington, Colchester, Milton, Saint George, Barre, West Haven, Dorset, Putney and Brattleboro). New Hampshire, seven localities (northernmost at Hanover, Webster, Dover, Durham, Raymond, Portsmouth, Hampton). **Habitat** – Open areas, particularly sandy fields. **Life Cycle** – Tenerals seen July 22–August 9, a gravid female observed late August (Larochelle 1976*b*). **Behavior** – Landry and Chamberland (1976) published extensive observations on this species. They stated species could climb well and could walk 25 cm/sec. The beetles used their forelegs to hold prey. According to their observation they were not very able to attack hairy or very large caterpillars. The beetle in the alert position raised itself on the front legs, middle legs half raised, antennae raised and directed forward. They observed a female dig a hole with the entrance 1 by 1.5 cm in an open field. The hole was extended 4 cm down under a rock. The adult forages largely in the twilight. Moore (1933) observed a specimen to escape by swimming and taking refuge under a small stone on the bottom of a pond. **Dynamics** – Fully-winged, light trap records.

Genus *Carabus*

25. *Carabus (Carabus) goryi* Dejean, 1831
(formerly *C. limbatus* Say 1823 NEC Fabricius 1776)

General Range – Transition Zone. North to NH, VT, NY, extreme southwestern ON, MI, WI and MN, west to IA, IL, TN, MS, south to AL,

GA and SC. **Local Range** – Vermont, 13 localities, north to Bolton and Huntington. The species seems to be advancing northward; the most northern record before 1970 was Lincoln, in 1991 it was taken near Camel's Hump. New Hampshire, six localities, north to Concord, other localities are Mount Monadnock, Fitzwilliam, Nashua, Hampton, and the Isle of Shoals. **Habitat** – Deciduous forest at least to 300 m elevation. **Life Cycle** – Adults from May 20-August 24, peaking in June. **Behavior** – Adults are rarely found under superficial cover. Rapid clearing of leaf litter will sometimes expose them, although they move rapidly away when first disturbed. Most specimens are caught in pitfall traps. W. Rosenberg (pers. comm.) once caught 50 in a single pitfall trap in NC. Several collectors have seen this beetle climbing trees. It has been caught by pyrethrin spray in the canopy of a sugar maple (Krinsky and Godwin 1990). **Dynamics** – Probably consistently vestigial-winged.

26. *Carabus (Diocarabus) chamissonis* Fischer von Waldheim, 1820

General Range – The tundra of AK and northern Canada north to the Arctic Ocean and including southern Victoria Island, in the interior of the continent extending well into the taiga, south to Edmonton, AB, Prince Albert, SK and Oxford House, MB. Absent from the Pacific coastal regions. In ON at Fort Severn on Hudson Bay, in the east from Fort Chimo on Ungava Bay and the northern tip of LB, south on the coastal tundra to the Straits of Belle Isle. Represented by isolated relict populations on Mont Albert and Mont Jacques-Cartier in the Gaspésie and as well as in the Presidential Range of NH. **Local Range** – Vermont, no records; New Hampshire, confined to the treeless summits of the Presidential Range, especially Mount Washington. **Habitat** – Usually a tundra species but relict populations occur near Edmonton, AB in deep ravines with spruce, aspen, and poplar trees. **Life Cycle** – Lindroth (1961*a*) records full grown larvae in mid-July and a teneral in August (in LB). **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Probably consistently vestigial-winged.

27. *Carabus (Homoeocarabus) maeander maeander* Fischer von Waldheim, 1820

General Range – Hudsonian and Canadian Zones. Northeast to NS and NF, north to southern LB and James Bay to the western shore of Hudson Bay to Fort Churchill, MB, and to Fort Good Hope on the Mackenzie River, northwest to AK in the Seward Peninsula, Kuskokwim Bay and Kodiak Island (this is the only area where the species reaches the West

Coast), in BC, limited to the northeast, south to MT, SD, IA, extreme northern IL, IN, PA, northern NY and ME. Also in eastern Siberia west to the Altai Mountains and south to Japan. **Local Range** – Vermont, six localities, all in the northwest, east to Jay and south to Ferrisburgh. Other localities are Hinesburg, Shelburne, South Burlington and Milton. New Hampshire, no records. **Habitat** – An amphibious species inhabiting swampy spots with shallow water usually with cattails (*Typha)* or sedges (*Carex)*. **Life Cycle** – Females gravid in May (Larochelle 1976*b*). Tenerals in late July or early August. **Behavior** – Most adults are caught in the first warm days after the snow has melted in the spring. At this time they wander away from the summer habitat and are caught crossing roads or pastures in the daytime. In summer they are much harder to find because they become nocturnal and spend much of their time in the water. This species is a powerful swimmer. I once collected a specimen which was swimming in the surf at Red Rocks Point in South Burlington. Larochelle (1976*c*) reports individuals swimming also hiding under floating vegetation where they remained submerged up to ten minutes. During this time they would protrude their abdomen above the surface to get air. **Dynamics** – Probably consistently vestigial-winged.

28. *Carabus (Hemicarabus) serratus* Say 1823

General Range – Upper and lower Canadian to Transitional Zones. Northeast to NF, in QC, Anticosti Island and the North shore of the Gulf, east to Seven Islands, inland, north to Abitibi, in ON, north to Sioux Lookout, in SK north to Saskatoon, in AB, north to McMurray, in BC north to the Okanagan Valley, west to OR, WY, CO, NM, south to KS, IA, IL, OH, WV, NC, SC, in mountains to GA. **Local Range** – Vermont, 15 localities scattered throughout the state, except in the high mountains. New Hampshire, five localities, south of the White Mountains except for one fully-winged specimen from Mount Washington. **Habitat** – Found in dry, open, or partly shaded areas such as gravel pits, railway embankments, thin open forest on rock ledges, edges of talus. Six were taken in pitfall traps on the sloping clay field described under *Cicindela limbalis*, W. Elmore. On Mount Mansfield up to 400 m. **Life Cycle** – Adults May 14-September 30; post-tenerals late July or early August. Hibernates as adult. **Behavior** – Mostly nocturnal, sometimes day-active in spring (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic, two long-winged specimens are known, one from KS, the other, Mount Washington.

29. *Carabus (Archicarabus) nemoralis nemoralis* Müller, 1764

General Range – Temperate Europe from northern Spain, Italy, and Yugoslavia, east to European Russia, north to Britain and Scandinavia. Introduced into Siberia at Novosibirsk and Kazakhstan at Almaty. Introduced into North America on both coasts in WA and NB, both about 1870, reaching Vancouver, BC in 1925. Deliberately introduced into MA in 1909. Present distribution on the West Coast from CA to northern BC at Prince Rupert. Inland records from NV, Cheyenne, WY and Edmonton, AB. In the East from NF west to MN and IL, south to OH and VA. **Local Range** – Vermont, 53 localities; New Hampshire, 20 localities, probably in all cultivated districts in all states. **Habitat** – A strongly synanthropic species which has been able to reach fields and gardens of even the most isolated farms. **Life Cycle** – Both adults and larvae overwinter, larvae abundant in garden soil in late spring, gravid females mostly in May but one found in late August (Larochelle 1976*b*). Adults March 23 - December 5, a teneral reported from June 7. **Behavior** – Adults feed on the garden slugs *Arion subfuscus* and *Deroceras laeve* and might be important in limiting their numbers. According to Digweed (1994), in June the females orient to both slugs and earthworms, but the males only to earthworms. Nüssler and Gramer (1966) report that in Europe this species climbs trees. This has not been recorded in North America. **Dynamics** – Hind wings vestigial.

30. *Carabus (Tachypus) auratus auratus* Linnaeus, 1760

General Range – Most of western Europe from Spain and France east to western Poland and the Czech Republic. The boundaries of this species are much confused because people tend to transport specimens of this attractive beetle, producing sporadic finds in Britain, Scandinavia, and as far east as Moscow. Introduced into all the New England states except RI. It was deliberately introduced at Melrose, Winchester, and Reading, MA in 1908-1910 as one of the species introduced in an attempt to control the gypsy moth *Lymantria dispar*. I learned much of the history of this introduction from Dr. J. G. Conklin of the University of New Hampshire (pers. comm.). *C. auratus* did not prove to be effective against the gypsy moth because it is not prone to climb trees. It is believed to have spread to various isolated areas in northern New England through the shipment of pansies from a market garden in Winchester, MA. The subsequent spread of the beetle has been very erratic apparently mainly through accidental transport of the larva. **Local Range** – Vermont, 18 localities. The earliest record is from Barre (1942),

then Montpelier, (1947), Plainfield (1950), perhaps extensions of the same colony from Calais (1961), Chelsea (1979), Washington (1982) and Cabot (1990). More isolated records are from Johnson (1969), White River Junction (1972), Craftsbury (1991), Sheldon (1991), Northfield (2002), Starksboro (1997), and Cambridge (1989). New Hampshire, six localities, Manchester (1938), Durham (1953), London (1994), Pittsfield, no date, Plymouth, no date, and Lancaster (1948). **Habitat** – A strongly synanthropic species, thriving in croplands and gardens. **Life Cycle** – Hibernates as an adult. **Behavior** – In Northfield, VT, May 18, we captured a specimen apparently just fallen into a pitfall trap although the temperature was 3° C and snow was falling. The elevation was about 549 m. Various observers in Europe have seen it climbing high in trees contrary to the experience in North America (Larochelle 1977*b*). **Dynamics** – Probably consistently vestigial-winged.

31. *Carabus (Tanaocarabus) sylvosus* Say, 1823

General Range – Range poorly defined in North America. Lower Canadian to Lower Austral Zones. North to western ME (Norway), central NH, extreme southwestern QC, in ON north to Gogama, north to MI and WI, west to IA, KS, OK, south to TX and FL. **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*; New Hampshire, three localities, Dover, Concord and Rumney. **Habitat** – Deciduous forests, Spires (1985) found it in second growth mixed forest in northern ON, Lenski (1984) recorded it from oak-hickory forests and adjacent clear cuts. **Life Cycle** – Activity observed in all months; gravid females in autumn (NC); tenerals in early July (NJ, WI; Larochelle and Larivière 2003). **Behavior** – Nocturnal. Adults known to prey on scarab beetles. Alarmed adults may emit *Brachinus*-like smoke from pygidial glands (Larochelle and Larivière 2003). **Dynamics** – Hindwings vestigial.

SUBFAMILY CICINDELINAE
TRIBE CICINDELINI

Fully-winged, daily fliers. Use flight to cover large foraging area, can jump and take wing simultaneously; flight also used to escape. Legs very long and thin, fast runners, poor wedge pushers, but capable of burrowing into loose material. Diurnal (local species); sight predators, vision stereoscopic; extraoral digesters, strictly predatory. Adults forage on open ground; larvae live in vertical burrows and are ambush predators.

Genus *Ellipsoptera*

32. *Ellipsoptera marginata* (Fabricius, 1775)

General Range – Strictly coastal and thus not fitting into a scheme of Life Zones. From southern ME (Popham Beach) south to the tip of FL and up the west coast of FL to its base, also Cuba and the Bahamas. **Local Range** – Formerly on the Atlantic coast of New Hampshire (Hampton, Rye). **Habitat** – Dunn (1981*a*) states: "along the back beach where the dunes and the salt marsh meet, and on the saline mud flats and occasional on the ocean beach." The beetle was last collected in NH in 1977 and is thought to have been extirpated by insecticide spraying of the marshes in attempts at mosquito control. **Life Cycle** – Little is known of this species. According to Knisley and Schultz (1997), it is an early summer species with adults peaking in numbers in late June and early July. **Behavior** – This species is partly nocturnal and comes to lights at night. It is usually solitary and is very wary and hard to spot and hard to catch. **Dynamics** – Fully-winged, a daily flier.

33. *Ellipsoptera puritana* (G. Horn, 1871)

General Range – Shores of the Connecticut River, formerly from Hartland, VT to Cromwell, CT and (disjunct) from the shores of Chesapeake Bay, MD. Old museum specimens labelled "N.Y." and "N.J." indicate a wider range in the 19th century. **Local Range** – Vermont, according to K.W. Cooper, (pers. comm.) there was one old, undated specimen formerly in the Dartmouth College collection labeled "Hartland, Vt." This is the only record for the Vermont side of the river. New Hampshire, Dunn (1981*a*) shows two localities in New Hampshire: Claremont and Charlestown. The species has not been collected in NH since 1939 and is probably extinct in both states. **Habitat** – Adults were found on or just below riverside bluffs of sand or alternating sand and clay layers. Knisley and Schultz (1997) give the most comprehensive summary of the habitat requirements. In the Chesapeake localities, the adults forage on the narrow sand beach below the bluff except at high tide, when they move up onto the cliff face. In New England, presumably, the adults would have moved onto the cliff face in times of high water. Larvae have been found in burrows on the sand beach in New England and in the cliff face on the Chesapeake. In CT surviving populations are on sand banks not associated with tall bluffs. The species there shares the sand banks with *C. repanda* (Omland, pers. comm.). Dam building and flood control have had a disastrous effect on the

Connecticut River populations by greatly decreasing the erosion by the river. The sand banks are no longer eaten back at their bases making the cliffs more stable and resulting in vegetation invading the cliffs. This is likely the primary cause of the disappearance of the species from our states. **Life Cycle** – According to Knisley and Schultz (1997), this species usually has a two-year life cycle, with both winters spent as larvae. Some individuals develop in only one year. Adults emerge in early June. Peak numbers and most matings occur in July and the adults disappear in August. Most adult activity is confined to July when adults of *C. repanda* are absent, thus reducing competition between the two. **Behavior** – Although primarily diurnal, this species is also active at night (Knisley and Schultz 1997). According to Wickham (1899), the adult can recognized by its posture (head held high, caudal end low). **Dynamics** – Fully-winged, a daily flier.

Genus *Cicindela* (Tiger Beetles)

34. *Cicindela (Cicindelidia) marginipennis* Dejean, 1831

General Range – Limited to certain sections of rivers from the Transitional to Lower Austral Zones. In addition to our states, it has been recorded from the upper Delaware River (NY, PA. and NJ), the Susquehanna River and its tributaries (PA), the Monongahela River near Morgantown, WV, several rivers in southern OH and southeastern IN, and along Bear Creek in northern AL and MS. Its habitat requirements probably have always restricted it to scattered localities, while dam-building, pollution, and other human activities must have obliterated it in many areas, including ones which hadn't happened to be found by collectors. For this reason it isn't possible to reconstruct the range before European settlement. **Local Range** – Vermont, three localities, the most northern from Richmond on the Winooski River, the others are Bethel on the White River and Dummerston on the West River. New Hampshire-Vermont (This awkward category results from the location of the interstate boundary which is at the mean low water line on the west side of the Connecticut River), the main populations and suspected larval sites are on islands in the river which are in NH. The beetles however, also forage on the west side of the river, entirely within VT when the water is high but partly in NH when the water in low. When Kenneth Cooper discovered this species, the first beetle he saw crossed the state line and thus became the first record for both states. It simultaneously crossed a town line so it could be recorded from Hartland, VT and Plainfield, NH. I know of four localities on the Connecticut River, the

most northern is at Sumner Falls (also called Hartland Rapids), where I have collected it on the western shore (Hartland, VT and Plainfield, NH). The second is at Hart Island in the same towns, about 3.5 km south of the first locality. I have collected it there both on the island (NH) and the west shore (VT). The third locality is on Chase Island, Cornish, NH (opposite Windsor, VT) and the fourth is at Great Island, Walpole, NH (opposite Westminster, VT). **Habitat** – The adults are found mostly on cobblestone bars on the upstream side of islands and also on spits connected to the shore. The adults will forage on sand banks on the downstream side of the same islands as well as on nearby river banks, but most of their time is spent among the cobblestones. The larva has not been identified with certainty but probable larvae of this species have been found in the higher more vegetated parts of the islands. Dunn and Wilson (1979) described the habitat in more detail and provide photographs of it. **Life Cycle** – Dunn (1981*a*) found adults from mid-July to late September. The length of the life cycle is unknown. **Behavior** – The adults, which have very long legs, often perch atop one of the cobbles and extend their legs so as to elevate their bodies as much as possible. This behavior is known as "stilting" and is common in many species of tiger beetles in very hot situations (Knisley and Schultz 1997). The abdominal coloration is similar to *C. rufiventris* and the comments there may apply to this species also. **Dynamics** – Fully-winged, a daily flier.

35. *Cicindela (Cicindelidia) punctulata punctulata* Olivier, 1790

General Range – Lower Canadian to Lower Austral Zones. North to southwestern ME, Eastern Townships of QC, the Saint Lawrence Valley as far east as Port Neuf, north to the Ottawa Valley, Georgian Bay, Lake Superior and Lake of the Woods, and extreme south of the prairie provinces. The western limit north of 41° N lat. is formed by the eastern edge of the Rocky Mountains but south of there it lies west of the Colorado River drainage, south to the southern tip of NV, the southern boundary is deep in Mexico. All but the southern tip of FL is within the range. The nominate subspecies occupies the entire range east of the Rockies. **Local Range** – The northeastern boundary of the range lies within our states. Vermont, 17 localities, at present the northeastern most records are from Ryegate and W. Elmore but little collecting has been done in the northeast part of the state in the proper season and I expect the true limit to exclude only Essex County in the extreme northeast. New Hampshire, 50 localities (Dunn 1981*a*). The species is widespread south of the White Mountains but there are only two records north of the

Whites, Jefferson and Whitefield. These localities are in an area of low elevation (below 300 m) forming a local expansion of the Coos. **Habitat** – Adults are common, occurring on bare soil in many situations including warm spots and dirt paths in grassy areas, bare soil, croplands and gardens, roadcuts, eroded areas, gravel pits, and even on city sidewalks. The larva is tolerant of different soil types but is a specialist in burrowing in hard, compacted soils, as on paths and dirt roads. **Life Cycle** – According to Shelford (1908) and confirmed by many other workers, this species has a one year life cycle. Adults are present from July 20-October 27 in Vermont and do not survive the winter. Larvae overwinter usually in the third instar. They feed in the spring and pupate in early June. **Behavior** – Adults are the only local tiger beetles that fly at night and are attracted to light traps. Black light records in Burlington are from June 12 and July 23. The repellant fluid of the adult is unusually strongly scented and smells like apples. The larval burrow is of the usual vertical form and is 30-40 cm deep. **Dynamics** – Fully-winged, a daily flier.

36. *Cicindela (Cicindelidia) rufiventris rufiventris* Dejean, 1825

General Range – Upper Austral (with an outlier in the Transitional) to Tropical Zones. North to the Boston area and to just north of New York City and to Lake Erie with a possibly detached area east of Albany, NY extending into VT. Northwest to a line from Lake Erie to the OK-TX boundary on the Red River, south of there west to the 100th meridian (100° W long.). Most of the area within the US contains the nominate subspecies, but another occupies the area around Boston (Murray 1980). The species is absent from the FL peninsula. **Local Range** – Vermont, one locality, Sandgate in the southwest. Howard Romack collected the specimen and also found it nearby in NY. *Cicindela rufiventris* should be monitored closely, possibly it should be included among the species actively spreading northward. New Hampshire, no records. **Habitat** – The VT specimens were from areas of disturbed soil where logs are loaded onto trucks. In IL, I have collected it at the foot of shale or clay bluffs along streams. Others have recorded it from rock ledges, forest trails, logging roads, road cuts, shale borrow pits, and strip mine spoil banks. It is usually in or at the edge of forest. The larval habitat has not been adequately defined or studied. **Life Cycle** – This species has a one year life cycle exactly similar to that of *C. punctulata*. Adults are present from early summer to early fall. **Behavior** – Adults tend to be active in early morning and late afternoon and to be quiescent in the hottest part of the day. The conspicuous red color of the abdomen displayed when the elytra are spread during flight may be a warning to potential

predators. Its sudden disappearance when the beetle drops to the ground and closes its elytra would probably confuse pursuers (Knisley and Schultz 1997). The red pigment is confined to the ventral surface of the abdomen, while the metanotum and abdominal terga are completely transparent, giving a view of the internal organs. When the beetle is flying, the abdomen is illuminated both by direct sunlight from above and reflected light from below. **Dynamics** – Fully-winged, a daily flier.

37. *Cicindela (Cicindela) ancocisconensis* Harris, 1852

General Range – Transitional and a small part of the Lower Canadian Zones. The range of this beetle is very difficult to define because it appears to be in decline so that many of the records are from the 19th and early 20th centuries when standards for accuracy in labels were less strict than now. This makes it hard to decide whether or not to accept some peripheral records. Pearson et al. (1997) provide a map which shows the species ranging from Gaspésie in QC to extreme northern GA and confined strictly within the Appalachians. This must mean that they reject five exact localities in northern IN, listed by Wilson and Larochelle (1979) as well as several other poorly documented ones in the midwestern states. I think that the IN records and at least the Chicago, IL one should be accepted. I define the general range as follows: *Historical Range*, northern limit in Gaspésie, QC, northwestern limit included QC, southeast to the Saint Lawrence River, Buffalo, Chardon River near Cleveland, OH and south along the Appalachians to extreme northern GA. There were two possibly disjunct populations further west, one occupying IN north of the upper part of the Wabash River and extending into IL at Chicago, and the other in the unglaciated hill country of southern IN, from Bloomington south. The eastern limit followed the edge of the Appalachians north into PA and included almost all of NY except the area south of the Catskills. It crossed MA just below the VT line, southern NH and reached western ME at Farmington. The record for Kansas City, MO has been rejected by all the cited authors. *Present Range* (includes all locality records since 1950), in Gaspésie and a number of localities on the Nicolet, Becancour, and Chaudiere rivers south of the Saint Lawrence, in ME, on the Sandy River near Farmington. Acciavatti et al. (1992) reported populations from 12 counties in WV. Knisley and Schultz (1997) report surviving populations in PA, MD, VA, and NC. **Local Range** – Vermont, two populations are known from relatively recent times, the West River in Jamaica (as recently as 1986) and Bethel (Ken Cooper, personal communication). There are 2 historical records, Mount Mansfield and Underhill, July 28, 1881. Both

are from the Roland Hayward Collection (cited by Wilson and Larochelle 1979). As the west side of Mount Mansfield is in the town of Underhill, the 2 labels may refer to the same location. New Hampshire, according to Dunn (1979, 1981*a*) and Wilson and Larochelle (1979), there are still flourishing populations in and around the White Mountains, from Conway and Bartlett north to Pittsburg. There are no recent discoveries further south where the beetle was reported in 1936 and 1937 at Hanover, Canaan (Clark's Pond), and New London. **Habitat** – The adults are usually found on clean sand deposits especially point bars. Wilson and Larochelle (1979) give the most thorough account of the species while Nelson and Labonte (1989) also discuss the habitat in details as well as threats to the ME population. Peskin (1988) gives a detailed description of the habitat at Jamaica, VT. Wilson and Larochelle (1979) provide photographs of typical localities. They report that specimens taken on clay at QC localities as reported by Chantal (1970) were forced into this habitat by high water levels and that the beetles returned to streamside sand deposits when the flood subsided. The locality at Jamaica, VT is artificial being on a sand bathing beach constructed for the patrons of the state park. It implies that there must be natural habitats nearby to supply the founders of this population. The larval burrows are reported to be well back from the stream margin where only the highest floods would reach them. **Life Cycle** – There is probably a two-year life cycle with adults overwintering, breeding in the spring and then disappearing before new adults appear in August. The latter feed in the fall and then go into hibernation. **Behavior** – Darlington (notes) says that this species "occurs with *repanda* and *generosa* on the high, clean white sandy banks of the Pemigewasset River at Plymouth [NH], flies higher, farther and straighter than *repanda*." Dunn (1979) reported a population of this species with reduced elytral markings from Indian Stream, in Pittsburg. Knisley and Schultz (1997) describe the prothoracic pleura as "metallic violet" and this is confirmed by Graves and Brzoska (1991) and Acciavatti et al. (1992). In VT specimens, however, the pleura are bright green, and Wickham (1899) quotes a correspondent, Ottomar Reinecke, to the effect that specimens from Cazinovia Creek (near Buffalo, NY) are recognizable by the bright green of the underside. **Dynamics** – Fully-winged, a daily flier.

38. *Cicindela (Cicindela) duodecimguttata* Dejean, 1825

General Range – Hudsonian to Lower Austral Zones. The range is strongly similar to *C. repanda*. In the north, to NF, central LB, southern tip of James Bay, north end of Lake Winnipeg, and to Great Slave Lake, west only to the Rocky Mountains, south to central TX. In the southeastern states, largely limited to the area above the Fall Line (Piedmont) but recorded from southwestern MS (Pearson et al. 1997). **Local Range** – Throughout both states in suitable habitats. Vermont, 21 localities; New Hampshire, 114 localities (Dunn 1981*a*). **Habitat** – Adults may be on sand or clay soil. When *C. repanda* is present, *C. duodecimguttata* favors the wetter or more shaded spots, where its slightly darker coloring appears appropriate. In VT, we have found it abundant near rivers but it is less bound to them than is *C. repanda.* I collected a long series in a sloping largely clay field at W. Elmore in the company of large numbers of *C. limbalis* and some *C. sexguttata* and *C. punctulata* (see below under *C. limbalis*). Another series was collected on seldom used roads in Ferdinand, VT on very fine gravel outwash, in the company of *C. longilabris.* Dunn (1981*a*) found the species commonest on dark gravelly soils rather than on sand. Frequent habitats were logging roads, trails, and gravel banks. Leng (1902) reported this species from the dark sand of cranberry bogs. Isolated specimens from the highest mountains are probably strays from lower elevations. **Life Cycle** – Mating takes place in May-June (Dunn 1981*a*). Adults nearly disappear in mid-July, new adults from last year's larvae appear at the end of July and forage until October but do not breed until the following year. New larvae appear in late summer, feed until fall and also overwinter. **Behavior** – The upper part of the larval burrow is slanted whether the soil surface is oblique or vertical. Summer burrows are about 10 cm deep while winter ones are 30 cm deep. Adults have been seen to feed on dead insects in shore drift in addition to preying on small flies, pygmy mole crickets (Tridactylidae) and other small insects (Knisley and Schultz 1997). The hunting technique is like that of *C. repanda.* **Dynamics** – Fully-winged, a daily flier.

39. *Cicindela (Cicindela) formosa generosa* Dejean, 1831

General Range – Lower Canadian to Lower Austral Zones. The species C. *formosa* Say 1817 has almost the same limits as *C. scutellaris* except that *formosa* is absent from the coastal plain of AL through GA to the Carolinas. The two species are almost always found together where both are present. The subspecies *C. formosa generosa* Dejean 1831 occupies

the area east of the Great Plains. **Local Range** – Nearly throughout both states. Vermont, 16 localities; New Hampshire, 23 localities. The species is not recorded from the Boreal Plateau in either state although it has been taken as far north as North Stratford, NH in the Coos, and Shelburne, NH in the Androscoggin Valley. **Habitat** – The same as for C. *scutellaris lecontei*, its almost constant companion. **Life Cycle** –There is the usual type of two year cycle as in *repanda.* The spring (old) and fall (new) adults overlap so that some adults are present throughout the entire summer. Mating has been observed in July (Dunn 1981*a*). Some adults do not emerge from the pupal chamber in the fall but remain until the spring. **Behavior** – The larval burrow is unique. The entrance is in a small pit with unstable sides (somewhat like that of an antlion trap).The upper part of the burrow is horizontal. The sand grains around the immediate entrance are cemented together presumably by a secretion from the larva. The main part of the burrow is vertical and is up to 60 cm deep (Knisley and Schultz 1997). The adult makes a loud buzzing sound in flight. It is a wary species and makes long escape flights when disturbed. According to Knisley and Schultz (1997), the adult will often tumble when landing and will emit a musty odor when handled. **Dynamics** – Fully-winged, a daily flier.

40. *Cicindela (Cicindela) hirticollis* Say, 1817

General Range – Widespread from all the contiguous US and all Canadian provinces. High Canadian Zone to Tropic Zone. North to Lake Melville area, central LB and Lake Athabaska in northern AB and SK, south to central FL, southern TX, and the mouth of the Colorado River in AZ, with an isolated population in Veracruz State, Mexico. The species apparently requires sand areas next to the ocean, large lakes or rivers and the range, therefore, is broken up into more or less isolated areas with distinctive subspecies. Graves et al. (1988) recognize 11 subspecies. **Local Range** – Vermont, six localities, on Lake Champlain from Burlington north to Knight's point on North Hero Island. An unpublished master's thesis (Peskin 1988) gives much information on this population. The only breeding population is on a sand spit at the mouth of the Winooski River, part of a small biological preserve which is bordered on the landward side by a residential area. Two of the additional sites are on beaches which probably had breeding populations until recently. Three additional sites probably represent individuals dispersing in search of new habitat. One of them, Knight's Point yielded two individuals in 1987 and may provide a hopeful sign. The beach there is constructed artificially with trucked sand. It is about 26 km from the

only known breeding population. These specimens may be hybrids of the subspecies *C. hirticollis hirticollis* x *rhodensis* as the markings are stronger than in the NH specimens. New Hampshire, four localities, by the ocean at Hampton beach, on the shore of Great Bay in Durham, at Lake Ossipee, and on a sand tennis court in Exeter 15 km inland. No specimens have been collected since the 1930's, and the population is believed to have been extirpated as a side effect of efforts used to control mosquitoes (Dunn 1981*a*). New Hampshire populations are subspecies *C. hirticollis rhodensis* Calder. **Habitat** – The adults are found on sand beaches bordering lakes and oceans. In other parts of the range, they are found on sandy shores of large rivers, but there are apparently no records from the Connecticut River except near the mouth in the state of CT. Perhaps the species disappeared as a result of artificial regulation of stream flow resulting from dam construction. **Life Cycle** – This species has a two year cycle similar to those of the two preceding species. According to Knisley and Schultz (1997) it emerges later in the spring and withdraws into the winter burrow earlier in the fall, so that the two generations of adults overlap extensively in the summer. In the southern states it develops in one year. In VT adults May 25-September 1. Adults in QC May 11- September 13 (Larochelle 1975). **Behavior** – Larvae live in the beach sand close to the water but above the reach of the waves (Knisley and Schultz 1997). In April and May, the habitat of a Lake Champlain population is completely immersed by the rising waters and both larvae and adults must endure prolonged submersion perhaps in air trapped in the burrows. The larval burrow is normally vertical and 12 cm deep. In some situations the larvae make burrows in vertical banks. **Dynamics** – Fully-winged, a daily flier.

41. *Cicindela (Cicindela) limbalis* Klug, 1834

General Range – Upper Canadian to Transitional (east of IL) or Upper Austral (west of IL) Zones. North to southern NF, Anticosti Island, north shore of the Gulf of Saint Lawrence, northern ON up to the tree line, southern three-fourths of MB and SK and a strip extending north along the Mackenzie River. West beyond the Rockies but not penetrating the Columbia River valley or Great Basin, south in the Great Plains to northern NM, south to northern KS, western and northern IL, extreme north of IN and OH, western PA, and northern half of NJ. **Local Range** – Records are too few to present a good picture of the local limits. Vermont, 12 localities all in the north, Westford, Waterbury, Duxbury, Worcester, W. Elmore, Plainfield, Cabot, Westmore, Mount Mansfield to 1225 m. There are no records from the Champlain lowlands. New

Hampshire, Dunn (1981*a*) gives six localities, one northern (Rumney) and the other five in the southeast from Dover south to Hampton and inland to Lea. As Dunn has pointed out, the habitat, steeply sloping clay banks, must be visited at the proper time of the year so the species is unlikely to be collected except by someone specifically looking for it. It may eventually be shown to occur throughout both states. **Habitat** – Sloping clay banks, sometimes very steep ones. The locality at W. Elmore, VT was a sloping field of several hectares which had been cleared of its vegetation and topsoil by a bulldozer. It was about 420 m elevation and was very thinly vegetated, primarily by mosses and lichens. Rye grass (*Lolium)* had been sown, but grew only sparsely. During the eight years I collected in this field, vegetation failed to invade it. The field swarmed with tiger beetles, and *C. limbalis* was the most abundant. I took several hundred specimens, mostly by pitfall trap, without appreciably reducing the numbers. Associated species were *C. sexguttata* ("*harrisi*" form), *C. duodecimguttata*, and *C. punctulata*. Adults were taken along the trail up the eastern side of Mount Hunger (in Worcester) up to 900 m elevation. **Life Cycle** – Mating and egg-laying occur in May and early June. According to Hamilton (1925) this species reaches only the second instar by fall and overwinters in this stage. Pupation is in the following July and new adults appear in August. Some new adults remain in the pupal chamber and do not start feeding until the next spring. Dunn (1981*a*) considered this to be a spring-fall species but at W. Elmore, adults were present throughout the summer. Vermont adults June 21-September 28. **Behavior** – The larval burrow is unusual in being largely horizontal except for the outer end, which is perpendicular to the soil surface, usually there is a short chimney of soil around the entrance. The burrow is 7-10 cm deep (Hamilton 1925). **Dynamics** – Fully-winged, a daily flier.

42. *Cicindela (Cicindela) longilabris longilabris* Say, 1824

General Range – This is the most northern of American tiger beetles. Hudsonian and upper Canadian Zones. North to Lake Melville, LB, and Great Whale River on Hudson Bay, further west the northern limit reaches Lake Athabaska, Great Slave Lake and Norman Wells on the Mackenzie River. The most northern record of all is from Old Crow, YT, on the Porcupine River beyond the Arctic Circle, west to Fairbanks, AK, the eastern side of the Coast Range of BC. The species does not reach the Pacific Ocean except at Puget Sound. South of there, it follows the mountains to the Sierra Nevada of CA, at least to Mount Whitney, and there are some isolated populations in the Coast Range of OR and CA.

The species is absent from most of the Great Basin, but another series of populations extends south along the Rocky Mountains to northern AZ and NM, east of the Rockies, the southern limit extends from Calgary, AB through Saskatoon, SK and Brandon, MB. It occurs in north central MN, through the Upper Peninsula of MI and the tip of the Lower Peninsula. It is absent from most of southern ON, but occurs in the Bruce Peninsula north of a line from Lake Simcoe to Cornwall. Isolated populations are in the Adirondacks and Catskills of New York state. It is absent from the Montreal area and along the Saint Lawrence but there is a large detached area including the remainder of QC south of the Saint Lawrence extending south into VT, NH, and ME. There are three subspecies (Spanton 1988). The nominate one occupies all the area east of the Rockies. **Local Range** – The species is restricted to the higher mountains and northern plateau in our states. Vermont, three localities, two in Duxbury on Camel's Hump and a third from Ferdinand. New Hampshire, 19 localities, in and north of the White Mountains. Mount Moosilauke and Mount Chocorua are the most southern records in the White Mountains but there is also an isolated population on Mount Cardigan. In the White Mountains, the species is found at all elevations from the valleys between the mountains (Berlin Falls) to the summit of Mount Washington (Darlington, notes). **Habitat** – One of the specimens from Camel's Hump was on a disused lumber road at 335 m on the eastern slope and the other was caught on a rock ledge on Bamforth Ridge at 610 m. The specimens from Ferdinand were on seldom- used roads on fine gravel outwash where they occurred with *C. duodecimguttata.* Graves (1963) listed jack pine (*Pinus banksiana*), blueberries (*Vaccinium* spp.) and reindeer moss (*Cladonia* spp.) as common associates. **Life Cycle** – There is a two-year life cycle. Adults appear in May and are present until the second week in September. Breeding is in early summer, the larvae overwinter in the second instar, the second summer is spent in the second and third instars, with pupation in July and August. New adults emerge and feed but do not breed until early summer of the following year (Spanton 1988). **Behavior** – Valenti (1995) describes vertical escape flights used by this species when cornered in a small clearing hemmed in by spruce trees. Larochelle (1977*c*) noted that the beetle became paralyzed and motionless when a sudden cold shower succeeded strong sunlight. **Dynamics** – Fully-winged, a daily flier.

43. *Cicindela (Cicindela) patruela patruela* Dejean, 1825

General Range – The species is limited to parts of the Transitional and Upper Austral Zones. This subspecies is widespread. Two other subspecies occur in limited areas, one in the NJ pine barrens, the other in part of western WI. Known northern limits are central NH, Karner, NY near Albany, the lower Ottawa valley in ON, the south shore of Lake Superior, and central MN. The latter is the westernmost point also. The southwestern limit passes through northeastern IL, southern IN, central KY, and eastern TN. In the Appalachian Mountains, it reaches northern GA. In the southern states it is limited to the mountains or nearly so (Knisley and Schultz 1979). The restricted habitat, coarse sand with pine trees, has been extensively destroyed and the range is now highly fragmented. This is now a rare, relict species. **Local Range** – Vermont, one record, from Burlington, 1870 (Harris 1918). The extensive sand plains in and around Burlington have largely been destroyed by urban growth so the species may now be extirpated from the state, however, there has been a credible sight record by an experienced collector who failed to capture the specimen. New Hampshire, two records, Chocorua and Exeter (Dunn 1981*a*). **Habitat** – Sand plains with pine forest or oak and pine. In some areas it is found on coarse sand with quartz cobbles, produced by the erosion of sandstone exposures (Knisley and Schultz 1997). Likely situations include trails, unpaved roads, gullies, and sand pits, especially long inactive ones. Willis (2001) characterized this beetle as a "disturbance-dependent species of early successional habitats." He suggests that the brown subspecies from WI is adapted to a background of dark brown mosses, lichens, and microbiotic crust in the former basin of glacial Lake Wisconsin, while the widespread *C. patruela patruela* is adapted to a background of greener mosses. **Life Cycle** – It resembles that of *C. repanda* with a two-year life cycle. The one-year old larvae pupate in the fall (Willis 2001). However, Knisley et al. (1990) observed that there appeared to be many more adults in the early spring than were obvious in the preceding autumn and they conclude that some of the individuals imitate *C. sexguttata* in that the newly formed adults remain in the pupal cell over winter. **Behavior** –The beetle oviposits among mosses but hunts on loose sand (Willis 2001). Boyd (1978) observed that this species, like *C. sexguttata,* will land on vegetation. **Dynamics** – Fully-winged, a daily flier.

44. *Cicindela (Cicindela) purpurea purpurea* Olivier, 1790

General Range – Transitional and Upper Austral Zones with limited penetration of the Lower Canadian Zone in New England. East to NS, north to southern ME, in QC around Montreal and along the Saint Lawrence River to Quebec City, in the Ottawa Valley and reaching the south shore of lake Superior, in the southern prairie provinces in south central BC west nearly to the Pacific Coast, south in the mountains into CA, AZ, and NM, south to northern TX and northern AR, in the southeast, limited to the Piedmont and Appalachians in northern AL, western NC, and VA. The subspecies *C. purpurea purpurea* occupies the entire range east of the Great Plains. Four other subspecies are western. **Local Range** – Probably throughout both states, including the highest mountains. Vermont, 12 localities; New Hampshire, 40 localities (Dunn 1981*a*). Darlington (notes) cites records from Mount Washington and Mount Moosilauke. **Habitat** – Adults are usually found on bare spots in grassy fields, commonly in ruts of seldom-used roads and especially along cow paths in upland pastures. Darlington (notes) writes "about old clay pit near Loon Lake; in dry sandy fields where the grass is thin." We have taken this species on woods roads in the National Forest and in gravel pits. **Life Cycle** – This species has a two-year life cycle similar to *C. repanda.* Adults are the earliest tiger beetles abroad in the spring, appearing in late April to mid-May in northern Vermont, and as early as late March in southern New Hampshire. Mating occurs in the spring and the larvae reach third instar by fall. They overwinter, feed the following spring, and pupate in July. New adults appear in August and feed in the fall but do not breed until the following spring. In Vermont, old adults appear as early as April 27 and the last disappear in early July. New adults are present from August 15 to September 27. **Behavior** – Adults are adapted to relatively low temperatures. Bernd Heinrich (pers. comm.) noted that in cool, sunny weather in mid-May, *C. purpurea* was active only in the morning while *C. tranquebarica* at the same site (old gravel pit) was active in the warmest part of the afternoon. Darlington (notes) saw *C. purpurea* landing on snow patches at Rumney, NH in April. The adults are rarely collected in numbers, probably because the favorite habitat, small bare spots in grassy fields, is usually widely dispersed. The larval burrow is of the usual vertical type, quite unlike that of *C. limbalis.* **Dynamics** – Fully-winged, a daily flier.

45. *Cicindela (Cicindela) repanda repanda* Dejean, 1825

General Range – A widespread species. Hudsonian Zone to the Lower Austral Zone. Northeast to central LB (Cape Henrietta Maria), southeast to FL, north of Lake Okeechobee, central TX, northwest to Peace River, AB, west of the Rockies only in eastern BC, UT, and the Columbia River drainage where it does not reach the Pacific Coast. Other subspecies occupy the Atlantic coast of Canada and nearby islands. **Local Range** – Throughout both states in suitable habitats. It probably does not breed in the higher mountains, although several collectors have taken stray specimens on the higher peaks. Vermont, 46 localities; New Hampshire, 114 localities (Dunn 1981*a*). **Habitat** – Adults are found on sand or sandy soil. They are abundant on sand bars along rivers and on sandy unpaved roads in river bottoms, also in damp sand pits. Larvae live in burrows among scattered vegetation, not in the open (Hamilton 1925). Adults burrow at night into dry sand along the upper stream banks. **Life Cycle** – In our area, this species has a typical two-year life cycle, spending the first winter as a full grown, third instar larva, in the second as an adult. According to Knisley and Schultz (1997), there is a one-year cycle in the southern states. Mating and egg laying are in May and June. There is a low point in the population in July, new adults emerge and feed in late summer. **Behavior** – The hunting adult alternates runs with pauses. Prey detection was studied by Gilbert (1997). He theorized that the pauses allow the beetle to correct the angle of its path to the location of the prey. Newly emerged adults have also been seen feeding on fruits of pokeweed (*Phytolacca*) and sassafras (*Lindera;* Hill and Knisley 1992). They hypothesize that such feeding is important because it allows a buildup of stores of nutrients before the adult predation becomes effective. The dorsal coloring of the adults tends to match that of wet sand. The flights are shorter and more curved than those of other local tiger beetles. Since this species often occurs in dense swarms, such behavior may make it difficult for a predator to focus on any individual, and thus it may be protective (Knisley and Schultz 1997). **Dynamics** – Fully-winged, a daily flier.

46. *Cicindela (Cicindela) scutellaris lecontei* Haldeman, 1853

General Range – Lower Canadian to Lower Austral Zones. North to Quebec City area, southern shores of Lakes Huron and Superior to southwestern MB and extreme southeastern AB. The Rocky Mountains form the western limit except for a few populations west of the mountains in CO, south to southern TX and FL, east to southwestern ME. The beetle is restricted to major sand areas, and the range is disjunct. There are

seven subspecies. We have *C. scutellaris lecontei*. It occupies virtually the entire northern edge of the species range and extends south into MO and OH. In New England, the southern limits are northern CT and western MA. *C. scutellaris rugifrons* Dejean 1825 occupies the Atlantic Coastal Plain from VA to eastern MA. The other subspecies occupy the Great Plains and parts of the southeastern states. **Local Range** – Both states are largely within the range of the species. Vermont, 14 localities; New Hampshire, 22 localities, not recorded from the Boreal Plateau although there are several records from the Coos. This may mark a segment of the northeastern limits of the species. According to Dunn (1981*a*) a few localities in southeastern New Hampshire (near the border of MA and east of the Merrimack River) contain individuals typical of *rugifrons* so the population there as a whole should be considered to be intergrades *C. scutellaris lecontei* X *rugifrons*. **Habitat** – Loose sand away from water. Dunes, sand pits, and blowouts are all suitable. Anthropogenic habitats are important to the survival of this species because of the wholesale destruction of most natural dune and sand plain habitats. **Life Cycle** – This species has a two-year life cycle similar to that of *repanda.* Adults which have overwintered are present from early May to late June in northern Vermont. The beetle is scarce or absent in July-August and new adults appear in September and are active while warm weather lasts in October. Mating has been observed in late May and early June. Adults have been collected from May 12- October 2 in VT. **Behavior** – The larval burrow is a vertical shaft, 30-55 cm deep (Knisley and Schultz 1997). Adults are relatively weak fliers but are especially wary and are not easy to catch. They sometimes take shelter in vegetation when pursued. Their repellant fluid, like that of *C. punctulata*, smells like apples. **Dynamics** – Fully-winged, a daily flier.

47. *Cicindela (Cicindela) sexguttata* Fabricius, 1775

General Range – Eastern North American species. Lower Canadian to Lower Austral Zones. North to the mouth of the Saguenay River, Lake Superior and southeastern ND, south to the Gulf of Mexico and northern FL, east to southern NS, west to the 100th meridian (100° W long.). **Local Range** – Our states are entirely within the general range and the species occurs throughout both. Vermont, 45 localities; New Hampshire, 41 localities. The form "*harrisi*" of uncertain status has been taken at W. Elmore, VT, and, according to Darlington's notes, at Jaffrey, Kearsarge, Chocorua, and "Glenn" in NH. **Habitat** – In most of its range, this is a forest and forest edge species, commonly seen on old lumber roads, trails and blowdowns. In northern New England, it can also be found in more

open situations. In our suburban garden, it is sometimes common and easily observed. The form "*harrisi*" (Leng 1902) reported from the Appalachians from QC to the Carolinas is normally at higher elevations than the typical *sexguttata* although Dunn (1981*a*) states that it has been taken on occasion in the same localities as the latter. In VT, "*harrisi*" has been found at or above 400 m elevation. This entity might be the result of the direct effect of temperature on the developing insect or it might be the mark of a sibling species. Kaulbars and Freitag (1993) considered "*harrisi*'' conspecific with *sexguttata* despite the observation of small differences of both male and female genitalia. Molecular techniques will be needed to settle the status of "*harrisi*." I collected a series of "*harrisi*" from the sloping clay field described above under *C. limbalis*. Larvae make their burrows at spots where the soil is exposed such as bases of windthrown trees, edges of trails, and small eroded gullies. I have also found larvae in partly shaded patches of the vegetable garden. **Life Cycle** – There is a two-year cycle which differs from that of *repanda* in two respects: mating is shifted to mid-summer (June and July) and the new adult does not normally quit the pupal chamber in the fall but remains quiescent until next spring, April-May. Rarely an adult may be seen in the fall. These are probably individuals that have been disturbed in the pupal chamber and are seeking new shelters. I have accidentally evicted such new adults while spading the garden in October. In Vermont, adults April 15-October 23, but specimens are very rare after early July. In the "*harrisi*" form, the adult is present later in the summer, July-September. Schultz (1998) has confirmed that in OH, females of *sexguttata* do not contain eggs until May or June. **Behavior** – According to Knisley and Schultz (1997), this species rarely makes dashes while hunting like other tiger beetles but tends to sit and wait in flecks of sunlight where it ambushes incoming insects. Schultz (1998) states that the adults are generally distributed through the forest before the trees leaf out but later move to tree-fall gaps and trails when the canopy is closed responding to a need for higher temperatures. Disturbed adults follow a curved flight path and often alight in or on vegetation. An adult has been observed foraging on floating water lily leaves (Lawton 1975). In the early spring the beetle is often found underneath loose bark or flat stones. This is when the air temperature is still low but the skies are clear and the sun is bright. The stones or bark are heated by the sun and the beetles are "basking" raising the body temperature but hidden from predators. **Dynamics** – Fully-winged, a daily flier.

48. *Cicindela (Cicindela) tranquebarica tranquebarica* Herbst, 1806

General Range –Upper Canadian Zone south to the Lower Austral Zone. Northern limits are the southwest corner of NF, the north shore of the Gulf of Saint Lawrence, southern end of James Bay and Great Slave Lake, west to the Cascade Range, in the central valley of CA, south to northern AZ, NM, TX, most of the Gulf States, the south tip of SC, but not reaching the Gulf of Mexico nor the State of FL. The nominate subspecies occupies the entire range east of the Rocky Mountains, including the Great Slave Lake area. There are five additional subspecies in the western states. **Local Range** – Our states are entirely within the general range and the species is found throughout both. Vermont, 19 localities; New Hampshire, 72 localities (Dunn 1981*a*). **Habitat** – This is a widespread, adaptable species, not associated with water as a rule. We have collected it with *C. formosa generosa and C. scutellaris lecontei* in areas of loose sand, and with *C. repanda* and *C. duodecimguttata* in sand and gravel pits. In the sloping field at W. Elmore it was associated with *C. limbalis, C. punctulata* and *C. sexguttata.* Darlington (notes) writes it "occurs on dirt roads, railroad embankments and banks along the Pemigewasset River (with *C. ancocisconensis).*" Adults have been taken on a number of mountain tops including Mount Washington, Mount Kearsarge, and Mount Monadnock (NH). Carl Parsons collected it on the summit of Styles Peak (1037 m) in Dorset, VT. **Life Cycle** – This species has the two-year life cycle typical of *C. repanda* and most other members of subgenus *Cicindela.* According to Knisley and Schultz (1997), however, development may take place in one year in the southern states. Graves and Brzoska (1991) report a hiatus in midsummer, but Dunn (1981*a*) indicates that adults may be found throughout the summer. Adults appear early in the spring and disappear into winter burrows late in the fall. Dunn (1981*a*) give March 29 and October 8 as extreme dates in southern NH. **Behavior** – According to Hamilton (1925), larval burrows are in relatively moist spots within the habitats frequented by the adults. Dunn (1981*a*) observed mating on May 31, June 6, and July 20. When disturbed, adults make long escape flights. **Dynamics** – Fully-winged, a daily flier.

SUBFAMILY LORICERINAE

TRIBE LORICERINI

Genus *Loricera*

The adult is fully-winged, a fast runner, poor wedge pusher, swallows pieces of prey, a specialized predator on Collembola, and uses stereoscopic vision to locate prey. Long, heavy bristles on antennae and labium form a trap for prey. Defensive fluids contain saturated aliphatic acids released by oozing discharge. Larva is a surface runner, adapted to catch Collembola by adhesive gland on enlarged galea.

49. *Loricera (Loricera) pilicornis pilicornis* (Fabricius, 1775)

General Range – Circumpolar. In Europe, south to northern Spain, southern Italy, northern Yugoslavia. In Asia, south to mountains of Iran and to Tian Shan, and Altai Mountains In North America, Hudsonian, Canadian, and Transitional Zones. East to NF, north to LB (Hamilton River), in QC north to Schaefferville and Poste-de-la-Baleine, in ON north to Fort Severn on Hudson Bay, in YT north to the Kluane River, west in AK to the western Yukon Valley at Nulato, on the south coast to Katmai, west to the Pacific coast and CA, south to UT, NE, MN, WI, OH, PA, and NJ. Other subspecies in the Amur and Ussuri Valleys of Siberia, the Kuril Islands of Russia and Japan, and the Aleutian Islands of AK. **Local Range** – Probably throughout both states. Vermont, 43 localities; New Hampshire, 30 localities. **Habitat** – Found in dense vegetation at the margins of slow streams and borders of ponds and bogs where it can be collected by tramping. According to Lindroth (1945), it favors small, stagnant, foul-smelling ponds. A specimen from the top of Mount Washington was probably a stray flier, as more certainly was one collected in early spring beneath a stone in a suburban garden in South Burlington. Even in a favorable habitat it is rare to collect more than one or two of these beetles on a single occasion. **Life Cycle** – Adults in VT collected Mar31-Oct31, showing that it overwinters as an adult. Tenerals found in late June and July. **Behavior** – A nocturnal species, sheltering by day under heaps of dead plants, small stones, and pieces of bark or wood. **Dynamics** – Fully-winged, flight records.

SUBFAMILY ELAPHRINAE

TRIBE ELAPHRINI

Medium-sized predators, diet unspecialized, the adults swallow pieces of solid food. The beetles are good runners but poor wedge pushers, local species are fully-winged, probably using wings only to disperse. Many species stridulate. Repellant fluids, containing higher saturated acids, ooze out from pygidial glands. Larvae have heavy urogomphi, an adaptation for burrowing through loose materials.

Adults of the two genera are very different. *Blethisa* are amphibious beetles with normal-sized eyes, largely nocturnal and usually found in floating vegetation mats. *Elaphrus* are largely diurnal and are seen running on bare, wet mud or sand, usually by streams or lakes. They have huge eyes giving them stereoscopic vision, and find their prey largely by sight.

Genus *Blethisa*

50. *Blethisa hudsonica* Casey, 1924

General Range – Upper and Lower Canadian Zones. East to NS and NF, north in QC to Natashquan, Lake Mistassini, and James Bay, northern parts of the western provinces, in NT to the Mackenzie Valley north to Norman Wells, northwest to Circle, AK, south to BC, MT, ND, WI, northern IL, MI, PA, NY, and MA. Also, in eastern Siberia to the Amur Valley and Kamchatka. Other subspecies in Siberia, Scandinavia, isolated in mountains in the British Isles, Alps, Pyrenees, central Asia (Aldans, Altai and Tannu-Ula). **Local Range** – Vermont, six localities, mostly on the shores of Lake Champlain (mouth of Lewis Creek in Ferrisburgh, Isle La Motte, two spots in the Missisquoi Delta at Long Marsh and Dead Creek, Alburgh) and Arrowhead Lake in Milton. New Hampshire, four localities, Lake Francis in Pittsburg, two sites in Errol (Long Pond and swampy borders of Androscoggin River), and Milton. All three species in this genus are underepresented in collections because of the special efforts and techniques required to collect them. The short season of adult activity poses further difficulties. **Habitat** – Usually in floating mats of vegetation. In the Missisquoi Delta, it was found at the outer edge of the marsh where it borders open water. On Isle La Motte a series of specimens were collected in "The Marsh," actually a wooded channel which bisects the island. In a period of low water the beetles

were congregated at a rather deep spot where mosses covered wet mud. Darlington (1931) quoted the collector of the series from Milton, NH as follows: the locality "was on the Salmon Falls River at a place where the shore was of deep mud with pools of water. The *Blethisa* occurred on grass roots." In OR it was taken in a floating mat of dead cattail stalks (Labonte and Johnson 1989). **Life Cycle** – Gravid specimens taken in July, a teneral taken August 8 (Larochelle 1978*a*). On Isle La Motte several specimens were taken in September, otherwise adults have been collected only in June-July in Vermont. **Behavior** – Species stridulate (Larochelle 1976*d*). It takes to the water to avoid danger. Labonte and Johnson (1989) report that it submerges by running down grass stalks below the surface. **Dynamics** – Fully-winged, flight has been observed in European specimens.

51. *Blethisa julii LeConte, 1863*

General Range – Hudsonian and Canadian Zones. East to NS and NF, in QC to Lac Saint Jean and Abitibi, in ON north to Lake Nipigon, in MB north to Churchill, north to Fort Smith in the NT, northwest to Anchorage, AK, south to southern AB (south of Calgary), south to MI, NY, NH, VT, and ME. **Local Range** – Vermont, one locality, Gillett Pond, Richmond. New Hampshire, three localities in the Presidential Range only (Hermit Lake, Starr Lake, and Lake of the Clouds). **Habitat** – According to Darlington (1931), "occurs in moss and grass beside the various exposed pools and springs from Starr L. on the north to south of the Lakes of the Clouds. The beetle is fairly common from June 24 - July 21 but is rare or absent later in the year so that the species is notoriously rare in collections." The locality in Richmond, VT is unusual for the low elevation (220 m). The pond lies in a deep, narrow cleft between two hills which shade it from all but the noonday sun. It is still relatively cold in June when the beetle was collected. **Life Cycle** – Adult activity is short, from late June to late July. Beetles become adult in late summer but apparently are inactive until the next summer. **Behavior** – According to Darlington (1931) "on warm days in late June, in the evening or early morning the *Blethisa* emerge from their retreats in the deep moss and run about the edges of the small "lakes," feeding on the drowned insects which have been thrown up on the leeward banks." **Dynamics** – Fully-winged, no flight records.

52. *Blethisa quadricollis* Haldeman, 1847

General Range – Hudsonian, Upper and Lower Canadian Zones. East to NS and NF, northeast to LB (Goose Bay), north in QC to Saguenay, in ON north to Lake Nipigon, in AB to McMurray, north to Fort Smith, NT, northwest to Anchorage, AK, west to BC (Summit Lake, north of Prince George), south to MT, MB and MN, near the Great Lakes in IL, IN, OH, south to PA, NJ, NY, south to Catskills and MA. **Local Range** – Vermont, two localities, Bear Pond on Mount Mansfield (1915 m), Moose Bog in Ferdinand. New Hampshire, nine localities, Pittsburg, Durham, Rye, Plymouth, Swanzey Pond, Hampton, Franconia, Starr Lake, and Lake of the Clouds (Presidential Range). **Habitat** – *Sphagnum* mats in acid bogs, according to Lindroth (1961*a*) "especially in pillows of *Sphagnum* covered with *Oxycoccus* (lesser cranberry) at the borders of pools, often where *Myrica gale* (sweet gale) grows". Darlington (1931) states "the favorite habitat of this fine beetle is in thick moss or grass which is not only wet but actually floating in several inches of water, in cold swamps. The species is thus sometimes taken in the dredging net with Dytiscidae." **Life Cycle** – The period of adult activity is short. According to Darlington, June 22 - July 12. Larochelle (1976*b*) reported a gravid female in early July. Hibernates as adult, tenerals appear at the end of the season but are not active until the following spring. **Behavior** – The beetle stridulates (Larochelle 1976*d*). The repellant secretion of adult has the odor of burnt chocolate, according to Larochelle (1978*a*). **Dynamics** – Fully-winged. Goulet (pers. comm.) has observed it in flight in QC.

Genus *Elaphrus*

53. *Elaphrus (Neoelaphrus) cicatricosus* LeConte, 1847

General Range – A limited area in the northeastern US barely reaching Canada. Transition Zone. North to western ME, extreme southern QC (Knowlton and Saint-Jean-sur-Richelieu), western NY, south central MI, south to eastern OH, down the Appalachians to northeastern TN, east of the mountains south to northern VA, NJ, and CT. **Local Range** – Our states are at the north edge of the range. Vermont, nine localities, Newark (northeasternmost record), Putney (the southernmost record), Elmore, Waterville, Underhill, Georgia, Milton, Westford, and Starksboro. New Hampshire, 9 localities, Second College Grant, Mount Washington, Rumney, Litchfield, Hollis, Pelham, Hampton, Hampton Falls, and South Hampton. **Habitat** – Found on moist mud or fallen leaves in dense

shade, particularly in alder thickets and by beaver ponds. The habitat makes it hard to see and to collect, making it seem rarer than it actually is. **Life Cycle** – VT adults, May 17-June 26, in other areas there are fall records. The species is teneral in August in QC and overwinters as an adult. **Behavior** – Mostly diurnal. Adults may stridulate when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

54. *Elaphrus (Neoelaphrus) clairvillei* Kirby, 1837

General Range – Hudsonian, Upper and Lower Canadian Zones. East to NS, northeast to NF, north to southern LB and James Bay in QC, in MB north to Fort Churchill on Hudson Bay, in the NT north to the Mackenzie Delta, northwest to the interior of AK, west to the Pacific Ocean, Queen Charlotte Islands in BC and to WA, OR, and northern CA, southwest to eastern AZ, south to NM in the Rockies, in the Great Plains not south of the Canadian border, further east, south to MN, northern IL and IN, northwestern PA, northern NJ, NY, MA, and RI. Goulet (1983) gives detailed range maps and much other information about this genus. **Local Range** – This species is throughout both states in suitable habitat. Vermont, 23 localities; New Hampshire, 19 localities, including the summit of Mount Washington. **Habitat** – On moist but not saturated mud or dead leaves in shaded places, often among thick sedges, cattails or alders. At Lawrence Brook in Morristown, VT it was abundant in flooded alder thickets bordering a beaver pond. It was in the borders of bogs at Peru, VT and at Bear Pond on Mount Mansfield. Goulet (1983) concluded that specimens from high altitudes do not breed successfully there but are winged migrants. **Life Cycle** – Larochelle (1976*b*) reported gravid females in late June, Goulet (1983) reported oviposition from mid-May to late June. Pupation occurs in rotten logs. Adults in Vermont recorded from April 29–October 6. Both new and old adults overwinter in logs in forests. Tenerals taken on August 8 (Larochelle 1976*e*). **Behavior** – Adults stridulate (Larochelle 1976*d*). **Dynamics** – Fully-winged, no flight records.

55. *Elaphrus (Neoelaphrus) fuliginosus* Say, 1830

General Range – Lower Canadian and Transitional Zones. Northeast to the coast of ME, in QC at Montreal and down the Saint Lawrence to the mouth of the Saguenay River, in ON at Ottawa, Sault Sainte Marie to the Assiniboine River in southern MB, northwest to Edmonton, AB, south to NE, central IA, northern IL and IN, southern ON, south to MD, eastern

NY (Adirondacks, Catskills, and Long Island), CT and RI. **Local Range** – Both states are entirely within the general range but the species is very rare and represented only by a few specimens. Vermont, five localities, W. Elmore, Worcester Mount, Newark, Newbury, and Franklin Swamp. New Hampshire, four localities, summit of Mount Washington, Lake of the Clouds, Rumney, and Hampton. **Habitat** – Larochelle (1975) characterizes the habitat as "open places with sparse vegetation on wet, sandy soil." Goulet (1983) states that the species lives on moist but not saturated fine organic mud substrate. Darlington (1931) wrote that his three specimens from the White Mountains were taken by "treading damp moss beside the lakes." Larochelle (1976*e*) collected it at a pool in a sand quarry where it was running on wet soil with *E. americanus* and *Omophron americanum*. My specimen from Newark, VT was at a small woodland, boggy spot with *Sphagnum*, sedges, and orchids along the Newport Pond Rd. at about 480 m elevation. The specimen from W. Elmore was in a wet, muddy recently cleared but uncultivated field at about 450 m elevation. The field contained sundews (*Drosera* sp.*),* hair-cap moss (*Polytrichum* sp.) and bog clubmoss (*Lycopodium inundatum*). The specimen from Worcester Mount was on mud by a small shallow pool in a depression on the mountain crest (about 750 m elevation). The pond had some *Sphagnum* and was ringed by alders. I find it difficult to characterize the habitat of this species and to account for its apparent rarity. **Life Cycle** – VT dates for adults are June 10-August 13. There is meager data for this species but little to indicate that the life cycle is different from other species of the genus. **Behavior** – Mostly diurnal. Adults may stridulate when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records but mountain top records suggest frequent flight.

56. *Elaphrus (Neoelaphrus) olivaceus* LeConte, 1863

General Range – Upper and Lower Canadian and Transition Zones. East to NS, northeast to NF, in QC north to Manicouagan and Abitibi, in ON north to the Albany River, in AB north to Lesser Slave Lake, recorded for NT (no locality, Bousquet and Larochelle 1993), west through the prairie provinces to Fraser River in central BC, not in the mountains of the West Coast but in the Rocky Mountains south to UT and CO, in the Great Plains, south to NE, south to MN, IL, IN, in southern MI, NY, northern NJ, CT, and RI. **Local Range** – The species is throughout both states. Vermont, 33 localities; New Hampshire, 23 localities. **Habitat** – The species is active in bright sunlight on bare, organic mud. It is especially common around beaver ponds (occasionally found in beaver

houses). It can also be found on muddy shores of ponds or very slow streams, often amid *Carex* sedges or cattails (*Typha*) and in muddy spots in *Sphagnum* bogs. When water levels are temporarily high it can be trampled from sedges or moss. **Life Cycle** – Tenerals in July and August, Darlington (notes) found tenerals as early as July 18 at lower elevations but as late as September 10 at Hermit Lake (1180 m). Adults hibernate and few are seen after mid-July. Adults in Vermont from June 2- August 15. **Behavior** – According to Goulet (1983), there are three color phases in the inland population of New England: blue-green, olive, and dark brown, while in coastal localities the dark brown phase is absent. **Dynamics** – Fully-winged, no flight records, but mountain top captures indicate a frequent flier.

57. *Elaphrus (Elaphrus) americanus americanus* Dejean, 1831

General Range – Hudsonian and Upper Canadian Zones. East to ME, northeast to QC, east to Longue -Pointe on the north shore, and north to Ungava and Hudson Bays, in NT north to Mackenzie Delta, west to the eastern third of the Yukon Valley in AK, on the Pacific Coast of AK west to Cook Inlet, south to central BC, south to southern Prairie Provinces, SD, IA, WI, MI, in ON south to Lake Ontario, to northern NY, NH, and southwestern ME. A few scattered records well south of the above (vicinity of Des Moines, IA, Kansas City, MO and Evansville, IN). Another subspecies occupies southern BC, the Rocky Mountains south to CO, and the mountains of WA and OR. **Local Range** – Our states lie at the southern edge of the general range. Vermont, no records; New Hampshire, three localities (Bretton Woods in Carroll Town, Second College Grant on the Dead Diamond River, and Haverhill at Oliverian Bridge). **Habitat** – Goulet (1983) states "wet beaches along slow meandering creeks. The beach is almost horizontal and consists of organic coarse and quite firm soil. The surface is sun-exposed and sheltered from winds. The habitat is regularly found around beaver ponds." **Life Cycle** – Adults in QC, May 8-August 20 (Larochelle 1975). **Behavior** – There are two color morphs, green and copper. **Dynamics** – Fully-winged, recorded in daytime flight in the spring (Larochelle 1976*e*).

58. *Elaphrus (Elaphrus) californicus* Mannerheim, 1843

General Range – Upper and Lower Canadian, Transitional and Upper Austral Zones. East to NS, northeast to QC (Gaspésie and Saguenay), north to southern MB and southern SK, in NT north in Mackenzie Valley,

north to Norman Wells, northwest in AK to Circle and Fort Yukon, west to BC, WA, OR and southwest to southern CA, south to UT, northern NM, northern KS, MO, southern IN, KY and MD, scattered southern records in FL, possibly TX and LA. **Local Range** – Throughout both states. Vermont, 33 localities; New Hampshire, 16 localities. **Habitat** – Lives on clay beaches along rivers and brooks. In the early spring may be found on bare fields away from streams. **Life Cycle** – Adults in VT April 26–November 7. **Behavior** – This species has several color morphs but according to Goulet (1983) only the green form is found in our states. **Dynamics** – Fully-winged, no specific flight records.

59. *Elaphrus (Elaphrus) ruscarius* Say, 1830

General Range – Transitional, Upper and Lower Austral Zones. North to southern ME through NH and VT to southwest QC where it is found only around Montreal and the Ottawa Valley, in southern ON north to Lake Huron, central and southern part of the lower peninsula of MI, in WI and MN except for the extreme north, west to KS, OK and northeast TX, south to the Gulf of Mexico, from LA eastward, but excluding peninsular FL. **Local Range** – Our states are on the northern edge of the general range. Vermont, 20 localities nearly throughout but only on the fringes of the Boreal Plateau. It is recorded from the Clyde River near Island Pond. New Hampshire, 18 localities, throughout, except for most of the Boreal Plateau. It is found with *E. americanus* at the Second College Grant, also at Colebrook on the Connecticut River. It has been taken also at the summit of Mount Washington. **Habitat** – Sand beaches where it is alone and also to some extent on clay beaches where it occurs with *E. californicus.* It is usually seen on unsaturated beaches in the bright sunlight. In the spring it has been taken in the sand traps of a golf course. **Life Cycle** – Adults in Vermont from April 19-July 24. Apparently new adults are not active in the fall, overwinters as an adult. **Behavior** – The species has two color morphs, dark bronze and green. The bronze phase is much the commoner in VT. **Dynamics** – Fully-winged, no flight records.

SUBFAMILY OMOPHRONINAE

TRIBE OMOPHRONINI

Genus *Omophron*

Fully-winged, occasional (probably migratory) fliers. Adults are nocturnal, foraging on the surface of sand banks. By day they shelter by covering themselves with sand. The short, oval body facilitates burial in the sand. They are not burrowers in the ordinary sense of the word. They are poor wedge pushers but fast runners with relatively long legs. The methods of burial deserve a detailed study. The larvae are true burrowers in loose sand. Adults are predatory and swallow pieces of prey. The defensive fluid of the adults oozes out and it contains aliphatic acids (Moore 1979).

60. *Omophron (Omophron) americanum* Dejean, 1831

General Range – Upper Canadian to Lower Austral Zones. North to southwest NF, Gaspésie, north shore of Gulf of Saint Lawrence, north in QC to Tadoussac and Fort Coulange on the Ottawa River, in ON north to Lake Superior and Lake Nipigon, north to Lake Winnipeg and southern AB, west to Bear Lake (UT-ID) and northeastern AZ, south to Mexico and FL. **Local Range** – Our states are entirely within the general range. Vermont, 45 localities; New Hampshire, 34 localities. **Habitat** – In sand deposits along rivers, sometimes with *O. tessalatum* but also found in sand along quite small streams, in wet sand around pools in sand pits, sandy spots in roadside ditches, and even in sand traps on golf courses. It is found in these evanescent habitats in late spring or in unusually wet weather. **Life Cycle** – Adults captured May 18-October 15. The adult hibernates. **Behavior** – It runs on the sand banks at night and buries itself by day. It can be collected by flooding the sand banks. I have also caught specimens which emerged at the beginning of heavy showers. In wet weather, specimens can be found beneath boards and other debris which is resting on wet sand. **Dynamics** – Fully-winged. It is found in isolated temporary habitats suggesting a greater frequency of flights than in *O. tessalatum*, however there are no observations of flight in this species.

61. *Omophron (Omophron) tessellatum* Say, 1823

General Range – Lower Canadian to Upper Austral Zones. North to Cape Breton, PE, Îles-de-la-Madeleine, (but not Gaspésie), north to Quebec City region, Lake Winnipeg and southeastern AB at Medicine Hat, west to the Rocky Mountains and further west through NM to the lower Colorado River (near Yuma, AZ), south to TX, KY, and VA. Entirely absent from the southeastern states. **Local Range** – Our states are entirely within the general range. Vermont, seven localities, only on the big rivers and the beaches of Lake Champlain (on the Connecticut River in Lemington and Rockingham; on the Lamoille River in Johnson, Cambridge, and Milton; on the Winooski River in Burlington, on Lewis Creek, Ferrisburgh; on Lake Champlain beach in Colchester). New Hampshire, four localities, from the Mascoma River (Canaan, in the Connecticut Valley) and Lee, Salem, and Pelham in the southeast. **Habitat** – Highly localized, many specimens from a few localities, big sand banks along larger rivers and lakes. **Life Cycle** – Tenerals are found in September so the species overwinters as an adult. **Behavior** – It stridulates when disturbed (Larochelle 1972). **Dynamics** – Fully-winged, no flight records. It probably flies only for seasonal migrations.

SUBFAMILY SCARITINAE

Adults are specialized burrowers, digging tunnels using the powerful short front legs often in combination with middle and hind legs and often with mandibles. The front tibia has rigid finger-like projections and there may be smaller projections on the middle or hind tibiae. The prothorax is connected to the hind body by the long narrow mesothorax, forming a stalk or peduncle. All species except some *Dyschirius* have a long, narrow, parallel-sided body and relatively short legs. Predominantly carnivorous, but some species also consume plant parts. Defensive fluid is an oozing discharge of unsaturated acids. The larvae are specialized burrowers.

TRIBE SCARITINI

Scarites have long modified mandibles used in burrowing. The other Scaritinae genera are much smaller insects.

Genus *Scarites*

62. *Scarites (Scarites) subterraneus* Fabricius, 1775

General Range – Transitional to Lower Austral Zones. East to southeastern NH and northwestern VT, north in NY to Albany and Buffalo, in ON north nearly to Goderich, north to MI and MN, northwest to ND, west to NE, KS, OK and AZ, south to TX, LA, FL, and Cuba. **Local Range** – Our states are on the northeast border of the general range. Vermont, 17 localities, north in the Champlain lowlands to Burlington and Underhill, in the Connecticut Valley north only to Windsor. New Hampshire, three localities, north to Pelham in the Merrimack Valley, and to Dover in the coastal plain. **Habitat** – Open or disturbed areas in croplands, pastures, barnyards, gardens and borders of rivers and lakes. Most of the records are from very low elevations. **Life Cycle** – Adults May 13-November 4; tenerals mid-October. The eggs are coated with mud and laid singly on trees and shrubs (Larochelle and Larivière 2003). Adults move to woods for overwintering. **Behavior** – The huge head and short modified legs make this beetle a slow runner. When handled it goes into a temporary cataleptic state, reminiscent of that of the opossum (*Didelphus)*. The antennae are folded back, the legs are pressed tightly against the body and the body is strongly flexed dorsally at the joint between prothorax and mesothorax. The initial faint lasts more than a minute. If the stimulus is repeated, the faints become successively shorter until they can't be induced at all. *Scarites* commonly makes burrows under the flat side of stones, cement tiles, or boards. Hlavac (1967) has described the method of burrowing. The beetle first loosens the dirt with its mandibles and then pushes it aside with the front and middle tibiae. The head and pronotum are raised at intervals, packing loose material on the ceiling. In sand, the beetle may back out of the burrow pushing out a heap of sand. The burrow system has many exits about one body length apart. The beetle is active at night and will forage on the surface near the burrows. Adults are solitary and if two are placed together they fight fiercely. They are general predators on terrestrial insects, especially cutworms. Also, they eagerly eat earthworms. **Dynamics** – Fully-winged. Where the beetle is common it is frequently found at lights.

TRIBE CLIVININI

Clivina and *Paraclivina* species are shaped like miniature *Scarites* but have shorter mandibles. They live in wet soil or fine gravel by shorelines or in disturbed ground such as croplands. They feed on some plant

material as well as being predators. *Schizogenius* are long and narrow and live in sand or gravel along streams.

Genus *Clivina*

63. *Clivina (Clivina) collaris* (Herbst, 1784)

General Range – Introduced from Europe or western Asia. North to the British Isles, southern Sweden, Denmark, and across central Russia to the Ural Mountains, south to the Caucusus, Bulgaria, southern Italy and Portugal, isolated in Kazakhstan and Kyrghystan. In North America, introduced into the area of Boston, MA before 1838. It has been found at Otis, MA in 1978, in the Ottawa region of Canada (1950), in Vancouver, BC (1954), at Winnipeg (1980), at Seattle, WA (1949). Also present at Quebec City and OH. **Local Range** – Vermont, no records; New Hampshire, one record from the southeastern area. Unlike *C. fossor,* this species is only spreading slowly. **Habitat** – Cultivated ground, gardens, farms. In Europe it has been recorded from decaying vegetables and from greenhouses. It is never reported from waterside margins in North America. From central Europe its habitat is given as from river banks and fresh and salt marshes. **Life Cycle** – In Europe it breeds in the spring and hibernates as an adult (Lindroth 1945). **Behavior** – Nocturnal, shelters by day in burrows up to 10 cm deep. **Dynamics** – Fully-winged, flight records in Europe.

64. *Clivina (Clivina) fossor fossor* (Linnaeus, 1758)

General Range – A widespread Eurasian species. In Europe, south to northern Spain, Corsica, Sicily, and Greece, north to Scandinavia and Kanin and Pechora regions of northern Russia, in Asia south to Asia Minor, the Caucasus, Turkestan, and southern Siberia, east to the Kamchatka Peninsula. Introduced into North America as early as 1915 at Montreal, in 1922 to NS, and in 1928 to NB. East to NF, in QC including all the area south of the Saint Lawrence and the north shore of the Gulf of Saint Lawrence, north to Abitibi, in ON in Ottawa about 1928, at present north to New Liskeard and Black Sturgeon Lake, north to MN, and SD, west to NE, CO, and TX, south to LA and GA. Isolated in BC south to OR. **Local Range** – Throughout both states. Vermont, 50 localities, the first Vermont record was 1956 at Johnson, and the beetle was common in most of the northern half of the state by 1963. New Hampshire, 26 localities throughout. The species was not recorded by Darlington in 1931. It was common throughout the state by 1980 but the

early spread is not well documented. **Habitat** – Common in cultivated soil, croplands, gardens, and waste ground, which must be the habitat where the bulk of the population lives. It is also frequent along rivers and streams, often with *C. americana.* Occasional specimens are found in other habitats, such as the banks of cold, swift mountain streams, beneath stones in cleared areas under power lines, and in subalpine vegetation at 1200 m elevation. **Life Cycle** – Adults in VT April 26-September 18. Tenerals in spring, late summer to fall, gravid females in early July in QC (Larochelle and Larivière 2003). **Behavior** – It burrows in the soil sometimes as deep as 20 cm or can be found under cover at the soil surface. Reported to be active 24 hours but reaches maximum activity in evening (Larochelle and Larivière 2003). Primarily predatory but also feeds on plant material. In Europe it is a pest of corn, sugar beets, and strawberries. One specimen at Richmond, VT was eating rotting kernels on a corn cob partially buried by spring floods. In the US it is an occasional pest by feeding on sprouting corn on very wet ground. When alarmed it sometimes feigns death in the same manner as *Scarites.* **Dynamics** – Wings are polymorphic, fully-winged individuals can fly and are frequent at artificial lights.

65. *Clivina (Clivina) impressefrons* LeConte, 1844

General Range – Transitional and Upper Austral Zones. East to central ME, north to southwestern QC at Montreal, in ON from the shores of the Great Lakes north to Bayfield near Goderich on Lake Huron, north to WI and MN, northwest to SD, NE, CO, UT, south to TX, LA, and GA. **Local Range** – Vermont, four localities, all from light traps, (Manchester, Dorset, Pittsford, and W. Elmore). New Hampshire, seven localities, north to Claremont and Dover, others from Westmoreland, Hollis, Lee, Durham, and Seabrook. **Habitat** – In IL and OH this is the commonest species from cultivated ground. It is rare in New England and most specimens are from light traps. Darlington (1931) never encountered the species. This might indicate the species had not spread eastward at the time he made his collections. Another possibility is that the species is not really established in our states and all our specimens are strays from the west or south. In IL it is also from river banks. **Life Cycle** – Adults present throughout the whole growing season in IL and OH. Tenerals in July in OH (Larochelle and Larivière 2003). **Behavior** – Adults have been seen in the field preying on caterpillars. They also feed on plant material, and its depredations on sprouting corn earn this species the name “slender seed-corn ground-beetle” (Phillips 1909). It shelters during the day in burrows and under debris and is active on the surface

at twilight and night. Larval burrows go as deep as 60 cm. **Dynamics** – Fully-winged, a frequent flier. Sometimes swarms at sunset and is found in light traps.

66. *Clivina (Leucocara) americana* Dejean, 1831

General Range – Transitional, Lower and Upper Austral Zones. East to NS, north to QC only in the Saint Lawrence Valley, north to Berthierville, in ON north to Ottawa and vicinity of Kincardine on Lake Huron, north to MI, WI, IA, SD, west to KS, OK, and TX, south to LA and FL. **Local Range** – Throughout both states. Vermont, 22 localities; New Hampshire, 21 localities, north to Indian Stream in Pittsburg. **Habitat** – Muddy stream and river banks, in open areas or among small grasses, reported from beaver houses in QC. **Life Cycle** – Adults in VT May 28-September 14; tenerals, July 30-September 9. **Behavior** – Nocturnal, shelter by day in burrows in damp mud or under plant debris. **Dynamics** – Fully-winged, black light records.

Genus *Paraclivina*

67. *Paraclivina ferrea* (LeConte, 1857)

General Range – Transitional, Upper and Lower Austral and Tropical Zones. Northeast to MD, north to VA, OH, IL, MO, northwest to KS, west to OK, NM, and AZ, south into Mexico and to LA and FL. **Local Range** – Vermont, one specimen taken by Larochelle and Larivière, May 25, 1986, under stone on bare wet ground by the White River (this represents a NEW STATE RECORD). The single Vermont record is far beyond the normal range of this species and is perhaps a stray carried north by a storm. New Hampshire, no records. **Habitat** – Banks of rivers and brooks, cultivated fields, and orchards (Larochelle and Larivière 2003). **Life Cycle** – Tenerals, July-August in MS. **Behavior** – Nocturnal, shelters by day in burrows and under debris of all sorts. **Dynamics** – Fully-winged, light trap records.

Genus *Schizogenius*

68. *Schizogenius (Schizogenius) amphibius* (Haldeman, 1843)

General Range – Transitional and Upper Austral Zones. East to southwestern ME, north to southwestern QC (Brome and Montreal), north to the Champlain Valley and northeastern NY, widespread in NY,

except for the Adirondacks and north, north to OH, IN, west to IL (to Pike County on the Mississippi River) and KY, south to central TN, NC (Black Mountains), and VA (The Piedmont). **Local Range** – Vermont, six localities, north to E. Georgia and Granby, Clarendon, Brattleboro, Jeffersonville (in Cambridge), and Bethel. New Hampshire, three localities, Charlestown and Hinsdale on the Connecticut River, and Somersworth in the southeast. **Habitat** – Sand deposits along rivers. According to Whitehead (1972) in cleaner, less silty sand than *S. lineolatus* and *S. sulcifrons*. **Life Cycle** – Adults, May- September; tenerals, late May (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day in burrows in the sand. **Dynamics** – Fully-winged, no flight records.

69. *Schizogenius (Schizogenius) ferrugineus* Putzeys, 1846

General Range – Transitional, Upper and Lower Austral Zones. East to western ME, north to QC (only record from Cap Rouge near Quebec City), north to ON (Toronto and Point Pelee), MN, west to SD, NE, CO, and AZ, south to NM, TX, LA, and FL. **Local Range** – Vermont, two localities, Winooski and Lemington. New Hampshire, one locality, Baker River in Rumney. **Habitat** – Darlington (1931) says of the habitat "it is found not near the water but on the upper banks on clean sand which is dry on the surface but damp a few millimeters below. The beetles are found in galleries under sticks and boards. The small Scarabiidae, *Aegialia spinifex* Horn and *Ataenius abditus* (Hald.), are found in the same place and their larvae may very well be the chosen prey of the *Schizogenius*." The Vermont capture in Lemington was in a similar situation but was in a grass tuft at the edge of the loose sand. According to Ciegler (2000) the species is not necessarily near water. In SC it is found under debris in sandy fields. **Life Cycle** – Adults, March- October; tenerals, August- September (Erwin 1981). **Behavior** – Nocturnal, in daytime found in burrows. **Dynamics** – Fully-winged, frequent flier, light trap records.

70. *Schizogenius (Schizogenius) lineolatus* (Say, 1823)

General Range – Transitional and Upper Austral Zones. East to southwestern ME, in QC along the Saint Lawrence River to Quebec City, in ON north to Ottawa, Collingwood and Bayfield on Lake Huron, north to WI, IA, west to MT, WY, KS, OK, and TX, south to AR, MS, AL, and SC. **Local Range** – Our states are at the northeastern edge of the range. Vermont, 22 localities, north to Bethel in the Connecticut River drainage,

on the Winooski River east to Duxbury, in the Champlain Valley, reaching the northern border. New Hampshire, eight localities, all in the western part of the state, from Indian Stream in Pittsburg to Franconia, Rumney, Lebanon, Claremont, Westmoreland, and Chesterfield. **Habitat** – In gravel and sand bars along rivers and the shores of Lake Champlain, often near isolated pools which contain warmer, more stagnant water than the nearby river. **Life Cycle** – Adults, June 2-September 10; tenerals, August 1- September 1. Gravid specimens in early June (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters in day in burrows in gravel. **Dynamics** – Fully-winged, light trap records, flies occasionally.

71. *Schizogenius (Schizogenius) sulcifrons* Putzeys, 1846

General Range – Transitional and Upper Austral Zones. East to NB, north in QC to region of Quebec City, in ON north to Toronto and London, north to OH, WI, west to IL, TN, and SC. **Local Range** – Vermont, eight localities, north to Milton and Johnson, also Richmond, Bolton, Huntington, Poultney, and the eastern part of the state from Royalton, Windsor, and Putney. New Hampshire, seven localities, north to Indian Stream, Pittsburg, Errol, Conway, Rumney, Walpole, Chesterfield and Hinsdale. Probably on all the rivers throughout both states. **Habitat** – Bare, wet gravel along rivers, not recorded by lakes. **Life Cycle** – Adults, March-October; tenerals, August-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day in burrows in gravel. **Dynamics** – Fully-winged, light trap records.

TRIBE DYSCHIRIINI

Genus *Dyschirius*

Dyschirius have a more or less globular pronotum. Some species run on the soil surface by day. Some species occur with the staphylinid genus *Bledius* and are thought to prey on larvae and adults.

72. *Dyschirius affinis* Fall, 1901

General Range – Transitional and Upper Austral Zones. East to western ME, north to southern QC, along the Saint Lawrence River to Joliette, all of the ON Peninsula, north to OH, WI, IA, ND, and MT, west to WY, CO, and AZ, south to NM, TX, OK, TN, and VA. **Local Range** – Vermont, 19 localities, widespread in the Champlain Valley along the

LaMoille River east to Johnson, the Winooski River to Jonesville, the Connecticut River north to Maidstone, not in high elevations except in the south where it is recorded from Searsburg. New Hampshire, 17 localities, widespread, most localities on the Connecticut and Merrimack Rivers, the most northern locality is on the Connecticut River at Pittsburg. **Habitat** – Margins of rivers, ponds, lakes in strongly sloping sandy soil. **Life Cycle** – Adults, May 10-September 21; tenerals, August-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal, sheltering during the day in burrows, associated with *Bledius*. **Dynamics** – Fully-winged, an occasional flier, light trap records.

73. *Dyschirius brevispinus* LeConte, 1878

General Range – Transitional Zone. East to western VT, north in QC to vicinity of Montreal, north to southern ON, west to OH and an isolated record from NE, south to PA. **Local Range** – Vermont, one record (South Burlington); New Hampshire, no records. **Habitat** – The two Vermont specimens were taken under small stones on bare cultivated soil. Elsewhere it has been collected in gravel pits. **Life Cycle** – Adults in VT were taken on May 30. Larochelle and Larivière (2003) report adults from May-August. **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

74. *Dyschirius dejeanii* Putzeys, 1846

General Range – Upper and Lower Canadian, Transitional Zones. East to NS and NF, in QC north to Gaspésie, Saguenay and Abitibi, north to Churchill, MB and Fort Smith, NT, to Kluane in YT, and Fort Yukon in central AK, west to BC and CA, south to UT, NM, KS, IA, IN, OH, PA, and NJ. **Local Range** – Our states are entirely in the general range. Vermont, 43 localities; New Hampshire, 26 localities, throughout both states. **Habitat** – It burrows in the mud bordering lakes and ponds, particularly beaver ponds. Common in the Missisquoi Delta as well as high in the mountains. At Lower Haystack Pond in Wilmington, VT, it has been taken at 900 m elevation. **Life Cycle** – Adults in VT, April 27-September 27. Larochelle and Larivière (2003) reported adults from March- November in QC. Tenerals, late June to August (Larochelle and Larivière 2003.) **Behavior** – Associated with *Bledius*. **Dynamics** – Fully-winged, frequent flier, night light records. Blacklight record in VT for May 30.

75. *Dyschirius erythrocerus* LeConte, 1857

General Range – Transitional and Upper Austral Zones. There is an isolated record from western NF (Lindroth 1955), otherwise east only to the Kennebec Valley of ME, north to southern QC (Granby and Joliette), north to southern ON, MI, IL and IA, northwest to SD, west to NE, south to KS, KY, OH, PA, NJ, and NY. **Local Range** – Our states are on the northeast edge of the general range. Vermont, six localities, Champlain Valley and Vermont Valley (Isle La Motte, South Burlington, Shelburne Pond and Bay, Lewis Creek, and Dorset). New Hampshire, eight localities, north to Haverhill, also Plainfield, Claremont, Ossipee, Bath, Litchfield, Durham, and Lee. **Habitat** – Recorded habitats include river banks, lake shore, and sea beaches. Most of our specimens however, were caught at light traps. **Life Cycle** – Adults, May30- September 20 in VT. **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier from late May to September.

76. *Dyschirius globulosus* (Say, 1823)

General Range – Upper and Lower Canadian, Transitional, Upper and Lower Austral Zones. East to NS, NF, north to QC, Gaspésie and Saguenay, in ON north to Nipigon, in AB north to Fort McMurray, north to YT and northwest to Fairbanks, AK, west to the interior of BC, south to WY, CO, NE, MO, KY, AL, and FL. **Local Range** – Our states are entirely within the general range. Vermont, 40 localities; New Hampshire, 20 localities, throughout both states. **Habitat** – On bare, dry soil in open areas in many situations, including gardens, sand pits, dirt roads, croplands, rock ledges, roadsides, drier parts of river banks, exposed mountain tops, and alpine tundra. Unlike other members of the genus, not associated with bodies of water or wet soil. **Life Cycle** – Adults in VT, April 15- October 1; tenerals mostly in the fall but some at other seasons. **Behavior** – Partly diurnal, especially in the spring. In the daytime it usually hides under small stones, in burrows, under plant material including lichens; some burrows reported as deep as 7.5 cm (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic, the long-winged individuals have been observed at artificial lights and in drift.

77. *Dyschirius haemorrhoidalis* (Dejean, 1831)

General Range – Upper and Lower Austral Zones. North to southeastern NH, MA, NY north to Mohawk Valley and Lake ON, southern ON at Burlington and Rondeau Park, MI, IL, IA, northwest to SD, west to NE,

KS, OK, and TX, south to LA and FL. **Local Range** – Vermont, no records; New Hampshire, one locality, Brookline in the south. **Habitat** – Open wet clay, sometimes mixed with sand at margins of rivers and ponds. Also in cultivated fields in damp or wet soil. **Life Cycle** – Active February to September (Larochelle and Larivière 2003). **Behavior** – Nocturnal, hides by day in burrows or cracks. **Dynamics** – Fully-winged, common at lights and sometimes found in lake or sea drift. Probably flies frequently between evanescent habitats.

78. *Dyschirius larochellei* Bousquet, 1988

General Range – Atlantic coast from NS to TX. **Local Range** – Vermont, no records; New Hampshire, the entire coastline from Odiorne Point in Rye to Seabrook. **Habitat** – Sea beaches and borders of salt marshes and lagoons. **Life Cycle** – Active January-September, November-December (Larochelle and Larivière 2003). **Behavior** – Nocturnal and shelters by day in burrows and crevices and under mats of algae. **Dynamics** – Fully-winged, no flight records.

79. *Dyschirius pilosus* LeConte, 1857

General Range – Transitional, Upper and Lower Austral Zones. East to ME, Kennebec Valley, north in QC to Berthierville, north to southern ON at Simcoe, northwest to southeastern MB, west to MT, ND, NE, KS, OK, TX, south to MO, KY, and VA. **Local Range** – Our states are on the northeastern border of the general range. Vermont, six localities, in the Champlain Valley at Swanton, Colchester, Burlington, on the Winooski River at Richmond, and in the Connecticut River Valley at Weathersfield and Putney). New Hampshire, seven localities, four on the Connecticut River (north to Haverhill, Claremont, Westmoreland, and Hinsdale), on the Pemigewasset River at Plymouth, on the Merrimack River at Litchfield and Nashua. **Habitat** – Bare mud banks of major rivers. **Life Cycle** – Adults, May 18- September 11. Larochelle and Larivière (2003) found adults as late as September in QC, and they found tenerals in late July and August. **Behavior** – Largely nocturnal except in early spring, shelters by day in burrows, also under debris or stones. **Dynamics** – Fully-winged, blacklight records.

80. *Dyschirius politus politus* (Dejean, 1825)

General Range – Circumpolar, across northern Eurasia, south to central France, northern Italy, Transylvania, Iran and across Siberia to the

northern Kuril Islands. In North America, Upper and Lower Canadian and Transitional Zones. East to ME, northeast to NF, in QC north to Lake Saint John and Kamouraska, in ON north to Ogoki on the Albany River, across the Prairie provinces to NT, YT, and central AK, south to OR, UT, WY, SD, MI, OH, NY, and MA. Another subspecies is in the mountains of central Asia. **Local Range** – Vermont, seven localities in the north only (Lemington on the upper Connecticut River, Missisquoi Delta, and five localities in Chittenden County, the southernmost being in Hinesburg). New Hampshire, two localities, Haverhill, and also Merrimack according to Choate (1977). **Habitat** – According to Lindroth (1961*a*), in sand by rivers and lakes but also in sand pits. It is rarely found in riverside or lakeside sand in the Burlington area where the similar *D. sphaericollis* is abundant. Perhaps competition from the latter species forces *D. politus* into more evanescent habitats where the two are sympatric. *Dyschirius politus* is relatively common in light traps despite its apparent rarity along rivers. **Life Cycle** – Adults active April-November in QC (Larochelle and Larivière 2003); tenerals in July in VT. **Behavior** – Associated with the staphylinid *Bledius* and has been observed preying on it in Europe (Lindroth 1945). **Dynamics** – Fully-winged, light trap records. Observed taking flight at sunset (Larochelle and Larivière 2003), and by day (Lindroth 1945).

81. *Dyschirius setosus* LeConte, 1857

General Range – Lower Canadian and Transitional Zones. East to NB, PE, in QC along the Saint Lawrence River to Rivière du Loup, west in the Ottawa Valley to Hull, isolated in the Magdalen Islands, north to southern ON, to MB, SK, AB, and BC, west to WA, south to ID, UT, CO, NE, IA, IL, MI, NJ, NY, and MA. **Local Range** – Our states are on the northeast border of the general range. Vermont, five localities in the northwest, south to Burlington, Colchester, E. Georgia, Franklin, and Johnson. New Hampshire, five localities, Bath and Hinsdale on the Connecticut River, Rye, Hampton and Seabrook on the Atlantic coast. **Habitat** – Sometimes lake margins, usually river banks on moist clay or sandy soil and also on the sea beach. Commonly collected with *D. pilosus*. **Life Cycle** – Adults in VT from May 25- June 27, in QC reported from April-October (Larochelle and Larivière 2003) and they report tenerals from August-October and rarely May-June. **Behavior** – Associated with *Bledius*. Nocturnal except in the spring, shelters by day in burrows. **Dynamics** – Fully-winged, no light trap records, but found on drift which suggests flight.

82. *Dyschirius sphaericollis* (Say, 1823)

General Range – Upper and Lower Canadian, Transitional and Upper Austral Zones. East to NS and southeastern NF, north in QC to Natashquan and Hull, northwest to Lethbridge, AB, west to BC, WA, and OR, south to ID, UT, NM, TX, OK, MO, KY, and VA. **Local Range** – Our states are entirely within the general range. Vermont, 15 localities; New Hampshire, 14 localities, throughout both states. **Habitat** – Sandbars along rivers. The sandy deposits may have some intermixes of mud. **Life Cycle** – Adults, Jun13-Sep10. Mating in May in QC and tenerals appear late May- October (Larochelle and Larivière 2003). **Behavior** – Beetles shelter by day in cracks or burrows in the soil or under debris, sometimes active by day in the spring. They are gregarious and are associated with the staphylinid *Bledius* and some species of Heteroceridae. **Dynamics** – Fully-winged, frequently at night lights.

83. *Dyschirius sublaevis* Putzeys, 1846

General Range – Atlantic coastal species, from ME (Kennebunk) to FL. **Local Range** – Vermont, no records; New Hampshire, one locality (Newcastle, an island near Portsmouth). **Habitat** – Sea beaches, sand flats and lake shores, borders of salt marshes and swamps, banks of saline pools and ditches (Larochelle and Larivière 2003). **Life Cycle** – Adults Jan-October (Larochelle and Larivière 2003). **Behavior** – Associated with a staphylinid, *Bledius*. **Dynamics** – Fully-winged, frequent flier, recorded at lights.

SUBFAMILY BROSCINAE

TRIBE BROSCINI

A group adapted for burrowing. Resembling Scaritini with the prothorax inflated and the mesothorax pedunculate but the anterior tibia with enlarged spurs as the main digging instruments and there are no fingerlike outgrowths. These beetles are predominantly carnivorous. They swallow solid pieces of the prey. The larva is a burrower. Largely found in cold climates in both northern and southern hemispheres and in the mountains.

Genus *Miscodera*

84. *Miscodera arctica* (Paykull, 1798)

General Range – Circumpolar, in Europe, Scandinavia, and northern Russia, some relict populations in Germany, hills and mountains of the British Isles, isolated in Switzerland and Tyrol, in the Ural Mountains, subarctic and arctic areas of Siberia, east to the Pacific Ocean and Kamchatka and Sakhalin. In North America, Hudsonian and Upper Canadian Zones. East to NS and NF, north to Ungava Bay and Cape Henrietta Maria on Hudson Bay, northwest in AK to Denali National Park and Kenai peninsula, south in the mountains to WA, MT and CO, in the plains south to northern SK, south to northern WI, Simcoe County, ON, northern NY (Keene Valley in the Adirondacks), and ME. **Local Range** – Our states are at the south end of the main range for the species. There are relict populations only in the Boreal Plateau except for one record from the summit of Mount Washington. Vermont, two localities, Westmore (south of Lake Willoughby) and Morgan (on Pherrins River). New Hampshire, three localities, near Pittsburg, Millsfield (on Clear Stream) and Mount Washington summit. **Habitat** – In dry areas of gravel and sand, usually moraine where it is normally found beneath large, deeply buried stones. Lindroth (1961*b*) described the habitat as "sandy moraine with no or sparse coniferous trees and low, thin ground vegetation, mostly tiny mosses or lichens." The specimens from Pherrins River were in such a situation. Niemelä et al. (1993) found it common in regenerating forests. Spence et al. (1996) found it also in older mixed largely poplar forests in AB. Beaudry et al. (1997) found it in burned plots among clear cuts of jack pine (*Pinus banksiana)*. The absence of the beetle from the Green Mountains can be attributed to the lack of suitable habitat at the proper elevation. The only gravel deposits in the mountains are relatively low on the slopes where the climate may be too warm for this beetle. **Life Cycle** – Teneral specimens in QC July 2-August 3 (Larochelle 1977*a*). **Behavior** – Commonly associated with the byrrhid beetles, *Byrrhus* and *Cytilus,* which are possible prey (Lindroth 1961*b*). The adult sometimes feigns death. **Dynamics** – Fully-winged, flight has been observed in Europe.

SUBFAMILY TRECHINAE

TRIBE TRECHINI

Small to very small predators, swallow pieces of solid food, good runners, poor wedge pushers. Adults are more or less subterranean in soil cavities but are not burrowers. Larvae are of the "pore explorer" type (Zetto Brandmayr et al. 1998).

Genus *Blemus*

85. *Blemus discus discus* (Fabricius, 1792)

General Range – Most of Europe, north to southern Scandinavia, Russia, north to Saint Petersburg, Britain and Ireland, south to southern France, central Italy, Transylvania and the north side of the Caucuses, across southern Siberia to Manchuria, China, and Japan. Accidentally introduced into North America, first noticed in QC in 1933. Range at present east to NB, north to Gaspésie, Saguenay, and Abitibi regions. In NY (see Cooper 1976) west to MI and OH, south to MA. **Local Range** – Vermont, first recorded in 1962 (Stowe), 22 localities throughout, probably absent from high mountains. New Hampshire, 11 localities, throughout except for high mountains. **Habitat** – A secretive species often found in rodent burrows, most easily seen when the burrows pass under boards or large, partly-buried stones. They have been taken in beaver houses, sometimes along driftwood on rivers. It is especially favored by areas of long grass in old fields, roadsides, and grassy areas near river banks. **Life Cycle** – Adults May-September, tenerals mid June-late September, mostly before mid July (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Adults may emit musky smell when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier. Reported to swarm by the hundreds at night where it is common.

Genus *Trechus*

86. *Trechus apicalis* Motschulsky, 1845

General Range – Hudson, Upper and Lower Canadian and Transitional Zones. Transamerican, also in eastern Siberia, west to Lake Baikal and the Lena River, across Canada south of the tundra, east to NS and NF, in LB north to Goose Bay, in QC north to Schaefferville and Fort George on Hudson Bay, in ON north to Attawaupiskit on James Bay, to Churchhill, MB on Hudson Bay, in NT north to Aklavik, west through

most of AK south of the tree line, in most of BC south to Canal Flats and Pavilion, not south of the international border in the west, absent from the Canadian prairies, south to northern WI, northern IN and OH, NY, NJ, CT, and RI. **Local Range** – Throughout both states. Vermont, 49 localities, rare in the Champlain lowlands, common in the mountains and Boreal Plateau. New Hampshire, 25 localities throughout. **Habitat** – In forests, most common under stones and logs which are partly buried, also in the crumbling wood of old rotten logs and under leaf litter especially of alder (*Alnus*), very common in mountain forests, in lowlands confined to the wettest, shadiest sites, in the mountains up to 1200 m. **Life Cycle** – Adults, in QC, March-October, gravid females, July-early August, tenerals April- late September, mostly in July. **Behavior** – According to Larochelle and Larivière (2003) this species sometimes emits a strong odor when alarmed. **Dynamics** – Wings dimorphic, long-winged form very rare, (perhaps 0.2% of population). A long-winged individual has been seen to take wing at sunset.

87. *Trechus crassiscapus* Lindroth, 1955

General Range – Confined to northeastern North America. Hudsonian and Upper Canadian Zones. East to NS, north to Hopedale, LB, in QC, north to Schaefferville and James Bay. Range interrupted by the valley of the Saint Lawrence, south of there confined to mountains, in the Adirondacks of northern NY, mountains of ME, south to Mount Greylock, MA. **Local Range** – Vermont, 14 localities in the Green Mountains and the Boreal Plateau. In the main range of the Green Mountains, also in the Worcester Range from Mount Hunger to Mount Elmore, isolated at Spruce Peak in Plainfield, in the Boreal Plateau at Morgan (Pherrins River). New Hampshire, 10 localities, from the White Mountains and from Pittsburg in the Boreal Plateau. The most southern records are Rumney and Waterville Valley. **Habitat** – In the Green Mountains usually in moss mats, often in small patches of *Sphagnum*, at boggy spots in the balsam forest or among alders in large wet areas, usually found under fallen leaves or bits of wood, not common under stones, from 770-1200 m elevation. **Life Cycle** – Adults, May-October (Larochelle and Larivière 2003); gravid females, early July; tenerals in August. **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Vestigial-winged or possibly dimorphic (only a small sample has been checked for wing development).

88. *Trechus rubens* (Fabricius, 1792)

General Range – Eurasian, across Scandinavia and northern Russia, (north to Pechora region), in Siberia to Lake Baikal, isolated in the alpine regions of eastern France, northern Italy, Bosnia, Transylvania, and Caucasus. An accidental introduction from Europe. In NS by 1875, in QC by 1926, in VT by 1966, and NH by 1982. At present east to NS, northeast to NF, in QC north to the Saguenay district, Gaspésie and Montreal, south to VT, NH, and ME. **Local Range** – Vermont, one locality, W. Elmore (1966). New Hampshire, three localities, Second Connecticut Lake (Pittsburg), Whitefield, and Atkinson and Gilmanton Academy Grant near Hellgate Camp (Choate 1977). **Habitat** – Open, weedy ground among the roots of tall plants, also in some wooded areas among fallen leaves, has been taken in beaver houses. **Life Cycle** – Adults May-October, gravid females late July-early August in QC; tenerals late June-August (Larochelle and Larivière 2003). Overwinters both as larva and adult. **Behavior** – Crepuscular and nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier.

TRIBE BEMBIDIINI

A large taxon of small to minute predatory ground beetles. They are good runners and poor wedge pushers. Most species are associated with wet shorelines. The function of the miniaturized apical segments of the palpi has not been explained. They are perhaps used to extract insect eggs or larvae from small cavities. Almost all species are fully-winged. Many are diurnal. Solid pieces of the prey are swallowed. The defensive fluids contain aliphatic ketones, higher saturated acids, and aromatic aldehydes; the fluids are oozed out, not sprayed. Larvae are of the "pore explorer" type (Zetto Brandmayr et al. 1998). There are three subtribes: Bembidiina are mostly larger forms, often with metallic coloration, Xystosomina is represented by one species, and Tachyiina are minute forms, and not metallic.

SUBTRIBE BEMBIDIINA

Represented locally by three genera:

Amerizus (1 species) A flightless, small-eyed species in mountain forests, usually under partially buried stones.

Asaphidion (1 species) Introduced species, a diurnal sight hunter with stereoscopic vision.

Bembidion (67 species) Only a few species are diurnal sight hunters.

Genus *Amerizus*

89. *Amerizus (Amerizus) wingatei* (Bland, 1864)

General Range – Upper and Lower Canadian and Transition Zones. East to NS, northeast to NF and southern LB, in QC, north to Gaspésie, Anticosti Island, the entire north shore east to Blanc Sablon at the Straits of Belle Isle, north to Fort George on Hudson Bay, in ON northwest to Nipigon, south to WI, IL, IN, KY, WV, VA, and NC (in the mountains). **Local Range** – In our states this species in the Boreal Plateau and becomes a mountain species further south. Vermont, 22 localities, in the main range of the Green Mountains from Haystack (Westfield) south to Stratton Mountain, in the Worcester Range on Worcester Mountain in Elmore, on Spruce Mountain in Plainfield, Bald Mountain in Westmore and Mount Equinox in the Taconics. New Hampshire, 11 localities, in the Boreal Plateau nearly to the summit of Mount Washington (Darlington 1931), from The Bowl (Waterville Valley in the Sandwich Range), south of the mountains from Gilmanton, and from Spruce Hole in Lee, nearly at sea level. This last habitat has northern plants and animals because cold air settles there and gives it a more northern climate. According to Darlington, similar localities are present in northeastern MA. **Habitat** – Mountain forests and subalpine and alpine meadows. It is particularly abundant in the crevices at the summit of Mount Mansfield where *Nebria suturalis* is also found. Along Texas Brook, Hancock, VT several specimens were found under stones of old fence rows in long abandoned brush covered farmlands. **Life Cycle** – In VT, adults May 26-October 30; tenerals June 24 (Mount Mansfield), October 22-30 at lower elevations. **Behavior** – Nocturnal, shelters by day under fallen leaves or under large embedded stones, also in rock crevices or in rotting logs. **Dynamics** – Vestigial-winged, hind wing is a minute scale.

Genus *Asaphidion*

90. *Asaphidion curtum curtum* (Heyden, 1870)

(The North American specimens were formerly misidentified as *A. flavipes* (Linnaeus, 1761))

General Range – A limited area in Europe and northern Africa, north to Denmark and Germany, south to France, Spain, Italy, Algeria, and Tunisia (not in the British Isles), eastern Europe and Asia. Introduced into North America, first recorded in 1930 in Flushing, Long Island, NY (Cooper 1930). It was rediscovered in 1976 at Southampton, Long Island (Davidson and Langworthy 1980). The first mainland record was that of Krinsky (1981). The addition of New Hampshire records from 1987 completes the picture of a relatively rapid spread from the original point of introduction to the northeast, extending around 300 km. So far, there are no indications of any tendency to spread inland or southwestward along the coast. **Local Range** – Vermont, no records. New Hampshire, two localities near the southeastern coast at Durham (1987) and Seabrook (1990). **Habitat** – According to Lindroth (1985) this beetle lives in "somewhat shaded sites in mainly forest habitats. In Denmark it has been found numerously on moist clayey mull-soil in deciduous forests, on open spots among vegetation of *Carex*, etc." Chandler (quoted in Bell 1989) characterized the habitat at Durham "a man-made swamp that may have originally been a boggy area. It is forested around the edges, and is sandy in areas and mucky in others. There is good leaf litter around the edges most of the time." **Life Cycle** – Copulation in CT in May, eggs laid singly in moist soil, adults found overwintering under dead leaves. **Behavior** – Diurnal. Predator of Collembola. **Dynamics** – Hind wings large and functional.

Genus *Bembidion*

Many species, a few of them diurnal sight hunters with stereoscopic vision.

Twenty-one local subgenera:

Hirmoplataphus (2 species) Barren fine gravel along rivers, brooks, or lakes.

Hydriomicrus (2 species) One species along large mountain brooks and in crevices in streamside rock ledges; one species in *Sphagnum* mats of bogs.

Odontium (3 species) Similar to *Bracteon* but crepuscular.

Bracteon (4 species) Diurnal sight predators with stereoscopic vision; found on bare ground of shorelines; use flight to extend foraging area and to escape predators.

Ochthedromus (2 species) On mud or muddy sand of lake, river, and pond shores; crepuscular or nocturnal; fly readily to escape predators and rising waters.

Pseudoperyphus (7 species) Sand and gravel of river shores; nocturnal or crepuscular.

Ocydromus (1 species) Bare, usually shaded gravel bars, commonest on rushing mountain streams.

Peryphus (3 species) Habitats vary, stream banks and sand areas.

Asioperyphus (1 species) On sloping sand banks along larger rivers.

Peryphanes (3 species) One alpine species, one introduced species, and one native forest species.

Bembidion (2 species) Bare soil or rock ledges not associated with water.

Furcacampa (4 species) Bare ground by lakes, ponds, rivers and wet cultivated ground.

Diplocampa (1 species) Marshy borders of pools, especially fens.

Semicampa (4 species) In forests or meadows, especially by vernal pools.

Notaphus (9 species) On bare mud or sand of rivers, lakes, ponds, and sea beaches.

Trepanedoris (4 species) Wet mud among herbaceous vegetation of marshes and fens.

Plataphus (5 species) Gravels along cold rushing mountain brooks.

Hydrium (2 species) On dry or wet soil either bare or sparsely vegetated, on sandy river banks or in sand or gravel pits.

Eupetedromus (5 species) On wet mud by lakes, swamps, and slow rivers.

Trichoplataphus (3 species) Barren fine gravel along rivers or lake shores, adapted to move through spaces in fine gravels, will shelter under water when pursued.

Phyla (1 species) Introduced Old World group; bare soil of gardens and orchards.

91. *Bembidion (Hirmoplataphus) nigrum* Say, 1823

General Range – Lower Canadian, Transition and Upper Austral Zones. East to NS, in QC in the Eastern Townships north to Bellechasse and along the north shore from Quebec City to Montreal, in ON north to Bayfield on Lake Huron and Collingwood on Georgian Bay, north to MI and MN, west to SD, KS, and AR, south to MS, AL, and GA. **Local Range** – Vermont, 89 localities; New Hampshire, 44 localities. Throughout both states. **Habitat** – Fine gravel mixed with sand, on banks of brooks and all rivers, conspicuously absent from the densely shaded mountain brooks where *B. simplex* and its relatives abound, rare on the shores of Lake Champlain where the next species replaces it. In mountains up to 500 m elevation. **Life Cycle** – In VT, adults April 18-September 25; tenerals late May-early September in QC (Larochelle and Larivière 2003.) **Behavior** – Nocturnal, hides in gravel during day. **Dynamics** – Fully-winged, flies to artificial lights in captivity.

92. *Bembidion (Hirmoplataphus) salebratum* (LeConte, 1847)

General Range – Upper and Lower Canadian and Transition Zones. East to NS, northeast to NF, north in QC including Gaspésie, north to Fort Rupert on James Bay, in ON north to Cochrane and Lake Nipigon, northwest to Rose Prairie near Dawson Creek, BC, west to ID, south to WY, SD, MN, IA, WI, MI, eastern part of southern limit not well known, apparently absent from peninsular ON, in QC generally south to lat of Montreal with only one record further south (Bondville in Brome County), in NY (on shores of Lakes Champlain, Ontario, and Erie), and PA. **Local Range** – Vermont, eight localities, seven on the shores of Lake Champlain from Isle La Motte south to Bridport, one on Lamoille River at Johnson. New Hampshire, one locality at Lake Chocorua (Tamworth). Darlington (1931) called this specimen *B. concolor* Kirby. This name is now applied to another species not found in this area.

Habitat – In general, the northern equivalent of *B. nigrum* which it replaces in similar habitats to the north. In VT however, it almost entirely supplants *B.nigrum* on the shores of Lake Champlain. **Life Cycle** – Adults in VT May 13-October 1; tenerals in QC, late June-late August. **Behavior** – Nocturnal, shelters in gravel by day. **Dynamics** – Fully-winged, frequent flier, flies when disturbed.

93. *Bembidion (Hydriomicrus) quadratulum* Notman, 1920

General Range – Upper and Lower Canadian Zones. East to NS, northeast to NF (throughout except for the northern peninsula), north to QC, east to Natashquan on the north shore of the Gulf, to Saint-Nérée in Bellechasse County and to Lake Tremblant in Terrebonne County, west to the Adirondacks of NY, and south to CT. **Local Range** – Our records are in relict areas at the southern edge of the range. Vermont, two localities, Cranberry Bog in Johnson and "Crater Bog" in Morgan along Pherrins River. New Hampshire, three localities, First Connecticut Lake, near Pittsburg Village, and Center Ossippee. This species is so difficult to find that the available data give only a sketchy idea of the true range. It is probably widespread in the bog areas of QC and ME and present in scattered localities in the much more limited bogs further south. **Habitat** – In the *Sphagnum* mats of bogs. **Life Cycle** – Adults in Vermont, May 25- August 15; tenerals late July-August. **Behavior** – Usually nocturnal, sometimes seen in the day. **Dynamics** – Fully-winged, occasional flier, has been taken in sea drift (Larochelle and Larivière 2003). Captive specimens fly to light.

94. *Bembidion (Hydriomicrus) semistriatum* (Haldeman, 1843)

General Range – Transition and Upper Austral Zones. East to NS, north in QC through the Eastern Townships nearly to Quebec City and the vicinity of Hull, west to MI, IN, KY, and TN, south to AL and GA. **Local Range** – Vermont, 38 localities; New Hampshire, 22 localities. Throughout both states. **Habitat** – Gravel banks along medium to large size brooks and small rivers and is commonly associated with *Diplous rugicollis*. Absent from deeply shaded mountain brooks where *B. simplex* abounds and is rarely on the larger rivers. One such locality, E. Georgia, VT, is a spot where the Lamoille River is shaded from the south by the foot of Georgia Mountain. At Huntington Gorge, Huntington, VT, it was abundant in rock crevices close to the river. **Life Cycle** – Tenerals, June-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal,

shelters during the day under gravel and stones. **Dynamics** – Fully-winged, flies occasionally; in captivity it flies to lights.

95. *Bembidion (Odontium) confusum* Hayward, 1897

General Range – Transitional, Upper and Lower Austral Zones. East to NB, north to Quebec City and Ottawa area, north to Collingwood on Georgian Bay, north to Lake Winnipeg, MB, northwest to AB, west to CO, south to NM, TX, MS, AL, and FL. **Local Range** – Vermont, six localities, on the West River at Townshend, Lamoille River at Johnson, and Winooski River at Colchester and Bolton. New Hampshire, eight localities on the bigger rivers, Connecticut River, northernmost at Pittsburg, Pemigiwasset River at Plymouth and Romney, Ammonoosuc River at Fabyan in Carroll. **Habitat** – Probably widespread and common on barren sand banks on medium to large rivers. **Life Cycle** – Tenerals, July-October, copulation in early June (Larochelle and Larivière 2003). **Behavior** – Predator with stereoscopic vision, crepuscular or nocturnal. Has been caught in numbers in pit fall traps. Larvae reported to prey on heterocerid larvae and Collembola (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, daily flier.

96. *Bembidion (Odontium) paraenulum* Maddison, 2009

General Range – Transitional, Upper and Lower Austral Zones. General range is poorly known. East to NH, north to WI, west to NE, south to MS, FL, and VA. **Local Range** – Vermont, no records; New Hampshire, one locality, Merrimack on the Souhegan River. **Habitat** – On an exposed sand spit on the river, on fine sand mixed with clay. During a flood, found on a piece of wood resting on a mixture of coarse sand and clay. Associated species are *B. confusum, B. rapidum* and *B. americanum.* **Life Cycle** – Unknown. **Behavior** – Crepuscular, by day shelters in soil cracks, burrows and under bits of wood. **Dynamics** – Fully-winged, a daily flier.

97. *Bembidion (Odontium) robusticolle* Hayward, 1897

General Range – Transitional and Upper Austral Zones. Its general range is poorly known. East to CT and VT, north to MI, WI, IA and ND, south to KS and KY. **Local Range** – Vermont is at the northeastern tip of the known range, one locality, Lamoille River at E. Georgia. New Hampshire, no records. **Habitat** – Sand banks by rivers. **Life Cycle** – Mostly nocturnal, sometimes flies in sunshine. Flies to escape when

alarmed (Larochelle and Larivière 2003). **Behavior** – An alert, wary species which flies readily. Crepuscular and nocturnal. **Dynamics** – Fully-winged, daily flier.

98. *Bembidion (Bracteon) carinula* Chaudoir, 1868

General Range – Hudsonian, Transitional**,** Upper and Lower Canadian Zones. East to NF, northeast to LB, north in QC to Fort Chimo on Ungava Bay, northwest to YT, west to northern BC, south to AB, MB, MN, IA, IL ,KY, OH, NY, and CT. **Local Range** – Our states are within the general range. Vermont, 11 localities, on the shores of Lake Champlain south to Ferrisburgh, on Island Pond in Brighton, on the Connecticut River at Maidstone, on the Winooski River from Bolton west to the mouth, no records from the southern half of the state. New Hampshire, seven localities, on Ossipee Lake, the upper end of the Connecticut River at Pittsburg, the Merrimack River south at least to Milford. **Habitat** – On open sandy shores, both of big rivers and of lakes, especially the latter. **Life Cycle** – Adults, May 23 - September 28, copulation observed June-July (Larochelle and Larivière 2003.); tenerals in August (Lindroth 1963). **Behavior** – Diurnal predator with stereoscopic vision. **Dynamics** – Fully-winged, daily flier.

99. *Bembidion (Bracteon) inaequale* Say, 1823

General Range – Upper and Lower Canadian, Transitional, and Upper Austral Zones. East to NS, in QC and Gaspésie north to Lake Saint Jean and Abitibi, north to McMurray, AB, northwest to AK, west to BC, OR and CA, south to UT, CO, KS, MO, MS, and GA. **Local Range** – Our states are entirely within the local range. In Vermont, 50 localities throughout. New Hampshire, 24 localities, probably throughout but apparently not along the seashore. **Habitat** – On bare, often muddy sand by lakes, ponds, rivers, small brooks; anywhere on moist sand. It may also be found on sparse vegetation on sand. The habitat is similar to that of *B. levettei carrianum* which it replaces to the south but the two have ranges that overlap extensively. **Life Cycle** – Adults in Vermont, April 11-September 23; tenerals mid-July-September. The adult hibernates. **Behavior** – Diurnal, sight hunter with stereoscopic vision. **Dynamics** – Fully-winged, daily flier.

100. *Bembidion (Bracteon) levettei carrianum* Casey, 1924

General Range – Hudsonian, Upper and Lower Canadian Zones (partial). East to NS, northeast to NF, north in LB at least to Lake Melville, in ON north to Fort Severn on Hudson Bay, in the NT to Great Slave Lake to Aklavik nearly on the Arctic Ocean, in the interior of AK, north to Fort Yukon on the Arctic Circle and to Russian Mission on the lower Yukon River, also recorded from Palmer near Anchorage, south to WA, ID, and in Rocky Mountains south to NM, in the Great Plains south to ND, MN, WI, MI, southern ON, NY (Buffalo, Adirondacks) to VT and MA. **Local Range** – Vermont, breeding populations are apparently limited to the Boreal Plateau. Larochelle (1978*b*) listed a record from the Winooski River at Richmond. No other specimens have been found. It seems likely that this specimen was a stray disperser and did not represent a breeding population. New Hampshire, three localities (Pittsburg, the Atkinson and Gilmanton Academy Grant at the extreme northern end of the state, and Fabyan, town of Carroll, at the south edge of the Boreal Plateau). **Habitat** – Sand banks by rivers, lakes, and ponds. **Life Cycle** – Adults in QC, April 15-November 5 (Larochelle 1975); tenerals in July-August. **Behavior** – Diurnal predator, in cloudy weather and at night shelters under debris or underground. **Dynamics** – Fully-winged, daily flier.

101. *Bembidion (Bracteon) punctatostriatum* Say, 1823

General Range – Lower Canadian, Transitional, and Upper Austral Zones. East to ME, NB, NS, north in QC to the Saguenay River and the vicinity of Ottawa, north to Saskatoon, SK, and Edmonton, AB, north to YT and AK, west to Pacific coast and BC (New Westminster), south to WA, MT, MN, MO, AR, KY, PA, NY, and CT. **Local Range** – Our states are within the general range, except for stray specimens, found only on medium to large rivers, which excludes it from large portions of both states. Vermont, 23 localities, on the Connecticut, West, Nulhegan, Lamoille, and Winooski Rivers. New Hampshire, 13 localities, on the Connecticut, Merrimack, Pemigiwasset, Androscoggin, Suncook, Blackwater, Contoocook, and Ammonoosuc Rivers. **Habitat** – Bare sand deposits on medium to large rivers. **Life Cycle** – Adults May 25-September 25 in VT. **Behavior** – Diurnal sight predator on barren sand banks along rivers. **Dynamics** – Fully-winged, a daily flier.

102. *Bembidion (Ochthedromus) americanum* Dejean, 1831

General Range – Transitional, Upper and Lower Austral Zones. East to ME, north in QC to Quebec City and Montreal, recorded from Cayuga on the Lower Grand River in southern ON, north to MI, WI, and MN, west to KS, south to TX, LA, and FL. **Local Range** – Our states are within the general range. Vermont, 13 localities, probably throughout on the lakes and big rivers. New Hampshire, 27 localities, nearly throughout. Darlington recorded a specimen from Mount Washington, presumably a stray flier. **Habitat** – On bare, often wet mud or muddy sands on shores of rivers and lakes. **Life Cycle** – VT specimens May 26-Sept 6; in QC April 4-November 11 (Larochelle and Larivière 2003). Tenerals in August. **Behavior** – Partly crepuscular. Shelters by day in soil cracks under mats of vegetation and at the bases of plant tufts. Has been seen feeding on a mosquito larva (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, daily flier. It uses flight to escape predators.

103. *Bembidion (Ochthedromus) cheyennense* Casey, 1918

General Range – Lower Canadian Zone. Largely west and north of *B. americanum.* In QC, north to the south side of Gaspésie and to Chicoutimi near Lac Saint Jean, east to NS (Majka et al. 2007), north to Saskatoon, SK and to Edmonton, AB, west to Victoria, BC on Vancouver Island, south and west to southern CA, TX, AR, MO, and WI. This species was not recorded in the east until 1975 (Larochelle 1975) although we had taken it in VT in 1960. Darlington did not find it in 1931 although he collected it in NH after 1980. It is conspicuous and fairly easily caught so one would expect earlier collectors to find it if it were here. The original range was probably west of the Mississippi River. **Local Range** – Our states are at the eastern edge of the known range. Vermont, five localities, Alburgh on Lake Champlain shore, Burlington, Winooski River in Colchester, Dead Creek in Addison, and Poultney River in Poultney. New Hampshire, seven localities, Pelham, Brookline, Richmond, Concord, Pittsburg on Indian Stream, Haverhill, and Woodstock. There are no localities east of the Merrimack Valley. **Habitat** – Bare, wet mud or muddy sand on the shores of rivers and lakes. **Life Cycle** – In QC, adults, May 8-September 27. **Behavior** – Diurnal, visual predator with large eyes (Dearborn et al. 2014). **Dynamics** – Fully-winged, daily flier.

104. *Bembidion (Pseudoperyphus) antiquum* Dejean, 1831

General Range – An eastern and central species. Lower Canadian to Upper Austral Zones. East to mainland NS, ME, MA, NY, NJ, MD, south to NC, extreme northern Albama, Ozark Plateau in AR and MO, west to eastern IA, north to Lake Superior shore of WI, ON (Michipecotin River), QC, (Lake Abitibi, Trois Rivières), and ME (Saint John River in extreme north). **Local Range** –Vermont, along White, Winooski and Lamoille Rivers, not along Lake Champlain. Along the Connecticut River. New Hampshire, no records (NH record in Bousquet 2012*a* is unconfirmed). **Habitat** – Among cobbles and gravels along streams of all sizes where the waters are flowing. **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – Unknown. **Dynamics** – Fully-winged, flies to escape danger (Bousquet 2012*a*).

105. *Bembidion (Pseudoperyphus) bellorum* Maddison, 2008

General Range – An Appalachian species. Lower Canadian, Transition Zones. Northeast to western ME, west to the eastern Adirondacks of NY, in the upper valley of the Allegheny River in PA, in eastern KY and southeastern OH, in WV in the eastern part of the state and south of Wheeling. **Local Range** – Vermont, several localities, including Moose River in Granby, East Haven, Nulhegan River in Bloomfield, Jonesville. New Hampshire, several localities, including Baker, Mount Washington, Millsfield, Baker River in Rumney, Campton, Passaconaway (Maddison 2008). **Habitat** – Cobble and gravel shores of small headwaters. **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – Unknown. **Dynamics** – A record from Mount Washington probably indicates flight.

106. *Bembidion (Pseudoperyphus) chalceum* Dejean, 1831

General Range – A transcontinental species. Hudsonian to upper Austral Zones. East to NF, Îles-de-La Madeleine, Cape Breton, mainland NS, ME, RI, NJ, MD, NC, south to SC, KY, AR, NE, in mountains to northern CO and northern CA, west to OR, BC (Fraser Valley), NT (Liard River Valley, Mackenzie Valley to Wrigley), north to SK (Prince Albert National Park), MB (Assiniboine River), ON (Abitibi River), QC (north to Port Harrison, Baie Comeau). **Local Range** – Vermont, throughout the state. In contrast to other *Pseudoperyphus*, it inhabits the shores of Lake Champlain from Alburgh to Benson. It is also along major rivers including the Winooski, White, Black and Connecticut. New

Hampshire, nearly throughout. **Habitat** – Maddison (2008) states "on gravel and cobble shores of rivers….can also be found around gravel-shored ponds, including in quarries." **Life Cycle** – Mating mid-July (QC); tenerals mid-July to September (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, sometimes active on sunny days. Adults escape by flying when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier (Larochelle and Larivière 2003).

107. *Bembidion (Pseudoperyphus) honestum* Say, 1823

General Range – An eastern species. Transitional to Upper Austral Zones. East to Cape Breton Island, mainland NS, ME, CT, NJ, south in highlands to NC, south to OH, IL, eastern KS, west to IA, WI, north to ON (near Saint Thomas), QC (Quebec City), NB (French Lake). **Local Range** – Vermont, Connecticut River shores and along rivers near Lake Champlain, along the Lamoille River from Milton to Johnson, along the Winooski River from Burlington to Duxbury, along the Otaquichi River from Bridgewater and Hartland, along the White River from Sharon and Royalton, Black River at Irasburg, also from Bloomfield, Newbury, Rockingham, and Vernon. New Hampshire, east to Conway, in Connecticut Valley from Walpole and Charlestown to Littleton, also from Wentworth, Rumney, Campton, and Plainfield. **Habitat** – Sand and gravel bars along rivers where the current is slowest. **Life Cycle** – Adults, April-October; tenerals late July in NS, early August in VT (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, sometimes active on sunny days. Adults escape by flying when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier (Larochelle and Larivière 2003).

108. *Bembidion (Pseudoperyphus) louisella* Maddison, 2008

General Range – A northeastern species. Lower Canadian, Transition Zones. East to NF, Cape Breton, ME, south to central NH, north and west to QC (near Trois Rivières, Gaspésie, Baie Comeau). **Local Range** – Vermont, Granby, Victory, Lemington, one mile upstream from Beecher Falls. New Hampshire, North Conway (Saco River), Rumney and Quincy (Baker River), Fabyan (Ammonoosuc River), Breton Woods, West Campton. **Habitat** – Gravels and cobbles along cold, clear rivers. **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – Unknown. **Dynamics** – Fully-winged, flies to escape danger (Bousquet 2012*a*).

109. *Bembidion (Pseudoperyphus) rothfelsi* Maddison, 2008

General Range – An eastern and central species. Lower Canadian to Upper Austral Zones. East to NS, ME, CT, NY, MD, south to NC, TN, southwestern MS, west to southeastern MO, eastern IL, southern OH, north to ON (near to Georgian Bay), QC (near to Trois Rivières), and central NB. **Local Range** – Vermont, statewide, but nearly absent from Lake Champlain. New Hampshire, in all but the southernmost counties. **Habitat** – Cobble shores, especially along smaller streams, not on Lake Champlain. **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – Unknown. **Dynamics** – Fully-winged, flies to escape danger (Bousquet 2012*a*).

110. *Bembidion (Pseudoperyphus) rufotinctum* Chaudoir, 1868

General Range – Transitional Zone. North to VT and NH, in eastern MA at Lowell, and an isolated locality in the mountains of VA (Alleghany County, on the Cowpasture River near Clifton Forge). **Local Range** – Vermont, six localities, Winooski on Winooski River, Hartland Rapids on Connecticut River, Quechee Gorge on Ottauquechee River in Hartland, Emerson Falls on Sleeper River, Saint Johnsbury, Bradford on Waits River, and Barnet on the Passumpsic River. New Hampshire, three localities, McIndoo Falls in Monroe, Lisbon and Woodsville on Ammonoosuc River, Haverhill. Range and habitat were discussed by Cooper (1976) and Davidson (1981). **Habitat** – Remarkably specialized. The beetles live on rock ledges along big rivers by rapids or falls. Usually they are within a meter of the water's edge where spray moistens and cools the rocks. Often there are thin mats of hair-like green algae. They can be found on isolated rocks or islets within the rapids. **Life Cycle** – Adults in VT July 20-September 10; tenerals in September, overwinter as adults in nearby forests. **Behavior** – The saltid bug, *Pentacora, is* associated with it. Davidson (1981) noted that on cloudy or rainy days the beetles can be found further from the stream margins. **Dynamics** – Fully-winged, frequent flier.

111. *Bembidion (Ocydromus) scopulinum* (Kirby, 1837)

General Range – A nearly circumpolar species found in North America and Asia, but not in Europe. Hudsonian, Upper and Lower Canadian Zones. East to NS, northeast to NF, LB north to Lake Melville, in QC north to Anticosti Island and north to Great Whale River on Hudson Bay, northwest to AK at Circle and Fort Yukon in the interior and at

Anchorage on the south coast, south to OR, ID, WY, NM, in the plains south to SD, MN, IL, OH, PA, NY, and CT. In NY and probably midwestern states, restricted to the margins of the Great Lakes. **Local Range** – Vermont, 36 localities, mostly in the mountains but also on the shores of Lake Champlain. New Hampshire, 17 localities, south to Lee and Hampton near the coast, also at Mount Washington and rivers on the Boreal Plateau. **Habitat** – Bare, usually shaded gravel bars, commonest on rushing mountain stream associated with *B. simplex.* Taken up to 1250 m, where it occurs in the gravel below the cascades on the steep slopes of Mount Mansfield facing Smuggler's Notch. On the shores of Lake Champlain it is associated with *B. salebratum.* It is found on coastal areas of New Hampshire. The species is rare along lowland rivers but was present on the Lamoille River, in Johnson. Darlington (1931) states that it is "common in gravel bars and on the banks of brooks in the White Mountains, from about 2000 feet to the tree line. Above the latter, it is also common but occurs in moss beside the various exposed lakes." **Life Cycle** – Adults in Vermont April 12-November 5; tenerals July-August. **Behavior** – Mostly nocturnal, shelters in gravel by day. **Dynamics** – Polymorphic, frequent flier. Light trap records and found in sea drift.

112. *Bembidion (Peryphus) obscurellum obscurellum* (Motschulsky, 1845)

General Range – Nearly circumpolar. In Europe, in southern Sweden and Denmark, also the Kola Peninsula of northern Russia, the Ural Mountains in northern Siberia. The Scandinavian localities are mostly on the seashore. In North America, in the Hudson and Upper and Lower Canadian Zones. The range in North America before 1965 east only to Lake Nipigon and western ON, north to Cedar Lake in MB and Norman Wells in the Mackenzie Valley, in AK to Marshall on the Lower Yukon River and Fairbanks in the interior, south to Matanuska and the Kenai Peninsula, generally distributed in the BC interior, south to CA, UT, NM, NE, and MN. Since 1965, it has been taken in the east, including QC north to Levis, NF (Stephensville) on the west coast, and in NB, ME, and CT. **Local Range** – Vermont, four localities, earliest one at Dorset light trap (June 28, 1965), the Island Pond airport at Brighton (August, 1965), Colchester near Mallets Bay at light trap in more recent years, and Bloomfield (1987; Larochelle and Lariviere 2003). New Hampshire, four localities on the coastal plain, Rye (1966), Durham (1970), Hampton (1970), and Pittsburg in the far north (1980). **Habitat** – The specimens from Island Pond were from beneath an old board on loose disturbed sand. Further west it is on bare sand both near and away from water. In

the west it has been recorded from saline habitats. Frank (1971) found it to be one of the commonest species on cultivated fields in western Canada. Liard (1978) found it common in QC in small disturbed sand deposits especially near road repairs and commonly associated with *B. nitidum* (but no tiger beetles). He terms it a "pioneer species" in recently disturbed grounds, usually on sandy soil associated with bridge and road construction, dumps, sand pits and sterile sand after recent floods. **Life Cycle** – Adults in QC, April-November, copulation in July; tenerals, early June-early August (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day under stones or plant debris. Observed in fields feeding on dipterous larvae and adult coccinelids (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier. Probably a strong flier as evidenced by its rapid spread to the east coast in 1965. At least it has become established at Colchester where it is collected repeatedly.

113. *Bembidion (Peryphus) petrosum petrosum* Gebler, 1833

General Range – A circumpolar species and subspecies. There is another subspecies in the Aleutian Islands. In northern Norway, Finland and Russia, south in the mountains of Siberia and the Tian Shan. In North America, Hudsonian, Upper and Lower Canadian Zones. East to NS, north to NF, LB to Lake Melville, in QC north to Schaefferville and Great Whale River, north through the NT at YT to AK, north to Old Rampart on the Porcupine River at 67º N lat., west to Inuvik on the Lower Yukon and Naknek Lake at the base of the AK peninsula, west to the Pacific coast, south to Vancouver City, south to OR, ID, UT, CO, and NM in the mountains, south to SD, MN, IL, OH, PA, and MA. **Local Range** – Our states are within the general range. Vermont, 15 localities, mostly in the mountains, but also along Lake Champlain and one record from Vernon in the southeast corner. New Hampshire, 12 localities, from Mount Washington northward on the Connecticut and Ammonoosuc Rivers, the southernmost localities are Rumney and Conway. **Habitat** – In fine gravel bars or on sand. It is fairly common along shaded mountain brooks with *B. basicorne.* Also on the shores of Lake Champlain with *B. salebratum.* Scarce along larger rivers but is present on bars that are shaded for part of the day. One specimen was taken at a small woodland spring at 900 m on Bolton Mount on October 30 and is probably a hibernator. **Life Cycle** – Adults in VT, April 12-October 30; tenerals, May 19-August 8. **Behavior** – Nocturnal, shelters by day under stones and driftwood. **Dynamics** – Fully-winged, frequent flier. Recorded from light traps.

114. *Bembidion (Peryphus) tetracolum tetracolum* Say, 1823

General Range – A European and west Asian species. North to southern Finland, central Sweden, southern Norway, west to the British Isles, south to southern Spain, Italy, Greece, Crimea, the Caucasus, Asia Minor, and Kyrghizia, east to Lake Baikal. Introduced in North America. Lindroth (1957) concluded it was a very old accidental introduction into North America, probably arriving in the 18th century. Bain (1998) recorded the remains of this beetle from an archeological excavation of an outhouse in Boston dating from the 17th century. It now has a very wide range in eastern North America and there is a secondary introduction in the Pacific coast region from Vancouver City south to OR. The eastern range extends to NS and NF, north in QC to Gaspésie, Lac Saint Jean and Abitibi, in ON at Ottawa and westward to Lake Huron, north to MI and MN, northwest to SD, south to IA, IL, TN, NC, and VA. **Local Range** – Throughout both states. Vermont, 20 localities; New Hampshire, 18 localities. **Habitat** – Bare soil in gardens and croplands and also along rivers. Darlington (1931) states that "near Boston this species is found chiefly under stones near truck gardens and greenhouses." In Europe it has been recorded as commonly by water contaminated with refuse and near stables (Lindroth 1945). **Life Cycle** – Adults in VT, March 28-October 12; tenerals, July- September. **Behavior** – Mostly nocturnal, shelters during the day under stones, in soil crevices, or under dead plant material. The adult has been seen feeding on Collembola and insect eggs. **Dynamics** – Dimorphic, but the brachypterous morph has unusally large hind wings, with only the reflexed tip missing.

115. *Bembidion (Asioperyphus) postremum* Say, 1830

General Range – Transition Zone. East to NB, northeast to Gaspésie, north in QC to Levis (not recorded north of the Saint Lawrence River), west to WI, south to IL and PA. **Local Range** – Vermont, 14 localities, along the entire length of the Connecticut River, on the Winooski River from Bolton to the mouth, on the Lamoille River from Johnson to the mouth. New Hampshire, 14 localities, along the Connecticut, Androscoggin, Merrimack, Pemigiwasset, and Ashuelot Rivers. **Habitat** – On sloping sand banks along the larger rivers. It was especially abundant on islands of fine sand in the Lamoille River just west of Johnson, VT. Much of the sand had been blown from a nearby talc mine. The small islands had grass at the top and steeply sloping bare sand on all sides extending downwards about 2-3 m to the water surface.

Associated species were *Omophron tessalatum* and *B. confusum.* Darlington (1931) characterized the habitat as follows "on damp ground somewhat back from the water's edge on the banks of rivers and less commonly ponds, often amid bits of debris and damp leaves under willow thickets." **Life Cycle** – Adults in VT, June 5- September 21; tenerals, June-July. **Behavior** – Nocturnal, forages on the surface of the sand, by day it digs into the sand. The swollen pronotum indicates enlarged muscles on the front legs which are an adaptation for burrowing. **Dynamics** – Fully-winged but no flight records.

116. *Bembidion (Peryphanes) grapii* Gyllenhal, 1827

General Range – A circumpolar species, northern Scandinavia, Finland, northern Russia and Siberia to Kamchatka. It is generally north of 60º N lat., except in parts of Sweden and the Ural and east Siberia mountains, in Iceland and Greenland. In North America, Arctic and Hudsonian Zones. East to NF and LB, in QC, north to Fort Chimo on Ungava Bay, and Great Whale River on Hudson Bay, in the NT north to Reindeer Depot at the mouth of the Mackenzie River, west in AK to the Seward Peninsula and the AK Peninsula and the inner Aleutian Islands to Umnak, south at higher elevations into MT, AZ, NM, east of the Rockies south to the Black Hills of SD, the Cypress Hills of AB, northern MN, northern MI and ON, and in QC south to Longue-Pointe on the north shore of the Gulf and Anticosti Island, isolated on high mountains in NY (the Adirondacks), MA (Mount Greylock), and the higher mountains of ME, NH, VT, and Gaspésie. **Local Range** – Our states have small relict populations south of the main range. Vermont, seven localities, Mount Mansfield, Camel's Hump, Mount Hunger and White Rocks in the Worcester Range, Mount Abraham in Lincoln, a high ridge on Mount Grant in Ripton, and Killington Peak. New Hampshire, four localities, Mount Washington, Carter Dome, Mount Lafayette, and Moosilauke. **Habitat** – In northern Canada associated with the northern part of the taiga zone and the southern part of the tundra zone where it does not occur far beyond the north limit of the trees. In New England it is restricted to high mountains where it is found on rocky summits which are bare or have only small or stunted trees. Most records are from 1200 m or higher and are associated with some tundra plants but on Mount Grant it occurs at only 900 m on a barren exposed ridge where there are no tundra plants. **Life Cycle** – Adults in VT, May 16-October 9; tenerals in QC, mid-July-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters under moss or stones during the day. **Dynamics** – Polymorphic, fully-winged specimens fly to lights and have been found

in sea drift. Chiolino (1970) found that the Mount Mansfield and Camel's Hump populations were mixed, 20% from Mount Mansfield and 15% from Camel's Hump were fully-winged, while the population from Mount Killington was 100% fully-winged. This could indicate that the latter population has been established relatively recently by individuals flying in from the preceding localities.

117. *Bembidion (Peryphanes) lacunarium* (Zimmermann, 1869)

General Range – Upper Austral and Transition Zones. East to ME (Mount Desert), north to southern QC (Mount Sutton, north of the VT border) and ON, MI, and MN, west to ND and IA, south to TX, KY and VA. **Local Range** – Vermont, 41 localities, mostly in the hills and mountains but one from Burlington, probably statewide. New Hampshire, eight localities, widespread but possibly absent from the flat areas of the coastal plain and the lower Merrimack Valley; in Pittsburg at First Connecticut Lake and Magalloway Mount, The Bowl in Waterville Valley, Rumney, Wentworth, Mount Chocorua in Tamworth, Richmond, Mount Monadnock at Jaffrey. **Habitat** – Very small forest streams. In the Green Mountains maybe with *B. simplex* at the uppermost parts of streams, and also higher up, where water flow is intermittent. It ascends mountains to the tree line at 1200 m. In the Champlain and Connecticut Valleys, it has been found in deep shaded ravines with hemlocks (*Tsuga canadensis)*. **Life Cycle** – Adults, April 19-September 25; tenerals, July 22-September 19. **Behavior** – Nocturnal, shelters by day under stones, moss, and debris. **Dynamics** – Dimorphic, macropterous form rare, no flight records.

118. *Bembidion (Peryphanes) stephensii* Crotch, 1866

General Range – Central Europe north to the British Isles and southern Scandinavia, south to northern Spain, Italy, and Bulgaria, east through European Russia to the Ural Mountains. Introduced in North America, first noted at Ottawa (1891) and Montreal (1898), east to NS, northeast to NF where it is widespread, in QC, north to Kamouraska and Lac Saint Jean, north in NY at Albany and northwest to WI, south to OH and VA. **Local Range** – In our states it is a recent immigrant and is not yet abundant or widespread. Vermont, four localities, all northern, north Burlington (1966 earliest record), Mount Grant in Ripton (1970), Malletts Bay in Colchester, and Peacham Bog in Peacham (1987). New Hampshire, one locality, Paul's Stream (Pittsburg, 1981) collected by Darlington. **Habitat** – Typically at seeps and small trickles in shaded

areas, sometimes in gravel pits. **Life Cycle** – Adults in QC, March-October; tenerals in QC, mid-June-October (Larochelle and Larivière, 2003). **Behavior** – Usually nocturnal, sheltering during the day under small stones, cracks in the soil or tunnels of earthworms. **Dynamics** – Fully-winged, observed flying during the day and at sunset, occasional in seashore drift. The remote nature of some of the VT localities demonstrates its powers of flight.

119. *Bembidion (Bembidion) mutatum* Gemminger and Harold, 1868

General Range – Upper and Lower Canadian Zones. East to NS, northeast to NF, in QC on Anticosti Island, on the north shore to Magpie River, north of Lac Saint Jean to Chibougamou, in ON north to Cochrane and on the north shore of Lake Superior, in MB north to The Pas, in NT, on the Hay River, in YT, north of Dawson City, in AK to Circle and Tanana, in BC west to Vanderhoof and Endako on the Nechako River, west to WA, south to ID, UT, CO, and NM, south to northern WI and MI, in QC, south only to Montreal except on hills and mountains (e.g., The Pinnacle in Brome County), in NY only in the Adirondacks, in ME only on Mount Katahdin. **Local Range** – Our states have relict populations in the high mountains. Vermont, six localities, Spruce Peak in Cambridge, Mount Mansfield, Camel's Hump, Mount Hunger, Mount Abraham in Lincoln, and Mount Grant in Ripton. New Hampshire, four localities, Errol, Rumney, Franconia, and the Presidential Range. **Habitat** – In VT, collected under dry clumps of moss on barren, smooth bedrock e.g., Maple Ridge on Mount Mansfield. Our records are mostly from the alpine tundra zone but on Mount Grant it was taken as low as 900 m on an exposed barren summit which burned many years ago. Further north it has been recorded from barren spots on dry moraines, a likely habitat for the specimens from the Boreal Plateau of NH. More northern records from QC are from roadsides, fields, and sand pits, like the habitat occupied by *B. quadrimaculatum* further south. In AB it has been recorded from field borders (Doane 1981). **Life Cycle** – In QC, adults March-November (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters during the day under moss clumps, observed feeding on dipteran pupae. **Dynamics** – Polymorphic, long-winged form capable of flight; has been caught in seashore drift.

120. *Bembidion (Bembidion) quadrimaculatum oppositum* Say, 1823

General Range – A circumpolar species. This subspecies is in North America, east of the Rocky Mountains. In western North America and Eurasia other subspecies occur. Transition, Upper and Lower Canadian, and Upper Austral Zones. East to NS, northeast to southwestern NF, in QC north to Rivière Saint Jean, on the north shore opposite Anticosti and to Fort Rupert on James Bay, in ON north to Moose Factory on Hudson Bay, north to The Pas in MB and to Fort MacMurray, AB, west to ND and SD, NE, CO, southwest to TX, south to KS, MO, TN, and GA. **Local Range** – Throughout both states at all elevations. Vermont, 74 localities; New Hampshire, 34 localities. **Habitat** – On bare soil of almost any description, including gardens, croplands, dirt roads, trails, gravel pits, drier parts of shores, on bare exposed rock ledges including those above the tree line, common in grounds disturbed by lumbering, also in sparse lawns. **Life Cycle** – In Vermont, adults April 10-November 26; tenerals, May-August. **Behavior** – Partly diurnal, observed feeding on small larvae of Diptera and Lepidoptera, shelters under dead leaves and stone, recorded from ant nests and in the soil as deep as 15 cm (Larochelle and Larivière 2003). It has been considered important in the control of the onion maggot, *Hylemya antiqua*. **Dynamics** – Polymorphic; the flightless individuals have the wings only slightly reduced. Fully-winged specimens observed taking wing in late afternoon. Recorded at light traps and taken in sea drift.

121. *Bembidion (Furcacampa) affine* Say, 1823

General Range – Transition and Upper and Lower Austral Zones. East to CT and NH, north to VT and ON (Michipicoten River) north of Sault Sainte Marie, west to ND, KS, OK, south TX, south to LA, AL, and FL. The northern limits are confused because dispersing fliers get way beyond the breeding range. **Local Range** – Confined to the far south of both states. Vermont, three localities, Putney, Marlboro, and Wilmington. New Hampshire, one locality, Hollis. Darlington (1931) mentions a specimen, collected by Dimmock and labelled "White Mountains." If not mislabeled, this specimen might represent a winged stray. **Habitat**– VT specimens were taken on bare, wet mud on the margins of marshy pools. **Life Cycle** – VT records are from June 27 and July 6. Probably like related species but poorly documented. **Behavior** – Mostly nocturnal, shelters by day under bits of wood and plant debris. **Dynamics** – Fully-winged, frequent flier. Light trap records, found in drift.

122. *Bembidion (Furcacampa) impotens* Casey, 1918

General Range – Lower Canadian, Transition, and Upper and Lower Austral Zones. East to NB, in QC from Gatineau, the Magdalen Islands, and Lac La Vieille in Parc de la Verendrye, in ON north to Nipigon at the north shore of Lake Superior, north to MB, SK, MT, ID, west to BC and CA, south to AZ, NM, TX, AR, MS, and FL. **Local Range** – Vermont, eight localities, S. Alburgh, W. Elmore, South Burlington, Richmond, Panton, West Haven, Vergennes, and Rockingham. New Hampshire, one record, Concord airport (this represents a NEW STATE RECORD). **Habitat** – Usually margins of water in unshaded areas. LeSage (1996) reported it from an area of mown sedges on a border of a lake. **Life Cycle** – In QC, adults from March- October (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters by day in soil crevices and plant debris. **Dynamics** – Fully-winged, frequent flier. A majority of specimens in VT were taken from light traps, also found in drift material.

123. *Bembidion (Furcacampa) mimus* Hayward, 1897

General Range – Upper and Lower Canadian and Transition Zones. East to NS, northeast to NF, in QC north to Lac Saint Jean and Abitibi, in ON north to the north shore of Lake Superior, in southern MB north to Victoria beach and west to Whitewater Lake, west to southern SK, SD, south to IA, IL, OH, PA, and NJ. **Local Range** – Vermont, 36 localities; New Hampshire, eight localities, Pittsburg, Littleton, Monroe, Campton, Keene, Dover, Durham, and Hampton. **Habitat** – Similar to *B. versicolor*, but favored by peat soils, abundant on the top of Mount Mansfield and Haystack Mountain (Wilmington, VT), and Mounts Washington, Moosilauke, and Lafayette. Occurs also in the lowlands and has been taken in beaver houses (Larochelle and Larivière 2003). **Life Cycle** – In VT, adults April 24-October 15; tenerals in QC, mid July-late August (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, hides under plant debris and soil cracks during the day. **Dynamics** – Fully-winged, observed in flight at late afternoon. Light trap records, found in drift material, observed on dispersal flights in the springtime.

124. *Bembidion (Furcacampa) versicolor* (LeConte, 1847)

General Range – Hudsonian, Upper and Lower Canadian, Transition, Upper and Lower Austral. East to NS and NF, northeast to LB, in QC north to Schaefferville and Fort Rupert, in ON north to Cochrane and

Ogoki, across the NT to central AK (Circle), west to the Pacific at Wrangell in the panhandle, west to the coast in BC and WA, south to ID, MT, SD, IA, KY, VA, GA, and FL. **Local Range** – Throughout both states. Vermont 152 localities; New Hampshire, 57 localities. **Habitat** – Bare soil in many situations; shores of streams, lakes, and ponds. Often abundant in wet mud at margins of beaver ponds, in muddy spots in *Sphagnum* bogs, in gardens and croplands when surface is wet. On shaded mountain streams it may be associated with *B. basicorne* and its relatives but is relatively scarce in this habitat. In springtime, it has been taken in dry mosses at the summit of Camel's Hump (1248 m). Darlington (1931) reported it from the summit of Mount Washington, occurs at the top of Mount Mansfield where it is outnumbered by *B. mimus*. Has been taken in beaver houses (Larochelle and Larivière 2003). **Life Cycle** – In VT, adults April 23- October 22; tenerals in QC, July-mid September (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters by day under leaves, soil cracks, and plant debris. **Dynamics** – Fully-winged, frequent flier. Sometimes flies to escape, observed flying in late afternoon. Light trap records, also in lake and seashore drift.

125. *Bembidion (Diplocampa) transparens transparens* (Gebler, 1830)

General Range – A northern Holarctic species. In Scandinavia, extreme northern Germany (only in beach drift), east across northern Siberia. In North America, Hudsonian and Upper and Lower Canadian Zones. East to NS, northeast to NF and LB, in QC, Gaspésie and north to the entire north shore and to Fort Rupert on James Bay, in ON, north to Long Lac east of Lake Nipigon, in NT, north to Aklavik, in AK, north to Fort Yukon and Kotzebue, west to Andreafsky on the south coast, east to Kenai Peninsula, throughout BC including Vancouver Island, west to WA and OR, south to ID, MT, SD, MN, IL, IN, OH, PA, NY (Adirondacks and bogs near Ithaca), and MA. **Local Range** – Vermont, nine localities, Isle La Motte, E. Georgia, Alburgh, W. Elmore, Johnson, Richmond, E. Dorset, Manchester, and Pownal. New Hampshire, six localities, Pittsburg, Jefferson (Cherry Pond), Haverhill (Oliverian Brook), Colebrook, Mount Washington, and Rumney. Rumney is the only record south of the main crest of the White Mountains. It extends from the full length of the west side of the Green Mountains but is absent from most of the Connecticut Valley and all of New Hampshire except the extreme north. **Habitat** – In tall reeds and sedges in swamps, fens, and on the borders of lakes and occasionally rivers. According to

Lindroth (1963), it becomes the leading shoreline *Bembidion* in the far north. **Life Cycle** – Adults, March-October; tenerals mostly in the autumn but there are some from May (Larochelle and Larivière 2003). **Behavior** – Nocturnal, usually found in piles of dead leaves. **Dynamics** – Dimorphic, fully-winged form flies frequently. Light trap records, frequent in lake and sea drift.

126. *Bembidion (Semicampa) muscicola* Hayward, 1897

General Range – Lower Canadian and Transition Zones. East to NS, in QC north to Gaspésie, Saguenay Valley, and to Lake Matagami north of Abitibi, in ON north to Ottawa, in southern MB, northwest to Dundurn, SK, south of Saskatoon, south to IL, MI, NY, NJ, and RI. **Local Range** – Probably throughout both states. Vermont, 13 localities; New Hampshire, 18 localities. **Habitat** – In shaded areas by temporary pools in wet spots among fallen leaves or mosses. Specimens from Jonesville, VT were taken by a leaf-clogged vernal pool among shaded rock ledges. In the Missisquoi Delta, many were caught in pitfall traps around low spots in the lakeside forest which is seasonally flooded. It reaches 1219 m on Mount Mansfield. **Life Cycle** – In VT, adults, April 16 - September 12. According to Larochelle and Larivière (2003), tenerals are found throughout the whole growing season from April-October. **Behavior** – Nocturnal species, shelters by day under dead leaves and clumps of moss and grass. It has been seen to feed on mosquito eggs in the field. **Dynamics** – Dimorphic; fully-winged individuals fly as seen by their occurrence in seashore drift

127. *Bembidion (Semicampa) nigrivestis* Bousquet, 2006

General Range – An east-central species. Transition and Canadian Zones. East to NB, south to NH (Dover), west to MB (Sandlands Provincial Forest), north to ON (Ottawa), QC (south of Saint Lawrence). **Local Range** – Vermont, no records; New Hampshire, Dover. **Habitat** – "In moss and leaf litter along the margins of a small intermittent stream shaded by alders, cedars, and balsam firs, and in moist leaves and moss among the margin of vernal snow-melt pools" (Bousquet and Webster 2006). **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – "Active on bare patches on the forest floor in the season when a significant amount of snow is still on the ground" (Bousquet and Webster 2006). **Dynamics** – Dimorphic for wing development (of 51 specimens only two had long wings).

128. *Bembidion (Semicampa) praticola* Lindroth, 1963

General Range – Lower Canadian and Transition Zones. East to NB, in north and southwestern QC to Labelle near Mont Tremblant, Rigaud and Gatineau County, in ON north to Kincardine on Lake Huron, west to MN, south to IL, NY, and NH. **Local Range** – Vermont, two localities, Elmore and Lake Fairlee (these represent a NEW STATE RECORD). New Hampshire, five localities, Pittsburg, Hanover (Cooper 1976), West Milton, Durham, and Hampton. **Habitat** – According to Lindroth (1963) the habitat is like that of *B. muscicola.* **Life Cycle** – Tenerals, July-September, rarely in November and May (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day under moss and leaf litter. **Dynamics** – Dimorphic, fully-winged form rare, no records of flight.

129. *Bembidion (Semicampa) semicinctum* Notman, 1919

General Range – Transition and Lower Canadian Zones. Northeast to NS, in QC northeast in the Saint Lawrence Valley to Saint Joachim, beyond Quebec City and on Île Aux Coudres, opposite Baie Saint Paul, in ON north to Ottawa, west to MI, south to PA, NJ, and CT. **Local Range** – Throughout both states. Vermont, 21 localities; New Hampshire, 22 localities. **Habitat** – Among fallen leaves, in mosses or sedges, usually near more permanent water than the two preceding species. Has been collected in thin moss cover at the edge of sand under willows, about 2 m from the Winooski River at N. Duxbury, and on mud among dense sedges and mosses by a beaver pond in W. Elmore. Also has been reported under dogwood (*Cornus)* and alders (*Alnus)*. Seventeen individuals were caught in one pitfall trap in Lincoln, VT. The date was June 27, so this was not a winter aggregation. **Life Cycle** – Adults in VT, April 12 - October 7; tenerals occur any time from May-October but most are found in August. **Behavior** – Nocturnal, usually shelters by day under dead leaves. **Dynamics** – Vestigial-winged, wing is reduced to a tiny scale.

130. *Bembidion (Notaphus) castor* Lindroth, 1963

General Range – Transition, Upper and Lower Canadian Zones. East to NS, northeast to NF, in QC to Gaspésie and to Longue-Pointe on the north shore of the Gulf, north to Abitibi, in ON north to the north shore of Lake Superior (Terrace Bay), north to southern MB, northwest to Edmonton, AB, west to MT, SD, south to IA, WI, MI, OH, WV, VA, NJ, and CT. **Local Range** – Our states are entirely within the general range.

Vermont, 65 localities; New Hampshire, 29 localities, throughout both states. **Habitat** – Sand or muddy sand banks along rivers, large brooks and lake shores. Despite the species name it is not commonly found by beaver ponds; does not ascend into the mountains. **Life Cycle** – Adults in VT, April 14-October 15; tenerals in QC, June-September (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, sheltering by day under pebbles and plant debris. **Dynamics** – Frequent flier, flight observed by day; light trap records.

131. *Bembidion (Notaphus) constrictum* (LeConte, 1847)

General Range – Atlantic coast from LB to FL and TX. **Local Range** – Vermont, no records. New Hampshire, four localities, coastal from Odiorne Point in Rye to Seabrook. **Habitat** – Sea beaches, salt marshes, saline clay soil, perhaps closer to the open sea than the preceding species. **Life Cycle** – Adults, April-November; tenerals in July (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters by day under algal mats, in soil cracks and under small stones. **Dynamics** – Fully-winged, occasional flier; light trap records.

132. *Bembidion (Notaphus) contractum* Say, 1823

General Range – Atlantic coast from southern and southwestern NF, south to FL and AL. **Local Range** – Vermont, no records. New Hampshire, entire Atlantic coast from Rye to Seabrook, and on the margin of Great Bay in Durham. **Habitat** – In salt marshes, on sea beaches at upper limit of tidal zone. **Life Cycle** – Adults, Jan-November; tenerals, late June-August (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters by day under algal mats at the base of plants and under debris. Has been seen feeding on a dead fly. **Dynamics** – Dimorphic, fully-winged form has been observed at lights at night.

133. *Bembidion (Notaphus) cordatum* (LeConte, 1847)

General Range – Transition and Upper Austral Zones. East to NH, north to extreme southern ON, (north to the vicinity of Simcoe), north to MB (Winnipeg), west to ND, WY, CO, and NM, south to TX, MO, IL, OH, WV, VA, PA, and NY. **Local Range** – Our states are at the eastern extremity of the general range. Vermont, one specimen, Dead Creek (Addison, June 12, 1963). New Hampshire, one specimen, Hanover, "on alga-overgrown mud at the inlet of Girl Brook to the Connecticut River during a prolonged spell of low water" (July 19, 1965; Cooper 1976).

These specimens may represent an eastward irruption of the species, similar to that postulated for *B. obscurellum* but without long term survival here. **Habitat** – The habitat in the midwest is muddy sand beside lakes or ponds. The two New England specimens were on mud beside impounded parts of streams. **Life Cycle** – Adults, March-October; tenerals, mid-August (Larochelle and Larivière 2003). **Behavior** – Usually nocturnal, sheltering by day under pebbles and plant debris. **Dynamics** – Fully-winged, frequent flier; light trap records.

134. *Bembidion (Notaphus) intermedium* (Kirby, 1837)

General Range – Lower Canadian and Transition Zones. East to Vermont, northeast in QC to Berthierville, in ON north to Lake Nipigon, northwest to Edmonton, AB, west to central BC, south to ID, MT, WY, NE, MN, MI, OH, DE, and NY. L**ocal Range** – Vermont, 16 localities, from Johnson to Pownal west of the Green Mountains and only three records east of the Green Mountains (Thetford, Springfield, and Ascutney). New Hampshire, no records. **Habitat** – On mud or muddy sand of river banks, fair numbers along the Winooski, Lamoille, and Missisquoi Rivers suggest breeding populations. Other scattered records are probably stray migrants. **Life Cycle** – In VT, adults, May 15-October 19; tenerals, June-August. **Behavior** – Largely nocturnal, shelters by day under plant debris. **Dynamics** – Fully-winged, frequent flier; light trap records.

135. *Bembidion (Notaphus) oberthueri* Hayward, 1901

General Range – Transition Zone. East to NB, in QC, the Eastern Townships and Saint Lawrence Valley north to Quebec City, north to Winnipeg, MB, and to about 160 km north of Edmonton, AB, west to the Rocky Mountains, in MT and WY, south to NE, IA, IL, IN, OH, PA, NY, and CT. **Local Range** – Our states are within the general range. Vermont, 19 localities. New Hampshire, 13 localities, along the Connecticut River from the north to Hinsdale on the southern border, east to Plymouth. Not reported from most of the Merrimack Valley nor the coastal plain. **Habitat** – The upper parts of sand banks along medium or large sized rivers, often among sparse vegetation, sometimes in oxbow ponds along rivers. It has been taken in beaver houses. **Life Cycle** – Adults, April 28-October 23 in VT; tenerals, July- October. **Behavior** – Usually nocturnal, shelters by day in soil and under stones. **Dynamics** – Fully-winged, frequent flier, flight observed at sunset. Darlington (1931)

recorded them from Mount Washington but they were probably stray fliers.

136. *Bembidion (Notaphus) patruele* Dejean, 1831

General Range – Transition, Upper and Lower Austral, and Upper and Lower Canadian Zones. East to NS, northeast to NF, north to LB, in QC on the north shore of the Gulf, east to Longue-Pointe, north to Fort Rupert on James Bay, in ON north to Lake Nipigon, in the NT north to Fort Smith, in BC west to the coast on the Skeena and Fraser Rivers, west to WA and OR, south to ID, UT, CO, OK, LA, MS, AL, and FL. **Local Range** – Vermont, 137 localities; New Hampshire, 46 localities. Throughout both states. **Habitat** – Abundant on bare, rich mud, or muddy sand, often with sparse vegetation (mainly sedges), near pools, lakes, and slow streams, especially common at beaver ponds, sometimes in beaver houses. It is common in the mountains and has been taken at Bear Pond above 900 m elevation on Mount Mansfield, VT. It has been found on the coast in New Hampshire. **Life Cycle** – Adults in VT, May 15-September 30; tenerals, June 28-August 1. **Behavior** – Largely nocturnal, shelters by day under cracks in the soil, pebbles, and pieces of wood and plant debris. **Dynamics** – Fully-winged, flies at sunset. Flies to light traps, common under lake and seashore drift.

137. *Bembidion (Notaphus) rapidum* (LeConte, 1847)

General Range – Lower Canadian, Transition, and Upper Austral Zones. East to NB, in QC north to Bellechasse County in the east and to Amos and Abitibi region in the west, in ON north to Black Sturgeon Lake near Lake Nipigon, in the southern Canadian prairies north to Lethbridge, AB, west to MT, WY, UT, and CA, south to AZ, NM, TX, LA, and GA. **Local Range** – Vermont, 11 localities, in the Champlain Valley north to the border, and in the Connecticut Valley north to Norwich, two specimens taken on Camel's Hump elevation 1160 m. New Hampshire, 11 localities, north to Hanover and Tamworth, probably absent from the northern half. This is an abundant species in the midwest but relatively rare in the northeast. It may be yet another recent invader from the midwest. All records from eastern states and provinces are from 1963 or later. **Habitat** – On mud or muddy sand by rivers and lakes, usually among some vegetation, sometimes away from shorelines and wet areas. Krinsky and Oliver (2001) collected it in brackish water shores in CT. **Life Cycle** – Adults in Vermont, May 13-August 9; tenerals in QC, July-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters

by day under pebbles, plant debris, and soil crevices. **Dynamics** – Frequent flier. Light trap records, and found in seashore drift.

138. *Bembidion (Notaphus) versutum* LeConte, 1878

General Range – Lower Canadian and Transition Zones. East to NB, north in QC to Gaspésie, and to Havre-Saint Pierre on the north shore, north to Abitibi, in ON north to Parry Sound on Georgian Bay, to the north shore of Lake Superior and to Black Sturgeon Lake near Lake Nipigon, west to MN, south to WI, MI, NY (on the Susquehanna River), and NJ. **Local Range** – Throughout both states. Vermont, 22, localities; New Hampshire, 12 localities. **Habitat** – Sand or mud, especially on mixed sand and mud on slow streams, often among sedges. Common on small deltas where streams enter beaver ponds, sometimes in beaver houses; reaches high elevations. Darlington (1931) took it at Hermit Lake, elevation 1180 m, at Mount Washington. **Life Cycle** – Adults in VT, June 28-September 23, in QC, April-Sept (Larochelle and Larivière 2003.); tenerals in August. **Behavior** – Nocturnal, shelters under plant debris and in cracks in soil by day. **Dynamics** – Fully-winged, light trap records.

139. *Bembidion (Trepanedoris) concretum* Casey, 1918

General Range – Hudsonian, Upper and Lower Canadian, and Transition Zones. East to NS, northeast to NF, in QC, north to Gaspésie, the north shore of the Gulf as far as Longue-Pointe and to Fort Rupert on James Bay, in ON, north to Lake Nipigon, in NT, north to Yellow Knife and Aklavik, in AK, northwest to Fairbanks, Circle, and Fort Yukon, widespread in BC but not reaching the coast, south to OR, MT, NE, MN, WI, northern IL and IN, OH, WV, VA, and NY. **Local Range** – Throughout both states. Vermont, 40 localities; New Hampshire, 27 localities. **Habitat**– In richly organic marshes (Lindroth 1963) with cattails (*Typha), Carex* sedges, and *Drepanocladus* moss. Found amid *Phragmites* reeds. It is often at edges of beaver ponds and has been taken in beaver houses. In VT it has been found at all elevations from the Missisquoi Delta (30 m) to Bear Pond (915 m) on Mount Mansfield. **Life Cycle** – In VT, adults April 23-September 5; tenerals in QC, July-October (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day under plant debris, or in moss under small stones. **Dynamics** – Fully-winged, frequent flier. Light trap records, and in seadrift.

140. *Bembidion (Trepanedoris) fortestriatum* (Motschulsky, 1845)

General Range – Hudsonian, Upper and Lower Canadian, and Transition Zones. East to NS, northeast to NF, in QC, on Anticosti Island and north to Lac Saint Jean and Abitibi, in ON, north to Sudbury and Long Lac, in AB, north to Edmonton, northwest in AK to Fairbanks and Anchorage, probably general in BC including Vancouver Island and the Queen Charlotte Islands, south to OR, UT, WY, apparently not in the Great Plains south of the Canadian border but south to MI, IL, IN, NY, and CT. **Local Range** – Probably throughout both states. Vermont, seven localities, Holland, Morgan, Charleston, Victory, S. Lincoln, Manchester, and Woodford. New Hampshire, nine localities, Pittsburg, Stewartstown, Jefferson, Grantham, Durham, Lee, Hampton, Litchfield, and Pelham. **Habitat** – In borders of marshes or more commonly, fens. **Life Cycle** – In VT, adults May 22-September 5; tenerals in QC, mid-July-late September (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, shelters by day in dead leaves and moss mats. **Dynamics** – Fully-winged, flight observed in captive specimens. Light trap records from VT, September 5.

141. *Bembidion (Trepanedoris) frontale* (LeConte, 1847)

General Range – Lower Canadian, Transition, and Upper Austral Zones. East to NS, in QC northeast to Gaspésie, north to Mattagami in the Abitibi area, in ON north to Ottawa and Southampton, in the prairies north to Winnipeg and Saskatoon, in BC in the extreme south at Keremeos, on the east side of the Okanagan Range, south to KS, MO, IL, IN, OH, WV, and VA. **Local Range** – Throughout both states. Vermont, 57 localities; New Hampshire, 33 localities. **Habitat** – Under dead leaves by brooks, rivers, borders of bogs and swamps. In very small, wet, shaded spots in woods where it may be among sedges. At all elevations up to a bog at 1180 m on Mount Mansfield. **Life Cycle** – In VT, adults, April 30- September 29; tenerals, May 31 and Sept 29. **Behavior** – Largely nocturnal, shelters by day under dead leaves. Observed eating mosquito eggs. More prone to climb on plants than other *Bembidion* species. **Dynamics** – Fully-winged, flight observed (Lindoth 1963); common in drift material.

142. *Bembidion (Trepanedoris) pseudocautum* Lindroth, 1963

General Range – Transition Zone. East to ME (Saint Croix Valley), in QC north in the Saint Lawrence Valley and Eastern Townships, northeast to Saint Joachim, through the ON peninsula, in MB north to Winnipeg,

in SK north to Saskatoon, in AB recorded only from the Cypress Hills, in BC only in the dry interior in the extreme south at Oliver and Salmon Arm, south to MT, MN, MI, OH, PA, NY, and CT. **Local Range** – Probably throughout both states. In Vermont, five localities, Alburgh, Milton, Shelburne, Underhill, and Dorset. New Hampshire, 12 localities, north to Pittsburg, south to Winchester, Pelham and Durham. **Habitat** – In shaded areas of eutrophic marshes, commonly among cattails (*Typha)*. One record from an old beaver house on the borders of a marsh. **Life Cycle** – In VT, adults, May 10-September 18; tenerals in QC, mostly in August but some are as early as June (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters under plant debris by day. **Dynamics** – Fully-winged, probably an occasional flier. One light trap record from VT in June 18.

143. *Bembidion (Plataphus) basicorne* Notman, 1920

General Range – An Appalachian species. Transition Zone. East to NS, north to Appalachian region of southeastern QC, in NY in the Adirondacks, the Catskills and the Allegheny Plateau, south to mountains of western MA, in PA on the Pocono Plateau, south into the mountains of VA, WV, and NC. **Local Range** – Vermont, 43 localities, cold rushing brooks of the mountains and plateaus, throughout except for the Champlain lowlands. New Hampshire, two localities, both on the south side of the White Mountains at Rumney and Bartlett. **Habitat** – Bare gravel bars and cold, clear mountain brooks. The altitude range is similar to that of *B. carolinense,* and the two species commonly occur together. *B. basicorne* usually outnumbers *B. carolinense* in more heavily shaded areas. **Life Cycle** – Adults in VT, April 14-November 5; tenerals, June 27-August 12. **Behavior** – Normally a nocturnal species, sheltering in the gravel during daytime. **Dynamics** – Fully-winged; taken in sea drift, indicating flight.

144. *Bembidion (Plataphus) carolinense* Casey, 1924

General Range – An Appalachian species. Upper and Lower Canadian Zone. East to NS, northeast to NF, in QC north to Anticosti, on the north shore of the Gulf of Saint Lawrence to Baie-Trinité, south of the Saint Lawrence from Sainte Claire, near Quebec City, and Knowlton and Potton Springs north of VT border, in NY from the Adirondacks, south through VA, KY, and TN in the mountains. **Local Range** – Vermont, 43 localities, throughout in the mountains and hilly regions, probably absent only from the Champlain lowlands. New Hampshire, 22 localities,

general in the White Mountains and Boreal Plateau, not in the Merrimack Valley or coastal plain, but present along the southwestern border south to Winchester. **Habitat** – Bare gravel banks along mountain brooks, most abundant below 400 m. It occurs with *B. basicorne* and *B. simplex* on the lower parts of brooks near Camel's Hump. At the opposite extreme, it shares gravel banks on the Black River at Irasburg with *B. rusticum* and *B. planum*. **Life Cycle** – VT specimens, April 14-October 7; tenerals, July 1-September 19. **Behavior** – Nocturnal. Adults fly to escape when alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, takes wing when alarmed; light records.

145. *Bembidion (Plataphus) occultator* Notman, 1920

General Range – A Transamerican species. Hudsonian and Upper and Lower Canadian Zones. East to NS, northeast to NF and LB, in QC, north to James Bay, in ON north to Moose Factory on Hudson Bay, northwest to AK (Matanuska Valley), south to southeast AB (Cypress Hills), extreme northern MI (Marquette, on Lake Superior), in QC, south to L'Islet and Lotbinière counties, otherwise only north of the Saint Lawrence River, south to NY, PA (needs confirmation), VT, and NH. **Local Range** – Our states contain relict populations south of the main range and confined to the mountains and Boreal Plateau. Vermont, five localities, Underhill, Bolton, Duxbury, S. Lincoln, and Victory. New Hampshire, 10 localities, mostly in the Boreal Plateau but also in the White Mountains on the Peabody River in Pinkham Notch, and The Bowl on the extreme upper part of the Wonalancet River, in the town of Waterville Valley. There is a questionable record from Pelham, possibly from a mislabelled vial. **Habitat** – Muddy or grassy shores of mountain brooks and small rivers, especially the inlets to beaver ponds or under willows or alders. **Life Cycle** – Adults in VT April 29-August 30. Tenerals in QC, mid July-early August (Larochelle and Larivière 2003). **Behavior** – Nocturnal, by day it is found in leaf litter and grass tufts. **Dynamics** – Fully-winged, flight has been recorded from sea drift and light captures (Larochelle and Larivière 2003).

146. *Bembidion (Plataphus) rusticum rusticum* Casey, 1918

General Range – Upper and Lower Canadian Zones. East to NS, northeast to NF and extreme southern LB (Pinware River), in QC, north to Gaspésie, Anticosti, the north shore of the Saint Lawrence River and Gulf, and on the south shore to Becancour, in the Eastern Townships at Knowlton and S. Bolton, in the US, south to PA, in NY, south to the

Catskills. Other subspecies in northwestern BC, southwestern YT, AK, and eastern Siberia as far as the borders of Mongolia. **Local Range** – Our states are at the eastern edge of the range. Vermont, 14 localities, throughout the entire length of the state south to Arlington and Dover. In the south found either in or at the edge of the mountains; in the north in certain spots even in the lowlands, e.g., on Missisquoi Bay at Highgate and on the Connecticut River at Lemington. New Hampshire, 13 localities, in the White Mountains and in the Boreal Plateau north to Pittsburg, on the Connecticut River at Colebrook, and on the Androscoggin at Errol. Also in the far south from Walpole and Hinsdale on the Connecticut River. **Habitat** – Barren gravel or sand bars, exceptionally on lake shores as at Missisquoi Bay. It is usually on larger streams than the other *Plataphus*. **Life Cycle** – Adults, June 3-September 30 in VT; tenerals in VT, September 30. **Behavior** – Nocturnal. When alarmed, adults may fly away to escape (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier (Larochelle and Larivière 2003).

147. *Bembidion (Plataphus) simplex* Hayward, 1897

General Range – An Appalachian species. Transition Zone. East to ME (Mount Katahdin), north in southern QC to Knowlton and Potton Springs, NY (Adirondacks, Catskills and Allegheny Plateau), in mountains of western MA and northwestern CT, south through the mountains of PA, VA, TN, and NC.
Local Range – Probably general in the mountains, plateaus, and higher hills throughout both states. Vermont, 37 localities, general except in the Champlain lowlands, south to Dover and Putney. New Hampshire, nine localities, south to Westmoreland and Richmond. The other records are in or near the White Mountains including Ellsworth, The Bowl (Waterville Valley), Moosilauke, and Mount Washington (where it ascends to 1200 m). It is probably much more widely distributed than the few records indicate but lack of suitable habitat probably excluded it from the Merrimack Valley and the coastal plain. **Habitat** – This and three other *Plataphus* species, *B. basicorne, B. carolinense, and B. rusticum rusticum*, inhabit bare gravel bars by cold rushing mountain streams. Of the four, this species is commonest in the higher headwaters, where the water is coldest and the shade deepest. It ascends the mountains as far as there are permanent streams and reaches at least 600 m in VT. **Life Cycle** – Adults, April 14-October 2 in VT; tenerals, July-late September. **Behavior** – Nocturnal. Adults may dig to escape when

alarmed (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, probably capable of flight but no records reported.

148. *Bembidion (Hydrium) levigatum* Say, 1823

General Range – Widespread species, in east-central ME to MT and southeastern AB, south to eastern UT (Grand County), the Rio Grande in western TX (Brewster County) and northern Chihuahua, and the FL panhandle (Bousquet 2012*a*). **Local Range** – Vermont, no records. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Open ground, often on river banks, in sandy soil, with little to no vegetation (Larochelle and Larivière 2003). **Life Cycle** – Activity observed March-October; tenerals July-August (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, sometimes active on sunny days (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier (Larochelle and Larivière 2003).

149. *Bembidion (Hydrium) nitidum* (Kirby, 1837)

General Range – Upper and Lower Canadian and Transition Zones. East to western ME, north in QC to Lac Saint Jean and Abitibi, in northern ON to Lake Nipigon and Cochrane, north to Saskatoon and to Fort Smith in NT and White River in YT, west to BC, south to MT, SD, MN, northern OH and IN, south in NY to south shores of Lakes Erie and Ontario, and in the Adirondacks. **Local Range** – Our states are at the eastern edge of the known range. Vermont, 12 localities, northeast to Ferdinand and south to Shaftsbury and Springfield. New Hampshire, nine localities, south to Hinsdale and Seabrook. Specimens from Mount Washington and Moosilauke are probably strays. **Habitat** – On dry soil either bare or sparsely vegetated, frequently in sand or gravel pits. It was common at W. Elmore, VT in the poorly vegetated field described under *Cicindela limbalis*. According to Frank (1971) it is common in cultivated fields and their borders in western Canada. **Life Cycle** – Adults in VT April 10-September 22; tenerals July-August (Larochelle and Larivière 2003). **Behavior** – Partly diurnal, shelters under stones, debris, and plant rosettes. **Dynamics** – Fully-winged, occasional flier (Larochelle and Larivière 2003).

150. *Bembidion (Eupetedromus) graciliforme* Hayward, 1897

General Range – Transition Zone. East to NS, north in southern QC to Quebec City and Montreal, in ON north to Ottawa and to Bayview on

Lake Huron, north to MI, WI, MN, west to SD and IA, south to IL, IN, OH, WV, VA, and MD. **Local Range** – Our states are within the general range. Vermont, 37 localities; New Hampshire, 20 localities. **Habitat** – On muddy shorelines of ponds, lakes, and slow parts of rivers, especially common near beaver ponds, along the major rivers and Lake Champlain where it occurs on the muddy borders of backwaters and shoreline pools, not on the open shore. It does not penetrate the mountains and has not been taken above 300 m. **Life Cycle** – Adults in VT, April 30- October 12; tenerals in QC, July-October (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters during the day under plant debris. **Dynamics** – Fully-winged, frequent flier; light trap records.

151. *Bembidion (Eupetedromus) immaturum* Lindroth, 1954

General Range – A northeastern species. Upper and Lower Canadian Zone. East to NS, northeast to NF, north in QC to Sept Îles on the north shore of the Gulf in Fort George on James Bay, north to ON, west to IA, south to NY, VT, and NH. **Local Range** – Our states are at the south end of the general range. Vermont, eight localities, south to the mouth of Lewis Creek at Ferrisburgh, Missisquoi Delta at Swanton and Highgate, the Lamoille Delta at Colchester, the Clyde River near Island Pond in Brighton and in Charleston, on the Connecticut River at Maidstone, Victory. New Hampshire, 12 localities, south to Ossipee, Danbury, and Andover. **Habitat** – Usually on more open shores than *B. incrematum,* on soft mud, usually with *Carex* sedges. A series of 14 specimens from the Clyde River were around muddy depressions formed by the partial slumping of the sod banks of this small river. **Life Cycle** – In VT, adults May 20-October 1; tenerals, mid May-November, mostly from mid-July onward (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, sheltering by day under dead leaves and wood. **Dynamics** – Fully-winged, frequent flier; light trap records.

152. *Bembidion (Eupetedromus) incrematum* LeConte, 1860

General Range – A transcontinental northern species, also in the mountains of northeastern Siberia, west to the Kolyma River. Hudsonian, Upper and Lower Canadian Zones. East to NS, north to southern LB, north in QC to the north shore of the Gulf and to Fort George on James Bay, in northern ON, north to Moose Factory on Hudson Bay, north in the Mackenzie Valley to Aklavik, in AK, north to Circle and west to the Kenai Peninsula, throughout BC, south in the mountains to CA, ID, and CO, in the plains south to ND, MN, MI, south in the mountains to VA,

south to MA. **Local Range** – Vermont, 18 localities; New Hampshire, 12 localities. Probably throughout both states except in the high mountains. **Habitat** – On bare mud of river banks and lake shores, usually in deep shade, abundant in the Missisquoi Delta, sometimes at beaver ponds. **Life Cycle** – Adults in VT, April 26-October 29; tenerals in QC mostly from mid-July to late August (Larochelle and Larivière 2003). **Behavior** – Usually nocturnal, sheltering under bits of wood and dead leaves by day. **Dynamics** – Fully-winged, frequent flier. Flight observed in captivity; found in lake and seashore drift.

153. *Bembidion (Eupetedromus) iridipenne* Bousquet & Webster, 2006

General Range – A northeastern species. Canadian, Transition Zones. East to NB, PA, south to VA, west to Gatineau Park in QC, north to Mont Tremblant Park in QC. **Local Range** – Vermont, three localities, South Lincoln, Nebraska Notch, Richmond (Gillett Pond). New Hampshire, five localities, Mount Washington, Concord airport, five miles southeast of Rindge, Magalloway Mountain, Connecticut Lakes, Atkinson and Gilmanton Academy Grant (19 km northeast of Errol). **Habitat** – "Open sun exposed areas, under debris on bare muddy-clayish soil along large streams or along margins of beaver ponds" (Bousquet and Webster 2006). **Life Cycle** – Presumed to be a spring breeder (Bousquet 2010). **Behavior** – "Adults were often observed running over the surface of bare patches of clay" (Bousquet and Webster 2006).

154. *Bembidion (Eupetedromus) variegatum* Say, 1823

General Range – An eastern species. Transition and Upper Austral Zones. East to NB, north to southern QC (Blandford, near Arthabaska), in ON recorded from Grand Bend near the southern end of Lake Huron, west to SD, KS, and TX, south to LA, AL, and GA. **Local Range** – Vermont, 15 localities, probably throughout. New Hampshire, eight localities, First Connecticut Lake in Pittsburg, Colebrook, Plymouth, Lancaster, Lebanon, Bath, Litchfield, and Hinsdale. **Habitat** – Sand, often mixed with mud, on margins of small ponds including oxbows or beaver ponds, also along river banks. Darlington (1931) collected it at Rumney "on the higher parts of damp banks often under willow thickets." **Life Cycle** – Tenerals, July-September. **Behavior** – Usually nocturnal, shelters by day under stones and plant debris. **Dynamics** – Fully-winged, frequent flier. Flies to escape, observed flying late afternoon; light trap records; lake and seashore drift.

155. *Bembidion (Trichoplataphus) fugax* (Leconte, 1848)

General Range – VT and southwestern MA (Hampden County), west to IL, south to northern and eastern TN (Cheatham, Fentress, and Sevier Counties), VA. **Local Range** – Vermont, recorded from VT in Hayward 1897 and Bousquet 2012*a*. New Hampshire, no records. **Habitat** – Open ground with moist, gravelly soil, sometimes mixed with sand and silt; river banks and flood plains (Larochelle and Larivière 2003). **Life Cycle** – Activity observed April-September; tenerals, July and August in MD (Larochelle and Larivière 2003). **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, probably capable of flight (Larochelle and Larivière 2003).

156. *Bembidion (Trichoplataphus) planum* (Haldeman, 1843)

General Range – Lower Canadian and Transition Zones. East to NS, in QC north to Lotbinière and Joliette, and along the Ottawa River to Hull, in ON, northwest to Black Sturgeon Lake south of Lake Nipigon, west to MN, IL, south to TN, VA, and MD. **Local Range** – Our states are within the general range. Vermont, 40 localities, on all big and middle sized rivers, including the entire length of the Connecticut River, also on Lake Champlain shores including Burton Island near Saint Albans. New Hampshire, 15 localities, on all the suitable rivers. **Habitat** – Barren gravel banks along large and middle sized rivers and gravel shores of lakes. It can be found on isolated gravel banks within the rivers. **Life Cycle** – Adults, May 15-October 11 in VT; tenerals, July 13-September 19. **Behavior** – Nocturnal, hides in gravel by day. When disturbed, it can escape by flight or by running into the water and hiding beneath stones (Landry 1976). **Dynamics** – Fully-winged, frequent flier. Flies when disturbed or by rising waters; light records.

157. *Bembidion (Trichoplataphus) rolandi* Fall, 1922

General Range – Seemingly an Appalachian species. Transition Zone. East to NS, in QC, north to Saint Foy (near Quebec City) and Sainte Éclair in Dorchester County, also near Montreal, in ON at Ottawa and Trenton, west to OH, WV, south to VA, DC, NJ, and MA. **Local Range** – Vermont, 10 localities, eight on the shores of Lake Champlain (Isle La Motte at Fleury Bay, North Hero (Knights Point and Carrying Place), South Hero (Allen Point), Shelburne Bay, Addison, and Shoreham), Poultney River at Poultney, on the West River at Jamaica State Park. New Hampshire, no records. **Habitat** – Along Lake Champlain,

especially in the angular shale gravel below bluffs. Davidson (1978) collected more than 60 specimens in an hour at Knights Point. **Life Cycle** – In VT, adults, May 7-October 21; tenerals June-August. **Behavior** – Nocturnal, shelters in gravel by day. Escapes by running into water and hiding under stones. **Dynamics** – Fully-winged; light records.

158. *Bembidion (Phyla) obtusum* Audinet-Serville, 1821

General Range – Southern and central Europe, west to Ireland, north to southern Sweden, east through European Russia to the Urals, south to the Mediterranean Sea and North Africa, Madeira. Introduced into North America. North American distribution summarized in Hoebeke et al. 1991. North to extreme southwestern QC (Dorval), to Ottawa and to Owen Sound in ON, west nearly to Windsor, ON, south to Cleveland, OH and the Finger Lakes region of NY, eastern limit in VT. An earlier record from New York City (Lindroth 1963) refers to a specimen intercepted from a ship and does not represent a successful invasion. The oldest record of an established population is from 1956 near Toronto, ON. The species reached Belleville north of Lake ON by 1962, Genesee County in western NY by 1964, and western VT by 1978. No doubt it will continue to spread. **Local Range** – Vermont, 12 localities, northwestern region only. The first collection was in Shoreham, 1978, north to Grand Isle, several localities around Burlington, and in the Green Mountains at Appalachian Gap and Camel's Hump. The most southern record is at Tinmouth in the Taconic range. New Hampshire, no records. **Habitat** – According to Lindroth (1945), especially liable to be found at the edges of potato and grain fields and also in other areas with bare soil or low vegetation, as well as in greenhouses, and in alvars. Similar habitats reported in North America include alfalfa fields, gardens and lawns, knotweed mats over sidewalks, and cleared ground beneath trees in an apple orchard. The Camel's Hump specimens had the hind wings only partly folded. It was climbing in a balsam fir tree at about 1000 m, and had the appearance of a winged stray which had recently landed. **Life Cycle** – Tenerals in VT in August, in QC August-November, and a few in spring and early summer. Normally overwinters as the adult, eggs are laid in the spring. **Behavior** – The species is usually nocturnal and becomes partly diurnal in the spring. **Dynamics** – Wings, dimorphic. Five out of seven specimens in VT were fully-winged. The presence of the vestigial-winged morph throughout the North American range suggest either that flight is less important than accidental transport by humans, or else the gene for short wings is transported by the long-

winged morph. In the latter case, either the gene for brachyptery is not dominant or else fertilized females fly before laying eggs.

SUBTRIBE XYSTOSOMINA

Represented by one species in North America.

Genus *Mioptachys*

159. *Mioptachys flavicauda* (Say, 1823)

General Range – A transamerican species, absent from dry interior states, so range is divided. Transition, Upper and Lower Austral Zones. East to NS, ME, MA, NJ, VA, SC, GA, south to FL, LA, TX, west to NM, AR, MO, NE, SD, north to ND, MN, ON (the Peninsula), QC (Saint Emile in Montcalm County, Berthierville). Western range from CA and AZ in the south to southern BC (Vernon, Summerland) in the north. **Local Range** – Vermont, six localities, north to Westford, south to Dorset, lowlands in Charlotte, also in mountains at Nebraska Notch, probably throughout. New Hampshire, eight localities, north to Rumney and Albany. **Habitat** – Under loose bark of hardwoods. Recorded from maple, elm, poplar, walnut (Larochelle and Larivière 2003). Sometimes found in sawdust. **Life Cycle** – Tenerals in October (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Has been seen preying on mites and Collembola (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

SUBTRIBE TACHYINA

Represented locally by six genera:

Tachyta (3 species) Under bark of dry, dead snags, also on rock ledges.

Elaphropus (formerly *Tachyura*; 12 species) Most are associated with streams or lakes, some on dry soil or away from water, others are associated in some way with ants.

Pericompsus (1 species) In fine dry sand along rivers.

Porotachys (1 species) In sawdust piles.

Polyderis (1 species) In dry areas, rock ledges, sometimes with ants or in saw dust piles.

Tachys (5 species) Under rocks at water margins.

Genus *Tachyta*

160. *Tachyta (Tachyta) angulata* Casey, 1918

General Range – A transcontinental species. Hudsonian, Canadian, Transition Zones. East to NS, ME, MA, NJ, south in mountains to SC, south to MI, WI, MN, south in mountains to NM, AZ, Mexico (Cofre de Perote, Durango), west to OR, BC (Kimberly, Okanogan), north to YT (29 km south of Rampart House, Gravel Lake, 93 km east of Dawson), AB (Edmonton), ON (Cochrane), QC (Poste-de-la-Baleine, Gaspseie). **Local Range** – Vermont, 23 localities including Burlington, Belvidere, Barton, Berlin, many places in the Green Mountains from the Sterling Range south to Hancock, also Dorset, Peru and Dover. New Hampshire, 21 localities throughout. **Habitat** – Under the bark of hardwoods (poplar, birch, maple) and conifers (pine, spruce), up to the tree line in the highest mountains. Erwin (1975) cites a specimen taken in the lining of a beaver house. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. Frequent climber on trees (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, has been taken in drift.

161. *Tachyta (Tachyta) inornata* (Say, 1823)

General Range – A transcontinental species, formerly considered a subspecies of *Tachyta nana* (full species status follows Bousquet 2010, 2012*a*). Transition to Lower Austral Zones. East to ME, MA, NY, VA, SC, FL, south to AL, LA, TX, AZ, west to OR, WA, BC (Terrace), north to SK, WI (to south shore of Lake Superior), ON (the peninsula), QC (eastern part of Ottawa Valley, Montreal area, Eastern Townships). **Local Range** – Vermont, nine localities, in the north Mount Mansfield, Johnson, W. Elmore, Hardwick (Eligo Pond), Lincoln Mountain, in the south, Peru, Brattleboro. New Hampshire, one locality, Pelham. **Habitat** – Under the bark of dead trees or branches. Recorded from both conifers (pines, spruces, firs; Larochelle and Larivière 2003) and hardwoods (oaks, elms, hackberry). I have also collected it, on three different occasions, under clumps of moss on dry rock ledges at 700 m in the mountains. **Life Cycle** – Tenerals June-August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, has been taken at light.

162. *Tachyta (Tachyta) kirbyi* Casey, 1918

General Range – A transcontinental species, formerly considered a subspecies of *Tachyta nana* (full species status follows Bousquet 2010, 2012*a*). Transition, Lower Canadian Zones. East to ME, MA, NY, south to ON, north to WI, MN, SD, NM, CO (in mountains), ID, OR, west to WA, BC, north to southeast AK (Sitka), east to AB (Edmonton, McMurray), ON (Abitibi, Gaspésie). **Local Range** – Vermont, four localities, Mount Mansfield, Georgia, Hardwick, Peru. New Hampshire, one locality, Durham. **Habitat** – Like *Tachyta inornata*. **Life Cycle** – Tenerals in August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Frequent climber on trees (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

Genus *Elaphropus*

163. *Elaphropus (Barytachys) anceps* (LeConte, 1848)

General Range – Transition and Upper Austral Zones. East to NS, in QC north to the south side of the Gaspésie and southwestern QC (Knowlton) north of the VT border, in ON at Belleville near Lake Ontario and at Bayfield, near the south end of Lake Huron, at Winnipeg, MB, Saskatoon, SK, and Medicine Hat, AB. There is also a surprising record from NT on the Hay River. West to BC, WA, and OR, south to NV, AZ, NM, KS, MO, AL, WV, MD, and NJ. It is difficult to compare the range of this species to *E. incurvus* because the species are so similar that they are easily confused. **Local Range** – Our states are entirely within the general range and *E. anceps* occurs throughout both of them. Vermont, 71 localities; New Hampshire, 39 localities, including Pittsburg at the north tip. **Habitat** – Similar to that of *E. incurvus* except that there are no records of *E. anceps* associated with ants. **Life Cycle** – In VT, adults, April 27-October 23; tenerals in QC late June-August (Larochelle and Larivière 2003). **Behavior** – Diurnal; at night and in cloudy weather it shelters under plant debris and stones. **Dynamics** – Fully-winged; probably an occasional flier, but no records of flight observation.

164. *Elaphropus (Barytachys) capax* (LeConte, 1863)

General Range – An east-central species. Upper and Lower Austral Zones. East to NJ, VA, GA, south to FL, west to MO, north to IL, IN, NY. **Local Range** –Vermont, two localities, LaPlatte River in Shelburne,

Bristol (R. Davidson, pers. comm.); New Hampshire, no records. **Habitat** – Borders of streams and marshes. **Life Cycle** – Active January-July, October-November (Larochelle and Larivière 2003). **Behavior** – Diurnal and nocturnal. On cloudy or cool days, it shelters among sedges (*Carex*) and cattails (*Typhus*). **Dynamics** – Fully-winged, it has been taken at light traps. A fast runner.

165. *Elaphropus (Barytachys) dolosus* (LeConte, 1848)

General Range – Transition and Upper Austral Zones. East to central ME, north to VT, NH, in southern ON north to Prince Edward County, a peninsula in Lake Ontario, and Grand Bend on Lake Huron, north to IN, WI, MN, ND, MT, and ID, west to WA, OR, southwest to CA, AZ, NM, TX, AR, and MO. This is basically a western species, widespread on the Great Plains, with a limited eastern extension in the Transition Zone. Perhaps the eastern records mark a recent invasion like those of *Bembidion obscurellum* and *B. cordatum*. **Local Range** – Vermont, three localities, E. Georgia, Winooski, and Vernon. New Hampshire, three localities, Nashua, Merrimack, and Litchfield, all on the Merrimack River at the southern boundary. **Habitat** – Bare sand along rivers and lake shores. **Life Cycle** – Adults, May-September; tenerals mid-July and August (Larochelle and Larivière 2003). **Behavior** – Diurnal, active in bright sunlight. On cloudy days and at night it shelters in soil crevices. **Dynamics** – Fully-winged, light trap records.

166. *Elaphropus (Barytachys) ferrugineus* (Dejean, 1831)

General Range – Upper Austral Zone. An east-central species. East to MA, CT, NY, NJ, MD, NC, SC, south to GA, AL, west to AR, MO, north to IA, IL, OH, NY, MA. **Local Range** – Vermont, no records; New Hampshire, Dover in the southeast (confirms NH record in Bousquet 2012*a*). **Habitat** – In nests of ants (*Lasius alienus* and *L. umbratus*), in rotten wood or under bark. **Life Cycle** – Active April-September (Larochelle and Larivière 2003). **Behavior** – Diurnal, active in sunshine (Larochelle and Larivière 2003). **Dynamics** – Wings vestigial, entirely flightless. A fast runner.

167. *Elaphropus (Barytachys) granarius* (Dejean, 1831)

General Range – Transition, Upper and Lower Austral Zones. East to NS, in QC limited to the southwest part of the Eastern Townships, the Montreal region, and the Ottawa Valley to Hull, north to ON, MI, WI,

northwest to MN, west to NE, KS, and CO, south to AR, MS, and FL. **Local Range** – Probably throughout both states. Vermont, 14 localities; New Hampshire, eight localities, north to Errol, Mount Washington summit (Darlington 1931). **Habitat** – In open, sparsely vegetated areas, in sand and gravel pits, occasional on ant hills, e.g., with *Formica fusca* at Shelburne Pond, VT. On Mount Mansfield, on the alpine tundra at 1200 m. **Life Cycle** – In VT, adults, April 18-August 30; tenerals, in August (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, shelters by day under stones, plant debris, and plant rosettes. **Dynamics** – Dimorphic, fully-winged individuals fly. Light trap records, taken in drift.

168. *Elaphropus (Barytachys) incurvus* (Say, 1830)

General Range – Lower Canadian, Transition, and Upper Austral Zones. East to NS, in QC in the Saint Lawrence Valley north to Chicoutimi and Abitibi, in ON north to Ottawa and Parry Sound, in southern MB north to Lake Winnipeg, in southern SK north to Regina, in BC, west to Kamloops and the Okanagan Valley, south to OR, ID, WY, NE, AR, MS, AL, and SC. **Local Range** – In our states, probably throughout, but most records are northern. Vermont, 30 localities, mostly northern, but one specimen each from Chelsea and Arlington. New Hampshire, 15 localities, mostly northern, but from Rye, Seabrook, Rindge, Northwood, and Walpole in the south. Darlington's published records cannot be used as *E. anceps* had not been recognized as distinct during his time. **Habitat** – On bare or sparsely vegetated soil, along margins of rivers and lakes, in gardens and wet parts of fields, bare mud along paths, occurs in trampled areas on Mount Mansfield, has been taken in beaver houses and ant nests (*Formica exsectoides* and *F. ulkei*; Larochelle and Larivière 2003). **Life Cycle** – In VT, May 3-October 14; tenerals, August 28-September 5. **Behavior** – Diurnal. When inactive, it can be found under stones, plant debris, basal rosettes of plants, and in ant nests. It has been observed attacking dead or disabled ants. **Dynamics** – Fully-winged, a frequent flier. Observed flying at sunset, light trap records.

169. *Elaphropus levipes* (Casey, 1918)

(This species was treated as *T. xanthopus by* Lindroth.)

General Range – Upper and Lower Austral Zone. East to NS, north to VT, NY (Long Island), west to NJ, VA, NC, and FL. **Local Range** – Vermont, one locality, at the mouth of Lewis Creek in Ferrisburgh. New

Hampshire, six localities, north to Columbia, Hanover, Walpole, Rindge, Nashua, and Hampton. **Habitat** – River banks on muddy sand. **Life Cycle** – Poorly known. April, August-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal species, shelters by day in soil or under bark. **Dynamics** – Fully-winged, no flight observations.

170. *Elaphropus (Barytachys) saturatus* (Casey, 1918)

General Range – Transition and Upper Austral Zones. East to NS, in QC north in the Eastern Townships and in the Saint Lawrence Valley, northeast to the vicinity of Quebec City, in ON north to Ottawa and through the peninsula to Bayfield on Lake Huron, north to WI, northwest to MN, west to IA and KS, southwest to TX, south to AL and GA. **Local Range** – Vermont, 37 localities, throughout. New Hampshire, 11 localities, north to Columbia. **Habitat** – Shores of lakes and medium-sized rivers; according to Lindroth (1966), on the upper edges of sand banks where sparse vegetation occurs, also taken in wet cornfields. **Life Cycle** – In VT, adults, May 10-October 24; tenerals, August 19, (Lindroth 1966). **Behavior** – Diurnal species. **Dynamics** – Fully-winged, light trap records in VT, June 9. Probably only an occasional flier, has been taken in seashore drift.

171. *Elaphropus (Barytachys) tripunctatus* (Say, 1830)

General Range – Transition and Upper Austral Zones. East to NS, in QC on the south shore of Gaspésie, and in the Saint Lawrence Valley to Levis, in ON north to Ottawa and Lake Simcoe, north to MI, northwest to ND, west to NE, southwest to TX, south to LA, AL, and GA. **Local Range** – Vermont, 23 localities, probably throughout; New Hampshire, eight localities, throughout. **Habitat** – Fine gravel on river and lake shores. **Life Cycle** – In VT, adults May 13-September 30; tenerals in QC, late June-August (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal species, shelters in gravel during the day.
Dynamics – Fully-winged, light trap records; flight observed at sunset.

172. *Elaphropus (Barytachys) vernicatus* (Casey, 1918)

General Range – Transition and Upper Austral Zones. East to NB, north to QC to Becancour in the Saint Lawrence Valley, in ON to Bayfield near the south end of Lake Huron, in southwestern MB recorded from Aweme, northwestern limit in southern SK, west to IA and MO, south to KY, VA, and NC. **Local Range** – Our states are within the general range.

Vermont, nine localities, Johnson, W. Elmore, Richmond, Duxbury, Shelburne, Mount Tabor, Jamaica, Rockingham, and Putney. New Hampshire, 10 localities, Mount Washington, Haverhill (Oliverian Bridge), Conway, Concord, Rye, Durham, Hinsdale, Winchester, Pelham, and Seabrook. **Habitat** – Usually in ant hills, recorded with *Formica exsectoides* among other species. Found along the shores of rivers and lakes, also in sandy fields. **Life Cycle** – Adults, in VT June 23-August 30; tenerals in QC July- September (Larochelle and Larivière 2003). **Behavior** – Diurnal, active in sunshine, sheltering within ant nests on cloudy, cool days and probably at night (Larochelle and Larviere 2003). **Dynamics** – Fully-winged, probably an occasional flier. No flight records but has been taken in seadrift.

173. *Elaphropus (Barytachys) vivax* (LeConte, 1848)

General Range – Transition and Upper Austral Zones. East to ME (lower Kennebec River), in QC north to the Eastern Townships, in the Saint Lawrence Valley east only to Becancour, west to the Ottawa Valley, north to MI, WI, west to IA, MO, and AR, southwest to TX, south to LA, AL, and GA. **Local Range** – Vermont, 15 localities, north in the Champlain Valley to Swanton, east in the Winooski Valley to E. Montpelier, and in the Connecticut Valley to Norwich. New Hampshire, 10 localities, north to Haverhill at Oliverian bridge, also at Concord, Keene, Brookline, Merrimack, Litchfield, Nashua, Lee, and Durham. **Habitat** – Shores of rivers and lakes, on mixed sand and mud, usually without vegetation. **Life Cycle** – In VT, adults May 10-August 20. **Behavior** – Diurnal species, shelters under plant debris or in cracks in the soil during the day. **Dynamics** – Fully-winged, light trap records, in drift.

174. *Elaphropus (Barytachys) xanthopus* (Dejean, 1831)

General Range – Upper and Lower Austral Zones. East to NS, north to southern ME, NY, PA, extreme southern ON, MI,and IL, west to MO, AR, AL, and FL. **Local Range** – Vermont, two localities, Putney and Brookline, in the southeast corner of the state. New Hampshire, six localities, mostly along the south border of the state (Rindge, Durham, Pelham, and Lee), but also Littleton and Campton in the north of the state. **Habitat** – Damp, bare mud, sometimes mixed with sand, bare or sparse vegetation. VT specimens found on mud amid stranded marsh plants, elsewhere recorded from sandy shores and cultivated ground. **Life Cycle** – No records. **Behavior** – Diurnal species. **Dynamics** – Fully-winged, light trap records and under lake shore drift.

Genus *Pericompsus*

175. *Pericompsus (Pericompsus) ephippiatus* (Say, 1830)

General Range – Upper and Lower Austral and Tropical Zones. East to southern NH, north to southern VT, in NY north to Hudson Falls and the Genesee River near Rochester, north to OH, IN, IL, northwest to Iowa City, west to north central KS (Scania on the Republican River), eastern OK (Sapulpa), in TX west to Del Rio, in Mexico, along the rivers which drain to the Gulf of Mexico, south to Tehuantepec, on the west coast of Mexico, north to Jalisco, south Honduras on east coast (Erwin 1974). **Local Range** – In our states found only on a short stretch of the Connecticut River near the southern boundary. Vermont, four records, Weathersfield (the most northern), Springfield, Putney, and Vernon. New Hampshire, four records, Walpole, Westmoreland, Chesterfield, and Hinsdale. **Habitat** – On medium to large rivers on barren or sparsely vegetated sand bars where sand is usually dry but close to the river water. **Life Cycle** – No records for this area. In southern states, tenerals in July-August. **Behavior** – Nocturnal or diurnal, shelters in burrows or cracks in soil by day. **Dynamics** – Fully-winged, frequent flier, light trap records, flies to escape in the daytime.

Genus *Porotachys*

176. *Porotachys bisulcatus* (Nicolai, 1822)

General Range – Original range southern and central Europe east to the Caucasus, North Africa and Madeira, not in the British Isles. It has recently expanded into Scandinavia and Karelia. Introduced into North America. Bousquet (1992) surmised that the introduction was before 1900 and was probably in MA. Recorded from southern ME, MA, NY, NJ, PA, OH, ND, WA at Snohomish (probably a separate introduction). In Canada, NB, in QC north to Chicoutimi in the Saint Lawrence Valley, north to Trois Rivières, in ON at Hamilton. **Local Range** – Vermont, two scattered records, Manchester (1964) and Colchester (1980). New Hampshire, two localities, at Oliverian Bridge (Haverhill) and "between Hanover and Monroe" (Darlington, notes). **Habitat** – The New World habitat is in sawdust piles among wood chips, fermenting barks of conifers, garbage deposits, and ant nests (Larochelle and Larivière 2003). The natural habitat was probably among fermenting wood particles accumulating at the bases of standing dead trees. **Life Cycle** – Adults April-September; tenerals June-August. **Behavior** – Largely nocturnal

species. Found by day in fermenting sawdust, wood chips, and other loose log bark. **Dynamics** – Fully-winged, light trap records, frequent flier, observed flying at sunset. The specimen from Colchester, VT was taken in June at a light trap in a corn field.

Genus *Polyderis*

177. *Polyderis laeva* (Say, 1823)

General Range – Transition, Upper and Lower Austral Zones. East to NS, north to northern NH, in QC north to Montreal, northeast to Quebec City, and west to Ottawa, in ON north to Grand Bend, north to MI, northwest to ND, west to IA, MO, and AR, southwest to TX, south to LA, MS, and FL. **Local Range** – Vermont, three localities, Shelburne Pond, Underhill, and Jonesville ledges in Richmond. New Hampshire, five localities, north to Haverhill and Tamworth, also from Hanover, Durham, and Pelham. This is our smallest carabid (maximum length 1.5 mm) which probably accounts for the scarcity of records. **Habitat** – Lindroth (1966) collected it "under stones in rich soil and at the borders of marshes." Erwin (1981) reported finding this species in a refuge pile from an ant nest. The specimens from Jonesville and Shelburne Pond were found under stones in moss clumps on bare rock ledges. Other records are from ant nests, sawdust piles, and heaps of wood chips, also among roots of goldenrod. **Life Cycle** – Adults in VT, March 29-April 21, only spring records available; in QC through the summer to November 11. Tenerals in the autumn, adults overwinter (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, sometimes active in daytime. **Dynamics** – Fully-winged, day flight observed, light trap records.

Genus *Tachys*

178. *Tachys (Paratachys) oblitus* Casey, 1918

General Range – An east-central species. Transition and Upper Austral Zones. East to CT, NY at Long Island, MD, south to SC, west to IA, north to IN, ON to Montebello and Rondeau Provincial Park, QC in Montreal area. **Local Range** – Vermont, six localities, all in northwest, Lamoille River at E. Georgia, Winooski River at Jonesville, Lake Champlain at Shelburne Bay and Shoreham, Otter Creek in Salisbury. New Hampshire, eight localities, north to Lebanon on the Connecticut River and Plymouth on the Pemigewasset River, east to Durham.

Habitat – Muddy borders of lakes and rivers, usually in thicker vegetation than the three following species. **Life Cycle** – Tenerals June-August. **Behavior** – Nocturnal, will take wing before sunset; fast runner. **Dynamics** – Fully-winged, a frequent flier, comes to light traps.

179. *Tachys (Paratachys) proximus* (Say, 1823)

General Range – Transition, Upper and Lower Austral Zones. East to western VT, northeast to southwestern QC (Montreal, Verchères), in ON north to Trenton and Grand Bend, north to OH, IN, and IL, northwest to SD, west to NE, MO, and AR, southwest to LA, south to MS, GA, and SC. **Local Range** – Vermont, 10 localities, all west of the Green Mountains, from Isle LaMotte (The Marsh, Fleury Bay) in the north, south to Home Creek mouth in Charlotte, Lewis Creek mouth in Ferrisburgh, inland at Winooski, Richmond, Huntington, Salisbury, and to Dorset. New Hampshire, one locality, Brookline (first recorded from NH in Majka et al. 2011, but without a specific locality). **Habitat** – Mixed mud and sand on the borders of slow rivers, brooks, and marshes. Chantal (1977) found it amid tidal debris along the Saint Lawrence River. **Life Cycle** – Adults in VT, April 13-June 28. Recorded in autumn from QC. Erwin (1981) reports tenerals in June in MD and adults as late as November. **Behavior** – Largely nocturnal; shelters by day under wood, plant, debris, and other cover. **Dynamics** – Fully-winged, frequent flier, flight observed at sunset, light trap records. Most VT records are light trap records, found also under drift on lake shores.

180. *Tachys (Paratachys) pumilus* (Dejean, 1831)

General Range – An east-central species. Upper and Lower Austral Zones. East to MA, CT, NY, DE, NC, GA, south to FL, LA, TX, west to MO, IA, north to IN, OH, NY (Sodus Point on Lake Ontario). **Local Range** – Vermont, no records. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Borders of rivers, lakes, ponds on wet mud, either bare or with scattered herbs, open not shaded. **Life Cycle** – Tenerals July (Larochelle and Larivière 2003). **Behavior** – Fast runner. **Dynamics** – Wings dimorphic; fully-winged form has been seen taking wing at sunset and has been taken in light traps (Larochelle and Larivière 2003).

181. *Tachys (Paratachys) rhodeanus* Casey, 1918

General Range – Transition Zone. East to RI and NH, north in QC to Montreal and Hull, in ON west to Belleville, west to OH. **Local Range**

– Vermont, one record, E. Georgia on Lamoille River. New Hampshire, one record, Charlestown on Connecticut River. **Habitat** – On the margins of slow rivers, lakes, and marshes, on very moist soil which is bare or with sparse vegetation. **Life Cycle** – Adults in QC, April 13-October 15. **Behavior** – Nocturnal, by day it burrows beneath deeply set stones or deep in heaps of plant debris. **Dynamics** – Fully-winged, observed flight at sunset, light trap records.

182. *Tachys (Paratachys) scitulus* LeConte, 1848

General Range – An east-central species. Transition to Lower Austral Zones. East to NB (Kouchibouguak), ME, MA, NY (Staten Island, Long Island), NJ, NC, GA, south to FL, LA, TX, west to KS, SD, north to IA, IL, ON, QC. **Local Range** – Vermont, 15 localities, on Lake Champlain from Missisquoi Delta to Shelburne Bay, Lamoille River east to E. Georgia, Winooski River east to Jonesville, Battenkill River from Sunderland to Arlington, on Hoosic River at Pownal. New Hampshire, several localities, on the Connecticut River north to Lancaster, on Ashuelot River at Keene, on Merrimack River at Litchfield, smaller rivers at Brookline, Pelham, and Lee. **Habitat** – Muddy borders of rivers, lakes, pools, and swamp forest. **Life Cycle** – Tenerals, July, August. **Behavior** – Mostly nocturnal but occasionally active by day; may escape by taking wing; has been seen attacking Lepidoptera larvae (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier, on the wing either by day or night.

SUBFAMILY PATROBINAE

TRIBE PATROBINI

Medium-sized, predominantly predatory beetles that swallow pieces of prey. Adults are nocturnal, larvae are nocturnal surface runners.

Three local genera:

Diplous (1 species) In stream gravels.

Patrobus (3 species) Near bodies of water.

Platypatrobus (1 species) In beaver houses.

Genus *Diplous*

183. *Diplous (Platidius) rugicollis* (Randall, 1838)

General Range – A limited area in northeastern North America. Lower Canadian Zone. East to NS, north in QC to Gaspésie, Tadoussac and Montreal area (probably in the Eastern Townships but no records), not recorded west of the Montreal area, west to the Adirondacks and Catskills and the high plateau area of southern NY and northern PA, south to the Berkshires in MA, absent from the level plains along the Saint Lawrence and Lake Champlain. **Local Range** – Vermont, 23 localities, south to Brookline, general in mountain or hilly areas, absent from the Champlain Lowlands. New Hampshire, 11 localities, from Pittsburg in the north to Charlestown on the Connecticut River, throughout the Boreal Plateau, the lower parts of the White Mountains and the hilly borders of the Connecticut Valley. **Habitat** – Darlington (1931) characterized the habitat as follows, "on the banks of small rivers which are formed by the confluence of mountain brooks just at the bases of the higher mountains." In VT, we find the species in gravel banks along clean, cold mountain streams, either large brooks or small rivers. The stream must be wide enough to interrupt the forest canopy so that direct sunlight reaches the gravel banks for part of the day. **Life Cycle** – Adults appear in late April-early May; tenerals appear from June 30-July 26 in VT. Darlington reported tenerals as late as August 27 in the White Mountains. Both new and old beetles disappear in late summer and do not appear again until the following spring. Both larvae and adults overwinter. **Behavior** – Nocturnal, shelter under stones by day; gregarious. **Dynamics** – Fully-winged; flight not recorded but a stray found at the summit of Mount Washington indicates flight capability.

Genus *Patrobus*

184. *Patrobus foveocollis* (Eschscholtz, 1823)

General Range – Hudsonian and Upper Canadian Zones. East to ME and NF, north to Ungava Bay and YT, northwest to AK including the Yukon Valley and the Aleutian Islands (Unalaska), also in easternmost Siberia (Kamchatka and northern Kurils), west to Creston, BC, south in the Rockies to CO, east of the Rockies south to the Cypress Hills, AB, and to Aweme, MB, south to northern MI and ME (Burlington). Isolated on Mont Albert in the Gaspésie. **Local Range** – Vermont, two localities, Camel's Hump (1130 and 1180 m), Mount Mansfield, (915 m). New Hampshire, four localities, Mount Washington, and Mount Garfield in

the Presidential Range, also Mount Moosilauke and the Third Connecticut Lake on the northern border. **Habitat** – In drier habitats than the preceding species, in openings in the spruce-fir forest. On Mount Mansfield under a board by the ruins of the old hotel. Some of the Camel's Hump specimens were in pitfall traps in the coniferous forest but one was under a *Sphagnum* moss mat where a pool forms in the spring. Fingernail clams (Sphaeriidae) were abundant near the beetle. **Life Cycle** – Vermont specimens May-November; gravid specimens in late June-July; species overwinters as both larva and adult (Larochelle and Larivière 2003). **Behavior** – No specific data. **Dynamics** – Wings dimorphic, long wing form has been taken at light traps.

185. *Patrobus longicornis* (Say, 1823)

General Range – Upper and Lower Canadian, Transitional, and Upper and Lower Austral Zones. East to NS, NE to NF, in QC north to Gaspésie, Saguenay, and James Bay, in ON north to Ogoki, north of Lake Nipigon, north to Edmonton, AB, Fort Smith in NT, west to central BC, Okanagan, OR, UT, and AZ, south to northern Mexico, OK, AR, LA, GA, and FL. **Local Range** – Our states are entirely within the general range, throughout both states. Vermont, 56 localities; New Hampshire, 35 localities. **Habitat** – Usually near streams, ponds, and lakes but not always so; often in bottomland forest near water. Not found above 600 m in the mountains. **Life Cycle** – Tenerals in late June-July; adults occur as late as mid-October, a few overwintering adults appear in April-May. The species commonly overwinters as the larva. Adults in VT from April 5-October 15. According to Larochelle and Larivière (2003) gravid specimens occur from early July to late September. **Behavior** – The diet is found to be one-third animal, the remainder, plant material. **Dynamics** – Wings dimorphic. Chiolino (1970) found that only two out of 84 Vermont specimens were fully-winged and these two were found at light traps. He found that 7% were fully-winged out of 375 North American specimens. He dissected 10 fully-winged specimens and found that three of them lacked flight muscles.

186. *Patrobus septentrionis septentrionis* Dejean, 1828

General Range – A circumpolar species. Across northern Europe, Scandinavia and Russia, isolated in the mountains of Britain, Ireland, and the Alps, Faeroe Islands and Greenland, across northern Siberia to the Amur River in Kamchatka, south into the Tian Shan Mountains. In North America, Arctic and Hudsonian Zones. East to LB, across Canada north

of the Saguenay and Lake Temiskeming and north to Ungava Bay and the Barren Grounds, in AB north of Edmonton to the Mackenzie Delta, across AK to the Aleutian and Pribiloff islands, southern limit, WA, northern MI, and central ME. **Local Range** – Vermont, no records (but could be found in the Northeast Kingdom). New Hampshire, two localities in the far north, Errol and Northumberland. **Habitat** – On borders of lakes, ponds, and slow streams, on mud, usually with *Carex* sedges; further north along the edges of the tundra and along the coast in areas prone to fog. In North America it is not in the mountains, nor fens or bogs (it is found in these habitats in Europe). **Life Cycle** – In QC, adults are present from June-October (Larochelle and Larivière 2003); tenerals in June-July; overwinters both as larva and adult. **Behavior** – In Europe it is reported to feed on dead insects in snow banks. **Dynamics** – Fully-winged, flight observed in Europe.

Genus *Platypatrobus*

187. *Platypatrobus lacustris* Darlington, 1938

General Range – Lower and Upper Canadian Zones. East to NB, extreme northern ME (Sinclair), in QC to Mount Tremblant and Gatineau, northern ON (Batchawana Bay on Lake Superior), NT (an island in Great Slave Lake), south to OH, VT, NH, and ME. The specialized habitat of this beetle makes it very difficult to collect and the range is probably more extensive than indicated above. *Platypatrobus* should be looked for everywhere within the range of the beaver. The near extinction of that animal in the 19th century must have affected this beetle so it may not have yet returned to all of its former range. **Local Range** – Vermont, three localities, W. Elmore, Bristol, and Jericho. New Hampshire, six localities, Pittsburg, Jefferson, Osipee, Hollis, Durham and Sunapee (Choate and Dyrkacz 1976). **Habitat** – This beetle is found only in beaver houses usually deep in the walls. It is difficult to find and collect. Conservation laws normally prohibit disturbances of active beaver houses but there are opportunities when beavers are removed to prevent flooding of roads or adjacent residences. They usually disappear quickly after the beavers have been removed. Beaver houses are surrounded by a moat of waist deep or neck deep water which makes access difficult. The houses contain many insects especially the pupae of water beetles. *Platypatrobus* shares this habitat with *Pterostichus castor* and *Atranus pubescens*. Other carabids are occasionally present. *Platypatrobus* is the only beaver hut beetle which requires the presence of the beavers. It is found only in large old beaver huts with vegetation.

Life Cycle – Goulet (1977) found that the beetle overwinters only as a third instar larva. In the laboratory, adults die in September-October. Pupation occurs at the end of May or the beginning of June. Eggs are laid from the end of July-October. In the laboratory, at 20º C, the eggs hatch in 6-7 days, the first instar lasts 6-7 days also. The second instar lasts 6-9 days, and the third instar must have a diapause since it lasts until the following spring. In July-August adults fly freely and may be found at light traps near beaver ponds, at this time they may be found under superficial cover on houses especially on cloudy or rainy days. **Behavior** – These beetles are usually covered with mites which are attached to the exoskeleton by prominent attachment disks. This genus is unusual in that the female mates many times. Other female American Patrobini only mate once. **Dynamics** – Fully-winged, common at light traps near beaver ponds.

SUBFAMILY BRACHININAE

TRIBE BRACHININI

Genus *Brachinus*

The bombardier beetles. They earn this name because they have the ability to release a jet of repellant substances with an audible popping sound. The discharge emerges at 100º C and contains hydroquinones. The discharge can be aimed with great accuracy. It is instantly lethal to small insects and is very effective against ants.

The larvae are ectoparasites of the pupae of aquatic beetles. The adults are found almost entirely at the margins of permanent bodies of water. They all have the same color in dorsal view: elytra bluish-black, head and thorax tan, usually with orange tint. Only a few *Lebia* share this color pattern, and they are not found at water margins. The adults have many distinct anatomical features. The abdomen has eight (male) or seven (female) sterna, while all other Carabidae have only six. There is only one seta above each eye. The elytra are truncate.

The most obvious way resources are partitioned is by size. *Brachinus* species show an unusual range in adult sizes, from *B. medius* (minimum length 5.7 mm) to *B. tenuicollis* (maximum length, 16.0 mm). Adult length is believed to be related to the varying size of different kinds of water beetle pupae. The eight Vermont species can be arranged in an ascending order of length.

Vermont *Brachinus* total length (mm)

Species	Range	Median
medius	5.7-8.0	6.9
janthinipenni	5.8-9.7	7.8
cordicollis	7.2-11.0	9.1
ovipennis	8.2-11.3	9.6
cyanochroaticus	7.8-12.4	10.1
cyanipennis	8.0-13.0	10.5
fumans	10.5-13.3	11.9
tenuicollis	13.1-16.0	14.7

188. *Brachinus (Neobrachinus) cordicollis* Dejean, 1826

General Range – An east-central species. Lower Canadian, Transition, Upper Austral Zones. East to NB, ME, MA, CT, New York City, NJ, MD, south to VA, OH (Columbus), IN (Lake County), IL (Des Plaines), AR (WA County), NM (Albuquerque), west to UT, NE, MN (Madison), MI (Garden Island in Charlevoix County, Cheboygan), ON at Lake Abitibi, QC in Fort Coulonge, Montreal, down the Saint Lawrence to Île-d'Orleans. **Local Range** – Vermont, seven localities, on Lake Champlain at Isle LaMotte, Grand Isle town, South Hero, Burlington, and Benson, on the West River in Jamaica. New Hampshire, two localities, on the Atlantic coast at Hampton and Hampton Falls. **Habitat** – Shores of lakes and rivers. **Life Cycle** – Tenerals April-May, August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, has been taken at lights.

189. *Brachinus (Neobrachinus) cyanipennis* Say, 1823

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NB, ME, MA (Nantucket, Barnstable), CT (New Haven), NY at Long and Staten Islands, NJ, south to MD, KY, MO, AR, AL (Mobile area), west to TX (Waco, Austin), OK (Stillwater), KS (Riley, Reno Counties), NE, SD (Highmore, Brookings), north to MB at Lake Jessica, northeast of Winnipeg, ON at Kenora, Manitoulin Island, Belleville, QC at Hull, Montreal, Becancour. **Local Range** – Vermont, 33 localities, probably statewide. New Hampshire, 18 localities, north to Claremont, Andover, Nottingham, and Durham. **Habitat** – Borders of lakes, rivers, brooks, ponds, swamps, marshes, beaver ponds, and houses, up to higher elevations than other *Brachinus*, Charleston, VT (365 m), and Townshend, VT (167 m). **Life Cycle** – Tenerals in August. Eggs laid

in a mud cell on underside of stone or log or in a soil crevice. Larval host is the whirligig beetle, *Gyrinis*. **Behavior** – Nocturnal. Adult feeds on dead or damaged insects, usually those washed up by a stream or lake. **Dynamics** – Fully-winged, an occasional flier.

190. *Brachinus (Neobrachinus) cyanochroaticus* Erwin, 1969

General Range – An almost transcontinental species. Upper Austral Zone. East to MA (Bristol County), CT, NY, NJ, south to OH, IN, IL, MO, KS, CO, west to ID (Lewiston), BC (Salmon Arm), SK (Regina), MB at Boissevain near Brandon, ON at Lake of the Woods and Gravenhurst, QC at Hull, Montreal, down the Saint Lawrence to Joliette. **Local Range** – Vermont, 17 localities, on Lake Champlain from Alburgh, Isle LaMotte, Highgate, Burlington, Shelburne, Charlotte, Ferrisburgh, West Haven, inland at Franklin on the Missisquoi River, E. Georgia on the Lamoille River, Richmond on the Winooski River, Shelburne Pond, Dead Creek in Addison, also on smaller streams and ponds in Huntington and Hubbardton. No records from the Connecticut River drainage. New Hampshire, four localities, in the south, Winchester, Swanzey, Concord, Kingston. **Habitat** – Shores of lakes and rivers in VT, below 122 m elevation. **Life Cycle** – Tenerals April-May, also August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier.

191. *Brachinus (Neobrachinus) fulminatus* Erwin, 1969

General Range – An east-central species. Upper Austral Zone. The range appears to consist of two isolated parts. Eastern range, east to the Atlantic coast, NH, MA, CT, Long Island, NJ, DE, also NC in Columbus and Robeson Counties (possibly another isolate), west to PA (Pittsburgh, Harrisburg), NY (Buffalo). Western range, IN east to Spencer, south to Evansville, Vincennes, west to Wabash River, north to Miller on Lake Michigan. **Local Range** – Vermont, no records. New Hampshire, four localities, in the southeast, Brookline, Pelham, Lee, Hampton. **Habitat** – By small streams and *Sphagnum* bogs. **Life Cycle** – Tenerals in April. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, flight not recorded.

192. *Brachinus (Neobrachinus) fumans* (Fabricius, 1781)

General Range – A transcontinental species. Transition, Upper and Lower Austral, Subtropical, Tropical Zones. East to ME (Mount Vernon), MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, GA, south to FL (Lake County), AL (Mobile), LA, TX, Mexico south to Tabasco State, Nuevo Leon, San Louis Potosi, Coahuila, Torreon, Chihuahua, Sonora, Sinaloa (Guasave), west to CA in San Diego, San Francisco, OR, WA, north to BC (Creston), AB (Lethbridge), MB (Aweme), MI at Huron, Livingston Oceania Counties, ON (Georgian Bay, Ottawa), QC in Hull, Montreal area to Île d'Orleans. **Local Range** – Vermont, 11 localities, Lake Champlain shore in Isle LaMotte, South Hero, Burlington, Bridport, and Benson, also Lamoille River in E. Georgia, Bennington, and Norwich on the Connecticut River. New Hampshire, six localities, north to Hanover, on the MA border at Rindge and Pelham, near the Atlantic coast at Durham and Dover. **Habitat** – Borders of swamps, rivers, lakes, especially Lake Champlain. **Life Cycle** – Tenerals August-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

193. *Brachinus (Neobrachinus) janthinipennis* (Dejean, 1831)

General Range – An east-central species. Transition and Upper Austral Zones. East to NH, MA, CT (Cornwall), NY (Westchester), NJ, MD, south to VA, PA (Pittsburgh), OH (Greenville area), IN (Knox County, Indianopolis area), IL (Champaign County), IA, TX (Round Mountain), west to CO (Denver), NE (Valentine), north to SD (Buffalo, Huron), MN (Lake Itasca), WI (Oconto), MI (Huron Mountains), ON in London, Toronto, Belleville, QC in Montreal area and down the Saint Lawrence to Becancour. **Local Range** – Vermont, 27 localities, more common in the southwest half of the state, five localities are on the shores of Lake Champlain, north to Highgate and Barton, in the Connecticut River drainage north to Randolph and Thetford, in the Lake Champlain drainage north to the border. New Hampshire, five localities, Hinsdale, Chesterfield, and Swanzey in the southwest, and Brookline and Milford in the south-center. **Habitat** – Shores of lakes, ponds, rivers, and streams, below 270 m. **Life Cycle** – Tenerals May-October. Larval hosts are pupae of the gyrinid beetle, *Dineutes*, and the hydrophilid beetle, *Tropisternus*. **Behavior** – Nocturnal, gregarious (Larochelle and Larivière 2003). **Dynamics** – Wings are small, the adult is probably incapable of flight.

194. *Brachinus (Neobrachinus) medius* Harris, 1828

General Range – A transcontinental species. Transition, Upper and Lower Austral Zones. East to ME (Mount Vernon), MA, CT, NY at Long Island, NJ, MD, SC, GA, south to FL, AL, LA, TX, Mexico, west to CA, OR, WA, north to BC (Creston, Salmon Arm), UT (Salt Lake City), CO (Greely), ND (Grand Forks), MN, ON, QC in Fort Coulonge, Belancour, along the big rivers. **Local Range** – Vermont, nine localities, along Lake Champlain from Colchester to Addison, also from Dead Creek in Addison, Winooski River in Richmond, Barre City, and W. Elmore. New Hampshire, eight localities, northern limits are Winchester, Concord, and Milton. **Habitat** – Shores of lakes, rivers, ponds, brooks, swamps, and bogs, below 300 m. **Life Cycle** – Tenerals August-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

195. *Brachinus (Neobrachinus) ovipennis* LeConte, 1863

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Milbridge), RI (Watch Hill), CT, NY at Long Island, south to PA (Pittsburgh), OH (Cincinnati), IL (Cairo), TX (Dallas), west to OK, KS (Lawrence), NE (Lincoln, NE City), north to SD (Spearfish), MN (Lake Pepin), WI (Madison, Brodhead), MI (Grand Rapids, Port Huron), ON on shores of Lakes Erie, Ontario, NY in Rochester, Montezuma Marsh, Duchess County, MA (Chicopee), QC (Becancour). **Local Range** – Vermont, seven localities, mostly on the shore of Lake Champlain from Grand Isle to Shelburne. The only inland records are from the Lamoille River in east Georgia and from Shelburne Pond. New Hampshire, no records. **Habitat** – Lake and river margins, 30-110 m elevation. **Life Cycle** – Tenerals April and September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, comes to lights at night.

196. *Brachinus (Neobrachinus) patruelis* LeConte, 1844

General Range – Upper Austral Zone. Largely an Atlantic coast species, but two localities suggest that there may be a population on the Great Lakes, MI (Detroit), IL (no locality). East to the Atlantic coast from NH south to NJ (Cape May), west to NJ in Bergen, Burlington, Morris, Warren Counties, NY at Long and Staten Islands, also Yonkers, north to CT, MA in Forest Hills, Framingham, ME. **Local Range** – Vermont, no records. New Hampshire, three localities in the southeast, Pelham, Salem, and Durham.

Habitat – Margins of lakes and ponds at low elevations. **Life Cycle** – Tenerals in May. **Behavior** – Unknown. **Dynamics** – Wings somewhat reduced, probably can't fly.

197. *Brachinus (Neobrachinus) quadripennis* Dejean, 1825

General Range – A transcontinental species, but absent from the Great Plains, splitting the range. Upper and Lower Austral Zones. Eastern range, east to NH, MA (Hampshire, Hampden Counties), NY at Long Island, NJ, PA, TN, GA, south to FL, AL (Mobile), LA (New Orleans), TX (Brownsville), west to AR, KS, NE, SD, ND, north SK (Kenosee), MB (Aweme), MN (Lake Itasca), WI, MI (Marquette on Lake Michigan), ON (near Simcoe), NY, MA. Western range, east to UT, eastern MT, south to CA, west to OR, WA, north to BC (Kamloops), AB (Medicine Hat). **Local Range** – Vermont, no records. New Hampshire, four localities, Brookline, Pelham, Hampton, and Rye, all are near the southern border and the last two are on the coast. **Habitat** – Borders of rivers, lakes, and pools, always at low elevations in our states. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

198. *Brachinus (Neobrachinus) tenuicollis* LeConte, 1844

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to MA (Boston), CT, Long Island, NJ, MD, KY (Mammoth Cave), TN (Reelfoot Lake), south to FL (Columbia and Seminole Counties), MS (George County), LA, TX (Gulf Coast and Pecos River), west to NM, CO, WY, north to NE, MN, WI, MI, ON (Point Pelee, Belleville, Isle of Quinte), QC (Hull, Rigaut, Montreal, Quebec City). **Local Range** – Vermont, 10 localities, on Lake Champlain from North Hero south to Lewis Creek (in Ferrisburgh), also inland at E. Georgia, Shelburne Pond, and Middlebury. New Hampshire, two localities, on the southern border, Brookline, Pelham. **Habitat** – Borders of lakes, ponds, isolated pools, rivers, marshes. **Life Cycle** – Tenerals in August. Larval host is *Hydrophilus*. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

199. *Brachinus (Neobrachinus) vulcanoides* Erwin, 1969

General Range – An eastern species. Upper Austral Zone. An entirely coastal species, north to NH, east to the coast (MA, CT, NY at Long Island, NJ), south to FL (Crescent City, a questionable record). No inland

records. **Local Range** – Vermont, no records. New Hampshire, two localities, Hampton and New Castle. **Habitat** – Always near the coast. **Life Cycle** – Active March-May, July-November (Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Fully-winged, flight not yet recorded.

SUBFAMILY HARPALINAE

TRIBE PTEROSTICHINI

A large tribe of carnivorous Carabidae. It consists of one large genus, *Pterostichus*, plus six smaller genera. *Pterostichus*, in turn, has 14 subgenera.

Beetles of the tribe Pterostichini are mostly black, mostly larger than the rival tribe Platynini, and differ from the latter tribe in having sternum VI fitted into a pair of "twists" in the elytral epipleurae. This makes the body more resistant to blows but somewhat slows down the deploying of chemical defenses from the pygidial glands. The mandibles are triangular, and are adapted for predation, in contrast to Zabrini, a species-rich tribe of largely plant-feeding Carabidae, with shorter, more curved mandibles.

Pterostichus are mostly forest dwellers, mostly common, and wing reduction is common.

Five subgenera are found at water margins: *Argutor and Phonias* (3 species each), *Melanius* and *Pseudomaseus* (2 species each), and *Lamenius* (1 species). Note: one species of *Phonias* is not associated with water margins: *P. femoralis* is found in open habitats and forest edges. Also one species of *Argutor* (*P. vernalis*) is an introduced species which has been collected in Vermont only once, in a wet meadow.

Morphnosoma (1 species, *P. melanarius*) is an introduced European species, abundant in open areas including gardens, pastures, cultivated fields, and roadsides. It is also found in other habitats such as forest edges and water margins, probable overflow from the areas of abundance.

Lenapterus (1 species) is a large species of the Hudsonian and Arctic-Alpine Zones, and *Cryobius* (3 species) is from the same zones, but minute.

Three subgenera have minute hind wing vestiges, and are certainly flightless. These are *Monoferonia* (1 species), *Cylindrocharis* (1 species), and *Hypherpes* (2 species).

Smaller genera of Pterostichini

Poecilus (2 species) Both from open habitats (gardens, croplands, pastures, etc.). Both have metallic colors, and have carinae on antennomeres II and III.

Lophoglossus (2 species) Both shining black, strongly similar to larger (13-15.6 mm) *Pterostichus*, but with marginal bead becoming wide posteriorly, anterior transverse impression of pronotum complete and deep, base of pronotum without laterobasal carina. (All three characters must agree to be *Lophoglossus*, otherwise the specimen is *Pterostichus*.) Males have an emarginated sternum VI, and have a spine-like projection in addition to two apical spurs on tibia of middle legs.

Gastrellarius honestus is 7.0-8.5 mm long, a forest species, like a *Pterostichus*, but with only one seta over the eye (all other Pterostichini have two).

Stereocerus haematopus is a species of Hudsonian and Arctic-Alpine Zones which is rather large (9.5-12.5 mm) and is usually metallic in coloration. Some females are not metallic in color and may be mistaken for some Zabrini in the same habitat.

Myas cyanescens is a rather large (13.5-15.5 mm) pterostichine with dilated terminal palpomeres on the labial palpi, and 4-6 terminal setae on the glossa. The outline of the body is oval, and the coloration is violet. A forest species. *Myas coracinus* may also occur in Vermont, as there is an unconfirmed catalogue record. The above remarks apply equally well to it.

Cyclotrachelus sodalis is a large (13-19 mm) black species with a short plus deep sinuation anterior to the hind angle. It differs from other Pterostichini in having three or more setae on the penultimate segment of the labial palps. A species of open fields or forest edges.

Genus *Poecilus*

200. *Poecilus (Poecilus) chalcites* (Say, 1823)

General Range – An east-central species. Transition to Lower Austral Zones. East to NS, ME, MA, NJ, VA, SC, GA, south to FL, AL, LA, TX, west to CO, ND, north to MN, WI, MI, ON at Ingolf, near Lake of the Woods, Grand Bend on Lake Huron, QC in Eastern Townships, Saint Lawrence Valley east to Quebec City. **Local Range** – Vermont, 12 localities, eight of them from Champlain lowlands, from Highgate to Addison, also from Brewster River (Cambridge), Mount Mansfield (taken in a pitfall trap), Hinesburg, Ripton, and Dorset. New Hampshire, five localities, Dover, Durham, and Hampton, near the coast, Rumney, and Mount Washington. The mountain records in both states are probably strays. **Habitat** – Grasslands, open fields, meadows, margins of forests, gravel pits, croplands. In OH I have collected large numbers which were exposed by the plow. This species is relatively rare in our states. The general distribution suggests that it is more warmth-demanding than *P. lucublandis*. Vermont specimens are mostly from light traps, and are almost entirely male. I suspect that they are stray migrants from established populations elsewhere. If any permanent populations are established locally, they are small and expected to be in southern New England or near Lake Champlain. **Life Cycle** – Mating in May, (Liard and Huot 1976). Copulation lasts 7-13 minutes. Eggs (2-5) laid in hard earthen ball in soil crevices late May to mid August, mostly in June. Tenerals in August. **Behavior** – Partly diurnal, feeds on insects, especially larvae, also some plant material and fungi. **Dynamics** – Fully-winged, a strong and frequent flier.

201. *Poecilus (Poecilus) lucublandis* (Say, 1823)

General Range – A nearly transcontinental species. Lower Canadian to Upper Austral Zones. East to NS, ME, CT, NJ, MD, NC, GA, south to TN, MO, OK, NM, UT, ID, OR, west to eastern WA, BC, north to NT at Fort Smith, SK north to Prince Albert, MB north to Winnipegosis, ON north to Mattigani River, QC north to Abitibi, Tadoussac, Forestville, Gaspésie, Anticosti, and Îles-de-La-Madeleine. **Local Range** – Throughout both states. Vermont, 92 localities; New Hampshire, 41 localities. **Habitat** – Abundant in open, grassy, or weedy places, such as gardens, yards, croplands, pastures, upper, drier lake and river shores. Also in mountain alpine habitats. Has been taken in beaver houses. MacLean and Usis (1992) found it abundant in floodplain forest in OH.

Life Cycle – Copulation in April to July (Larochelle and Larivière 2003) lasting 20 to 120 minutes; tenerals, May and June. **Behavior** – Partly diurnal. Feeds on insects, especially larvae, pupae, eggs. It is both a predator and a scavenger. It also feeds on fungi and on softer tissues of higher plants. Kirk and Dupraz (1972) found that if a male approaches a female which is unready to mate, she sprays him with a secretion from the pygidial glands which renders him motionless for one to three hours. **Dynamics** – Fully-winged. Lindroth (1966) considered that the wings were so weak that he doubted that this species could fly. However, we have a very few individuals at light traps, and a few other observers have confirmed this infrequent flier.

202. *Lophoglossus scrutator* (LeConte, 1846)

General Range – An east-central species. Transition Zone. East to MA, CT, south to NY at Long Island, NJ, PA, OH, IL, west to IA, north to WI, MI, ON on the peninsula, QC in Eastern Townships, Saint Lawrence Valley, east to Quebec City, Ottawa Valley west to Rigaud. **Local Range** – Vermont, four localities, all in the delta of the Missisquoi River, in the towns of Highgate and Swanton in the Missisquoi National Wildlife Refuge. New Hampshire, no records. **Habitat** – The VT specimens were collected on very soft mud in the natural levees among the distributaries of the delta. Most were under rather large logs embedded in the soft shaded mud. Other scientists report this species also from open marsh habitats among dense vegetation (Larochelle and Larivière 2003). **Life Cycle** – Tenerals, August, November rarely in May (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged, but there are no flight records.

203. *Lophoglossus vernix* Casey, 1913

General Range – Eastern species. Transition Zone. A little known species, recorded only from CT, NH, and MD. In New England, known only east of the Connecticut River. Lyme, CT is the only locality for *L. scrutator* east of the river, and the only known town from which both species have been recorded. **Local Range** – Vermont, no known localities. New Hampshire, two localities, Plaistow and Durham, both in the coastal plain. **Habitat** – Lowlands (Larochelle and Larivière 2003). **Life Cycle** – Active July-August, October (Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Fully-winged, probably capable of flight (Larochelle and Larivière 2003).

204. *Gastrellarius honestus* (Say, 1823)

General Range – An east-central species (nearly qualifies as an Appalachian species). Canadian, Transitional, and Upper Austral Zones. East to NS, ME, MA, NY (statewide including Long Island), NJ, VA, SC, south to GA, AL, TN, west to IL, MI, north to ON in Toronto, Isle of Quinte, QC north to LaBelle in the Ottawa Valley, down the north side of the Saint Lawrence to Saint Fidel, on the south shore to L'Isle County, on the south side of Gaspésie to Matapédia. **Local Range** – Vermont, 76 localities, throughout. New Hampshire, 13 localities, probably throughout. **Habitat** – An abundant forest species in mountains and lowlands, in both coniferous and hardwood forests, but absent from seasonally flooded forests. **Life Cycle** – Gravid in May, teneral specimens in late June through August. **Behavior** – Nocturnal adults usually shelter under the bark of fallen logs by day, forage in leaf litter by night. It has been seen climbing up to 2 m to prey on gypsy moth larvae on tree trunks (Larochelle and Larivière 2003). **Dynamics** – An old brachypterous species. The hind wing represented by a minute scale.

205. *Stereocerus haematopus* (Dejean, 1831)

General Range – A circumpolar species. In both eastern and western Siberia to the Ural Mountains, but not in European Russia or Scandinavia. In North America, Hudsonian, Arctic-Alpine Zones. East to LB, NF, only on the northern peninsula, south to QC at Blanc Sablon on the Straits of Belle-Isle, Schaefferville and Opinaca River south of Fort George, ON south to Moose River, also south to South Twin Island in James Bay, MB south to Gillam, SK south to Lake Athabaska, AB south to Edmonton, in the Rockies south to Banff, BC south to Field. Isolated in ME (Mount Katahdin), NY (Adirondacks), WY, James Bay (South Twin Island), and on Banks Island in the Arctic Islands. **Local Range** – Vermont, an old record, but we have not found it in 40 years of collecting on Mount Mansfield or Camel's Hump. Either it went extinct in the nineteenth or twentieth century or the specimen was mislabeled. New Hampshire, three localities, Mount Adams, Mount Washington, Mount Lafayette. **Habitat** – Drier parts of tundra and far northern forests, Niemelä et al (1993) found it abundant in such forests in AB, where it was not adversely affected by clear-cutting. There are no records from forests in New England. **Life Cycle** – Copulation late June, gravid late June-early July, tenerals late July to September (Larochelle and Larivière 2003). **Behavior** – Nocturnal, shelters by day in leaf litter and under stones. **Dynamics** – Wing-dimorphic, most individuals have complete

wings with weak veins. Lindroth (1966) doubted they could fly; there are no flight records. Some specimens have clearly reduced wings.

206. *Myas (Trigonognatha) coracinus* (Say, 1823)

General Range – More or less sympatric with the next species, *M. cyanescens*, but not ranging as far into the northeast, petering out in NY and MA, with unconfirmed record from VT. **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, no records. **Habitat** – Same habitats as the next species, and often occurring together later in the season (R. Davidson, pers. comm.). **Life Cycle** – In many frost to frost surveys in PA, *M. cyanescens* dominates in spring and early summer, both species occur in relatively equal numbers in July, and *M. coracinus* dominates in late summer and early fall (R. Davidson, pers. comm.). **Behavior** – Nocturnal, shelters by day in forest litter. **Dynamics** – Hind wings are vestigial, the beetle is flightless.

207. *Myas (Trigonognatha) cyanescens* Dejean, 1828

General Range – An east-central species. Transitional, Upper Austral Zones. East to NS, ME, MA, NY (including Long Island), VA south to GA, AL, west to TN, IL, WI, MN, north to ON (the Peninsula), QC north to Chicoutimi and Lake Temiskaming. **Local Range** – Vermont, 14 localities, north to Cambridge; New Hampshire, six localities, north to Eaton. **Habitat** – Rather dry forests, often oak forest in VT. Often on thin soils on rock ledges. **Life Cycle** – Copulation late June. **Behavior** – Nocturnal, shelters by day usually in deep leaf litter. It has been seen preying on caterpillars and on pupae. **Dynamics** – Hind wings are vestigial, the beetle is flightless.

208. *Pterostichus (Argutor) commutabilis* (Motschulsky, 1866)

General Range – A transcontinental species. Northeast to NS and NB, in QC north to Lac Saint Jean and Abitibi, in ON north to Parry Sound, in MB north to Riding Mountain, in SK north to Saskatoon, in BC, at Salmon Arm, in eastern WA and OR, south to CO, TX, LA, and FL (Dearborn et al. 2014). **Local Range** – Vermont, 40 localities, from Coventry in the north to Arlington, Dover, Putney in the south. New Hampshire, 24 localities, throughout the state from Pittsburg in the north to Winchester, Rindge, Pelham, Seabrook in the south. **Habitat** – Marshes and marshy borders of rivers, lakes, and ponds. Also found in alpine tundra on Mount Washington (Bousquet and Webster 2004). **Life**

Cycles – Gravids in May, tenerals in July and August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. May fly by day, frequent in lake drift (Larochelle and Larivière 2003).

209. *Pterostichus (Argutor) praetermissus* (Chaudoir, 1868)

General Range – Southern ON and QC and adjacent US (Dearborn et al. 2014.). **Local Range** – Vermont, 14 localities, all from marshes along Lake Champlain or along the lower reaches of the Missisquoi, Lamoille, and Winooski Rivers from Highgate to Panton. New Hampshire, 8 localities, from Winchester in the southwest, and southeast corner of the state north to Durham. **Habitat** – Marshy borders of Lake Champlain and big slow rivers. **Life Cycle** – Mates in spring, overwinters as adult (Dearborn et al. 2014). **Behavior** – Unknown. **Dynamics** – Fully-winged, but flight not observed (Bousquet 2010).

210. *Pterostichus (Argutor) vernalis* (Panzer, 1795)

General Range – An Old World species. East to the Lena River, south to the Caucasus, Bulgaria, Sicily, North Africa, the Azores, west to Portugal, France, Great Britain, Norway, north to central Sweden and both shores of the Gulf of Bothnia. Introduced from Europe to Montreal (1915). **Local Range** – Vermont, one locality, Alburgh (this represents a NEW US RECORD). New Hampshire, no records. Previously collected near Montreal in 1915. **Habitat** – The Vermont specimens were captured in a wet spot in a grazed dairy pasture (Byers et al. 2000). In Europe, according to Lindroth (1986) "preferring eutrophic fens and moist meadows with grasses and sedges, usually near water. Occasionally found in water-meadow, forest and more rarely in oligotrophic bogs." **Life Cycle** – According to Lindroth (1986) "a typical spring breeder." **Behavior** – Unknown. **Dynamics** – According to Lindroth (1986) "wings full or moderately reduced."

211. *Pterostichus (Phonias) corrusculus* LeConte, 1873

General Range – A northeastern species. Transition Zone. East to ME, MA, CT, south to NJ, west to NY in Rochester, Long Island, north to ON at Muskoka Lakes, near Ottawa, QC in the Gatineau Hills at Lake Ramsey. **Local Range** – Vermont, one locality, Craftsbury (this represents a NEW STATE RECORD). New Hampshire, seven localities, both in the north (Pittsburg, Colebrook, Errol) and far south (Winchester, Pelham, Hampstead, and Rye). **Habitat** – Floodplain forests usually near

streams or ponds (Larochelle and Larivière 2003); also associated with *Sphagnum* (R. Davidson, pers. comm.). **Life Cycle** – Active in February-June, September-October, December (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Wings vestigial.

212. *Pterostichus (Phonias) femoralis* (Kirby, 1837)

General Range – An east-central species. Transition and Upper Austral Zones. East to MA, NJ, south to DC, OH, IL, AR, KS, west to CO, MT, AB in Medicine Hat, north to SK, MB in extreme south, ON in Rainy River District, Grand Bend on Lake Huron, QC at Lake Nominingue near Mount Tremblant, Tadoussac, and Rimouski. **Local Range** – Vermont, 10 localities, south to Rutland, Shoreham, northeast to Belvidere, probably nearly statewide. New Hampshire, two localities, all in the extreme south, north only to Durham, in the Connecticut Valley, north only to Westmoreland. **Habitat** – Dry areas, usually open fields, sometimes in gravel pits. In South Burlington, on open quartzite ledges. In AB it has been reported from the grassy borders of wheat fields (Doane 1981). **Life Cycle** – Gravid in April (Larochelle and Larivière 2003), tenerals August-October. **Behavior** – Nocturnal. Has been observed feeding on Diptera larvae in the field. Active under the snow in October and November (Larochelle and Larivière 2003). **Dynamics** – Wing-dimorphic. Fully-winged form rare. It has been seen in flight and in drift on lakes.

213. *Pterostichus (Phonias) patruelis* (Dejean, 1831)

General Range – A northern transcontinental species. Upper Canadian to Upper Austral Zones. East to Anticosti, Îles-de-la-Madeleine, PE, NF, NS, ME, MA, CT, NJ, VA, south to OH, IL, MO, KS, west to NE, SD, ND, MT, BC, AK (east to Kenai Peninsula), north to Liard Springs in BC, AB (Edmonton), ON at Long Lac and Cochrane. **Local Range** – Vermont, 42 localities, in all parts of the state. New Hampshire, 32 localities, from Pittsburg to Winchester and Seabrook. **Habitat** – Bogs, fens, marshes, small boggy spots in forest. Common in bogs, few in marshes. It has been found in beaver houses; all elevations including Bear Pond on Mount Mansfield. **Life Cycle** – Gravid in June, tenerals April to November, peaking in August (Larochelle and Larivière 2003), no larval diapause. **Behavior** – Nocturnal. Gregarious in winter, active under the snow in October, November (Larochelle and Larivière 2003). A capable swimmer, will dive and stay under for one minute to avoid capture. **Dynamics** – Wings polymorphic (Chiolino 1970). Long-winged

specimens are about 5% of the New England population. Chiolino found evidence for three distinct types of wing reduction in Vermont. The fully-winged form has been observed in flight in daylight and has been taken at light traps.

214. *Pterostichus (Bothriopterus) adstrictus* Eschscholtz, 1823

General Range – A Holarctic species. In the old world, East to Kamchatka, westward across northern Russia, also south in the mountains of Siberia to Mongolia, and in the Kuril Islands and Sakhalin, south in the Urals, west to Scandinavia, Iceland, Faroes, Shetland, northern Scotland, isolated in mountains of Ireland, Wales and northern England. In North America, Hudsonian, Canadian and Transitional Zones. East to LB, NF, Anticosti, Îles-de- la-Madeleine, Cape Breton, NS, ME interior plus coast east of Penobscot River, south to CT at Cornwall in northwest, NY in Adirondacks, Buffalo, PA, VA in mountains, OH, IN in north, MN, NE, NM, AZ, west to CA, OR, WA, BC, AK inYukon Valley, Attu Island, north to NT at Aklavik, QC to Ungava Bay. **Local Range** – Vermont, 79 localities; New Hampshire, 27 localities. Common throughout both states. **Habitat** – In VT, largely a forest species. There are few records from the Champlain lowlands, and these are from deep ravines and north-facing slopes. Common up to the tree line at about 1200 m and occasional on the highest peaks. Probably absent from most of the flat areas in northwestern VT. Further north and near the oceans, it invades open areas. In AB, Niemela et al. (1993) found it increased in numbers in clearcut areas. **Life Cycle** – Mating pairs observed May and June (Larochelle and Larivière 2003). Gravid females June and July. The eggs are laid in logs, where they develop more rapidly than in *P. pensylvanicus* (Goulet 1974). Tenerals in July-September. **Behavior** – Nocturnal. Bousquet (1997) found both larvae and adults in forest leaf litter in QC. Found preying on caterpillars, fly larvae, insect eggs, and pupae. (Larochelle and Larivière 2003). Sometimes climbs on bushes (Larochelle and Larivière 2003). **Dynamics** – Fully-winged. It probably flies more readily than *P. pensylvanicus*, as there are more drift records than for the latter.

215. *Pterostichus (Bothriopterus) mutus* (Say, 1823)

General Range – A transcontinental species. Canadian, Transition, Upper Austral Zones. East to NF in Stephenville near an airfield, perhaps an introduction, NS, ME, MA, NY, MD, NC, GA, south to WV, OH, IL, IA, NE, NM, ID, west to BC, including Vancouver Island, north to MB

(Winnipeg), ON north to Sudbury, QC north to Abitibi, Lac Mistassini, Saint-Fidèle, and south of the Saint Laurence to Lobineare. Lindroth (1966) concluded that the population in BC resulted from a recent introduction. **Local Range** – Vermont, 90 localities; New Hampshire, 22 localities. Throughout both states. **Habitat** – A common forest edge species. It flourishes in suburban gardens, under clumps of shrubs, in hedgerows, and in small remnant patches of forest, and so is a successful synanthropic species. It is also found in relatively thin forests, or along old roads and trails deeper in the forests, especially in the autumn. Darlington (notes) reported it from the highest peaks of the Presidential Range. He considered these specimens to be stray migrants. In VT it has been found up to 800 m. Further north it is reported from open grassy areas, croplands, and gravel pits (Larochelle and Larivière 2003). **Life Cycle** – Mating April, gravid late April to early July; tenerals March to September (Larochelle and Larivière 2003). In VT, mid-August to mid-October. **Behavior** – Nocturnal. It has been observed preying on caterpillars. **Dynamics** – Fully-winged, occasional flier. It has been observed at lights, and in sea drift (Larochelle and Larivière 2003).

216. *Pterostichus (Bothriopterus) pensylvanicus* LeConte, 1873

General Range – A nearly transcontinental species. Lower Canadian, Transition Zones. East to NF, Anticosti, NS, ME, MA, CT, south to NY (Long Island), MD, WV in mountains, OH (northern), IL (northern), west to SD, ND, BC at Vernon, Smithers, northwest of the Coast Range, north to NT (Fort Smith), SK (Saskatoon), ON at Lake Nipigon, Long Lac, Timagami, QC at Lake Mistassini, Chicoutimi, Tadoussac. **Local Range** – Vermont, 85 localities; New Hampshire, 33 localities. **Habitat** – Common under cover in deciduous forests in VT. Compared to *P. adstrictus*, it is more common in drier and lower areas. In the mountains, not above 900 m. Farther north it can be found in more open habitats (Larochelle and Larivière 2003). **Life Cycle** – Mating observed in April, gravid mid-April to mid-May (Larochelle 1976*b*; Larochelle and Larivière 2003). Tenerals mostly in August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. We have found numbers of this species and *Cymindis cribricollis* beneath flat rocks on south-facing slopes in sunshine in late autumn, where the beetles were enjoying the warmth from the stones. Adults have been observed feeding on Lepidoptera larvae (Larochelle and Larivière 2003). The female oviposits in wet soil, where the eggs develop more slowly than those of *P. adstrictus* (Goulet 1974). The larvae inhabit leaf litter. Adults are active under snow in November. **Dynamics** – Fully-winged. Capable of flight, but fly rarely.

A few records from ocean drift are the evidence of actual flight (Larochelle and Larivière 2003). This may be a species where the development of flight muscles is dimorphic.

217. *Pterostichus (Melanius) castor* Goulet & Bousquet, 1983

General Range – A northeast and north-central species. Lower Canadian Zone. East to NH, south to VT, MI, west to WI, north to ON, QC north to Saint Damien (46˚20' N lat.). **Local Range** – Vermont, six localities, Elmore (W. Elmore beaver ponds on Bedel Brook), Underhill (ponds on Clay Brook), Richmond (Gillett Pond), Bolton (ponds on Gleason Brook), Bristol (pond on brook, at Bear Meadows), Fletcher (north of Metcalf Pond). New Hampshire, four localities, Strafford, Marlow, Hollis, Ossipee. **Habitat** – Beaver houses, both active and abandoned. At Bear Meadows, one was taken on a *Sphagnum* mat within sight of a beaver colony. **Life Cycle** – Gravid in May (Larochelle and Larivière 2003); teneral, late June-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Has been collected at electric lights.

218. *Pterostichus (Melanius) corvinus* (Dejean, 1828)

General Range – A nearly transcontinental species. Upper Canadian, Transition Zones. East to NB, ME, MA, CT, NJ, MD, VA, south to GA, WV, OH, IN, IL, MN, NE, CO, OR, west to BC in Okanagan Valley and Liard Hot Springs, north to NT, SK, MB in Victoria Beach and Strathclair, ON north to Lake Simcoe and probably farther, and QC north to Rouyn in the west, and Grandes Bergeronnes on the Gulf north shore in the east. **Local Range** – Vermont, 75 localities, throughout the state. New Hampshire, 26 localities throughout the state except for the higher areas of the White Mountains. **Habitat** – Borders of marshes, ponds, lakes and streams, occasional in beaver houses. **Life Cycle** – Spring breeder, mating May-June; tenerals August-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Flight has been observed, including in daylight (Larochelle and Larivière 2003).

219. *Pterostichus (Pseudomaseus) luctuosus* (Dejean, 1828)

General Range – A transcontinental species. Canadian, Transition Zones. East to southern NF, PE, QC at Anticosti Island, Îles-de-la-Madeleine, NS, ME, MA, NY at Long Island, NJ, MD, south to WV, OH, IL, IA, NE, ID, west to WA, BC (Vancouver Island), north to AB (McMurray), MB, ON (Nipigon, Thunder Bay), QC (Mistassini). **Local**

Range – Vermont, 35 localities, throughout the state including the borders of Lake Champlain and the highest mountains. New Hampshire, 33 localities, including coastal areas and the Isles of Shoals. **Habitat** – Borders of swamps and streams, also by beaver ponds. Up to 3,000 m elevation. Unlike the next species, apparently never in *Sphagnum* bogs. Has been collected in beaver houses. **Life Cycle** – Mating spring to early summer, gravid in June (Larochelle and Larivière 2003); tenerals late fall, early spring. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, occasional flier. Flight confirmed by occasional specimens at lights and in drift.

220. *Pterostichus (Pseudomaseus) tenuis* (Casey, 1924)

General Range – An east-central species. Canadian Zone. East to NF, PE, NS, ME, MA, CT (northern border only), NY, south to PA, WV, OH, MI, WI, CO, MN, west to AB, north to MB, ON, QC. **Local Range** – Vermont, 16 localities, throughout the state. New Hampshire, eight localities, including Pittsburg, Jefferson, Sunapee, Marlow, Rindge, Pelham, Lee, Durham, probably throughout the state in suitable habitats. **Habitat** – Bogs, also marshes such as in the Missisquoi Delta, wooded swamps, as "The Marsh" (really a swamp) on Isle La Motte, islands in Lake Champlain near St. Albans such as Burton's Island and Four Brother Islands (the latter in NY). Up to 900 m elevation at Bear Pond on Mount Mansfield. **Life Cycle** – Gravid in April; tenerals August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Flight has been observed only in the laboratory (Larochelle and Larivière 2003).

221. *Pterostichus (Morphnosoma) melanarius melanarius* (Illiger, 1798)

General Range – A palaearctic species, introduced in North America. In Scandinavia, north to 62º N lat., in Russia east to the central Siberia, south to Altai, Kazakhstan, Armenia, Ukraine, Bulgaria, Italy, west to Spain, British Isles. In North America, east to NF, NS, ME, MA, south to CT, PA, OH, west to ON (Fort William), north to Selkirk, MB, and QC at Mattagami in Abitibi District, to Natashquan on the north shore of the gulf, also Anticosti and Îles-de-la-Madeleine. A west coast population extends from BC to CA and east to ID. This species was first recorded in North America in NS in 1926. It reached Thunder Bay, ON by 1948 and Selkirk, MB by 1956. A second introduction in BC was first marked in Oliver, BC in 1927; it reached Vancouver Island 1958. Earliest

records for United States include VT (1955), NH (1968), and CT (1972). **Local Range** – Abundant throughout both states. Vermont, 126 localities; New Hampshire, 36 localities. **Habitat** – Abundant in cultivated land, pastures, gardens, suburban yards, and forest edges. Fully-winged individuals can be found almost anywhere, such as shorelines, mountain forests and even above tree line. The species is so abundant that isolated strays probably give a false impression of the limits to the habitat. **Life Cycle** – Mating in July-October, larvae and some adults overwinter, the latter may breed a second time; tenerals, July-October. **Behavior** – Nocturnal. In the field has been observed preying on insect larvae and pupae, insect eggs, earthworms, small salamanders, earwigs, aphids, and other adult beetles. They also feed on insect and vertebrate carrion, some plant material, seeds. They sometimes damage strawberries (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic. Fully-winged form rare in Europe but dominant in North America, except in Selkirk, MB, where all individuals proved to have reduced wings. This topic was studied by Chiolino (1970). The proportion between the forms appeared to shift rapidly in Vermont from 100% long-winged in 1958-60, to 81% in 1961-1964, and 76% in 1965-1966. This is a synanthropic species, so the reduced winged morph is likely to be transported accidentally in truckloads of hay, topsoil, nursery stock and building materials. The picture is complicated by the fact that not all of the long-winged individuals are able to fly. Chiolino found that some of them lack well-developed flight muscles, and that this is correlated with a reduction of the basalare and subalare. Those individuals which have full-sized wings and full flight muscles are capable of flight. They have been seen taking wing at sunset, collecting at street lights, and in sea drift.

222. *Pterostichus (Euferonia) coracinus* (Newman, 1838)

General Range – An east-central species. Canadian to Upper Austral Zones. East to NF, Anticosti, Îles-de-la-Madeleine, PE, NS, ME, MA, NY (including Long Island), VA, south to NC, TN, west to IL, MN, north to ON (Nipigon, Moose River, Sudbury), NU (Hay Island in James Bay, QC (Fort Rupert on James Bay, also along the north shore of the Gulf of Saint Lawrence to Blanc Sablon), LB in the extreme south. **Local Range** – Vermont, 83 localities, throughout the state. New Hampshire, 24 localities, throughout the state; in the White Mountains up to Thompson and Meserve's Purchase. **Habitat** – Deciduous and mixed forest. It much outnumbers *P. stygicus* in mature mountain forests. There is a dwarf form, *P. washingtonensis* Nicolay & Weiss (at present listed as a

synonym of *P. coracinus*), in the alpine tundra zone of Mount Washington up to 1917 m. This form is not known outside the Presidential Range. The nature of this form needs clarification. **Life Cycle** – Tenerals, June to August. **Behavior** – Nocturnal. It has been observed preying on caterpillars. **Dynamics** – Completely short-winged.

223. *Pterostichus (Euferonia) lachrymosus* (Newman, 1838)

General Range – An Appalachian species. Transition Zone. East to NB, ME, CT (south to the coast), NJ, VA, NC, south to SC, GA, TN, west to OH, north to ON (Isle of Quinte, Ottawa), QC (north to Saint Jerome and to Quebec City area). **Local Range** - Vermont, 13 localities, northeast to Elmore and Wolcott, in the South at Grafton. Remaining records in the higher foothills and lower mountain slopes from Jericho, Richmond, Huntington, Cambridge, Stowe, Bolton, and Bristol. New Hampshire, one locality, Eaton. **Habitat** – In thin, young forest on bedrock or sand, often associated with *Myas cyanescens*. Such forests commonly lack fallen logs, detached bark and other cover, so pitfall traps are needed to find the beetles. This species perhaps has greater tolerance for drought than do the other *Morphnosoma.* **Life Cycle** – Tenerals in July-September. **Behavior** – Nocturnal. It has been observed feeding on caterpillars. **Dynamics** – Wings vestigial, flightless.

224. *Pterostichus (Euferonia) stygicus* (Say, 1823)

General Range – An east-central species. Transitional and Upper Austral Zones. East to NB, ME, MA, NY at Long and Staten Islands, DE, VA, SC, south to GA, MS, LA, TX, west to KS, IA, MN, north to ON (Toronto, Belleville), QC (north and south shores of Saint Lawrence as far as Quebec City and Île d'Orleans, also along the Richelieu River). **Local Range** – Vermont, 79 localities, in the northwest to Westmore and Granby, probably throughout the state except for the northeast corner. New Hampshire, 22 localities, throughout the state except for the White Mountains, north of them at Shelburne and Jefferson and further north near the Connecticut River in Pittsburg, near the ocean at Hampton Falls. **Habitat** – Deciduous forests and their edges, up to 550 m in the mountains. Compared to *P. coracinus* less strictly a forest species and confined to lower elevations. **Life Cycle** – Tenerals late July-September. **Behavior** – Nocturnal. It has been observed feeding on caterpillars, MacLean and Usis (1992) used antigens to show that this species preys on gypsy moths and tiger moths. **Dynamics** – Completely short-winged.

225. *Pterostichus (Lenapterus) punctatissimus* (Randall, 1838)

General Range – A boreal species. Hudsonian and Upper Canadian Zones. East to NF, Anticosti, NS, ME, south to MA, NY (Adirondacks only on high peaks and at Upper Ausable Lake, 600 m), ON. **Local Range** – Vermont, 14 localities, in four or more or less isolated populations: (1) in the main range of the Green Mountains from Camel's Hump south at least to Lincoln Mountain, and probably much farther; (2) from the Winooski Water Gap to the Lamoille Water Gap, including Mount Mansfield, Bolton Mountain and the Sterling Range; (3) in the Worcester Range from Mount Elmore to Mount Hunger; (4) in the Boreal Plateau in the northeast, in bogs in Wolcott and Morgan (small bog by Pherrins River). New Hampshire, 10 localities, in the Boreal Plateau and in the White Mountains, west to Mount Moosilauke. This species should be looked for in the higher mountains in southern Vermont, including Mount Equinox, and in the north, including Jay Peak. **Habitat** – There are two habitats in VT. In the higher mountains above 900 m it is found under cover in fir and spruce forest, sometimes under logs or stones but more frequently under moss mats on rocks. In the Worcester Range I found it especially common in small gaps in the crest line where clouds tend to hang and where mosses and lichens are best developed. Darlington (1931) also reported finding it in rotten logs and also under stones above tree line. The second Vermont habitat is in or near some bogs where cold air accumulates. Crater Bog in Morgan is nearly encircled by an esker ridge, while Bear Bog in Wolcott is another cold spot. Such places have been called “inverted mountains” because the coldest microclimate is found at the bottom, not the top. The elevation of Crater Bog is about 350 m, while that of Bear Bog is 427 m. **Life Cycle** – Mating June-August; tenerals May-September. **Behavior** – Nocturnal. The defensive fluid of this species has a distinctive and very pleasant odor resembling a mixture of chocolate and coffee ("mocha"). **Dynamics** – A completely flightless species, hind wing resembles a tiny scale.

226. *Pterostichus (Lamenius) caudicalis* (Say, 1823)

General Range – A nearly transcontinental species. Upper Canadian to Upper Austral Zones. East to Anticosti, NF, ME (to Kennebec Valley), MA, CT, NJ, VA, south to NC, OH, IL, MO, KS, CO, UT, NV, west to eastern OR and WA, BC west to Oliver and Kamloops, north to NT (Fort Smith, in extreme south), SK (North Battleford), MB to Gillan, 56˚ N lat., ON to Hudson Bay, QC (to Abitibi, Lac Saint Jean, Gaspésie). **Local Range** – Vermont, 32 localities, in virtually all the river valleys, also

Lake Champlain shores. New Hampshire, 19 localities, on river and lake shores. Not on the Connecticut River north of Lancaster nor near the White Mountains. **Habitat** – Shaded areas of soft wet mud along lakes, rivers, brooks, and ponds. **Life Cycle** – Mating in July (Larochelle and Larivière 2003); tenerals September-October. **Behavior** – Nocturnal. Active under snow in October and November (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, but no flight records.

227. *Pterostichus (Monoferonia) diligendus* (Chaudoir, 1868)

General Range – An Appalachian species. Transition Zone. East to ME, MA, NJ, MD, south to NC, west to KY, OH, PA, NY (Catskills, Ithaca, Rochester), north to QC (extreme south at Lake Memphremagog, Knowlton). **Local Range** – Vermont, 54 localities, most records are from the hills and mountains, but it is rare in the Champlain Valley (Shelburne Bay and Burlington) and near the Connecticut River (Norwich, Hartland, Weathersfield, Putney). New Hampshire, 15 localities, throughout the state except absent from the coastal counties; in the north in Dixville Notch, in the south from Swanzey, Jaffrey, and Mont Vernon. **Habitat** – In deciduous forests, near but not in rushing brooks and hillside seeps, also associated with wet spots. We once found a concentration of this species along a wet area on an unused old logging road in Dorset, VT. Larochelle and Larivière (2003) pointed out that *P. diligendus* is often associated with the northern two-lined salamander (*Eurycea bislineata*). **Life Cycle** – Gravid May, July (Larochelle and Larivière 2003); eggs laid in June, under moss on logs, presumably to keep them free of mold. Tenerals late July-October (Bousquet 1983). **Behavior** – Nocturnal. It has been observed preying on caterpillars and lepidopteran pupae. **Dynamics** – Fully-winged.

228. *Pterostichus (Cylindrocharis) rostratus* (Newman, 1838)

General Range – An Appalachian species. Transition Zone. East to NB, ME, MA, CT, NY(Long Island), NJ, MD, VA, NC, SC, GA, south to AL, TN, west to KY, PA, ON (Frankford in Hastings County, Toronto, Belleville), north to QC (to the Saint Lawrence at Sorel and Athabasca, north of the river only near Quebec City, including Stoneham and Île-d'Orleans). **Local Range** – Vermont, 70 localities, nearly throughout the state, but not recorded from Grand Isle County or from the flat western towns in Franklin County. New Hampshire, 18 localities, nearly throughout the state but absent from the White Mountains, although recorded north of there at Atkinson and Gilmanton Academy Grant and

at Errol. **Habitat** – Deciduous and mixed forests usually below 700 m, but it has been collected up to 900 m. **Life Cycle** – Tenerals, mid-July to October (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Has been seen in the field preying on lepidopteran pupae. The enlargement of the mandibles in this species remains to be explained. If alarmed, it emits a strong odor. **Dynamics** – The elytra are locked together and the wings are reduced to tiny scales in this flightless species.

229. *Pterostichus (Hypherpes) adoxus* (Say, 1823)

General Range – A "semi"-Appalachian species. Transition Zone. East to NS, ME, MA, CT, NJ, VA, NC, SC, GA, south to TN, west to WV, OH, IN, ON, north to WI, QC (Ottawa Valley east of Gatineau, south of Mount Tremblant, north shore of Saint Lawrence to Portneuf, in the Eastern Townships to Sherbrooke). **Local Range** – Vermont, 50 localities, nearly throughout the state but not recorded from Grand Isle County nor from the flat western towns in Franklin County. New Hampshire, seven localities, nearly throughout but probably absent from the White Mountains, although there are two records from Pittsburg. **Habitat** – In deciduous or mixed forest, mainly in rotten logs. **Life Cycle** – Tenerals in July. **Behavior** – Nocturnal. Frequently climbs on logs and trees (Larochelle and Larivière 2003). In mountains, frequent up to 900 m, but has been taken up to 1130 m on Mount Equinox. It has been observed preying on caterpillars (Larochelle and Larivière 2003). When alarmed it emits a strong smell. **Dynamics** – Flightless; wings reduced to tiny scales, elytra locked together.

230. *Pterostichus (Hypherpes) tristis* (Dejean, 1828)

General Range – An Appalachian-central species. Lower Canadian to Upper Austral Zones. East to NS, ME, MA, CT, NJ, VA, NC, SC, GA, south to TN, west to IL, WI, ON, north to QC to Lac Nominangue, near Mount Tremblant, north shore of Saint Lawrence River and Gulf to Rivière-au-Tonnerre at 50˚ N lat. (Bousquet 1997), to Île-au-Coudre in the Gulf, and to Matapedia on the south side of Gaspésie. **Local Range** – Vermont, 78 localities, throughout the state. Unlike *P. adoxus* it has been collected in Grand Isle town and in Highgate. New Hampshire, 22 localities, not recorded from the White Mountains, otherwise throughout the state. **Habitat** – Deciduous or mixed forests in contrast to *P. adoxus*, mainly found on the ground, often under logs. **Life Cycle** – Mating in July and August (Larochelle and Larivière 2003); tenerals May-August. **Behavior** – Nocturnal. It can climb on fallen trees, but is less prone to

climb than *P. adoxus*. Preys on caterpillars. When alarmed it emits a strong odor. **Dynamics** – Flightless; wings reduced to tiny scales, elytra locked together.

231. *Pterostichus (Cryobius) arcticola* (Chaudoir, 1868)

General Range – An arctic American species. Arctic-Alpine Zone. East to LB (north to Hebron, south to Red Bay), south to QC (to Opinaca River at 52˚ N lat.), MB (Churchill), BC, west to AK (along the coasts and in the mountains), north across AK, YT, NT, NU and QC, isolated in ME (Mount Katahdin), NH, and in NY (the Adirondacks). North of the continent found in Baffin and Victoria Islands. **Local Range** – Vermont, no records. New Hampshire, including Mount Washington and Mount Madison (Ball 1966). **Habitat** – Alpine tundra. **Life Cycle** – Gravid in July; tenerals late July to September. **Behavior** – Nocturnal. **Dynamics** – Flightless, hind wings vestigial.

232. *Pterostichus (Cryobius) brevicornis brevicornis* (Kirby, 1837)

General Range – A Holarctic species. Hudsonian Zone. East to LB (north to Cabot Lake at 56˚ N), NF restricted to the northern peninsula, QC east to Blanc Sablon, south to about 47˚ N, to Tadoussac and Port Neuf in the east, to Lake Mistassini, farther west isolated in Gaspésie, ON south to Michipicoten River, north of Lake Superior, MI, MN, MB south to Piquitenay, BC south to Alaska Highway mile 383, west to AK and across the Bering Straits into Russia, and west to Kola peninsula near Finland. North to the limit of trees. Isolated in ME (Mount Katahdin, Grafton Township, Riley Township), VT, NH, NY in the Adirondack Mountains. **Local Range** – Vermont, seven localities, on the crest of the main range of the Green Mountains from Mount Mansfield in the north to Lincoln Mountain in the south. New Hampshire, six localities, in the White Mountains from Mount Moosilauke to Mount Washington, also from Deer Mountain, west of the Third Connecticut Lake in Pittsburg. **Habitat** – High, cold parts of the coniferous forest from 750 to 1130 m, caught in numbers in pitfall traps. **Life Cycle** – Gravid June-July, mating May-June. Tenerals late July-October. **Behavior** – Nocturnal. Sometimes aggregates in rotten logs. **Dynamics** – Flightless, hind wing vestigial.

233. *Pterostichus (Cryobius) pinguedineus* (Eschscholtz, 1823)

General Range – A Holarctic species. Arctic-Alpine Zone. East to the Mackenzie Delta, south to the limit of tundra in Canada, AK, and eastern Siberia, west to the Yenissee River Mouth, North to the Arctic Ocean. There are many isolated populations further south, including the Stanovoi Mountains of Siberia, the islands in the Bering Sea, the inner Aleutians out to Umnak, the island of Kodiak and Afognak, and the mountains of southern AK. The species does not occur farther south in the western mountains of Canada or the US but does inhabit the treeless summits of mountains in the east, including Mont Albert and Mont Jacques-Cartier in Gaspésie, Mount Katahdin in ME, and Mount Marcy and Whiteface Mountain in NY. **Local Range** – Vermont, three localities, Mount Mansfield, Camel's Hump and Devil's Gulch (in Eden). New Hampshire, six localities, in the White Mountains, west to Mount Moosilauke, east to the Presidential Range, including Mounts Washington, Garfield, and Lafayette. **Habitat** – Most VT specimens have been collected in deep rock crevices at or above tree line. They share this habitat with *Nebria suturalis*. At the Devil's Gulch, a deep narrow crevice, it is found as low as 750 m. Otherwise Vermont records are from above 1200 m. Darlington (1931) reported it as low as 750 m in the White Mountains, and he found it generally distributed in the tundra above 1200 m. **Life Cycle** – Tenerals late August-September. **Behavior** – Nocturnal. **Dynamics** – Flightless, wings vestigial.

Genus *Cyclotrachelus*

234. *Cyclotrachelus (Evarthrus) sodalis sodalis* (LeConte, 1848)

General Range – A largely central species with an eastern extension. Upper Austral Zone. East to NB and western VT, NY, south to VA, NC, GA, MS, west to IL, IA, MN (Duluth area), north to WI, MI, ON (the Peninsula North to Ottawa). Other subspecies in the Southern states. **Local Range** – Vermont, two localities, southwestern corner only, Bennington (Bell and Nielsen 1978), Shaftsbury. New Hampshire, no records. **Habitat** – Open areas, pastures, croplands, railway embankments, hedge rows, forest edges, gardens. Probably originally a species of the long grass prairies. **Life Cycle** – Active in April-October (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Reported feeding on caterpillars, weevils, true bugs, flies, ants (Larochelle and Larivière 2003). **Dynamics** – Wings vestigial.

TRIBE ZABRINI

This is the smaller of two large tribes which are adapted to a largely vegetable diet, particularly of seeds. Both Zabrini and Harpalini have curved mandibles with the apices directed medially. The larger species have relatively small but projecting eyes. In these features there is a strong resemblance to the Harpalini. In other respects the two tribes are very different. In Zabrini, sternum VI fits into a pair of "twists" in the apices of the elytral epipleura, locking the elytra and sternum VI together. These features are absent in Harpalini. Also, most Zabrini have two suborbital setae, while Harpalini have only one.

Genus *Amara*

235. *Amara (Curtonotus) alpina* (Paykull, 1790)

General Range – A Holarctic species. In the eastern hemisphere in northern Scotland, far northern Scandinavia, across northern Russia, including Kolguev and Vaygach Islands, and Novaya Zemlya, to the Bering Strait and the Kuril Islands. In North America, Arctic-Alpine Zone. East to LB (the entire coastline, north to Cape Chidley), NF (north peninsula only), south to QC (Blanc Sablon, Schaefferville, Fort Rupert), ON (Fort Severn, Cape Henrietta Maria), MB (Churchill), south in the Rockies to CO, NM, UT, west to BC (Chilkat Pass), AK (Mount McKinley, Kenai Peninsula, Bering Strait, Point Barrow, Pribilof Islands, Saint Lawrence, Saint Matthew), north to Arctic ocean, NU (Cape Sparbo, on Devon Island nearly 75º N lat., the northernmost record, also Victoria, Baffin, Bylot Islands). **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, one locality, Mount Washington. **Habitat** – Tundra, alpine heaths, moraines, dry river banks. More common in areas with crowberry (*Empetrum*). **Life Cycle** – Mating July; tenerals in August. Larval development may take two years. **Behavior** – Nocturnal. The fluid from the pygidial glands has a strong odor. **Dynamics** – Wings polymorphic. The fully-winged morph is most common, and might be capable of flight.

236. *Amara (Curtonotus) aulica* (Panzer, 1796)

General Range – Introduced from Europe. Original range, west to Britain, Ireland, Shetland, Faeroes, north to Scandinavia and Pechora region of Russian south to northern Spain, central Italy, Greece and the Caucasus. In Asia, across temperate Siberia and Turkestan to the Pacific

Ocean. The first record in North America is from Cape Breton in 1929, it was in NF in 1949. Present range is east to NF, Cape Breton Island, NS, NB, PE, west to QC (Quebec City to Montreal, also Île Brion, near Îles-de-la-Madeleine), south to MA (Boston Harbor Islands; Davidson et al. 2011). **Local Range** – Vermont, no records. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Open ground, especially with tall weeds, also grain fields, potato fields, vacant lots, gravel pits. **Life Cycle** – Tenerals in June-July, mating in autumn. Larvae overwinter. **Behavior** – Both diurnal and nocturnal. Frequent climber on Compositae, Umbelliferae, grains, *Rubus*, dogwoods, alders. It feeds on seeds of Compositae, Umbelliferae, and small grains. **Dynamics** – Fully-winged, a frequent flier. Comes to lights, also in drift

237. *Amara (Curtonotus) carinata* (LeConte, 1847)

General Range – A transcontinental species. Transition, Upper Austral Zones. East to MA, CT at Enfield in 2000 (Krinsky and Oliver 2001), south to WV, OH, IN, IL, MO, KS, NM, AZ, west to CA, OR, north to ID, BC (in the dry interior, north to 150 Mile House), AB (Edmonton), SK (Saskatoon), MB (Woodside), ON, QC (Hull, Montreal, several localities between Montreal and Quebec City, Maria, on the south side of Gaspésie.) This is a species of the Great Plains which has spread eastward since 1955. The Eastern records are infrequent and scattered, so that it is uncertain to what extent breeding populations have become established. **Local Range** – Vermont, four localities, South Burlington, Williston, Stowe, Pomfret. New Hampshire, two localities, Rye, Seabrook. **Habitat** – Open land such as pastures, croplands, sand hills. **Life Cycle** – Mating late July-early August; tenerals May-early July. **Behavior** – Nocturnal. By day it hides under hay, dry cow dung. It feeds on grass seeds, fungi, fly larvae. Climbs on grasses. **Dynamics** – Fully-winged, a frequent flier.

238. *Amara (Curtonotus) hyperborea* Dejean, 1831

General Range – A circumpolar species. Hudsonian Zone. East to LB (Hebron to Red Bay), NF (Gander), south to QC (Île-aux-Coudres, Val d'Or), ON, MI (Whitefish Point on Lake Superior), MB (Gillam), AB (Macleod, James River, Jasper), BC (Sikanni River), west to AK (Anchorage, Cooks Inlet), north to the tree limit in YT, NT (Norman Wells, Reindeer Depot), QC (Fort Chimo). Eastern hemisphere in boreal forest, from Finland to Kamchatka and Chukotski Peninsulas. **Local Range** – Vermont, no records. New Hampshire, one locality, Mount

Washington (confirms NH record in Bousquet 2012*a*). **Habitat** – Open areas, also among willows and alders, on moraines and other poorly vegetated areas. **Life Cycle** – Tenerals mostly in July. **Behavior** – Mostly nocturnal. It feeds on grass seeds. Occasionally climbs on grasses. **Dynamics** – Fully-winged, a frequent flier. Common in drift.

239. *Amara (Curtonotus) pennsylvanica* Hayward, 1908

General Range – An east-central species. Upper Austral Zone. East to NS (Halifax), MA, CT (Stonington, New Haven, Cheshire), NY at Long and Staten Islands, NJ, MD, VA, SC (mountains), south to GA, AL, AR, TX, west to WY, north to ND, MI, ON (Southampton, Toronto, Isle of Quinte), QC (Montreal). **Local Range** – Vermont, no records. New Hampshire, one locality, Mount Moosilauke (probably a stray flier). **Habitat** – Pastures, croplands, sand areas, dry river banks. **Life Cycle** – Mating in May (takes one minute); tenerals mostly in July. **Behavior** – Largely nocturnal, but it may fly in the daytime. **Dynamics** – Fully-winged, an occasional flier.

240. *Amara (Curtonotus) torrida* (Panzer, 1796)

General Range – A Holarctic species. Hudsonian Zone. East to LB (Hopedale, L'Anse-au-Loup), NF, QC at Anticosti, Belle isle, Île Brion, Îles-de-la-Madeleine, south to NS (Victoria), NB (Tabusintac), QC (north shore of the gulf from Blanc Sablon to Sept-Îles; Schaefferville, Fort Rupert, isolated at Rivière-de-la-Madeleine at the north coast of the Gaspésie, and on Île Rasade, near Rivière du Loup), ON (Ogoki, near Lake Nipigon, Moose Factory, Fort Severn), MB (Winnipeg, Husavick), SK (Regina, Cypress hills), south in the Rockies to CO, BC (in the southeast in the Rockies, reaching the seas at Prince Rupert), west to AK (in the Yukon Valley west to Ruby, on the south coast on the Kenai Peninsula and Kodiak Island, to Koggiung on Bristol Bay, isolated on Attu Island in the far west of the Aleutian Islands), north to the limit of trees. In Eurasia from northern Scandinavia and Finland, across far northern Russia to Taimyr and Kamchatka Peninsulas. **Local Range** – Vermont, no records; New Hampshire, 2 records, Mount Washington and Seabrook, on the back dunes. **Habitat** – Croplands, pastures, grassy dunes near the sea. Often near alders (*Alnus*) and in abandoned fields. Also in alpine tundra on Mount Washington. **Life Cycle** – Mating late June-July; tenerals July-August. **Behavior** – Nocturnal. It sometimes climbs on plants. It has been seen attacking moth eggs. **Dynamics** – Fully-winged, a frequent flier.

241. *Amara (Bradytus) apricaria* (Paykull, 1790)

General Range –Either a Holarctic species or else a very early introduction to North America. Lindroth suggested the latter possibility, citing as evidence the absence of the species from apparently suitable habitat in AK. Old World distribution, in Eurasia from the northern limit of the forests south to southern Spain, southern Italy, Sicily, Greece, Armenia, south Turkestan, northern Mongolia, and the Amur River Valley. North American distribution, in Hudsonian, Canadian, Transition and Upper Austral Zones. East to LB, NF, QC at Anticosti, Îles-de-le-Madeleine, Cape Breton Island, Sable Island, NS, PE, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, SC, south to GA, AL, AR, KS, CO, UT, OR, west to WA, BC (west to Okanogan Valley), north to BC (Fort Saint John), YT, NT, MB (Gillam), ON, QC at Inoucdjouac (formerly Port Harrison), Schaefferville. **Local Range** – Vermont, 16 localities, probably throughout; New Hampshire, eight localities, probably throughout. **Habitat** – Dry, open ground of all sorts. Croplands, pastures, gravel pits, sand dunes; often among weeds. **Life Cycle** – Tenerals, mostly in May, a few June-August. **Behavior** – Partly diurnal. It has been observed before sunset climbing grasses and feeding on grass seeds; also observed to feed on coccinellids and "wireworm" (Elateridae) larvae. Darlington (1931) collected it at the summit of Mount Washington and Lake of the Clouds. **Dynamics** – Fully-winged, a frequent flier. It comes to lights in numbers throughout the summer.

242. *Amara (Bradytus) avida* (Say, 1823)

General Range – An east-central species. Canadian, Transition, Upper Austral Zones. East to NF, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, south to PA, OH, IN, IL, MO, KS, west to CO, MT, BC (Creston in the southeast), north to AB (Edmonton), SK (Prince Albert), MB (Dauphin), ON (Thunder Bay), QC (Abitibi, Lac Saint Jean, Saint-Nérée in Bellechasse County). **Local Range** – Vermont, nine localities, throughout; New Hampshire, six localities, throughout, including Mount Washington. **Habitat** – Dry, open, somewhat sandy ground such as crop lands, pastures, sand dunes, and shorelines. Also twice recorded from beaver houses. **Life Cycle** – Tenerals common May-June, less so July-September. **Behavior** – Partly diurnal. It has been seen climbing on plants. Probably a seed eater, but it has been seen feeding on moth eggs and attacking strawberry plants. **Dynamics** – Fully-winged, a frequent flier. It has been taking wing at sunset, common at light traps.

243. *Amara (Bradytus) exarata* Dejean, 1828

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY to Long and Staten Islands, MD, SC, GA, south to FL, TN, MO, KS, TX, west to SD, north to MN, WI, MI, ON (only in far south Point Pelee, Chatham), NY (Rochester). **Local Range** –Vermont, no records. New Hampshire, eight localities, north to Rumney, four localities in the Connecticut Valley (from Claremont south), in the east from Dover and Durham. **Habitat** – Open, dry sandy areas, including upper zones of river banks and sea margins, some crop lands, forest edges. **Life Cycle** – Tenerals May-June, a few July-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

244. *Amara (Bradytus) latior* (Kirby, 1837)

General Range – A transcontinental species. Canadian, Transition, Upper Austral Zones. East to NF (one specimen, perhaps not established), NS, NB (Fredericton), ME MA, CT, NY at Long and Staten Islands, south to NJ, PA, KY, IA, KS, NM, AZ, west to OR, WA, BC on Vancouver Island (Victoria) north to Dawson Creek, AB (McMurray), SK (near Saskatoon and Battleford), MB (Brandon, Winnipeg), ON (Nipigon, Sioux Lookout, Marmora), QC (Abitibi area, Mistassini, Magpie River on north shore of the Gulf of Saint Lawrence). **Local Range** – Vermont, six localities, probably throughout. New Hampshire, four localities, Mount Washington, Whitefield, Dover, Hampton Beach. **Habitat** – Sandy areas, such as moraines, sand dunes, crop lands, shores, gravel pits. **Life Cycle** – Mating in September; tenerals May-June, more rarely, August-October. **Behavior** – Nocturnal, it has been seen feeding on grasshopper eggs. **Dynamics** – Fully-winged, frequent flier. Takes wing at sunset, comes to light traps.

245. *Amara (Percosia) obesa* (Say, 1823)

General Range – A transcontinental species. Canadian, Transition, Upper Austral Zones. East to NF (only two localities, but the presence of vestigially-winged specimens implies a breeding population), QC at Île-de-la-Madeleine, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, NC, GA, south to TN, MO, OK, NM, AZ, west to UT, OR, WA, BC (Vancouver City, Quesnel, Dawson Creek), north to YT, NT (Fort Simpson, Fort Smith), AB (Jasper, McMurray), SK (Saskatoon), ON (Ingolf, Nipigon Lake), QC (Mistassini, east on the

north shore to 62º W long.). **Local Range** – Vermont, six localities, throughout. New Hampshire, three localities, Pittsburg, Errol, Mount Washington, probably throughout. **Habitat** – Dry areas, open or partly shaded by willows or alders; in croplands, pastures, dunes or gravel pits. It was frequent in a sloping field in W. Elmore. **Life Cycle** – Tenerals May-September. **Behavior** – Nocturnal. Feeds on grasshopper egg packets and nymphs, there are no records for it feeding on anything else. **Dynamics** – Wings dimorphic, the fully-winged form is relatively rare. There is one record for it at a light.

246. *Amara (Xenocelia) chalcea* Dejean, 1828

General Range – An east-central species. Upper Austral Zone. East to ME, MA, CT, NY at Long Island, NJ, MD, NC, SC, south to GA, PA, IN, TX, NM, west to CO, north to ON (Huntley), NY (Ausable Point). **Local Range** – Vermont, two localities, North Hero, New Haven. Probably confined to the Champlain Valley, North Hero is the northernmost record for the species. New Hampshire, six localities, one from Mount Washington must be a stray flier, all the others are from the seacoast (Rye, Hampton, Seabrook) or slightly inland (Durham, Exeter). **Habitat** – Pastures and croplands with sandy soils, usually with weeds, sometimes in sand pits. **Life Cycle** – Tenerals May, July, August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier. It has been found in sea drift.

247. *Amara (Celia) bifrons* (Gyllenhal, 1810)

General Range – An Old World species, introduced in North America. Old World distribution, west to Britain, Ireland, Shetland Islands, north to southern Scandinavia, across to western Siberia, east to Tian Shan, Altai Mountains to Lake Baikal, south to Caucasus Mountains, Bulgaria, central Italy and Portugal. The first North American specimen was collected at Glace Bay, Cape Breton Island, in 1929. By 1937 it had been collected in Saint Pierre and Miquelon. Current range, east to LB (Thunder River), NF, Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME (Sinclair at the extreme north), QC (south to north side of Gaspésie, north shore of Gulf of Saint Lawrence from 47º N lat. to LB border, to Saint-Nérée in Belle-Chasse County, west to Val d'Or, north to Poste-de-la-Baleine), south to MA (Boston Harbor Islands; Davidson et al. 2011). **Local Range** – Vermont, no records. New Hampshire, four localities, two in Pittsburg, one in Second College Grant. A single record from Rye, perhaps a stray migrant in sea drift.

Habitat – Dry, open sand areas, dunes, sand and gravel pits, roadsides. With sparse vegetation in pastures. **Life Cycle** – Tenerals June-July. **Behavior** – Largely nocturnal. Feeds on seeds. **Dynamics** – Winged, a frequent flier.

248. *Amara (Celia) musculis* (Say, 1823)

General Range – A nearly transcontinental species, not quite reaching the Pacific. Canadian, Transition, and Lower Austral Zones. East to NS, ME (Allagash, Waterford, Wilton), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, KS, NM, AZ, west to CA, OR, WA, BC (Creston, Oliver), north to AB (Edmonton), SK (Saskatoon), MB (Victoria Beach), ON (Batchawana Bay, Sudbury), QC (Abitibi, Quebec City). **Local Range** – Vermont, eight localities, South Burlington, Richmond, Jonesville, Huntington, Abbey Pond Trail (Middlebury), Manchester, Shaftsbury, Springfield. New Hampshire, nine localities, from Pittsburg and Mount Washington, south to Seabrook, Rye, and Manchester. **Habitat** – Pastures, cultivated fields, gardens, forest edges, lawns, gravel and sand pits; in places with sparse to dense weeds. It came in great numbers to a light trap at the edge of dense, tall weeds in South Burlington. **Life Cycle** – Mating observed in late August; tenerals mostly May, June, some as late as August. **Behavior** – Diurnal. It climbs on goldenrod (*Solidago*) and feeds on the seeds. In cloudy weather it hides on plant rosettes. **Dynamics** – Fully-winged. When alarmed it emits a foul odor.

249. *Amara (Celia) rubrica* Haldeman, 1843

General Range – An east-central species. Transition, Upper Austral Zones. East to NS, ME (Baldwin, Mount Vernon), MA, CT, NY at Long and Staten Islands, NJ, DE, NC, SC, south to GA, TN, west to KS, SD, north to MN, WI, MI, ON (Bobcaygeon, Ottawa) QC (Nominingue, Saint Romuald, near Quebec City). **Local Range** – Vermont, 14 localities, in all parts of Vermont. New Hampshire, three localities. Pittsburg, Errol, Colebrook. **Habitat** – Vegetated areas of sandy soil, such as moraines, pastures, gardens. **Life Cycle** – Tenerals early May to mid-June. **Behavior** – Mostly diurnal. It climbs goldenrod to feed on the seed heads. **Dynamics** – Fully-winged, a frequent flier.

250. *Amara (Celia) sinuosa* (Casey, 1918)

General Range – A transcontinental species. Hudsonian, Canadian Zones. East to LB (L'Anse-au-Loup), QC at Anticosti, NF, NB, south to QC (Rivière-du-Loup, Saint-Fidèle, Nominingue, Rigaud), ME, NY, ON, (Parry Sound, Sudbury, Michipicotin Island in Lake Superior, Thunder Bay, Nipigon area), MI, MN, MB, SK (Cypress Hills), CO (mountains), UT, BC (Terrace), Vancouver Island, west to AK (south coast at Haines, Palmer, La Wing, Kenai Peninsula), north to YT (Dawson), NT (Yellowknife), QC (Schaefferville, Fort George). **Local Range** – Vermont, no records; New Hampshire, a single specimen from Mount Washington. **Habitat** – Dry sand areas, including moraines, gravel and sand pits, cultivated fields, roadsides. **Life Cycle** – Tenerals June, some in August. **Behavior** – Mostly nocturnal. Climbing not reported. **Dynamics** – Fully-winged, but no flight observations.

251. *Amara (Amarocelia) erratica* (Duftschmid, 1812)

General Range – A circumpolar, far northern species with isolated mountain populations farther south. In the Old World, in the far north of Scandinavia and Russia, across Siberia to the Bering Strait and Kamchatka, isolated in theAlps, Carpathians, Caucasus and Tian Shan. In the New World, Arctic-Alpine, Hudonian Zone. East to LB, NF, south to QC (Blanc Sablon, Fort Rupert), ME (Carabasset Valley), MB (Gillam), NT (Fort Smith), BC (Chilcotin, Stanley), west to AK, north to NT (Aklavik), QC (Ungava Bay). Isolated southern populations in QC (Mont Albert), Rocky Mountains (higher peaks south to CO), Cascade Range, Sierra Nevada, Coast Range of BC (higher peaks south to CA). **Local Range** – Vermont, one locality, Mount Mansfield. New Hampshire, two localities, Mount Washington and Mount Moosilauke. **Habitat** – Grasslands on high mountains. **Life Cycle** – Tenerals in July and especially in August. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged, flight observed in captivity.

252. *Amara (Amarocelia) laevipennis* Kirby, 1837

General Range – A transcontinental species. Hudsonian, Canadian Zones. East to NF (Stephenville), QC at Anticosti, Îles-de-la-Madeleine, NS, PE, NB, ME (Carrabasset Valley, Fryeburg), MA, south to QC (Ayers Cliff, Montreal), ON (Sudbury), MI, MN, MB, SK, MT, WA, west to BC (Vancouver City, Trail, Prince George), north to NT (Fort Smith), AB, SK, MB (Gillam), ON (Cochrane), QC (Schefferville).

Local Range –Vermont, 10 localities, Camel's Hump, W. Elmore, Richford, Brighton, Ferdinand, Newark, Bristol (bog and beaver Pond in Bristol Notch), Weathersfield, Manchester, Shaftsbury, Peacham. New Hampshire, five localities, Pittsburg (four localities), Errol. **Habitat** – Clearings in forests, such as beaver ponds, clearcuts, roadsides. **Life Cycle** –Tenerals July to mid-August. **Behavior** – Nocturnal. It has been seen feeding on grasshopper eggs. **Dynamics** – Fully-winged, an occasional flier.

253. *Amara (Amarocelia) patruelis* Dejean, 1831

General Range – A Holarctic and transcontinental species. In northeast Siberia, east to the Lena River. . In North America, Arctic-Alpine, Hudsonian, Canadian, Transition Zones. East to NF, QC at Îles-de-la Madeleine, PE, NS, NB, ME, MA, CT, NJ, south to DC, PA, IN, IL, IA, SD, CO (in the mountains), west to CA, WA, BC (west to Creston), AK (on the coast from Skagway to Nome and in the Yukon Valley north to Circle), north to YT (Dawson), NT (Reindeer Depot), QC (Fort Rupert, Mistassini, Roberval). **Local Range** – Vermont, seven localities, Manchester, Rutland, Mount Mansfield, Huntington, Burlington, South Burlington, Colchester (Mallett's Bay). New Hampshire, 10 localities, from Pittsburg in the north, to Walpole and Seabrook in the south, probably throughout the state. **Habitat** – Roadsides, lawns, dry fields, gardens, cultivated fields, sand and gravel pits. **Life Cycle** – Mating May-June; tenerals July-August. **Behavior** – Diurnal. Active in the spring, much scarcer in the autumn. **Dynamics** – Fully-winged, an occasional flier. It flies by day.

254. *Amara (Amara) aenea* (DeGeer, 1774)

General Range – Old World species introduced in North America. In the Old World, east to Siberia (Lake Baikal), south to Turkmenia, Afghanistan, Armenia, North Africa, west to Azores, Madeira, Canary Island, Portugal, France, (not in the British isles), southeast Norway, southern Sweden, (about to 6º N lat.), northern Russia, and Siberia. In the New World, introduced to New England by 1828, east to NF, QC at Îles-de-la-Madeleine, PE, NB, ME, MA, CT, NJ, DE, VA, NC, south to SC, TN, AR, OK, CO, AZ, west to CA, OR, WA, north to ID, MN, WI, MI, ON (Bruce peninsula, Ottawa), QC (Abitibi region, Magpie River on north shore). **Local Range** – Vermont, 42 localities, all parts of the state, one example from MountMansfield. New Hampshire, 19 localities, all parts of the state, eight localities are from the banks of the Connecticut

River, from Hinsdale to Pittsburg. Except for one from Franconia Notch, none are from high altitudes. **Habitat** – Open grasslands, pastures, orchards, roadsides. Often in drier areas, independent of soil type, and areas with shorter vegetation than frequented by its closest relatives. The most common *Amara* in lawns. Numerous under hay and paper mulch in a raspberry plantation. **Life Cycle** – Mating May-June; tenerals July-September. **Behavior** – Diurnal. It has been observed feeding on larvae of Lepidoptera, Coleoptera, and Diptera, as well as on spiders, also on several kinds of plant seeds (Larochelle 1990). In Europe it has occasionally been found attacking winter grain fields. It frequently climbs on herbs, shrubs, and trees. It attacks the flowers of chickweed (*Stellaria*), cracks the seed pods of mouse-ear chickweed (*Cerastium*) and feeds on the unripe seeds (Lindroth 1945). **Dynamics** – Fully-winged, a frequent flier both by day and by night.

255. *Amara (Amara) aeneopolita* Casey, 1918

General Range – An east-central species. Hudsonian, Canadian Zones. East to NB, south to NY, MI (Marquette), SD, AB (McMurray), north to NT (Norman Wells), QC. **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Open ground with firm, dry soil and some vegetation, like meadows and farm fields (Larochelle and Larivière 2003). **Life Cycle** – Active in June-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged. Found frequently in drift, indicating flight ability (Larochelle and Larivière 2003).

256. *Amara (Amara) basillaris* (Say, 1823)

General Range – An east-central species. Upper Austral Zone. East to MA, CT, MD, VA, NC, SC, south to GA, west to IL, north to IN, PA, NY, VT. **Local Range** – Vermont, no records. New Hampshire, one locality, Nashua on the southern border. **Habitat** – Poorly known, reported from clumps of broomsedge (*Andropogon*) and under mullein (*Verbascum*) leaves. **Life Cycle** – Active in January, March-December (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged. Occasionally in drift.

257. *Amara (Amara) convexa* LeConte, 1847

General Range – A nearly transcontinental species. Transition, Upper Austral Zones. East to NS, ME (Ogunquit in the extreme south), MA, CT, NJ, south to PA, OH, IN, IL, IA, NE, NM, UT, ID, west to BC (Creston, Kamloops, Chilcoten), AB (McMurray), SK (Saskatoon), MB (The Pas), ON (Timagami, Thunder Bay), QC (Lac Saint Jean). **Local Range** – Vermont, 10 localities, Burlington and nearby in the Champlain Valley, also Brandon and Putney. New Hampshire, five localities, two in the Presidential Range, two on the Atlantic coast (Rye, Seabrook) and one in Rumney. **Habitat** – Primarily a prairie species. In this area in dry, sandy pastures, croplands, roadsides. **Life Cycle** – Mating in July; tenerals in August-September and October 8. **Behavior** – Usually nocturnal. It has been seen preying on Coccinellidae. In the Great Plains it commonly spends the day under dried cow droppings. **Dynamics** – Fully-winged. Frequent in drifts, so it is probably a frequent flier.

258. *Amara (Amara) crassispina* LeConte, 1855

General Range – An east-central species. Upper Austral Zone. East to NH, MA, CT, VA, NC, SC, GA, south to FL, AL, AR, KS, TX, west to CO, SD, north to IL, IN, PA, NY. **Local Range** – Vermont, no records; New Hampshire, one locality, Winchester in the extreme southwest. **Habitat** – Associated with broomsedge (*Andropogon*). **Life Cycle** – Active in January-August, October-November (Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Fully-winged. Occasional with seashore drift.

259. *Amara (Amara) cupreolata* Putzeys, 1866

General Range – A nearly transcontinental species. Canadian, Transition, Upper Austral Zones. East to QC at Anticosti, Îles-de-la-Madeleine, PE, NS, NB, ME, MA, CT, NJ, DE, VA, NC, SC, south to GA, AL, MS, AR, KS, CO, UT, west to MT, BC (Trail), North to NT (Norman Wells), QC (Lac Saint Jean, Bergeronnes). **Local Range** – Vermont, 30 localities, northeast to Maidstone, possibly absent from the higher parts of the northeast, one high altitude record from summit of Mount Equinox in Manchester. New Hampshire, nine localities, from Dixville and Mount Washington in the north to Hinsdale, Litchfield, and Hampton in the south. **Habitat** – Dry, open areas, usually with some scattered tall weeds. Especially on rock ledges at all altitudes, also on roadsides, lawns, pastures, croplands, and orchards. **Life Cycle** – Mating

in May; tenerals in July and August, rarely in June. **Behavior** – Largely diurnal. It has been seen preying on caterpillars, it also feeds on seeds. It climbs on herbs, occasionally feeding on *Solidago*. **Dynamics** – Wings are dimorphic. Most individuals have wings which, though structurally complete, are too small to allow flight. There is a fully-winged form which has been seen to take flight at sunset and come to lights.

260. *Amara (Amara) familiaris* (Duftschmid, 1812)

General Range – An Old World species introduced in North America. In the Old World, east to Pacific Ocean in Primorie (Maritime) Provinces of Siberia, south to Mongolia, Tian Shan, Kazakhstan, Caucasus, North Africa, west to Portugal, Ireland. Introduced in Iceland. North to Scandinavia, Russia (all except the most northern areas). Introduced to western North America, BC (Vancouver Island, 1919, and Terrace, 1966), AK (Ketchikan, 1945), AB (Edmonton, 1981), OR (1953). In eastern North America, "Boston Neck, R.I." (probably MA, 1918), NS (1924), southern ON (1925), NF and QC (1927), NB (1928), Abitibi region of QC (1936), ON (Bruce Peninsula, 1956). Current limits: in west, north to AK (Ketchikan), east to ID, south to CA; in east, east to NF, QC at Îles-de-la-Madeleine, PE, NS, NB, ME, MA, CT, NJ, VA, NC, south to SC, TN, west to MO, IA, north to IL, IN, MI, ON, QC (Abitibi, Lac Saint Jean, Mingan). **Local Range** – Vermont, 13 localities, probably throughout the state, but no records so far from the northeast. The earliest Vermont record is from 1955, probably caused by scarcity of carabid collectors 1930-1955. New Hampshire, nine localities, from Pittsburg in the north, to Hinsdale and Hampton in the south. Recorded from Mount Washington and two other high altitude places in the White Mountains. **Habitat** – Open areas on sand and clay soil, croplands, pastures, gardens, roadsides, orchards, vacant lots. **Life Cycle** – Mating late August; tenerals, mostly May-June, occasional in early August. **Behavior** – Diurnal. Feeds on seeds (*Poa*, *Stellaria*, *Cerastium*, and no doubt others) and insects (Diptera larvae and pupae, elaterid larvae). **Dynamics** – Fully-winged, a frequent flier. Seen in flight in sunlight, also taking off at sunset and in light traps.

261. *Amara (Amara) impuncticollis* (Say, 1823)

General Range – An east-central species. Canadian, Transition, Upper and Lower Austral Zones. East to NF, QC at Îles-de-la-Madeleine, PE, ME, MA, CT, NJ, DE, NC, SC, GA, south to FL, AL, LA, TX, Mexico, west to AR, MO, SD, MB, (Morden, Victoria Beach), north to ON

(Britannia), QC (Abitibi, Grandes Bergeronnes). **Local Range** – Vermont, likely throughout the state, including S. Burlington, Winooski, Shoreham (other localities need to be verified subsequent to publication of Hieke 2000, as also for NH). New Hampshire, likely throughout the state, including Keene. **Habitat** – Common in gardens, lawns, orchards, weedy vacant lots, crop lands. **Life Cycle** – Tenerals April-September. Six tenerals were collected while I was turning garden soil in South Burlington, August 27-September 1. **Behavior** – Largely diurnal. It has been observed feeding on seeds and other plant parts, caterpillars, and a grasshopper, also fungi in the field. It has been seen climbing on grasses. **Dynamics** – Fully-winged, a frequent flier. Common at light traps, it has also been seen in flight during the day.

262. *Amara (Amara) littoralis* Dejean, 1828

General Range – A continental species. Hudsonian, Canadian, Transition, Upper Austral Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, NS (Halifax, Yarmouth), NB, ME, MA, CT, NJ, MD, south to PA, OH, IN, IL, MO, KS, NM, AZ, west to CA, OR, WA, BC, Vancouver Island, Queen Charlotte Islands, AK, (south coast to Kenai Peninsula, Kodiak, Island), north to YT (Whitehorse), NT (Reindeer Depot, Norman Wells), QC (Lake Mistassini, Magpie, on the north shore of the Gulf of Saint Lawrence). **Local Range** – Vermont, eight localities, south to Manchester, Springfield, northeast to Craftsbury, in the Champlain Valley at Burlington. New Hampshire, seven localities, from Pittsburg in the north to Hampton, Rye, and Chesterfield. No mountain top records for either state. **Habitat** – Gardens, lawns, croplands, sand pits. Unlike *A. impuncticollis*, it has not been recorded in orchards. **Life Cycle** – Tenerals April and July-September. **Behavior** – Diurnal. It has been seen feeding on grasshopper eggs. **Dynamics** – Fully-winged, an occasional flier. It has been seen taking flight at sunset.

263. *Amara (Amara) lunicollis* Schiødte, 1837

General Range – A circumpolar species. Old World range: east to Kamchatka, south to Kirghizia, Caucasus, Bulgaria, northern Italy, northern Spain, west to British Isles, including Shetland, north to northern Scandinavia, Russia, Siberia. Hudsonian, Canadian Zones. New World range: east to LB (west Saint Modeste in the extreme south), NF, QC at Anticosti, Cape Breton, NS, NB, ME, MA, south to PA, MI, MN, MB (Winnipeg, Dauphin), SK, AB (Banff), west to BC (Creston, Copper Mountain), AK (Kenai Peninsula, Palmer, Fairbanks), north to YT

(Dawson), NT (Norman Wells, Yellowknife), MB (Gillam), QC (Abitibi, Sept-Îles). **Local Range** – Vermont, 14 localities, at all elevations from 30 m by Lake Champlain (South Hero, Burlington, Shoreham), to Mount Mansfield and Camel's Hump, in the Connecticut Valley (Putney, Thetford), probably statewide. New Hampshire, seven localities, Errol in the north, Stratham and Durham, also four coastal localities in the southeast. **Habitat** – Grassy, weedy fields, crop lands, garden, orchards, rock ledges with grass. Orchards in Springfield and Shoreham. **Life Cycle** – Active in April-November (Larochelle and Larivière 2003). **Behavior** – Largely diurnal. It has been seen feeding on an earwig. **Dynamics** – Fully-winged, occasional flier. It has been seen taking wing at sunset, and coming to lights.

264. *Amara (Amara) neoscotica* Casey, 1924

General Range – East to NS, south to NJ, IL, west to CO AB, north to SK, MB, ON, QC. **Local Range** – Vermont, one locality, Springfield. New Hampshire, no records. **Habitat** – Dry, open ground such as old fields and vacant lots (Dearborn et al. 2014). **Life Cycle** – Unknown. **Behavior** – Occasional on *Solidago* (Bousquet 2010). **Dynamics** – Fully-winged, but flight not observed (Bousquet 2010).

265. *Amara (Amara) otiosa* Casey, 1918

General Range – East to NF, NS, NB, NY, NJ, south to NC, PA, IL, MO, west to TX, CO, north to MN, WI, ON, QC. **Local Range** – Vermont, six localities, all in the Champlain Valley, north to Grand Isle, east to Westford, south to Shoreham, west to Lake Champlain. New Hampshire, four localities, Mount Washington (1500-1800 m), Exeter, Hampton Beach in Hampton. **Habitat** – Farm fields, orchards, and sub/alpine areas (Dearborn et al. 2014). **Life Cycle** – Unknown. **Behavior** – Unknown. **Dynamics** – Fully-winged, known to fly (Bousquet 2010).

266. *Amara (Amara) ovata* (Fabricius, 1792)

General Range – A Palearctic species, introduced in North America. In the Old World, east to Siberia, Japan, south to Iran, Caucasus, Portugal, west to Ireland, north to Scandinavia, northern Russia. In North America, east to MA, VA, south to IA, west to BC, north to AB, ON, QC. **Local Range** – Vermont, one specimen, Mount Equinox (this represents a NEW STATE RECORD). New Hampshire, one specimen, Mount

Washington at 1800 m. **Habitat** – Dry, open areas, often with sparse, tall herbs, the soil is often gravelly. Vacant lots, railway embankments, gravel pits, upper zone of river banks. **Life Cycle** – "A typical spring breeder" (Lindroth 1986). **Behavior** – Mostly nocturnal in Europe. It has been recorded feeding on seeds, flowers or fruits of *Alliaria*, *Barbarea*, *Brassica*, *Reseda*, and *Cynosurus*. It occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier. Frequent in drift.

267. *Amara (Amara) tenax* Casey, 1918

General Range – East to VT, MA, south to IL, IA, KS, CO, west to NV, AB, north to NT. **Local Range** – Vermont, recorded from VT in Hieke 2003. New Hampshire, no records. **Habitat** – Unknown. **Life Cycle** – Unknown. **Behavior** – Unknown. **Dynamics** – Unknown.

268. *Amara (Amara) turbata* Casey, 1918

General Range – East to MA, NY, NJ, NC, south to TN, AR, KS, NM, AZ, west to CA, AB, AK, north to SK, ON, QC. **Local Range** – Vermont, no records. New Hampshire, one locality, Washington (in Sullivan County, has no connection with Mount Washington). **Habitat** – Lowlands and uplands (Larochelle and Larivière 2003). **Life Cycle** – Active in April (Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Fully-winged, probably capable of flight (Larochelle and Larivière 2003).

269. *Amara (Paracelia) quenseli quenseli* (Schönherr, 1806)

General Range – A circumpolar species. In the Old World: Scandinavia, Iceland, Scotland, far northern Russia (Pechora and Kanin Peninsula, northern Siberia), also in mountains farther south (Pyrenees, Alps, Montenegran Mountains, Carpathians, Bulgarian Mountains, Caucasus, Armenian Mountains, Urals, Altai, Tian Shan, Stanovoi, Kamchatka). In the New World: east to LB, NF, QC at Anticosti, Îles-de-la-Madeleine, PE, NS, ME MA, CT, NY at Long Island, NJ, MD, south to OH, IN, MO, OK, NM, AZ, west to CA, OR, WA, BC (interior only, not to the coast), AK (on the coast from Skagway to the tip of the Alaska Peninsula and north to Nome, in the interior to Fairbanks, Ramparts, also on the islands of Afognak, Kodiak, Aleutians, west to Attu, Pribilofs), north to YT, NT (Norman Wells), QC (Fort Chimo). **Local Range** – Vermont, three localities, South Burlington, Westford, Fairfax. New Hampshire, eight localities, from Errol in the north, to Seabrook and Swanzey in the south.

Habitat – Sandy areas, including beaches, dunes and croplands. **Life Cycle** – Tenerals in June. **Behavior** – Mostly diurnal. It has been observed climbing goldenrod (*Solidago*) and feeding on the seed heads. **Dynamics** – Wings polymorphic, an occasional flier. It comes to lights, has been collected in drift.

270. *Amara (Zezea) angustata* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, Upper Austral Zones. East to NB, ME (Mount Desert), MA, CT, NJ, DE, VA, NC, SC (in the mountains), south to TN, MO, KS, west to SD, ND, north to MB (The Pas, Cedar Lake), ON (Gravenhurst, Marmora), QC (Abitibi, Saint-Fidèle). **Local Range** – Vermont, 18 localities, statewide except for the high mountains. New Hampshire, four localities, Atkinson and Gilmanton Academy Grant in the north, and Durham, Hampton, and Pelham in the south. **Habitat** – Grasslands, pastures, roadsides, orchards. **Life Cycle** – Active in March-December (Larochelle and Larivière 2003). **Behavior** – Largely diurnal. It has been seen feeding on seeds of bluegrass (*Poa*) and on caterpillars. It climbs readily in the inflorescences of grasses. **Dynamics** – Fully-winged, a frequent flier, it comes to lights.

271. *Amara (Zezea) angustatoides* Hieke, 2000

General Range –NB to SD, south to southern PA and northeastern WV (Bousquet 2012*a*). ME, coastal, inland to Lewiston, Paris, Cumberland. **Local Range** – Vermont, four localities, Brattleboro, Saint Johnsbury, Stowe, South Hero. New Hampshire, four localities, Hanover, Laconia, Mount Washington, Mount Chocorua. **Habitat** – Open places such as farm fields, meadows, orchards, gravel pits, usually covered with grasses (Bousquet 2010). **Life Cycle** – Active in April-August; tenerals April (NY), early August (ME; Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Fully-winged, known to fly (Bousquet 2010).

272. *Amara (Zezea) flebilis* (Casey, 1918)

General Range – Cape Breton (NS), NB, ME (Hancock Point, North Cutler, Paris, Wales), west to OR, CO, AZ, south to IL, IN, PA, VA. **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, recorded from "White Mountains" in Hieke 2003. **Habitat** – Presumed to live in open places (Bousquet 2010). **Life Cycle** – Active in May-June, December (Larochelle and Larivière 2003). **Behavior** –

Unknown. **Dynamics –** Wings vestigial, incapable of flight (Larochelle and Larivière 2003).

273. *Amara (Zezea) pallipes* Kirby, 1837

General Range – A transcontinental species. Lower Canadian, Transition, Upper Austral Zones. East to QC at Îles-de-la-Madeleine, Cape Breton Island, NS, NB, ME, MA, CT, NJ, VA, south to TN (mountains), OH, IN, IL, IA, SD, MT, ID, WA, west to Vancouver Island, BC (Agassiz), north to AB (Edmonton), SK, MB (The Pas), ON (Sault Sainte Marie), QC (Abitibi, Roberval, Gaspésie). **Local Range** – Vermont, five localities, Burlington, South Burlington, W. Elmore, Camel's Hump, Putney, probably statewide. New Hampshire, three localities, all in Coos County, Pittsburg, Whitefield, Mount Washington. **Habitat** – Areas with dense grasses and forbs, such as pastures, croplands, roadsides, and the borders of beaver ponds. **Life Cycle** – Tenerals have been collected in April. **Behavior** – Largely diurnal. It climbs on bluegrass (*Poa*) and feeds upon the seeds, it also attacks timothy (*Phleum*). **Dynamics** – Winged, an occasional flier.

TRIBE OODINI

A tribe with one supraorbital seta, dorsal surface glabrous, elytral stria VIII with apex deepened, bordered medially by strong carina extending posteriorly to suture.

Three genera, five species:

Anatrichis (1 species) Minute, length 6 mm or less; no setae at corners of clypeus.

Lachnocrepis (1 species) Ventral surfaces of middle hind tarsi with long, golden, setae; clypeal setae as in *Oodes.*

Oodes (3 species) Middle and hind tarsi with two rows of short spines; clypeus with seta at antero-lateral angle.

Genus *Anatrichis*

274. *Anatrichis minuta* (Dejean, 1831)

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long Island, MD, VA, NC, SC, GA, south to FL, AL, LA, west to TX, OK, KS, NE, north to IL, IN, OH. **Local Range** – Vermont, no records. New Hampshire, one locality, South Hampton. **Habitat** – Bottomlands, swamps, marshes. **Life Cycle** – July and August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

275. *Lachnocrepis parallela* (Say, 1830)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, NB, ME (Acton, Belgrade, Smithfield, Winslow), MA, CT, NY at Long Island, NJ, DC, VA, NC, GA, south to FL, AL, LA, west to MO, IA, NE, SD, ND, north to MB (Winnepeg, Whitemouth Lake), ON (near Gravenhurst), QC (Saint Lawrence Valley, from Montreal to Quebec City, also at Orford Lake). **Local Range** – Vermont, 10 localities, mostly in the Champlain Valley from Alburgh to Ferrisburgh, also Shelburne (Shelburne Pond). New Hampshire, 11 localities, north to Northumberland, Lancaster and Jefferson, in the southwest at Charlestown, in the southeast along the coast and inland to Rochester, Durham, Exeter and Pelham. **Habitat** – Swamps and marshes, often among cattails (*Typha*) or buttonbushes (*Cephalanthus*). Less demanding of shade than *Oodes*. **Life Cycle** – Tenerals July-October. **Behavior** – Both diurnal and nocturnal. It has been seen eating seeds. Amphibious, escapes by swimming or diving and can remain submerged for 20 minutes. **Dynamics** – Fully-winged, an occasional flier.

276. *Oodes amaroides* Dejean, 1831

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Acton), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, MS, LA, west to WI, MI, ON (Point Pelee), NY, (Rochester, White Plains). **Local Range** – Vermont, no records. New Hampshire, 14 localities, north to Sutton, Rochester, and Northwood, from all the towns bordering the sea, also from Durham, Lee, and Pelham in the southeast, and Winchester in the southwest. **Habitat** – Wet soils in floodplains and swamps. **Life Cycle** – Tenerals June-August. **Behavior** – Diurnal and nocturnal. Sometimes

climbs on trees or shrubs. Adults escape by diving; strong swimmers. **Dynamics** – Fully-winged, a frequent flier.

277. *Oodes brevis* Lindroth, 1957

General Range – An east-central species. Upper and Lower Austral Zones. East to MA, NJ, MD, VA, GA, south to FL, AL, LA, west to TX, AR, MO, IA, north to MI (Point Pelee), NY. **Local Range** – Vermont, no records. New Hampshire, one locality, Exeter in the southeast. **Habitat** – Floodplain forests and forested margins of swamps and marshes. **Life Cycle** – Tenerals July-September. **Behavior** – Diurnal and nocturnal. It climbs on herbs, especially cattails (*Typha*). The adult dives to escape, a powerful swimmer. **Dynamics** – Fully-winged, an occasional flier.

278. *Oodes fluvialis* LeConte, 1863

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Belgrade), MA, NJ, VA, NC, SC, GA, south to FL, AL, LA, west to MO, IA, MN, north to WI, MI, ON (Gravenhurst, to Toronto), QC, ME (Albany Township, Acton). **Local Range** – Vermont, eight localities, all near Lake Champlain. On the lake shore, South Hero, Colchester (Mallett's Bay), Burlington, Ferrisburgh; several kilometers from the lake, Shelburne (Shelburne Pond), Williston (Muddy Pond), Panton (Dead Creek). New Hampshire, nine localities, north to Thornton, Rumney, and Plymouth. **Habitat** – Marshes and swamps, especially those subject to seasonal flooding. **Life Cycle** – Tenerals July-September. **Behavior** – Diurnal and nocturnal. Amphibious, often escapes by swimming or diving. **Dynamics** – Fully-winged, an occasional flier.

TRIBE CHLAENIINI

Medium to large species, mostly with bright metallic coloration, largely hairy, and able to defend themselves with strongly odorous secretions (some with hydroquinones, others with creosote). All but one species are inhabitants of river, swamp, and lake borders. Only one supraorbital seta.

One genus *Chlaenius*. Eight subgenera in Vermont:

Eurydactylus (1 species) The only species which lives away from water in dry, open habitats. It has multiple (usually four) lateral setae in the pronotum.

Anomoglossus (1 species) Has elongate mandibles.

Chlaenius (3 species) Antennomere IV distinctly longer than antennomere III. Male with tuft of setae on outer side of middle tibia at apex. Head partly or entirely pubescent.

Lithochlaenius (1 species) The only local species with rounded humeri.

Chlaeniellus (5 species) Similar to *Chlaenius*, but antennomeres III and IV equal, no tuft on middle tibia of male, legs pale.

Brachylobus (1 species) Mentum a trapezius, with transverse anterior margin, without either median tooth or lateral lobes.

Agostenus (1 species) Similar to *Chlaeniellus,* but more or less black.

Randallius (1 species) Small, purple *Amara*-like species.

279. *Chlaenius (Eurydactylus) tomentosus* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Paris), MA, CT, NY at Long and Staten Islands, NJ, DE, VA. NC, SC, GA, south to FL, AL, LA, TX, NM, west to AZ, CO, NE, SD, ND, north to AB (Medicine Hat), SK, MB (Victoria Beach), ON (Bruce Peninsula), QC (Nominingue, Île d'Orleans). **Local Range** – Vermont, eight localities, Colchester, Milton, Winooski in the northwest, W. Elmore in the north center, Brighton in the northeast, Rutland, Thetford, and Dorset in the south, probably in suitable habitats throughout Vermont. New Hampshire, 11 localities, north to Franconia, Haverhill (Mount Moosilauke) and Conway, no records north of the White Mountains. **Habitat** – A xerophilous species found in gravel pits and dry gravelly slopes in fields and pastures, also in lightly wooded or cut-over forests. **Life Cycle** – Mating May-June; tenerals August-November. **Behavior** – Nocturnal. Adults are recorded as feeding on caterpillars, other insects, earthworms, fungi, and plants. Occasionally climbs trees. **Dynamics** – Fully-winged, a frequent flier.

280. *Chlaenius (Anomoglossus) emarginatus* Say, 1823

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS (Annapolis Royal), NB, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, SC, GA, south to FL (Palm Beach), AL, LA, TX, west to OK, KS, NE, north to SD, MN, WI, ON (Rainy River District, Ottawa), QC (Nominingue, down the Saint Lawrence to Quebec City area). **Local Range** – Vermont, 12 localities, north to Burlington, Stowe, Guildhall, south to Grafton, Manchester, probably throughout the state except for the high mountains. New Hampshire, eight localities, five of them near the southern boundary, Swanzey, Litchfield, Pelham, South Hampton, Exeter, farther north are Concord, Rumney, and Thornton. There are no records from the White Mountains or north of them. **Habitat** – Moist areas in forests, including flood plains. The specimens from Guildhall were under logs where a flood plain bordered cropland. Unlike most other *Chlaenius*, not found close to shorelines. **Life Cycle** – Mating May-June; tenerals August-October. **Behavior** – Nocturnal. Adult has been seen feeding on caterpillars. **Dynamics** – Fully-winged, a frequent flier.

281. *Chlaenius (Chlaenius) aestivus* Say, 1823

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, west to AR, MO, IL, north to WI, MI, ON (Point Pelee, Pelee Island), NY (Buffalo, Albany). **Local Range** – Vermont, no records. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Flood plain forests. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. Eggs are laid in a mud cell affixed on plants, often on a tree, up to 3 m above the ground. **Dynamics** – Wings dimorphic. The fully-winged form is rare, it has been observed in flight.

282. *Chlaenius (Chlaenius) laticollis* Say, 1823

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, NM, west to AZ, CO, north to KS, MO, IL, MI, OH, NY (Buffalo, Ithaca), CT (Mansfield). **Local Range** – Vermont, no records. New Hampshire, two localities, both in South Hampton. **Habitat** – Flood plain forests. **Life Cycle** – Mating in June; tenerals in August. **Behavior** – Eggs are laid on the ground. **Dynamics** – Fully-winged, it has been observed in flight.

283. *Chlaenius (Chlaenius) sericeus* (Forster, 1771)

General Range – A transcontinental subspecies (other subspecies in the southwest). Upper and Lower Canadian, Transition, Upper and Lower Austral Zones. East to NF (a single specimen), QC at Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to BC (Vancouver City, Oliver), AB (Lethbridge), SK, MB, ON (Moose Factory), QC (Abitibi, to Grandes Bergeronnes on the north shore, Petit-Cap in Gaspésie). **Local Range** – Vermont, 71 localities, statewide. New Hampshire, 45 localities, statewide excepting the higher parts of the White Mountains. **Habitat** – An abundant and active species, which appears to move from place to place according to the weather. In drier weather, it is usually found on shores of lakes, ponds, rivers, and brooks. Absent only from mountain brooks with deep shade. Common in bottomland forests, it has also been found in beaver houses. In wet weather it spreads into wet fields and pastures, roadside ditches, and by temporary pools. Up to 300 m elevation. **Life Cycle** – Mating May-June; tenerals late July-November. **Behavior** – Nocturnal. Eggs deposited in mud packet on fallen plant stems or on stones. It sometimes climbs trees. Adult feeds on insects, earthworms, mostly on dead or dying specimens. **Dynamics** – Fully-winged, a frequent flier.

284. *Chlaenius (Lithochlaenius) cordicollis* Kirby, 1837

General Range – An east-central species. Transition and Upper Austral Zones. East to NB, ME, MA, CT, NY at Long Island, NJ, DE, VA, south to NC, WV, West to IA, MN, north to MB (Victoria Beach), ON (near Collingwood), QC, (Hull, Nominingue, along the Saint Lawrence to Quebec City). **Local Range** – Vermont, 24 localities, 19 from the shores of Lake Champlain, from Alburgh, Isle LaMotte, and Swanton in the north, to Benson in the south. Also from Poultney in the southwest, and Royalton, Hartford, Rockingham, and Jamaica in the Connecticut River drainage. New Hampshire, one locality, from Walpole on the Connecticut River. **Habitat** – Shorelines, usually on large rivers or lakes. By Lake Champlain it is commonly found hiding among angular fragments of limestone at fishing access points. **Life Cycle** – Tenerals July-September. **Behavior** – Nocturnal. Adult feeds largely on injured or dead insects, often those that wash ashore. It may escape by submerging itself and hiding under water for about one minute. Another defense is to eject a strongly odorous spray (creosote) for up to 6 cm. It is a powerful swimmer. **Dynamics** – Fully-winged, a frequent flier.

285. *Chlaenius (Chlaeniellus) brevilabris* LeConte, 1847

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT (Cornwall in the northwest), NY to Long Island, NJ, DC, VA, south to WV, AL, MS, LA, TX, west to OK, KS, NE, north to ND, MN, WI, MI, ON (Pelee Island, Toronto), NY (Lowville, Whitehall). **Local Range** – Vermont, 10 localities, only at low altitudes in the Champlain Valley, the most northern in Sheldon on the Missisquoi River, on the Lamoille River in Georgia and Cambridge, on the Winooski River in Winooski, on the Poultney River in Fair Haven and Poultney, by Lake Champlain in Addison and Benson, and by Shelburne Pond in Shelburne, only one record east of the mountains in Corinth. New Hampshire, one locality, in Concord. **Habitat** – Shores of rivers, rarely by lakes or ponds. **Life Cycle** – Tenerals July-August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, it flies to lights.

286. *Chlaenius (Chlaeniellus) impunctifrons* Say, 1823

General Range – An east-central species. Lower Canadian, Transition, and Upper and Lower Austral Zones. East to ME (Lewiston), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL (Lake Okechobee), AL, LA, west to TX, CO, WY, SD, north to MB (Victoria Beach), ON (Sioux Lookout, Ottawa), QC (Fort Coulonge, La Trappe, Saint Joachim, Knowlton). **Local Range** – Vermont, 26 localities, in the Winooski River valley, east to Saint Johnsbury in the Connecticut River valley, no doubt along all the rivers of Vermont. New Hampshire, 21 localities, north on the Connecticut River to Lancaster, in the Merrimack drainage, north to Thornton. **Habitat** – In bottomland forests, also at the margins of cattail (*Typha*) and other marshes, usually on wet soil. One specimen was found in a floating *Sphagnum* mat on a bog at 915 m elevation. **Life Cycle** – Mating May, early June; tenerals June-September. Eggs laid in mud cells on leaves of trees, shrubs, cattails. **Behavior** – Nocturnal. Preys on insects, spiders. Climbs frequently on trees and shrubs. **Dynamics** – Fully-winged, a frequent flier.

287. *Chlaenius (Chlaeniellus) pennsylvanicus pennsylvanicus* Say, 1823

General Range – A transcontinental subspecies. Canadian, Transition, Upper and Lower Austral Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, NS, Cape Breton Island, NB, ME, MA, CT, NY at Long Island, NJ, MD, VA, NC, SC, GA, south to FL, AL, MS, AR, KS, CO,

MT, ID, west to OR, WA, Vancouver Island, north to BC (Kamloops, Salmon Arm), AB, SK, MB (Riding Mountain), ON (Michipicoten River, Sudbury), QC (Lake Abitibi, Lac Saint Jean). **Local Range** – Vermont, 68 localities, state-wide up to 1000 m on Mount Mansfield. New Hampshire, 35 localities, all parts of the state, including Mount Washington and the high mountains. **Habitat** –Muddy borders of ponds, pools, very slow streams. In contrast to *C. tricolor*, it is usually found by standing waters. Along rivers it is usually found by oxbows or by isolated pools. It is common by beaver ponds. **Life Cycle** – Mating May-June; tenerals July-September. **Behavior** – Nocturnal, except in early spring. Occasionally climbs up to 2 m on trees. **Dynamics** – Fully-winged, a frequent flier.

288. *Chlaenius (Chlaeniellus) tricolor tricolor* Dejean, 1826

General Range – An east-central subspecies (another subspecies in the western states). Transition, Upper and Lower Austral Zones. East to NF, NS, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, AL, LA, TX, west to CO, NE, SD, north to ND, MN, WI, MI, ON (Collingwood, Arnprior), QC (Fort Coulonge, Nominingue, Port-au-Saumon, La Pocatiere, in Kamouraska County). **Local Range** – Vermont, 77 localities, throughout the state. New Hampshire, 34 localities, north to Pittsburg, south to Hinsdale and Seabrook. **Habitat** – Common near rivers, brooks, lakes, and ponds. Usually found under driftwood or rocks. In wet weather it moves away from permanent water, and may be found in fields, pastures and gardens. I have found it at 900 m elevation at Sterling pond, and Darlington reported it from Lake of the Clouds on Mount Washington. **Life Cycle** – Mating May-June; tenerals August-November, rarely in late May. Eggs laid in mud cells attached to sedges, grasses. **Behavior** – Largely nocturnal. This species has been seen feeding on caterpillars and slugs. It occasionally climbs on trees and other plants. **Dynamics** – Fully-winged, a frequent flier.

289. *Chlaenius (Brachylobus) lithophilus* Say, 1823

General Range – A nearly transcontinental species. Canadian, Transition, Upper and Lower Austral Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, south to GA, AL, MS, AR, TX, west to NM, UT, ID, WA, BC (Fort Saint John), north to NT (Fort Smith), AB, SK, MB (Victoria Beach), ON (Ogoki, Nipigon), QC (Abitibi, Lac Saint Jean). Another subspecies in the southwest. **Local**

Range – Vermont, 17 localities, throughout the state, along the upper part of the Connecticut River at Lemington and Maidstone, and the Moose River in Victory. New Hampshire, 19 localities, all parts of the state from Pittsburg to Hinsdale and Seabrook. The highest elevation is 1002 m at Crawford Notch in the White Mountains. **Habitat** – In or by dense sedges and grasses by pools along rivers and lakes. **Life Cycle** – Tenerals July-August. **Behavior** – Mostly nocturnal, sometimes active in spring sunshine (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, an occasional flier.

290. *Chlaenius (Agostenus) niger* Randall, 1838

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to NF, QC at Îles-de-la-Madeleine, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long Island, NJ, DC, VA, VA, SC, south to FL (Miami), AL, LA, west to TX, KS, WY, MT, WA, BC (Oliver), north to NT (Fort Smith), AB (Flatbush), SK, MB (Whitemouth Lake, Victoria Beach), ON (Long Lac), QC (Abitibi, Lac Saint Jean). **Local Range** – Vermont, six localities, bog in Warren's Gore, Craftsbury, Colchester at mouth of Winooski River, Shelburne Pond, swamp and marsh at mouth of Lewis Creek, Putney. New Hampshire, five localities, South Hampton, Durham, Andover, Rumney, and Mount Washington (the last is probably an intercepted stray). **Habitat** – An amphibious species, found in marshes, in floating mats of vegetation or clinging to bits of wood. My first encounter with this distinctive species was at Reelfoot Lake in TN, when I walked on a small pier. The pier sank under water, and several beetles emerged from beneath it. I collected some, and they proved to be *C. niger*. **Life Cycle** – Tenerals early August. **Behavior** – Nocturnal. Often hides by daylight in floating mats of vegetation. It commonly forages under water to a depth of 20 cm. It is a strong swimmer and is able to dive. **Dynamics** – Fully-winged, a frequent flier.

291. *Chlaenius (Randallius) purpuricollis* Randall, 1838

General Range – An east-central subspecies (another subspecies west of this one). Upper Austral Zone. East to NH, MA, CT (West Hartford), Long Island (Far Rockaway), NJ, south to PA, IN (IN Dunes), IL, IA, KS, CO, west to UT, MN, MB, north to ON (Isle of Quinte), QC (near to Montreal at Saint Scholastique, Saint Cesaire). **Local Range** – Vermont, no records. New Hampshire, one locality, Mount Washington. **Habitat** – In the interior of the continent, found in the remnants of long

grass prairies. In eastern Canada, found on limestone pavement (alvars). **Life Cycle** – Tenerals June-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Flight has not yet been witnessed.

TRIBE LICININI

Members of this group are adapted to prey on snails. Unlike the Cychrines, the Licinines have mandibles which are adapted to crushing the shells. Licinines and Cychrines could be considered to be rivals, feeding on the population by different methods. On the other hand, the fact that they have different modes of attack tends to limit the responses of the snail. The Licinines crush the shell; the best way to defeat this line of attack is to grow a stronger, thicker, shell. The Cychrines, in contrast, reach into the aperture of the shell. Thickness of the shell does not give protection here. Many snails have instead developed baffles in the aperture.

Three genera are represented locally in this tribe:

Diplocheila (4 species) Medium size, with labrum strongly asymmetrical.

Dicaelus (4 species) Medium size, with labrum symmetrical. With the base of the elytral interval 7 carinate or strongly convex.

Badister (6 species) Minute species, with labrum cleft and one or the other mandible notched transversely.

Genus *Diplocheila*

292. *Diplocheila (Isorembus) assimilis* (LeConte, 1844)

General Range – An east-central species. Transition, Upper Austral Zone. East to NH, MA, CT, NJ, south to MD, GA, OH, IN, IL, west to MN, WI, MI, ON (Grand Bend, Bayfield), QC (Fort Coulonge, Montreal, Berthierville). **Local Range** – Vermont, 12 localities, 10 of them bordering Lake Champlain, from Highgate, Alburgh and Isle LaMotte in the north, south to Lewis Creek mouth in Ferrisburgh, also Poultney River in West Haven, and Coventry on Barton River, near Lake Memphremagog. New Hampshire, six localities, Concord, Rochester, Hampton, Salem, Pelham, Brookline. **Habitat** – In seasonally flooded forests by big lakes, and in cattail (*Typha*) swamps and rich fens. **Life**

Cycle – Tenerals in August. **Behavior** – It swims to escape. **Dynamics** – Fully-winged, an occasional flier.

293. *Diplocheila (Isorembus) impressicollis* (Dejean, 1831)

General Range – An east-central species. Transition, Upper Austral Zones. East to NH, MA, CT, NY at Staten Island, NJ, MD, south to VA, OH, IN, IL, MO, OK, TX, west to NM, KS, NE, SD, ND, north to WI, MI, ON (Grand Bend, Kincardine, Ottawa), QC (Hull, Montreal down the Saint Lawrence to Portneuf, also Woburn near Lake Megantic). **Local Range** – Vermont, five localities, Home Creek mouth in Charlotte, Lewis Creek in Ferrisburgh, Dead Creek in Panton, Cedar Lake in Monkton, also in Newport Town near Lake Memphremagog. New Hampshire, one locality, Rochester. **Habitat** – In cattail (*Typha*) marshes and other wetlands. Less restricted to shade than *D. striatopunctata* and *D. assimilis*. **Life Cycle** – Tenerals July-October. **Behavior** – Nocturnal. It swims to escape. **Dynamics** – Fully-winged, a frequent flier.

294. *Diplocheila (Isorembus) obtusa* (LeConte, 1847)

General Range – A nearly transcontinental species. Lower Canadian, Transition, Upper Austral Zones. East to QC at Anticosti, Îles-de-la-Madeleine, PE, NS, NB, ME, MA, CT, south to NY (Ithaca), PA, OH, IN, IL, AR, KS, CO, MT, ID, WA, west to BC (Vernon), north to NT (Fort Wrigley, Fort Smith, Hay River, Good Hope), ON (Nipigon), QC (Île du Grand Calumet, Saint Foy, Gaspésie). **Local Range** – Vermont, 11 localities, nine in the Champlain Valley from Isle LaMotte to Rutland town, also Luce Hill in Stowe, and Springfield in the Connecticut Valley. New Hampshire, three localities, Lyme and Winchester in the Connecticut Valley, and Hampton on the coast. **Habitat** – Unlike its congeners, this is an upland species, found in pastures, roadsides, orchards, lawns, and gardens. Also found on the upper, drier banks of rivers and lakes. **Life Cycle** – Tenerals June-September. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged, a frequent flier.

295. *Diplocheila (Isorembus) striatopunctata* (LeConte, 1844)

General Range – An almost transcontinental species. Transition, Upper Austral Zones. East to QC at Anticosti, Îles-de-la-Madeleine, NB, NS, NH, NY, NJ, VA, GA (in mountains), south to OH, IN, IL, MO, KS, MT, UT, west to CA, OR, WA, BC (Salmon Arm, not reaching the coast), north to NT (Fort Smith), MB) Victoria Beach), ON (Grand Bend, Lake

Simcoe), QC (Hull, Saint-Fidèle, Gaspésie). **Local Range** – Vermont, six localities, all from swamp forests by Lake Champlain, Missisquoi delta in Highgate, Alburgh, Isle LaMotte, Colchester, Shelburne Bay, Lewis Creek mouth in Ferrisburgh. New Hampshire, one locality, Rochester. **Habitat** – In VT only in the bottomland forests by Lake Champlain. **Life Cycle** – Tenerals July-September. **Behavior** – Nocturnal. It swims to escape. **Dynamics** – Fully-winged, an occasional flier, it comes to lights.

296. *Dicaelus (Paradicaelus) dilatatus dilatatus* Say, 1823

General Range – This subspecies eastern, another subspecies west of the Appalachians. Upper and Lower Austral Zones. East to ME (Bangor), MA, CT, NY at Staten Island, NJ, DC, MD VA, NC, SC, GA, south to FL, AL, MS, west to AR, WV, PA, north to NY (Buffalo, Rochester, North Branch). **Local Range** – Vermont, three localities, Westford, Salisbury (Bryant Mountain), Peacham. New Hampshire, four localities, north to Cornish, Lyndeborough in the south center, and Durham and Exeter in the southeast. **Habitat** – Dry deciduous forests and sand areas. Seemingly more adapted to dry conditions than its congeners. A specimen was encountered in western VT crossing a sand dune, it was probably dispersing, rather than a resident. **Life Cycle** – Tenerals August-September. **Behavior** – Nocturnal. Feeds on snails and insect larvae, including those of gypsy moths. It defends itself with a smoke-like spray. **Dynamics** – Old brachypterous. Wings vestigial, flightless.

297. *Dicaelus (Paradicaelus) elongatus* Bonelli, 1813

General Range – An east-central species. Upper and Lower Austral Zones. East to ME (Lewiston), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, west to TX, OK, KS, NE, north to SD, IA, WI, MI (Oakland County), ON (Pelee Island, Decew Falls), NY (Buffalo, Whitehall). **Local Range** – Vermont, five localities, in the Champlain Valley north to Shelburne and Hinesburg, in the Connecticut Valley north to Rockingham, by the Battenkill north to Dorset. New Hampshire, five localities, north to Rumney. The other records in the southeast: Rye, Hampton, South Hampton, Pelham. **Habitat** – Deciduous forests at low elevations, apparently not favored by limestone outcrops. **Life Cycle** – Tenerals June-November. **Behavior** – Feeds on caterpillars, apparently not recorded as attacking snails. It defends itself with a smoke-like spray. Occasionally climbs on plants. Aggregates in autumn. **Dynamics** – Old brachypterous, flightless.

298. *Dicaelus (Paradicaelus) politus* Dejean, 1826

General Range – An east-central species. Upper Austral Zone. East to ME (Belgrade, Mount Vernon), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, AL, MS, MO, west to IA, north to WI, MI, ON (Decew Falls, Belleville), QC (Rigaud, Saint Bruno, Ayers Cliff). **Local Range** – Vermont, 13 localities, mostly from the west side of the state, from Brewster River (Cambridge) south to Salisbury, up to 440 m on Mount Mansfield, east of the mountains recorded from Marlboro. Camp Johnson, in Essex, is the only record not associated with rock, mostly limestone exposures. New Hampshire, nine localities, north to Franconia, Rumney, Webster, Swanzey, Pelham, Durham, New Fields, Hampton, Pelham. **Habitat** – Deciduous forest, usually on limestone in VT, especially on dry limestone ridges with oaks. **Life Cycle** – Tenerals August-early November. **Behavior** – Nocturnal. Feeds on caterpillars, not yet reported feeding on snails. Repels attacker with a smoke-like spray. **Dynamics** – Old brachypterous, flightless.

299. *Dicaelus (Paradicaelus) teter* Bonelli, 1813

General Range – An east-central species. Upper Austral Zone. East to MA, CT (Cornwall), NY, NJ, MD, VA, NC, SC (mountains), GA (mountains), south to AL, TN, west to IN, MI, north to ON (Collingwood), QC (Saint-Jean-sur-Richelieu, Hull). **Local Range** – Vermont, three localities, Shelburne (Shelburne Pond), Charlotte (Mount Philo), Salisbury (Bryant Mountain, 5 examples). New Hampshire, no records. **Habitat** – Deciduous forests, especially oaks growing on limestone. **Life Cycle** – Tenerals July-September. **Behavior** – Nocturnal. At night, it forages on fallen logs and climbs standing trees. It is recorded as feeding on snails and on caterpillars. **Dynamics** – Old brachypterous. Wings strongly reduced, it is flightless.

Genus *Badister*

300. *Badister (Badister) neopulchellus* Lindroth, 1954

General Range – A transcontinental species. Transition, Upper Austral Zones. East to PE, Cape Breton Island, NS, MA, CT, NY at Staten Island, NJ, NC, south to GA, OH, IN, IL, MO, TX, CO, UT, ID, CA, west to OR, WA, BC (Vancouver City), north to NT (Great Slave Lake), MB (south end of Lake Manitoba), ON (Parry Island), QC (Hull, Saint Hippolyte, Kamouraska). **Local Range** – Vermont, 14 localities, north

to Highgate, south to Newfane, probably throughout the state, except for the highest mountains. New Hampshire, 10 localities, north to Jefferson, east to Rochester, no records in or north of the White Mountains. **Habitat** – Lakeside and riverbottom flood plains, in shade, also below willows or alders in marshes, or by beaver ponds. **Life Cycle** – Active in January-November; tenerals August-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Active under snow in late autumn. It has been recorded as feeding on carabid eggs. **Dynamics** – Fully-winged. It frequently comes to lights.

301. *Badister (Badister) notatus* Haldeman, 1843

General Range – An east-central species. Upper Austral Zone. East to ME (Waterville), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, AL, MS, LA, west to TX, OK, KS, NE, SD, north to MN, WI, MI, ON (Delhi, Ottawa), QC (Rigaud, Montreal area). **Local Range** – Vermont, five localities, from North Hero in the north to Manchester in the south, also Rutland town and Stowe (Taber Hill). New Hampshire, 10 localities, north to Jefferson, east to Hampton and Rochester. **Habitat** – Usually found in dry areas. A specimen from Burlington was found in a suburban garden, that from Stowe was in a pasture at 400 m. Elsewhere it has been reported from roadsides, gravel and sand pits, and croplands. **Life Cycle** – Tenerals June-August. **Behavior** – Nocturnal. **Dynamics** – Wings dimorphic. Fully-winged form has been taken at lights.

302. *Badister (Badister) obtusus* LeConte, 1878

General Range – An east-central species. Lower Canadian Zone. East to QC at Anticosti, NS, south to NH, ON (Belleville), MI, CO, west to MB, (Riding Mountain, Victoria Beach), ON (Sioux Lookout), QC (Abitibi region, Montreal region). **Local Range** – Vermont, no records. New Hampshire, one locality, Rumney (this represents a NEW STATE RECORD). **Habitat** – Forests with wet leaf litter. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier.

303. *Badister (Baudia) grandiceps* Casey, 1920

General Range – A nearly transcontinental species. Lower Canadian, Transition, Upper Austral Zones. East to Cape Breton Island, NS, ME (Newport), MA, NY, south to NJ, DC, KY, NE, west to OR, WA, north to BC (Creston), Vancouver Island, AB (Flatbush, Lake Wabamun), MB (Victoria Beach), ON (Lake Simcoe, Marmora, Arnprior), QC (Montreal area, Sainte Mathilde in Charlevoix-Est County, Heberville near Lac Saint Jean). **Local Range** – Vermont, one locality, Franklin. New Hampshire, two localities, South Hampton, Exeter. **Habitat** – Marshes, swamps, fens. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, occasional flier. It comes to lights at night.

304. *Badister (Baudia) micans* LeConte, 1844

General Range – An east-central species. Transition, Upper Austral Zones. East to PE, NS, MA, CT, NY at Long Island, NJ, south to GA, OH, IN, west to IL, north to MI, ON (Grand Bend, Belleville, Trenton), QC (Hull, Rigaud, Montreal area, Granby). **Local Range** – Vermont, nine localities, south to Dorset, east to W. Elmore. New Hampshire, 11 localities, north to Colebrook, south to Hinsdale, Brookline, Pelham, close to the White Mountains at Jefferson and Lancaster, in the southeast at Rochester, Durham, Lee, Hampton Falls, and South Hampton. **Habitat** – Swamps and marshes bordering lakes, also fens and *Sphagnum* bogs (in Williston), by beaver ponds (W. Elmore). **Life Cycle** – Tenerals August-September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier. Goes to lights at night.

305. *Badister (Baudia) transversus* Casey, 1920

General Range – An east-central species. Transition Zone. East to ME (Newport), MA, CT, NY, NJ, south to OH, west to MB (Whitemouth Lake), north to ON (Fort William, Ottawa), QC (Montreal area, to La Trappe, Berthierville, Granby). **Local Range** – Vermont, one locality, W. Elmore. New Hampshire, five localities, north to Littleton, also Rumney, in the southeast in Pelham, Exeter, and Rye. **Habitat** –The specimen from W. Elmore was found by a complex of beaver ponds at the edge of forest. Shaded areas by marshes and swamps are the reported habitats. **Life Cycle** – Active in April-November; tenerals late May (ON; Larochelle and Larivière 2003). **Behavior** – Nocturnal. Occasional climber on plants (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier (Larochelle and Larivière 2003).

TRIBE HARPALINI

The Harpalini form a large and complex tribe, with many genera and subgenera. In contrast to Amarini, the Harpalini have only one supraorbital seta. The sixth sternum cannot be anchored to the elytral apices, consequently these beetles must rely more on repellant fluids, and less on a hard shell. Like Amarini, members of this tribe feed largely on seeds. There are three subtribes: Anisodactylina, Stenolophina, and Harpalina.

SUBTRIBE ANISODACTYLINA

The males have dilated front and middle tarsi with very numerous, densely packed hairs on their ventral surfaces. Represented locally by five genera.

Genus *Notiobia*

306. *Notiobia (Anisotarsus) nitidipennis* (LeConte, 1847)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME, MA, CT, NY at Long Island, NJ, MD, VA, NC, SC, GA, south to FL, MS, AR, west to TX, IL, WI, north to MI, ON (Point Pelee and Long Point on Lake Erie, Isle of Quinte on Lake ON), QC (Rigaud, La Trappe). **Local Range** – Vermont, eight localities, north to Jericho and Stowe, in the Connecticut Valley north to Norwich. New Hampshire, two localities, Haverhill, Concord. **Habitat** – Deciduous or mixed forest edges or clearings, on shaded ground, with moss or short grass as ground cover. **Life Cycle** – Tenerals August-November, rarely in June. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier. Occurs in drift. Has been taken at light traps.

307. *Notiobia (Anisotarsus) sayi* (Blatchley, 1910)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to MA, CT, NY at Long and Staten Islands, NJ, MD, NC, SC, GA, south to FL, MS, LA, TX, west to OK, KS, SD, north to WI, MI, ON (Simcoe, Trenton, Belleville), QC (Montreal, Joliette). **Local Range** – Vermont, three localities, only in Champlain Valley, South Burlington, Underhill, Westford. New Hampshire, listed from NH in Bousquet 2012*a*. **Habitat** – Sand areas, in VT only near Lake

Champlain among sparse vegetation, including croplands. **Life Cycle** – Tenerals June-July. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Has been caught in light traps.

308. *Notiobia (Anisotarsus) terminata* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to NF, PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, Mexico, Costa Rica, west to AZ (southeast), OK, KS, NE, SD, ND, north to MN, WI, MI, ON (Michipicoten River, Sudbury), QC (Abitibi, Lac Saint Jean). **Local Range** – Vermont, 19 localities, probably throughout the state. New Hampshire, 13 localities, north to Whitefield, absent from the White Mountains and the territory north of them. **Habitat** – On sand or sandy soil, with sparse or dense grasses or other herbs. In croplands, pastures, also forest edges. **Life Cycle** – Mating in August; tenerals June-October. **Behavior** – Nocturnal. It climbs on herbs and woody plants. It is recorded as feeding on fireweed (*Epilobium angustifolium*) seeds. A preference test showed that the beetle favors dry seeds over unripe seeds, and the latter over other plant tissues (Noonan 1973). It also takes animal prey. **Dynamics** – Fully-winged. Frequent at light traps.

Genus *Xestonotus*

309. *Xestonotus lugubris* (Dejean, 1829)

General Range – An east-central species. Lower Canadian, Transition, Upper Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, south to NC, WV, OH, IN, IL, west to MO, IA, SD, north to MN, WI, ON (Nipigon, Huron County, Ottawa), QC (Fort Coulonge, Mont Laurier, Saint Emile, Port-au-Saumon, Kamouraska). **Local Range** – Vermont, 12 localities, probably throughout excepting the high mountains. New Hampshire, 10 localities, from Pittsburg in the north to Hinsdale in the south, in Jefferson and Franconia, at the edge of the White Mountains, but absent from the high peaks. **Habitat** – In thin forests, forest edges and nearby fields, areas around beaver colonies, apple orchards. **Life Cycle** – Mating in May; tenerals April-May, also July- September. **Behavior** – Nocturnal. It sometimes shelters by day in beaver houses, in one case 16 individuals in a single beaver house. It sometimes climbs on plants. **Dynamics** – Fully-winged, an occasional flier.

Genus *Anisodactylus*

310. *Anisodactylus (Anisodactylus) agricola* (Say, 1823)

General Range – An east-central species. Upper Austral Zone. East to ME, NJ, MD, VA, NC, south to GA, AL, AR, west to MO, IA, north to WI, MI, OH, NY. **Local Range** – Vermont, no records. New Hampshire, one locality, Milton in the southeast. **Habitat** – Wet, shaded ground in bottomland forest. **Life Cycle** – Mostly March-April. **Behavior** – Nocturnal. **Dynamics** – Wings vestigial, flightless.

311. *Anisodactylus (Anisodactylus) carbonarius* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to VT, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, MS, west to AR, KS, NE, SD, north to IA, MI, ON along the shores of Lakes Ontario and Erie, also an isolated record from Lake Abitibi, QC along the Saint Lawrence to Quebec City, along the Ottawa River from Hull to the Montreal area, from Saint-Jean-sur-Richelieu. **Local Range** – Vermont, one locality, Dorset. New Hampshire, four localities, Rumney is the most northern, others are in the southeast, Hampton, Exeter, and Pelham. **Habitat** – Open areas such as grasslands, croplands, pastures, on sandy soil, commonly caught on shores. **Life Cycle** – Tenerals June-August. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier.

312. *Anisodactylus (Anisodactylus) harrisii* LeConte, 1863

General Range – A nearly transcontinental species. Lower Canadian, Transition, and Upper Austral Zones. East to NS, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, MS, MO, west to CO, MT, ID, OR (eastern), WA (eastern), BC (Okanagan Valley), north to AB (near to Red Deer), SK (Prince Albert), MB (Victoria Beach), ON (near Parry Sound), QC (Lake Abitibi, Quebec City, Montmagny). **Local Range** – Vermont, 51 locations, nearly statewide, but not recorded from the vicinity of Lake Memphremagog, nor from Essex County. New Hampshire, 32 localities, statewide from Pittsburg to Hinsdale and Seabrook. One has been caught on Mount Washington, probably a stray flier, otherwise not known from the White Mountains. **Habitat** – By far the most abundant *Anisodactylus* in VT. Most specimens have been found by shores of lowland lakes, ponds, rivers, and brooks, but I have caught it in gardens, and in hill pastures up

to 400 m. **Life Cycle** – Mating April-May; tenerals April-May, a few in July-November. **Behavior** – Usually nocturnal. Feeds on both seeds and caterpillars. It climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

313. *Anisodactylus (Anisodactylus) kirbyi* Lindroth, 1953

General Range – A species with eastern and western populations. Lower Canadian, Transition, Upper and Austral Zones. East to QC at Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NJ, south to PA, OH, IN, IL, MN, west to SD, MB (Portage la Prairie), north to ON (Ottawa), QC (Mont Tremblant, Lac Saint Jean). **Local Range** – Vermont, 44 localities. New Hampshire, 24 localities, statewide, from Pittsburg south to Winchester and Seabrook. In the White Mountains, recorded only from Gorham. **Habitat** – Wet muddy shores of rivers and lakes. Compared to *A. nigrita*, less prone to be found by small ponds and brooks, and more likely to be in the shaded areas. Most records are below 100 m elevation. One from Mount Mansfield must be a stray flier. **Life Cycle** – Mating May-June; tenerals July-October, a few in May-June. **Behavior** – Largely nocturnal. It has been seen to escape by diving into water. Occasionally clings to plants. **Dynamics** – Fully-winged, a frequent flier. It may be seen flying in sunshine, it comes to lights at night.

314. *Anisodactylus (Anisodactylus) nigerrimus* (Dejean, 1831)

General Range – An east-central species. Transition, Upper Austral Zones. East to NF (not established, probably a stray flier), NS, NB, ME, MA, CT, NY at Long and Staten Islands, DC, VA, NC, SC, south to GA, AL, AR, west to MO, ND, north to ON (Malachi on the MB border, Sioux Lookout, Ottawa), QC (Maniwaki, Grandes Bergeronnes on the north shore, Bellechasse County on the south shore). **Local Range** – Vermont, 22 localities, widespread, but not recorded in the Connecticut Valley north of Norwich. New Hampshire, 25 localities, statewide from Pittsburg south to Hinsdale and Pelham, one probable stray flier from Mount Washington. **Habitat** – Dry, open, sandy areas; captured in gravel pits, eroded glacial outwash, coastal sand areas and dunes, including an area of dunes north of Westford, VT. **Life Cycle** – Tenerals July-October, a few in spring. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged. It has been seen in flight by daylight, also at sunset.

315. *Anisodactylus (Anisodactylus) nigrita* Dejean, 1829

General Range – A nearly transcontinental species. Lower Canadian, Transition Zones. East to PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DC, south to VA, WV, OH, IN, IL, west to NE, SD, MT, BC (Okanagon Valley, Cranbrook, Vernon), north to AB (Lethbridge), SK (Prince Albert), MB (Victoria Beach), ON (north shore of Lake Superior), QC (Abitibi, Port au Saumon, on the south shore to Kamouraska). **Local Range** – Vermont, 27 localities, probably statewide, north to Coventry and Warren's Gore. New Hampshire, 26 localities, statewide, from Pittsburg south to Hinsdale and Pelham. Recorded from Pinkham Notch, otherwise unknown from the White Mountains. **Habitat** – Wet, muddy borders of ponds, lakes, slow rivers, and brooks, often by beaver ponds, occasional in beaver houses. Common by Lake Champlain. Often in matted sedges which have been depressed by storm surges. Taken at 400 m elevation in Stowe. **Life Cycle** – Mating in April-May; tenerals July-October, a few earlier. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged, a frequent flier.

316. *Anisodactylus (Anisodactylus) pseudagricola* Noonan, 1996

General Range – Canada: ON. USA: CT, MA, MI, MO, NH, NY, OH, PA (Bousquet 2012*a*). **Local Range** – Vermont, no records. New Hampshire, one locality, Lee. **Habitat** – *Sphagnum* bogs. **Life Cycle** – Active in April-June, September (Larochelle and Larivière 2003). **Behavior** – Unknown. **Dynamics** – Unknown.

317. *Anisodactylus (Gynandrotarsus) merula* (Germar, 1824)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME, MA, CT, NJ, DC, VA, NC, SC, GA, south to FL (the Keys), LA, TX (Panhandle), AZ, west to CO, NE, SD, ND, north to MB (near Brandon), WI, MI (Lower Peninsula), ON (Spencerville, Bell's Corners, Belleville), QC (Nominique, Trois Rivières). **Local Range** – Vermont, nine localities, five of them from Chittenden County, one from Sterling Pond, and three from the northeast (Brighton, Lyndon, Victory). This species should be expected in sandy areas farther south. New Hampshire, five localities, in the extreme south, Hinsdale, Litchfield, Pelham, and Seabrook, in the north, Whitefield. **Habitat** – Similar to *A. rusticus*, but perhaps more limited to dry sand. **Life Cycle** – Tenerals July-October (rarely April-June). **Behavior** – Largely

nocturnal. It has been seen feeding on plant material and weevils, and preying on the eggs of the weevil *Naupactus peregrinus* on a small twig. Occasionally climbs on plants, a fast runner. **Dynamics** – Fully-winged, a frequent flier.

318. *Anisodactylus (Gynandrotarsus) rusticus* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, west to AZ, CO, WY (Yellowstone National Park), SD, north to MB (Winnipeg), MN (Lake Superior), WI, MI, ON (Grand Bend, Ottawa), QC (Mont Tremblant, down the Saint Lawrence to Grandes Bergeronnes). **Local Range** – Vermont, 30 localities, nearly throughout the state, but not recorded from the Boreal Plateau. New Hampshire, 17 localities, widespread south of the White Mountains, Lisbon, Whitefield, Jefferson at the foot of the mountains, on Mount Washington (possibly an intercept), and in Errol in the Boreal Plateau. **Habitat** – A xerophilous species on sandy or stony soil, or on dune sand. Frequent in gravel pits and gardens with sandy soil. In high but not very dense weeds in orchards and open forests. **Life Cycle** – Tenerals July-October, a few April-June. **Behavior** – Largely nocturnal. Feeds on mushrooms, other plant material, also caterpillars and other arthropods. Occasionally climbs on plants. A slower runner than *A.merula*. **Dynamics** – Fully-winged, a frequent flier.

319. *Anisodactylus (Anadaptus) discoideus* Dejean, 1831

General Range – An east-central species. Transition, Upper Austral Zones. East to NB, ME, MA, CT, NY at Staten Island, NJ, DC, VA, NC, south to SC, KY, MO, west to NE, SD, ND, north to SK, MB (Winnipeg), MN, WI, MI, ON (Bayfield, Ottawa), QC (along the larger rivers, on the Saint Lawrence to Portneuf, north of that river to Mont Tremblant. **Local Range** – Vermont, 29 localities, probably statewide, on the Connecticut River at Lemington. New Hampshire, 21 localities, south to Hinsdale, Pelham, and Hampton, north to Lancaster. **Habitat** – Common on sand or sandy mud. Along rivers and large brooks, occasional on lake shores. In cultivated fields in bottomlands. **Life Cycle** – Mating in early June; tenerals August-September. **Behavior** – Largely nocturnal. Burrows during the day, or hides in cracks in the mud resulting from the mud contracting during drying. Feeds on plant matter, also insects. **Dynamics** – Fully-winged, a frequent flier.

320. *Anisodactylus (Anadaptus) sanctaecrucis* (Fabricius, 1798)

General Range – An east-central species, extending some distance west of the Rockies. Transition, Upper and Lower Austral Zones. East to PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, LA, west to AR, KS, CO, UT, ID, WA, BC (Kamloops), north to AB (Cypress Hills), SK (Regina), MB, ON (Nipigon, Cochrane), QC (Maniwaki, Portneuf). **Local Range** – Vermont, 49 localities, north to Maidstone on the Connecticut River, probably throughout the state. New Hampshire, 31 localities, all over the state, from Hinsdale and Seabrook to Pittsburg. An intercept from Mount Washington. **Habitat** – Common on sand or sandy mud. Along rivers and brooks in company of *A. discoideus*. The smaller size of this species partly explains the coexistence of the two species. *A. sanctaecrucis* is very common on the shores of Lake Champlain, while *A. discoideus* is only occasional there. **Life Cycle** – Mating in May; tenerals July-October, rarely May-June. **Behavior** – Largely nocturnal. Feeds on plant parts, caterpillars, and other arthropods. Occasionally climbs on plants. Sometimes uses flight to escape. **Dynamics** – Fully-winged, a frequent flier.

321. *Anisodactylus (Spongopus) verticalis* (LeConte, 1847)

General Range – An east-central species. Transition , Upper Austral Zones. East to ME (Paris), MA, CT, NY at Long and Staten Islands, MD, VA, NC, SC, south to GA, AR, OK, west to KS, SD, north to SK, MB (Winnipeg), MN, WI, MI, ON (Point Pelee, Toronto, Belleville), QC (Rigaud, Montreal area, down the Saint Lawrence to Portneuf, Sainte Hyacinthe on the Yamaska River). **Local Range** – Vermont, 13 localities, in the west from Alburgh in the north to Arlington in the south, in the east reported from West Windsor and Athens, in the Winooski Valley up to Barre City. New Hampshire, 16 localities, in the Connecticut Valley north to Colebrook, in the Merrimack Valley north to Plymouth, east of that valley north to Conway, also one probable intercept from Mount Washington. **Habitat** – Flood plain forests and other humid forests near streams. **Life Cycle** – Mating in June; tenerals July- September, rarely May or June. **Behavior** – Nocturnal. There are no observations in the field of feeding. The mandibles resemble those of more predatory tribes, making it probable that this species does more active predation than other Harpalini. **Dynamics** – Fully-winged, an occasional flier.

Genus *Geopinus*

322. *Geopinus incrassatus* (Dejean, 1829)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East To ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, MS, LA, TX, NM, AZ, west to NV, ID, AB, north to SK (Saskatoon), MB (Victoria Beach), ON (Michipicoten River, Ottawa), QC (Berthierville on the Saint Lawrence River, Saint Cesaire on the Yamaska River). **Local Range** –Vermont, four localities, all on the Winooski River in Colchester, Burlington, and Winooski. New Hampshire, one locality, Plymouth. **Habitat** – Sand or very sandy soil, especially in the higher, drier parts of sand banks along rivers. It is a specialized burrower, and is usually deeply buried by day. At night it often emerges on the surface, where it may be caught in pitfall traps. *Omophron tessellatum* and *Bembidion postremum* may inhabit the same sand banks. **Life Cycle** – Tenerals June and September. **Behavior** – Nocturnal. It has been seen feeding on both seedlings and cutworm. **Dynamics** – Fully-winged, a frequent flier. It comes to lights in numbers.

Genus *Amphasia*

323. *Amphasia (Pseudamphasia) sericea* (Harris, 1828)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to QC at Îles-de-la-Madeleine, ME (Brunswick), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, west to OK, KS, NE, MN, north to WI, MI, ON (Grand Bend, Barrie), QC (Ville Marie, Port-au-Saumon, Lotbinière County). **Local Range** – Vermont, nine localities, South Burlington, Hinesburg, and Richmond in Chittenden County, Waterbury in Washington County, Stowe and Elmore in Lamoille County, Manchester (two localities, including Mount Equinox) and Dorset in Bennington County. There are no records from the Boreal Plateau. New Hampshire, 11 localities, eight of them from the southeast, Concord and Brookline in the Merrimack Valley, the most northern locality is Ellsworth. **Habitat** – Open, unshaded areas, such as pastures, with thin to dense cover of grasses and forbs. **Life Cycle** – Tenerals April. **Behavior** – Both diurnal and nocturnal. It has been seen feeding on grass seeds (*Poa* and *Agrostis*), also caterpillars and other arthropods. Frequently climbs on plants, especially grasses. One was caught by pyrethrin spray in a red maple tree (*Acer rubrum*; Krinsky and Godwin 1990). **Dynamics** – Fully-winged, a frequent flier.

324. *Amphasia (Amphasia) interstitialis* (Say, 1823)

General Range – An east-central species. Transition, Upper Austral Zones. East to ME (Waterville), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, south to SC, TN, AR, west to KS, NE, SD, north to MN, WI, MI, ON (Grand Bend, Ottawa), QC (Hull, Montreal area, Saint Lawrence Valley to Portneuf County, Brome). **Local Range** – Vermont, 39 localities, widespread in the west all the way from Highgate to Pownal, in the east, north to Weathersville in the Connecticut Valley. New Hampshire, 10 localities, mostly along the southern border or near the sea coast, north in the Connecticut Valley to Cornish. **Habitat** – A forest insect, especially in bottomland forests. Also in towns, especially in old established neighborhoods with shrubs and bushes. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. A good climber. It, like *A. sericea,* was caught by pyrethrin spray in a red maple tree (Krinsky and Godwin 1990). **Dynamics** – Fully-winged, a frequent flier . The hind wings of this species are entirely black, this is the only carabid known to me to have the wing membrane pigmented.

SUBTRIBE STENOLOPHINA

Closer to Harpalina, but mostly smaller, only some *Stenolophus* up to 9 mm long. Male front and middle tarsi show the seriate scales in reduced form. Represented locally by six genera.

325. *Stenolophus (Stenolophus) carbo* Bousquet, 1993

General Range – An east-central species. Upper and Lower Austral Zones. East to NS, NH, MA, CT, NY at Long and Staten Islands, NJ, MD, NC, SC, GA, south to FL, AL, AR, TX, west to OK, SD, north to MI, ON (Point Pelee, Long Point), NY. **Local Range** – Vermont, no records. New Hampshire, four localities, Hampton on the coast, Pelham and Salem on the southeastern border, and Hopkinton in the lower Merrimack Valley. **Habitat** – Reported from a lake shore, a cattail (*Typha*) swamp, and a hillside spring. **Life Cycle** – Active in March-October (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Occasionally climbs trees. **Dynamics** – Fully-winged, an occasional flier.

326. *Stenolophus (Stenolophus) fuliginosis* Dejean, 1829

General Range – A transcontinental species. Upper and Lower Canadian, Transition, Upper Austral Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, south to SC (Oconee County in the mountains), AL, AR, NE, WY, ID, OR, west to WA, Vancouver Island, north to BC, AB (Edmonton), SK, MB, ON (Nipigon), QC (Abitibi, Port Cartier, Gaspésie). **Local Range** – Vermont, 39 localities, in all parts of the state, including Alburgh and Norton on the northern border and Marlboro in the south. New Hampshire, 22 localities, statewide from Pittsburg to Winchester, Nashua, and Hampton. **Habitat** – Wet mud by lakes, slow parts of rivers, flood plains, ditches, pools in sand and gravel pits. It has been found in a beaver house. Often found with *S. ochropezus*. It has been found up to 900 m in the mountains, also at 30 m by Lake Champlain. **Life Cycle** – Tenerals mid-June to mid-August, rarely May, November. Mating in May. **Behavior** – Mostly nocturnal, but active by day in the spring. It takes wing in the day in springtime, at sunset in the summer. Occasionally climbs on trees and other plants. It becomes gregarious in winter. **Dynamics** – Fully-winged, an occasional flier.

327. *Stenolophus (Stenolophus) fuscatus* Dejean, 1829

General Range – An east-central species. Transition and Upper Austral Zones. East to ME (Steuben), MA, CT, NJ, south to MD, PA, OH, IN, west to IL, SD, north to ON (Long Point, Turkey Point, Belleville), QC (Rigaud, Montreal, Knowlton, Saint Emile, Levis). **Local Range** – Vermont, seven localities, Montgomery, Westmore, W. Elmore, Mount Mansfield, Richmond, Shelburne Bay, Brattleboro, probably throughout the state. New Hampshire, eight localities, Pittsburg in the far north, Mount Washington, Haverhill, Rye, and in the south, Hinsdale, Rindge, Hollis, Wilton, and Pelham, probably throughout the state. **Habitat** – Usually near water, such as lakes, ponds, slow streams, temporary pools, sandpits not thick with vegetation. Possibly favored by partial shade. Reaches the highest mountains in both states. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. It has been seen taking flight at dusk. **Dynamics** – Fully-winged, an occasional flier.

328. *Stenolophus (Stenolophus) humidus* Hamilton, 1893

General Range – A largely eastern species. Transition, Upper and Lower Austral Zones. East to NS, ME (Monmouth) , MA, CT, NJ, MD, VA, NC, SC, south to GA, west to AL, WV, OH, north to ON (Delhi), QC (Rigaud, Frelichsburg). **Local Range** – Vermont, 13 localities, mostly in the mountains, northeast to Brighton and Guildhall, south to Manchester (Mount Equinox) and Putney, four records from Mount Mansfield and one from Camel's Hump. New Hampshire, four localities, north to Rumney, also Litchfield, Hampton, Seabrook. **Habitat** – Muddy borders of small pools and marshes. **Life Cycle** – Active in April-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged, but flight has not been witnessed.

329. *Stenolophus (Stenolophus) megacephalus* Lindroth, 1968

General Range – An east-central species. Transition Zone. East to MA (Boston area), CT (Mansfield), NY at Long Island, west to ON (Point Pelee, Gravenhurst area), north to QC (Fort Coulonge, Gatineau Park). **Local Range** – Vermont, no records. New Hampshire, three localities, in the extreme southeast, Durham, Southampton, Pelham. **Habitat** – Borders of *Sphagnum* bogs, also moss carpets in fens, and margins of lakes and swamps. **Life Cycle** – Active in April-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier. It has been taken at artificial lights.

330. *Stenolophus (Stenolophus) ochropezus* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NJ, DE, NC, SC, GA, south to FL, AL, MS, LA, TX, west to AZ, UT, NE, SD, north to MB (Darlingford, south of Portage-la-Prairie), ON (Sudbury), QC, (Hull, Montreal area, along the Saint Lawrence to Quebec City area). **Local Range** – Vermont, 45 localities, Alburgh and Morgan in the north to Pownal in the south. New Hampshire, 21 localities, statewide, Pittsburg in the far north, Jefferson, Whitefield, Pinkham's Grant in the lower parts of the White Mountains (but there are no records from the high peaks), south to Hinsdale, Brookline, and Seabrook. **Habitat** – Borders of marshes, lakes, slow streams, river margins, swamps, ponds, wet areas in gravel pits, ditches. It has been found in a beaver house. Unlike *S. fuliginosis*, it does not occur on Mount Mansfield, the highest record in VT is about 400 m. **Life Cycle** – Tenerals mid-July to September, rarely

earlier. **Behavior** – Nocturnal. Rarely climbs on trees and other plants up to 2 m. It has been taken in beaver houses. **Dynamics** – Fully-winged, a frequent flier, in fact an incredibly abundant one. Its abundance at light traps suggests that much of the population travels among small patches of habitat which vary location according to rainfall patterns.

331. *Stenolophus (Stenolophus) plebejus* Dejean, 1829

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, SC, GA, south to FL, AL, LA, west to TX, AR, MO, IL, north to MI, ON (near Simcoe), QC (southwest). **Local Range** – Vermont, one locality, Huntington near Owl's Head Mountain, the single specimen is probably a stray migrant. New Hampshire, five localities, in the southern half of the state north to Rumney, in the southeast at Farmington, Exeter, and Seabrook (two localities). **Habitat** – Among dense vegetation (cattails, sedges, rushes) on margins of ponds, lakes, slow streams, marshes, swamps, beaver ponds. It has been found in a beaver house. **Life Cycle** – Tenerals July, less frequent in September. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier.

332. *Stenolophus (Agonoderus) comma* (Fabricius, 1775)

General Range – A transcontinental species. Canadian, Transition, Upper and Lower Austral Zones. East to NF, QC at Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, LA, TX, NM, west to AZ, UT, OR, WA, Vancouver Island, BC, north to AB (Edmonton), SK, MB (Victoria Beach), ON (Nipigon, Ogoki), QC (Fort Rupert, Grandes Bergeronnes, Gaspésie). **Local Range** – Vermont, 60 localities, throughout the state at all elevations. New Hampshire, 34 localities, throughout the state at all elevations, from the seashore to the top of Mount Washington. **Habitat** – It is abundant beneath driftwood along lakes and rivers, also in cultivated ground, such as gardens and farm fields. Judging by the numbers that come to light traps, an important fraction of the population must move frequently in response to changing soil moisture conditions, and changing availability of seeds and invertebrate prey. It is a minor agricultural pest, occasionally attacking grain when the soil is wet. I have collected it on the summit of Mount Mansfield, and Darlington (1931) found it abundant above the tree line on Mount Washington. Whether the mountaintop populations are successfully breeding there or are just stray fliers is not known. Bain

(1998) reported its presence in the material of a seventeenth century outhouse in Boston, establishing that this species was on the east coast long before the eastern forests were cleared. **Life Cycle** – Eggs laid singly in cells in the soil, late April-late July (SD); tenerals mid-June-October (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal, except in the spring. It usually shelters by day in a burrow. It feeds mostly on insects (especially larvae) and seeds, sometimes attacks sprouting grain. It sometimes climbs in trees and is an abundant flier. **Dynamics** – Fully-winged. Abundant at light traps.

333. *Stenolophus (Agonoderus) lecontei (*Chaudoir, 1868)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Waterville), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, MS, LA, west to TX, OK, KS, IA, MN, north to WI, MI, ON (only near Lake Erie), NY (Saint Lawrence County), QC (Laniel near Lake Témiscamingue). **Local Range** – Vermont, 10 localities, north to Newark, E. Georgia, Johnson, south to Manchester and Putney. New Hampshire, three localities, Presidential range, Haverhill, Brookline. **Habitat** – Collected along rivers, on sand deposits, often together with *S.comma*, which heavily outnumbers it. Such is the case with specimens taken at E. Georgia and Johnson along the Lamoille River. These specimens and one from Newark mark the northern limit in Vermont. The other localities are largely from light traps. The general range suggests that this species needs more warmth than *S. comma.* **Life Cycle** – Active in January, March-October; tenerals July-August (Larochelle and Larivière 2003). **Behavior** – Preys on insect larvae and also feeds on seeds. **Dynamics** – Fully-winged and presumably a frequent flier. The super abundance of the similar *S. comma* probably makes *S. lecontei* seem rarer than it actually is.

334. *Stenolophus (Agonoderus) lineola* (Fabricius, 1775)

General Range – A nearly transcontinental species. Transition and Austral Zones. East to ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, MS, LA, TX, NM, AZ, west to UT, ID, AB (Medicine Hat), north to SK, (Kandahar, on the Quill Lakes), MB (Winnipegosis), MN, WI, MI, ON (Point Pelee, Long Point, Simcoe, Port Colburne, Belleville), QC (Berthierville). **Local Range** –Vermont, six locations, Manchester in the south, others in Chittenden County (Burlington, Shelburne, Colchester, Hinesburg, Westford). Vermont

records are confined to the valleys on the west side of the state. New Hampshire, four localities, Whitefield in the north, and Durham, Seabrook, and Brookline in the far south. **Habitat** – It favors areas of sand, both along and away from shores, including areas of loose sand and also cultivated ground such as gardens and row crops. **Life Cycle** – Active in March-October (Larochelle and Larivière 2003). **Behavior** – Nocturnal. It has been seen feeding on seeds, also on caterpillars. **Dynamics** – Fully-winged, a frequent flier.

Genus *Agonoleptus*

335. *Agonoleptus conjunctus* (Say, 1823)

General Range – A transcontinental species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to QC at Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, NM, AZ, west to CA, OR, WA, Vancouver Island, BC (Williams Lake), north to AB, SK, MB, ON (Nipigon), QC (Abitibi, Forestville on the north shore of the Saint Lawrence, 100 km beyond Tadoussac, Gaspésie on Mont Albert). **Local Range** – Vermont, many localities thoughout the state. New Hampshire, several localities, including Lisbon, Lebanon, Northwood, Crawford. **Habitat** – In contrast to most of the New England small Harpalines, *S. conjunctus* is usually encountered in dry habitats, including cultivated fields, gardens, roadsides, sand and gravel pits, lawns, dry upper parts of stream banks, rock ledges, grassy areas on cliff tops, and areas above tree line. **Life Cycle** – Mating in May; tenerals August-September. **Behavior** – Usually nocturnal, except in the spring. In spring, it shelters under stones, where it is warmed on sunny days. It sometimes climbs on trees, and has been collected by spraying pyrethrin in the crown of a maple (Krinsky and Godwin 1990). **Dynamics** – Wings dimorphic. The fully-winged form has been taken at a light trap.

336. *Agonoleptus rotundicollis* (Haldeman, 1843)

General Range – An eastern, largely Appalachian species. Transition Zone. East to MA, CT, NJ, MD (mountains), NC, south to SC in the mountains, west to WV, OH, north to ON (north shore of Lake Erie at Point Pelee and Long Point), NY (Westfield on Lake Erie, Keene Valley in the Adirondacks), QC (southwest at La Trappe, Deux Montagnes, and Harrington). **Local Range** – Vermont, four localities, Lewis Creek in Ferrisburgh, E. Dorset, Starksboro, S. Burlington. New Hampshire, no

records. **Habitat** – Seemingly more a forest species than *S. conjunctus*, although it has also been caught under heaps of dead grass and weeds in a garden. **Life Cycle** – Active in March-June, August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. It climbs in trees, and has been caught by spraying pyrethrin in a maple crown (Krinsky and Godwin 1990). **Dynamics** – Fully-winged.

337. *Agonoleptus thoracicus* (Casey, 1914)

General Range – East-central VT to southeastern ND, south to northeastern KS, TN, and northeastern VA (Bousquet 2012*a*). **Local Range –** Vermont, several localities, including Shelburne Pond in Shelburne, Winooski River in Richmond, Plymouth, Dorset, Windsor, Salisbury, Bolton Notch in W. Bolton, ledges above Jonesville. One record in Topsham (Bousquet and Messer 2010). New Hampshire, no records. **Habitat –** Unknown. **Life Cycle –** Unknown. **Behavior –** Unknown. **Dynamics –** Vestigial-winged, probably flightless.

Genus *Bradycellus*

338. *Bradycellus (Catharellus) lecontei* Csiki, 1932

General Range – A northern, transcontinental species. Canadian, Transition Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, south to MA, NY (Adirondacks, Rochester), ON, MI, IL, WI, MN, SD, CO, MT, OR, west to WA, BC (Keremeos, Fraser Lake), AK (Fairbanks, Circle), north to YT (Dawson), NT (Fort Smith), QC (Mistassini Post, Duparquet), LB in the extreme south. **Local Range** – Vermont, 12 localities, in the south at elevated localities, from Shelburne north it can also be found at lake level (30 m). New Hampshire, eight localities, six in Pittsburg, also Mount Washington, and by the ocean at Durham. **Habitat** – Margins of rivers, lakes, ponds, among depressed or emergent grasses and sedges. **Life Cycle** – Tenerals late July-late September. **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged. A frequent flier at sunset, also at lights at night.

339. *Bradycellus (Stenocellus) congener* (LeConte, 1847)

General Range – A transcontinental series, widespread in the west, with extension eastward along the Great Lakes. Transition, Upper Austral Zones. East to MA, NY (West Point), south to OH, MO, WI, MN, KS,

NM, AZ, west to CA, OR, WA, BC, Vancouver Island, north to AB (Edmonton), SK (Saskatoon), MB (Victoria Beach), ON (Ottawa, Southhampton), QC (Abitibi, Grandes Bergeronnes). **Local Range** – Vermont, 11 localities, northeast to Lemington, south to Putney. New Hampshire, one locality, Pittsburg. **Habitat** – Borders of lakes, ponds, pools, if these are open. **Life Cycle** – Tenerals July-August. **Behavior** – Nocturnal. It has been seen attacking a coccinellid. **Dynamics** – Fully-winged, a frequent flier; it takes wing at sunset.

340. *Bradycellus (Stenocellus) insulsus* (Casey, 1914)

General Range – A northeastern species. Transition, Upper Austral Zones. East to NH, south to NJ (Cape May), west to MI, north to ON (Long Point). **Local Range** – Vermont, one locality, Rutland Town. New Hampshire, one locality, Rye (Odiorne Point). **Habitat** – Beaches on the ocean and the Great lakes. **Life Cycle** – Active in February, June-July (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier.

341. *Bradycellus (Stenocellus) neglectus* (LeConte, 1847)

General Range – A nearly transcontinental species. Upper and Lower Canadian, Transition Zones. East to NF, QC to Anticosti, Cape Breton Island, NS, PE, NB, ME, MA, CT, NY, NC, south to GA, AR, west to WI, UT, BC, north to AB (Edmonton), MB (Gillam), ON (Nipigon), QC (Fort Rupert, Port Cartier). **Local Range** – Vermont, 10 localities, mostly on the main ridge of the Green Mountains, south to South Lincoln. Also in the Worcester Range at W. Elmore, in the Boreal Plateau at Brighton, Norton. New Hampshire, eight localities, six of them at Pittsburg, also one each on Mount Washington and in Durham near the coast. **Habitat** – In VT on dry ledges and cliffs. In NH, also near the coast. It has been observed in a beaver house. **Life Cycle** – Tenerals late June to late September. **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

342. *Bradycellus (Stenocellus) nigriceps* LeConte, 1869

General Range – An east-central species. Transition, Upper Austral Zones. East to NB, ME, RI, CT, NJ, VA, south to SC, MS, AR, west to IA, MN, north to MB (Winnepeg), ON (Kincardine, Ottawa), QC (Mont Tremblant, Val Racine, Quebec City). **Local Range** – Vermont, 18 localities, mostly in Champlain lowlands, from Alburgh south, also from

Hyde Park, Elmore, Stowe. New Hampshire, five localities, on the Connecticut River at Colebrook and Charlestown, on the Merrimack at Nashua and Litchfield, and on the coast in Rye (Odiorne Point). **Habitat** – Grassy borders of slow rivers or brooks. In saline meadows and on the coast. **Life Cycle** – Active in February-December (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, but active by day in the spring. It usually shelters by day under plants. It occasionally climbs on plants, including trees. *B. nigriceps* and *B. neglectus* aggregate together in the winter. **Dynamics** – Fully-winged, a frequent flier. Flies by day in the spring. Later in the spring it takes wing at sunset.

343. *Bradycellus (Stenocellus) rupestris* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, MS, LA, west to OK, KS, IA, SD, north to MN, WI, ON, QC (Abitibi, Grandes Bergeronnes). **Local Range** – Vermont, 25 localities, statewide. New Hampshire, 26 localities, in all parts of the state, from Pittsburg to Hinsdale and Hampton Falls. **Habitat** – Xerophilic, in dry, open locations at all elevations up to the summit of Mount Washington. Dry, bare soil of gardens, lawns, roadsides, croplands, pastures, ledges, quarries, gravel pits. I caught it in numbers while weeding out crabgrass (*Digitaria*). **Life Cycle** – Tenerals June-September, rarely April-May. **Behavior** – Mostly nocturnal, but active in daytime, especially in spring. Occasional climber on plants, including trees. It has been seen preying on small worms. **Dynamics** – Fully-winged, a frequent flier. Common at light traps.

344. *Bradycellus (Stenocellus) tantillus* (Dejean, 1829)

General Range – Eastern North America. Southern Ontario west to South Dakota and Iowa, south to Texas, and east to Florida (Dearborn et al. 2014). **Local Range** – Vermont, one locality, Shelburne Pond in Shelburne. New Hampshire, no records. **Habitat** – Edges of marshes, ponds, lakes, slow streams; on wet, open ground covered by dense vegetation (Larochelle and Larivière 2003). **Life Cycle** – Adults active all year; tenerals appear July-August (Dearborn et al. 2014). **Behavior** – Mostly nocturnal. Occasionally climbs on trees (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, a frequent flier. Occasionally found in drift (Larochelle and Larivière 2003).

345. *Bradycellus (Lipalocellus) nigrinus* (Dejean, 1829)

General Range – A transcontinental species. Upper and Lower Canadian, Transition Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT (south Litchfield), NY (south to West Point), PA, VA (in the mountains), south to WV, OH, IN, IL, MN, MB, SK (Cypress Hills), NM, UT, CA, west to OR, WA, BC, Vancouver Island, Queen Charlotte Islands, AK (Anchorage, Kodiak Island), north to AB (Edmonton), ON (Long Lac, Nipigon), QC (Fort Rupert, Havre Saint Pierre). **Local Range** – Vermont, 42 localities, throughout the state, from Lake Champlain to the highest mountains. New Hampshire, 28 localities, throughout, including the coast, Connecticut Valley, Mount Washington, and Pittsburg. **Habitat** – Marshy borders of streams and ponds with emergent grasses and sedges. Especially abundant at beaver ponds in the mountains. From lake level (30 m) to 1300 m on Mount Mansfield. It occurs on the borders of *Sphagnum* bogs, also under dead plants such as false hellebore (*Veratrum viride*), at small moist spots in the mountains. **Life Cycle** – Tenerals mostly July, August, also April, October. **Behavior** – Mostly nocturnal, it makes diurnal dispersal flights in spring. Occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

346. *Bradycellus (Lipalocellus) semipubescens* Lindroth, 1968

General Range – An east-central species. Upper and Lower Canadian, Transition Zones. East to NS, NB, ME, MA (Lowell, Sherborn), CT, south to NY (Mount Whiteface), MI, west to AB (McMurray), north to ON (Kincardine), QC (Fort Rupert, Chute-aux-Outardes). **Local Range** – Vermont, eight localities, Highgate, Swanton, Fairfax, Georgia, Hardwick, Richmond, Mount Mansfield, Manchester. New Hampshire, six localities, Pittsburg, Errol, Mount Washington, Haverhill, Litchfield, Pelham, probably throughout the state, except possibly the coastal area. **Habitat** – Wooded swamps and bottomland forests, also under alders and willows in marshes. From Lake Champlain to 1300 m on Mount Mansfield. Appearing to require more shade than *B. nigrinus*. **Life Cycle** – Tenerals late July. **Behavior** – Usually nocturnal, except in spring. **Dynamics** – Fully-winged, a frequent flier.

347. *Bradycellus (Triliarthrus) atrimedius* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, Upper Austral Zones. East to NB, ME, MA, NJ, VA, south to NC, TN,

MO, west to TX, SD, MB (Winnipeg), north to ON (Toronto), QC (Montreal and Quebec City). **Local Range** – Vermont, 11 localities, along Lake Champlain from Highgate to Ferrisburgh, also Richmond and Huntington, and one southern record in Rutland. New Hampshire, 15 localities, north to Colebrook on the Connecticut River, and Hill on the Pemigewasset River. There are no records from the coastal counties. **Habitat** – Sand or muddy sand on shores of rivers, ponds, oxbows. On Lake Champlain only at the mouths of rivers. Does not occur above 300 m. **Life Cycle** – Tenerals mid-August. **Behavior** – Nocturnal, except in spring. **Dynamics** – Fully-winged, a frequent flier.

348. *Bradycellus (Triliarthrus) badipennis* (Haldeman, 1843)

General Range – An east-central species. Transition, Upper Austral Zones. East to ME (Mount Vernon, Isle-au-Haut), CT (New Haven), NY at Long and Staten Islands, NJ, MD, VA, SC, south to GA (in the mountains), TN, MO, KS, west to IL, WI, north to MI, ON (Belleville, Ottawa), QC (Montreal, Quebec City). **Local Range** – Vermont, 12 localities, mostly in the Champlain Valley, in the south from Putney and Rutland, also up to 400 m at W. Elmore. New Hampshire, five localities, Hinsdale, Chesterfield, Exeter, and Hampton all in the far south, plus an isolated record from Mount Washington, probably a stray migrant. **Habitat** – Bottomland forests, clumps of alders and willows, also in oak forests on sand, and on rock ledges. No records above 500 m except for Mount Washington. **Life Cycle** – Tenerals August-November. **Behavior** – Mostly nocturnal. Recorded from pyrethrin sprayings in hickory, oak and maple trees (Krinsky and Godwin 1990). **Dynamics** – Fully-winged, a frequent flier. It flies by day in the spring, thereafter it takes wing at sunset.

349. *Bradycellus (Triliarthrus) kirbyi* (Horn, 1883)

General Range – An east-central species. Transition Zone. East to ME (Winslow), MA, CT, NY at Long Island, NJ, south to VA, west to OH, WI, north to MI, ON (Washtego at northern outlet to Lake Simcoe), QC (Lake Taylor in the Gatineau, Montreal, Sherbrooke). **Local Range** – Vermont, 10 localities, in the south Putney and Brookline, in the north Weybridge, Duxbury, Richmond, Bolton Notch, E. Georgia, Morristown, and W. Elmore. New Hampshire, 11 localities, north to Colebrook, south to Hinsdale, Litchfield, Hampton, probably statewide, except for the White Mountains and the far north. **Habitat** – Sedge areas bordering rivers or brooks, borders of beaver ponds. **Life Cycle** – Tenerals September-

October. **Behavior** – Usually nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged, an occasional flier.

350. *Bradycellus (Triliarthrus) lugubris* (LeConte, 1847)

General Range – An east-central species. Upper and Lower Canadian, Transition, and Upper Austral Zones. East to NF, QC at Anticosti, PE, NS, NB, ME, MA, CT (Cornwall, Mansfield), NY, PA, VA, south to NC, TN, IL, MN, west to AB (George Lake), north to MB (Victoria Beach), ON (Sioux Lookout, Nipigon), QC (Fort Rupert, Lake Mistassini, Baie Trinite, Mont Lyall in Gaspésie). **Local Range** – Vermont, 23 localities, from 30 m at Lake Champlain to 1200 m on Mount Mansfield. New Hampshire, 14 localities, south to Hampton, Pelham, Chesterfield, north to Pittsburg, all elevations to the top of Mount Washington. **Habitat** – Swamp, bottomland forests, borders of marshes, wet ditches, especially in the higher mountains. It reaches the borders of Lake Champlain but is not common there. **Life Cycle** – Mating in May; tenerals in October. **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged, an occasional flier.

Genus *Dicheirotrichus*

351. *Dicheirotrichus (Trichocellus) cognatus* (Gyllenhal, 1827)

General Range – A circumpolar species. In Eurasia, east to the Pacific Ocean, south to Altai, Alps, west to British Isles, Shetland, Iceland, Greenland, north to the tree line. In North America, Hudsonian, Canadian Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, NS, NB, ME, MA, south to NY, PA, ON, MI, IN, MB, SD, NM, AZ, west to CA, OR, WA, Vancouver Island, Queen Charlotte Islands, BC, AK, Kodiak Island, Aleutian Islands to Attu, north to AK (Rampart House), NT (Fort Good Hope on the Mackenzie River), QC (Port-de-la-Baleine, Schaefferville). **Local Range** – Vermont, four localities, Jay Peak, Bald Mountain in Westmore, General Stark Mountain in Fayston, upper New Haven valley above South Lincoln. New Hampshire, nine localities, from Mount Washington north, including Northumberland on the Connecticut River. In the southeast there is an isolated population near the ocean at Rye, Southampton, and Pelham. **Habitat** – Open areas just below the tree line, and in the alpine tundra. The Bald Mountain specimen was at an elevation of 900 m in an area which had burned many years before. The specimen from South Lincoln was from an abandoned and partly overgrown pasture. This species has been taken several times

in beaver houses. **Life Cycle** – Mating in October (in AB); tenerals, July-August. **Behavior** – Largely nocturnal. It has been found in heaps of plants and in mouse nests. It has been recorded in Europe as feeding on heather (*Calluna*) seeds. It occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier both by day and by night.

Genus *Acupalpus*

352. *Acupalpus (Acupalpus) canadensis* Casey, 1924

General Range – An east-central species. Lower Canadian, Transition Zones. East to NF, PE, Cape Breton Island, NS, NB, ME, MA, south to PA, OH, west to SD, north to SK (Yorkton, Canora), MB (Winnipeg), ON (Britannia, Simcoe, Isle of Quinte), QC (along the Ottawa and Saint Lawrence Rivers, from Rigaud to Saint-Fidèle). **Local Range** – Vermont, two localities, Colchester, Shelburne Pond. New Hampshire, two localities, Errol, Columbia, both north of the White Mountains. **Habitat** – Wet, muddy ground at the edges of marshes, swamps, lakes, slow streams, usually associated with much organic matter. **Life Cycle** – Active in January, March-September, November-December (Larochelle and Larivière 2003). **Behavior** – It has been seen climbing on plants. **Dynamics** – Fully-winged, a frequent flier.

353. *Acupalpus (Acupalpus) carus* (LeConte, 1863)

General Range – A nearly transcontinental species in the north. Lower Canadian, Transition, Upper Austral Zones. East to NF (southwest only), PE, Cape Breton Island (Baddeck), NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, south to DE, PA, OH, IN, IL, AR, NE, ID, WA (Okanagon Valley), west to BC (Creston, Osoyoos), north to MB (Husavick), ON (Bala in Muskoka District), QC (from Montreal to Saint-Fidèle almost to the Saguenay River). **Local Range** – Vermont, 24 localities, from the QC boundary south to Sunderland and Putney. New Hampshire, 18 localities, probably throughout the state, from Pittsburg to Winchester, Pelham, and Hampton. **Habitat** – Marshy borders of ponds, lakes, slow streams, bottomland forests, especially areas with *Carex* sedges, usually on wet clay. **Life Cycle** – Tenerals April, June, August. **Behavior** – Mostly Nocturnal. **Dynamics** – Wings dimorphic. The fully-winged form is a frequent flier.

354. *Acupalpus (Acupalpus) hydropicus* (LeConte, 1863)

General Range – An east-central species. Upper Austral Zone. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, south to VA, KY, west to IL, north to MI, NY (north to Monroe, Saint Lawrence County). **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, three localities, Rye, Hampton Falls, Pelham, all in the southeast. **Habitat** – Forests, cranberry bogs. **Life Cycle** – Active in February-July, October (Larochelle and Larivière 2003). **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Flightless, wings entirely vestigial.

355. *Acupalpus (Acupalpus) nanellus* Casey, 1914

General Range – An east-central species. Transition Zone. East to Cape Breton Island (Cape North), NS, NB, NH, MA, RI, south to CT, NY, west to WI, north to MI, ON (Southampton, Pelee Point, Long Point, Turkey Point), QC, (Temiskaming, Vaudreuil, Montreal area, Saint Lawrence Valley to Ancienne Lorette). **Local Range** – Vermont, one locality, W. Elmore at light trap. New Hampshire, three localities, Rumney, Pelham, Rye. **Habitat** – Swamps, fens, bogs. Usually in shady areas, sometimes among cattails (*Typha*). **Life Cycle** – Active in March-August; tenerals April, July (Larochelle and Larivière 2003). **Behavior** – Tenerals April, July. **Dynamics** – Wings dimorphic. Long-winged morph is occasional in drift on lakes.

356. *Acupalpus (Acupalpus) pumilus* Lindroth, 1968

General Range – East-central species. Transition, Upper Austral Zones. East to PE, NS, ME (Belgrade), MA, CT, NY, south to DE, west to NE, north to MN, MI, ON (Muskoka District, Grand Bend), QC (Saint Lawrence Valley from Montreal to Quebec City area). **Local Range** – Vermont, seven localities, Alburgh, Highgate, Colchester, Shelburne Bay, Shelburne Pond, Mount Mansfield, W. Elmore (these represent a NEW STATE RECORD). New Hampshire, four localities, Pittsburg in the north, Rumney in the middle, and Pelham and Brookline on the southern border. **Habitat** – Wet mud of shorelines by ponds, lakes, slow rivers, also in *Sphagnum* bogs. Up to 900 m elevation on rich, organic soils and thick vegetation. **Life Cycle** – Tenerals April, June, August. **Behavior** – Nocturnal, it takes wing at dusk. Occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

357. *Acupalpus (Tachistodes) partiarius* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Mount Desert Island), MA, NY at Long and Staten Islands, NJ, DE, VA, NC, south to SC, AL, LA, west to TX, OK, KS, SD, north to IA, WI, MI, ON (Pelee Island, Point Pelee, Long Point, Hastings County, Isle of Quinte), QC (near Hull, Montreal area). **Local Range** – Vermont, one locality, Isle la Motte. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Shores of ponds, rivers, lakes, also away from water in cornfields, pastures. **Life Cycle** – Acitivity observed in February-September, November (Larochelle and Larivière 2003). **Behavior** – Nocturnal, except in the spring. Occasionally climbs on plants. **Dynamics** – Fully-winged. It usually flies in the sunshine in spring, later in the season it takes wing at dusk and comes to lights.

358. *Acupalpus (Tachistodes) pauperculus* Dejean, 1829

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, NC, SC, south to GA, AL, LA, west to CO, SD, north to MN, ON (Cochrane, Gravenhurst), QC (Mont Tremblant, Moisie, Gaspésie). **Local Range** – Vermont, 35 localities, statewide, from near sea level on Lake Champlain to the highest mountains. New Hampshire, 17 localities, north to Pittsburg, south to Hinsdale, Brookline, Pelham, and Seabrook. Not recorded in the White Mountains. **Habitat** – Marshy borders of ponds, lakes, slow streams, fens, bogs, usually in areas of dense *Carex* sedges or manna grass (*Glyceria*), or else in mats of dead plants. In wet weather it can be found in pastures and other normally drier areas. At all elevations in VT. **Life Cycle** – Tenerals August-December, a few in April and May. **Behavior** – Diurnal in spring, otherwise nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier. It usually flies in the sunshine in spring, later in the season it takes wing at dusk and comes to lights.

359. *Acupalpus (Tachistodes) testaceus* Dejean, 1829

General Range – An east-central species. Upper and Lower Austral Zones. East to ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to FL, AL, LA, west to TX, OK, KS, IL, north to WI, MI, ON (Point Pelee, Long Point, Marmora), QC (Montreal). **Local Range** – Vermont, no records. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Water margins. **Life Cycle** – Active in

January-November; tenerals in July; (Larochelle and Larivière 2003). **Behavior** – Nocturnal in summer and fall, active during the day in spring. **Dynamics** – Fully-winged, a frequent flier. Flies by day in spring, later in the season it takes wing at dusk. Comes to lights at night.

Genus *Philodes*

360. *Philodes (Philodes) alternans* (LeConte, 1853)

General Range – A largely eastern species. Transition, Upper Austral Zones. East to NH, NY (Ithaca), NJ, south to DE, WV, west to KY, IL, north to ON (Ottawa), QC (Montreal, Sainte Foy, near Quebec City). **Local Range** – Vermont, one locality, Arlington (along the Battenkill, near W. Arlington). New Hampshire, one locality, Farmington. **Habitat** – The specimen from Arlington was found under a large flat stone at the margin of the Battenkill, below an eroding bank about 1.3 m height. **Life Cycle** – Active in March, May-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – No records.

361. *Philodes (Goniolophus) rectangulus* (Chaudoir, 1868)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to MA, NY, DE, SC, GA, south to FL, MS, west to IA, SD, north to MI, ON (Point Pelee, Grand Bend, Saint Williams, Trenton), QC (Hull, Vaudreuil, Montreal). **Local Range** – Vermont, two localities, Shelburne (at the mouth of the Laplatte River), Ferrisburgh (at the mouth of Lewis Creek). New Hampshire, one locality, Brookline, on the southern border (this represents a NEW STATE RECORD). **Habitat** – VT records are from the wet mud banks by Lake Champlain at the mouths of two small rivers, elevation about 30 m. **Life Cycle** – Active in January-December; tenerals in July (Larochelle and Larivière 2003). **Behavior** – Nocturnal, takes wing at sunset. **Dynamics** – Fully-winged, a frequent flier.

SUBTRIBE HARPALINA

The males have dilated front and middle tarsi with two rows of scales on their ventral surfaces. Represented locally by five genera.

Genus *Ophonus*

362. *Ophonus (Metophonus) puncticeps* Stephens, 1828

General Range – An introduced European species. Old World range, east to southern Russia, Crimea, Georgia, Armenia, Syria, south to Albania and central Italy, west to northern Spain, Ireland, north to extreme southern Sweden, Ukraine. New World range, first introduced in Long Island in 1957. The first mainland record is from Poughkeepsie, NY (1969). It then appeared in MA (1973), NJ (1975), ME (1977), QC (1985), ON and NS (1987). Current range, east to NS, ME, MA, CT, NY at Long Island, NJ, south to PA, west to OH, ON, north to QC. **Local Range** – Vermont, eight localities. New Hampshire, two localities, Whitefield, Bath. **Habitat** – Open, weedy areas with Queen Anne's lace (wild carrot, *Daucus carota*). **Life Cycle** – Tenerals June. **Behavior** – Largely nocturnal, but often found in the dry, contracted umbels of wild carrot. Feeds extensively on seeds of *Daucus*, and also pollen. Sometimes feeds on snails. It climbs readily. **Dynamics** – Fully-winged, a frequent flier.

Genus *Harpalus*

363. *Harpalus (Pseudophonus) compar* LeConte, 1847

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, ME (Bangor), MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, AZ, west to CO, WY, ND, North to MB (Selkirk), ON (Thunder Bay, Michipicoten River, Ottawa), QC (Mont Tremblant, Baie Saint Paul, Cap Saint Ignace). **Local Range** – Vermont, 15 localities, probably statewide, except for the high mountains. New Hampshire 12 localities, not in the high mountains, otherwise statewide. **Habitat** – Open ground with grasses or weeds, usually on sandy soils. Dry upper zones of rivers and lakes, croplands, pastures, gravel pits. **Life Cycle** – Mating May and August; tenerals, July-September. **Behavior** – Largely but not entirely nocturnal. Occasionally climbs on plants. Reported at carrion (Ciegler 2000). **Dynamics** – Fully-winged, a frequent flier.

364. *Harpalus (Pseudophonus) erythropus* Dejean, 1829

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, ME (Waterville, Mount Vernon), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, MS, AR, OK, west to CO, WY, ND, north to MB (Riding Mountain, Winnipeg), ON (Ottawa), QC at Meech Lake, Sainte Scholastique, and down the north side of the Saint Lawrence to Valcartier, near Quebec City, also along the Richelieu River at Lacadieu and Clarenceville, but not in the Eastern Townships. **Local Range** – Vermont, 14 localities, from the west and south, Manchester and Putney in the south, along the shores of Champlain from Orwell to Highgate, inland to W. Elmore, Mount Mansfield, Hinesburg, and Lincoln. New Hampshire, six localities, Seabrook and Durham in the southeast, Rumney in the west-center, and Franconia, Carroll, and Mount Washington in the White Mountains. **Habitat** – Open areas such as pastures, roadsides, croplands, not necessarily on sand. Also at forest edges and in open forests. **Life Cycle** – Mating in late September; tenerals June-October. **Behavior** – Nocturnal. Preys on scarabaeid larvae. Occasional tree climber. **Dynamics** – Fully-winged, a frequent flier.

365. *Harpalus (Pseudophonus) faunus* Say, 1823

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, VA, NC, SC, GA, south to FL, MS, LA, TX, AZ, west to CO, NE, SD, north to ND, MN, WI, MI, ON (Manitoulin Island, Ottawa), QC (Joliette, Cowansville). **Local Range** – Vermont, six localities, South Burlington, E. Georgia, W. Elmore, Barre, Mount Mansfield, Dorset. New Hampshire, six localities, Pittsburg (Halls Stream), Conway (Intervale), Orford, Chesterfield, Rye, Pelham. Probably throughout both states. **Habitat** – Open, dry areas such as croplands, pastures, dry upper zones of river shores, open rock ledges. **Life Cycle** – Tenerals late June-August. **Behavior** – Nocturnal. It has been seen feeding on seeds of ragweed (*Ambrosia*) and caterpillars. Sometimes seen climbing on plants. **Dynamics** – Fully-winged, a frequent flier.

366. *Harpalus (Pseudophonus) pensylvanicus* (DeGeer, 1774)

General Range – A transcontinental species. Transition, Upper and Lower Austral Zones. East to PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to

FL, LA, TX, Mexico, AZ, west to CA, OR, WA, north to BC (Agassiz, Salmon Arm), MT, ND, MB (Husavick), ON (Sault Sainte Marie), QC (Abitibi District, Saint-Nérée in Bellechasse County). **Local Range** – Vermont, 75 localities, in every county. New Hampshire, 30 localities, throughout. **Habitat** – Abundant in croplands, hayfields, orchards, forest edges, gardens, gravel pits, and forest clearings. This species is so successful that it far outnumbers all other species of the subgenus combined, so that emigrating individuals can "flood" other habitats where this species is unsuccessful in reproducing. **Life Cycle** – Mating August-September. Eggs are placed singly in the soil 5-15 cm deep. **Behavior** – Nocturnal. Feeds on seeds, pollen, and other tissues of plants including ragweed (*Ambrosia*), barnyard grass (*Echinochlua*), strawberry (*Fragaria*), timothy-grass (*Phleum*), bluegrass (*Poa*), dock (*Rumex*), foxtail (*Setaria*), wheat (*Triricum*), corn (*Zea*). It also feeds on fungi, as well as available animal matter, including caterpillars, beetle larvae and adults. Reported to feed on carrion (Ciegler 2000). It frequently climbs on herbs and trees. The larva makes a burrow and presses seeds into sides of the burrow for storage. **Dynamics** – Fully-winged, a frequent flier.

367. *Harpalus (Pseudophonus) rufipes* (DeGeer, 1774)

General Range – An introduced, Eurasian species. East to Japan, eastern Siberia to the Sea of Okhotsk, south to Kirghizia, Iran, Armenia, Asia Minor, North Africa, west to Azores, Spain, Ireland, north to Scotland, southern half of Sweden, Russia, Siberia. This is a late introduction, first detected in PE in 1937, then in Cape Breton Island in 1938. Later spread to NB (1939), Gaspésie (1941), ME, in the potato-growing districts, probably in the 1940s or 1950s since huge populations had built up by 1960. The species was found in Orono in the south of ME in 1970, in QC at Port-au-Saumon in 1976. In 1990, it appeared in CT (Hartford). Current range, east to NF, Anticosti, PE, Cape Breton Island, NS, NB, ME, MA, south to CT, west to VT, north to QC. **Local Range** – Vermont, 10 localities. First in Barre (1970), then Craftsbury (1992), Lyndon (1995), Newbury (1995), Newport (1998), Jericho, Westford, Springfield (all in 1999), Burlington (2002), Peacham (2006). New Hampshire, 13 localities, the oldest from 1974. All records before 1980 are from the coastal area, inland to Somersworth, Lee, and Kensington (Dunn 1981*b*). In 1983, collected at Litchfield on the Merrimack River. In 1992, it was found at Haverhill on the Connecticut River. In 1996 it was collected at Brookline, on the MA border, and in 1997 at Whitefield in the north. **Habitat** – Croplands, lawns, pastures. Strongly

synanthropic in Europe, also reported from open forests. In the potato fields of ME it is almost unbelievably abundant, so that it invades nearby houses in large numbers. **Life Cycle** – Mating July-August; tenerals, July-August. **Behavior** – Nocturnal. Reported to feed on seeds of cereals, strawberries (*Fragaria*), lamb's quarters (*Chenopodium album*), and caterpillars. Sometimes climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

368. *Harpalus (Pseudophonus) vagans* LeConte, 1865

General Range – An east-central species. Transition, Upper Austral Zones. East to MA, CT, NY at Long and Staten Islands, NJ, VA, NC, SC, south to GA, AL, MS, AR, OK, west to KS, SD, north to IA, WI, MI, ON. **Local Range** – Vermont, 10 localities, entirely in the western drainage, east to W. Elmore, Lincoln, and Dorset. New Hampshire, no records. **Habitat** – Open areas with grasses or weeds, usually on sandy soils. Upper dry zones of rivers and lake shores, gravel pits, croplands and pastures. Not above 450 m. **Life Cycle** – Tenerals July-August. **Behavior** – Nocturnal. It has been seen feeding on scarabaeid larvae. It has been seen climbing up to 3 m above the ground. **Dynamics** – Fully-winged, an occasional flier.

369. *Harpalus (Megapangus) caliginosus* (Fabricius, 1775)

General Range – A transcontinental species. Upper and Lower Austral Zones. East to ME (Orono), MA, CT, NY at Long and Staten Islands, NJ, VA, NC, SC, GA, south to FL (only from Tallahassee west), LA, in Mexico from San Luis Potosi, Sonora, Baja CA Norte, to CA (to the coast), west to OR, WA (in the east), north to ID (northern), WY, MB (Aweme, Winkler), ND (Pembina), IA, WI, MI, ON (Ingolf in the northwest, Georgian, Belmont Lake, Ottawa), QC, (Hull area, Nominingue, down the Saint Lawrence to Île d'Orleans). **Local Range** – Vermont, five localities, all in the west, Burlington, South Burlington, Hinesburg, Lincoln, Bolton (summit of Mount Hunger). New Hampshire, one locality, Jefferson at Cherry pond. **Habitat** – Croplands, pastures. In southwest OH I encountered it under drying hay, or formerly, wheat or oat shocks. In Vermont it is a rarity and is perhaps not breeding successfully. **Life Cycle** – Mating in September, rarely June; tenerals, April-September, mostly July. **Behavior** – Both diurnal and nocturnal. Feeds on seeds and pollen, also insects, especially larvae. **Dynamics** – Fully-winged, a frequent and powerful flier. At least some of our records may be strays from farther west and south.

370. *Harpalus (Plectralidus) erraticus* Say, 1823

General Range – An east-central species. Transition, Upper Austral Zones. East to ME (Bethel), MA, CT, NY at Long and Staten Islands, NJ, MD, SC, south to GA, MS, MO, KS, NM, west to CO (the Great Plains), MT (the extreme east), AB (the southeast corner), north to SK, ON (Lake of the Woods, Ottawa), QC (Fort Coulonge, Kazabazua, La Tuque, Quebec City, Arthabaska). **Local Range** – Vermont, 16 localities, mostly in the Champlain Valley, from Milton to Bristol, also in the east from Saint Johnsbury, Newbury, and Weathersfield. New Hampshire, seven localities, Shelburne and Franconia in the north, Walpole and Hinsdale in the southwest, Dover, Durham, and Seabrook in the southeast. **Habitat** – Sand areas, often in or near loose sand. **Life Cycle** – Mating August-September; tenerals, August-September. Eggs are laid in a 5-12 cm deep burrow. **Behavior** – Largely nocturnal. The adult feeds on both animals and plants, including roots, stems, and grains of maize. The larva lives in a burrow and stores seeds there. When available, the grass *Setaria* (foxtail) prevails in the larval burrow. **Dynamics** – Fully-winged, an occasional flier.

371. *Harpalus (Opadius) fulvilabris* Mannerheim, 1853

General Range – A transcontinental species. Hudsonian, Canadian Zones. East to LB (extreme south), NF, QC at Anticosti, Îles-de-la-Madeleine, Cape Breton Island, NS, NB (Kouchibouac), ME (Mount Katahdin, Kineo on Moosehead Lake, Weld), south to QC (Berthierville and Bellechasse County), NY (Mount Marcy, Mount Hopkins in the Adirondacks, Sodus Point on Lake Ontario (perhaps a drift specimen), MI (Marquette in the Upper Peninsula, Isle Royale), MN, MB (Winnipeg), SK (Prince Albert), SD (isolated in the Black Hills), south in mountains to CO and NM (southern Sangre de Cristo mountains), BC (Williams Lake), west to AK (Kenai Peninsula, Unalaska and Kodiak Islands), north to YT (Dawson), NT, MB (Churchill), QC (Schaefferville). **Local Range** – Vermont, four localities, Mount Mansfield in Smuggler's Notch, Bristol at Bristol Memorial Park, Ripton, Peru. New Hampshire, three localities, Mount Washington, Mount Moosilauke, Crawford Notch. **Habitat** – Open or partially shaded areas in the mountains. In Smuggler's Notch, one was taken at 823 m on the almost vertical cliffs. In contrast, the specimen from Bristol was in a wooded area with exposed bedrock at only 274 m; in Ripton it was found in an old field at 549 m; the specimen from Bromley Mountain was at 914 m. **Life Cycle** – Tenerals May-October, mostly June. **Behavior** – It

has been seen eating insect eggs. **Dynamics** – Wings dimorphic. The fully-winged form can probably fly as it has been in ocean drifts.

372. *Harpalus (Opadius) indigens* Casey, 1924

General Range – An east-central species. Transition Zone. East to NS, NB, ME, MA (Cape Cod, Martha's Vineyard), south to NY (Ithaca), west to ON (Constance Bay on Lake Huron, Petawawa), isolated records from farther west, MI (Emmet County, Stone Bay), NE (McPherson County in the Sand Hills), north to QC (Fort Coulonge, Lachute, Ayers Cliff in the Eastern Townships, down the Saint Lawrence to Port-au-Saumon). **Local Range** – Vermont, eight localities in all parts of the state, Milton, Fairfax in the Champlain Valley, Dorset and Springfield in the south, Richmond, W. Elmore, Craftsbury, and Ferdinand in the north. New Hampshire, five localities, Seabrook, Durham, Swanzey, Rumney, Mount Washington. **Habitat** – Open areas on poor soil, usually sand, but the long series of specimens from W. Elmore were from the sterile, sloping field of clay and gravel described for *Cicindela limbalis*. **Life Cycle** – Tenerals late June-August, mostly late July-August. **Behavior** – Mostly nocturnal. It has been seen attacking caterpillars. **Dynamics** – Fully-winged, an occasional flier. One example in sea drift on Martha's Vineyard (MA).

373. *Harpalus (Opadius) laevipes* Zetterstedt, 1828

General Range – A Holarctic species. In the Old World, east to Pacific Ocean in Siberia (Primorie, Kamchatka, Kuril Islands), Japan, south to Altai Mountains, Caucasus, Ural Mountains, Syria, Asia Minor, mountains of Bulgaria, Yugoslavia, Alps, Pyrenees, west to Ireland, north England, Scotland, Shetland, north to northern Scandinavia, Finland, northern Russia, and Siberia. In North America, a transcontinental species. Hudsonian, Transition, Canadian Zones. East to LB (L'Anse-au-Loup), NF, QC at Anticosti, Îles-de-la-Madeleine, PE, NS, south to ME, NY (Adirondacks), MI, WI, MB (Winnipeg), SK, south in Rocky Mountains to NM, AZ, NV, west to OR, WA, Vancouver Island, BC, AK, north to YT (Dawson), NT (Norman Wells), MB (Gillam), ON (Sudbury), QC (Abitibi, Lac Saint Jean). **Local Range** – Vermont, no records. New Hampshire, four localities, all in or near the White Mountains, Crawford Notch, Rumney. **Habitat** – NH specimens are from areas of mixed sand and gravel (probably moraine). Elsewhere, it has been found in burnt areas, forest edges, and old clearings. Often under blackberries (*Rubus)* in old clearings (Landry 1975*b*). Found under

stones in a muddy marsh with *Sphagnum* moss in a coniferous forest. **Life Cycle** – Tenerals May-August, mostly May. **Behavior** – Mostly nocturnal. When not moving, concealed by body luster resembling charred wood. **Dynamics** – Fully-winged, frequent flier. Common in drift.

374. *Harpalus (Opadius) laticeps* LeConte, 1850

General Range – A transcontinental species. Canadian, Transition, Hudsonian Zones. East to LB (L'Anse-au-Loup), QC at Îles-de-la-Madeleine, NB, ME, MA, south to NY, (Ithaca, Adirondacks), MI (Sheboygan County, extreme north of Upper Peninsula), MN (Duluth, Minneapolis), MB (Winnipeg), SK (Cypress Hills), SD (Black Hills), south in Rocky Mountains to NM (Magdalena Mountains), AZ (Rincon and Santa Catalina Mountains), NV (Ruby Mountains), west to OR (Mary's Peak), WA (Olympic Peninsula), BC, YT (Whitehorse), north to AK (Fairbanks), NT (Norman Wells, Yellowknife), MB (Gillam), ON (Pickle Lake), QC (Poste-de-la-Baleine, Schaefferville, Mingan). **Local Range** – Vermont, two localities, Springfield, Williston. New Hampshire, seven localities, Exeter in the southeast, Rumney and Wakefield south of the mountains, Carroll, Mount Washington, Pinkham Notch, Crawford Notch. **Habitat** – The specimen from Williston, VT was caught in a forest which was relatively open because of damage from a severe ice storm. This species has been found in burnt forests, sand and gravel pits, and open forests and forest edges, usually on sand. **Life Cycle** – Tenerals in June. **Behavior** – Nocturnal. When not moving, concealed by body luster resembling charred wood. **Dynamics** – Fully-winged, a frequent flier.

375. *Harpalus (Opadius) lewisii* LeConte, 1865

General Range – A northern, east-central species. Transition, Canadian Zones. East to QC at Îles-de-la-Madeleine, NS, NB, ME, MA, south to CT, NY (Peru, shore of Lake Champlain), ON (Elmira), MI (Marquette, etc., only on the Upper Peninsula), WI (Wisconsin Dells), MN (Duluth, Pelican Lake), west to AB (McMurray), north to NT (Fort Smith), MB (Victoria Beach), QC (Abitibi, LacSaint Jean), not in Gaspésie. Darlington (1931) suggested that this species is a recent immigrant from the west. **Local Range** – Vermont, three localities, all in the Champlain Valley, Burlington, Milton, E. Georgia. New Hampshire, six localities, two near the coast, Exeter, Hampton, two south of the White Mountains, Rumney, North Conway, two in or near the north side of the mountains,

Franconia, Gorham. **Habitat** –The VT specimens were from fallow fields on sand. Elsewhere, this species has been found in sand pits and in areas regenerating from forest fires. **Life Cycle** – Mating late June; tenerals May-August, mostly in August. **Behavior** – Nocturnal. When not moving, concealed by body luster resembling charred wood. **Dynamics** – Fully-winged, a frequent flier.

376. *Harpalus (Opadius) nigritarsis* Sahlberg, 1827

General Range – A circumpolar species. Hudsonian, Canadian Zones. In Old World, east to Kamchatka, south to Lake Baikal, Altai Mountains, Ural Mountains, west to Scandinavia, north to Kola Peninsula of Russia, northern Siberia. In North America, east to LB, NF, QC at Anticosti, NS at Cape Breton Island, QC (Mt Albert, Gaspésie), south to QC (Saint-Fidèle, Témiscaming), isolated in the Adirondacks of NY, ON (Sudbury), MI (Whitefish Point on Lake Superior), MN, MB (Pine Falls), south in Rocky Mountains to NM, AZ, west to CA, WA, BC, AK (Kenai Peninsula, Unalaska, Kodiak Islands), north to YT (Whitehorse Pass), NT (Norman Wells). **Local Range** – Vermont, no records. New Hampshire, one locality, Mount Washington. **Habitat** – Reportedly found on open ground covered with short grass. Either a stray migrant or a member of a small population on Mount Washington. Elsewhere it occurs near the seashore. **Life Cycle** – Tenerals June-October, mostly July. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged, a frequent flier. This species has been found frequently in ocean drift

377. *Harpalus (Opadius) providens* Casey, 1914

General Range – An east-central species. Transition and Upper Austral Zones. East to ME, MA, CT, NJ, south to MD (Plummers Island), WV (Cheat Mountain), KY, MO, west to KS, NE, north to MN (Crow Wing County), MI (Marquette), ON (Belleville, Ottawa), QC (Hull, Duparquet, Sorel, Maurice). **Local Range** – Vermont, three localities, all in the west, Jericho, Salisbury, Manchester. New Hampshire, 13 localities, from Swanzey and Exeter in the south, north to the White Mountains. **Habitat** – This species appears to be more of a forest species than its close relatives. The Jericho specimen is from a forestry plantation on sand, while that from Salisbury is from open oak forest on a limestone ridge. **Life Cycle** – Tenerals March-November, mostly August-September. **Behavior** – Mostly nocturnal, often shelters in a burrow by day. Preys on caterpillars, especially on gypsy moth (*Lymantria dispar*). **Dynamics** – Fully-winged, occasional flier. Occasional in drift

378. *Harpalus (Opadius) reversus* Casey, 1924

General Range – An east-central species. Transition Zone. East to NH, MA (Boston), south to NY, MI, WI, KS, NM, west to WY, MT, north to AB (Edmonton), SK (Saskatoon), MB, ON, QC (Hull area to Portneuf). This species was unknown east of Lake Superior, originally it inhabited the short grass areas of the Great Plains. The clearing of forest lands allowed it to spread eastward. The first eastern record is from Boston, MA in 1903, followed by ON (Nipigon, 1913) and MI (Marquette, 1915). **Local Range** – Vermont, two localities, Elmore (1961) and Richmond. New Hampshire, two localities, Mount Washington (1953) and Swanzey. **Habitat** – Open areas, usually with short grass, such as pastures and sand pits. **Life Cycle** – Tenerals, May-September, mostly July-August. **Behavior** – Mostly nocturnal. By day it sometimes shelters under dried cattle dung. It has been seen preying on chrysomelid pupae. Sometimes climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

379. *Harpalus (Opadius) spadiceus* Dejean, 1829

General Range – An Appalachian species. Transition Zone. East to NH, MA, NY at Long and Staten Islands, NJ, PA, south to NC, GA, west to TN, KY, WV, OH, ON, QC. **Local Range** – Vermont, no records. New Hampshire, one locality, Swanzey in the southwest. **Habitat** – A forest species, usually from areas with thick leaf litter and dense shade. **Life Cycle** – Tenerals March-October, mostly June and September. **Behavior** – Nocturnal. Observed to eat caterpillars (Larochelle and Larivière 2003). **Dynamics** – Wings vestigial, totally flightless.

380. *Harpalus (Harpalus) affinis* (Schrank, 1781)

General Range – An introduced Eurasian species. In Old World, east to Primorie Province of Siberia, Sakhalin Island, south to Lake Baikal, Altai, Tian Shan, Kirghizia, Caucasus, Asia Minor, Greece, Sicily, Sardinia, west to Spain, Ireland, north to Scandinavia, Russia, Siberia. Introduced into NF by 1843 (Beauvois in 1805 redescribed it as "*H. viridiaenus*" from "North America"). Current range, east to LB, NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NJ, VA, south to OH, IN, IL, MO, west to TX, KS, north to WI, ON (Cochrane), QC (Fort George, Magpie River); isolated in the west to OR, WA, Vancouver Island, north to BC, isolated in the south to FL. **Local Range** – Vermont, 25 localities, probably statewide. New Hampshire, 17 localities, probably statewide, except White Mountains

represented only by stranded flying dispersers. **Habitat** – Dry, open, unshaded ground of all sorts, pastures, croplands, gardens, lawns. **Life Cycle** – Mating May-August, most reproduction in the spring. Tenerals, May-October (most in the autumn). **Behavior** – Diurnal. Feeds on seeds, caterpillars, fly larvae. Sometimes climb on plants. **Dynamics** – Fully-winged, a frequent flier. Flies in sunlight in the spring and at night in the summer.

381. *Harpalus (Harpalus) herbivagus* Say, 1823

General Range – A transcontinental species. Lower Canadian, Transition, Upper Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, AL, TN, AR, OK, NM, west to AZ UT, OR, WA, BC (southern Okanagan Valley), north to AB, (Edmonton), SK, MB, ON (Lake of the Woods, Thunder Bay), QC (Ville Marie, Mont Tremblant, Grandes Bergeronnes, on south shore east to Temiscuotta County). **Local Range** – Vermont, 33 localities; New Hampshire, 19 localities. **Habitat** – Abundant in sand and gravel pits, dry pastures, gardens and lawns, roadsides, clearings in forests, open rocks in the mountains, and mountaintop tundra. Also under dry debris on shorelines. **Life Cycle** – Mating April-June; tenerals March-December, mostly August-October. **Behavior** – Largely nocturnal, but active by day in the spring. Feeding on grass shoots, grass seeds, fungi, caterpillars, beetles, flies. **Dynamics** – Fully-winged, a frequent flier.

382. *Harpalus (Harpalus) opacipennis* (Haldeman, 1843)

General Range – A transcontinental species which does not reach the east coast. Canadian, Transition Zones. East to ME (Bigelow Township), south to NY (Ithaca), PA, IN, WI, MB, SD (Black Hills), south in mountains to NM, AZ, west to CA (Sierra NV), WA (Puget Sound), Vancouver Island, BC, AK (Copper Center), north to YT (Old Crow), NT (Fort Simpson), ON (Lake of the Woods, Lake Temiskaming), QC (Abitibi, Lac Saint Jean). **Local Range** – Vermont, three localities, Richmond, W. Elmore, Rutland. New Hampshire, no records. **Habitat** – Dry open sand areas with grasses. **Life Cycle** – Mating in mid-July; tenerals, May-November. **Behavior** – Largely nocturnal. Feed on grass seeds. **Dynamics** – Fully-winged, an occasional flier. In spring it sometimes flies in daylight.

383. *Harpalus (Harpalus) plenalis* Casey, 1914

General Range – A transcontinental species. Canadian, Transition, Upper Austral Zones. East to QC at Îles-de-la-Madeleine, Cape Breton Island, NS, ME, MA, CT, south to NY, AR, TX (College Station), NM (Santa Fe), west to AZ, ID (Coeur d'Alene), BC (Hope), north to NT, (Fort Simpson), SK (Redvers in the southeast corner), MB, ON, QC (Abitibi, Lac Saint Jean, Gaspésie). **Local Range** – Vermont, four localities, Richmond, W. Elmore, Warren, Manchester. New Hampshire, six localities, all northern, south to Haverhill, two in the White Mountains, three farther north. **Habitat** – Dry, open hillsides with sparse vegetation and stony or gravelly soils. Not in the Champlain Valley. **Life Cycle** – Mating April-July; tenerals, April-October. **Behavior** – Largely nocturnal, sometimes flies in daytime. **Dynamics** – Fully-winged, an occasional flier.

384. *Harpalus (Harpalus) rubripes* (Duftschmid, 1812)

General Range – Introduced species from Eurasia. In Old World, east to Iran (Kopet Dagh), south to Armenia, Crimea, Greece, Sicily, Corsica, Spain, west to Ireland, north to southern Scandinavia, Mordova, Ukraine. A relatively recent introduction to North America. First collected in NH in 1982. It has since spread to eastern ON, NB, NS, PE, QC, VT, south to PA, MA, RI, CT. **Local Range** – Vermont, three localities. Newbury (1995), Ferdinand (1996), Williston (2000). New Hampshire, six localities, three on the coast, inland to Durham, Pelham, Carrol in the north (1987). **Habitat** – Very dry, open habitats, sandy fields, sand pits, loose sand, also alvars (limestone flats). **Life Cycle** – Lindroth (1986) states that it breeds in spring or in autumn. **Behavior** – Largely, nocturnal. **Dynamics** – Fully, winged, an occasional flier.

385. *Harpalus (Harpalus) solitaris* Dejean, 1829

General Range – A circumpolar species. In Old World, east to Kamchatka, Sakhalin, Japan, south to Altai, Ural Mounains, Caucasus Mountains, Alps, Pyrenees, north to Scandinavia, Kola Peninsula, Siberia. In North America, a northern, nearly transcontinental species, not reaching the west coast. Hudsonian, Upper Canadian Zones. East to LB (Goose Bay), NF, QC at Anticosti, NB, south to QC (mountains and north shore of Gaspésie to Rimouski, La Tuque on the Saint Maurice River, and Duhamel), ON (Thunder Bay), MB (Gillam), AB (Shovel Pass in Jasper National Park), west to BC (northeast, along the Alaska

highway, YT (Watson Lake in the southeast), north to NT (Yellowknife), QC (Fort Chimo, Schaefferville). **Local Range** – Vermont, no records; New Hampshire, one locality, Mount Washington. **Habitat** – On Mount Washington on the alpine tundra. Farther north reported from moraines and gravel pits. **Life Cycle** – Tenerals late June-August. **Behavior** – Mostly nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, an occasional flier. It has been found in ocean drift.

386. *Harpalus (Harpalus) somnulentus* Dejean, 1829

General Range – A transcontinental species. Hudsonian, Canadian, Transition, Upper Austral Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, south to VA, OH, IN, IL, AR, KS, NM, AZ, west to CA, OR, WA, BC, AK, north to YT (Old Crow), NT (Fort Simpson), MB (Gillam), ON, QC (Schaefferville). **Local Range** – Vermont, 74 localities; New Hampshire, 15 localities. **Habitat** – Dry, usually sandy fields and pastures, moraines. Common in sand and gravel pits. In VT, the *fallax* morph is common in the lower, more nearly flat areas, while the *pleuriticus* morph prevails in the mountains and foothills. **Life Cycle** – Mating in July; tenerals mostly July-August. **Behavior** – Mostly nocturnal. It has been seen preying on caterpillars and grasshoppers. **Dynamics** – Fully-winged, an occasional flier. It is common in lake and sea drift.

387. *Harpalus (Harpalobius) fuscipalpis* Sturm, 1818

General Range – A Holarctic species. Hudsonian and Canadian Zones. In Old World, east to eastern Siberia, south to Mongolia, Tien Shan and Pamir mountains, plains of Kazakhstan, north side of Caucasus mountains, Armenia, North Africa, west to southern France, north to central Russia, Siberia. In North America, east to NS, south to NH, OH, WI, MN, SD, south in mountains to NM, AZ, west to CA, OR, WA, BC, Vancouver Island, AK, (Copper Center, Ramparts), north to YT (Whitehorse), NT (Norman Wells), AB (McMurray), SK (Canora), MB (Victoria Beach), ON (Thunder Bay), QC (Fort Coulonge, Val Morin, La Tuque). **Local Range** – Vermont, no records. New Hampshire, one locality, Mount Washington. **Habitat** – On Mount Washington on the alpine tundra. Farther north, recorded from open habitats such as moraines and dunes. **Life Cycle** – Tenerals mid-May. **Behavior** – Nocturnal. Adults feed on seeds and have been observed feeding on

plants. **Dynamics** – Fully-winged, an occasional flier. Has been seen at lights.

Genus *Selenophorus*

388. *Selenophorus (Celiamorphus) ellipticus* Dejean, 1829

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, MD, NC, SC, GA, south to FL, AL, LA, west to TX, OK, KS, IL, north to WI, MI, ON (only from Point Pelee and Long Point on Lake Erie), NY (only near NY City). **Local Range** – Vermont, no records. New Hampshire, three localities, all in the southeast, Walpole, Swanzey, Hinsdale. **Habitat** – Dry open fields, pastures, croplands, on sandy soil. **Life Cycle** – Activity observed January-December (Larochelle and Larivière 2003). **Behavior** – Largely nocturnal. By day it hides under fallen leaves or burrows in the soil. **Dynamics** – Fully-winged. An occasional flier, indicated by its presence in sea and lake drift.

389. *Selenophorus (Celiamorphus) granarius* Dejean, 1829

General Range – An east-central species. Upper Austral Zone. East to MA, CT, NJ, MD, NC, south to GA, MS, TX, west to IL, north to IN, NY. **Local Range** – Vermont, no records; New Hampshire, one locality, Concord (represents a NEW STATE RECORD). **Habitat** – Dry sandy fields, croplands, forest edges, and clearings. Often in areas with *Cladonia* lichens. **Life Cycle** – Mating in May. **Behavior** – Nocturnal. **Dynamics** – Wings are dimorphic. Fully-winged morph is occasional in sea drift.

390. *Selenophorus (Selenophorus) gagatinus* Dejean, 1829

General Range- An east-central species. Transition, Upper and Lower Austral Zones. East to NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, south to SC (in the mountains), FL, AL, west to TX, AR, MO, IN, MI, north to ON, (Britannia, Belleville), QC (Saint Lawrence valley from Montreal to Levis, Clarenceville near the Richelieu River). **Local Range** – Vermont, 10 localities, mostly west of the Green Mountains, but also recorded from Barre City and from Fairlee in the Connecticut Valley. New Hampshire, four localities, north to Holderness, also Farmington, Durham, Hampton. **Habitat** – Sand areas, also limestone, dolomite, and quartzite ledges, below 500 m elevation,

with low vegetation, grasses, or *Cladonia* lichens. Often in forests of chinquapin oak (*Quercus muehlenbergii*) or juniper (*Juniperus*) thickets. **Life Cycle** – Mating in May; tenerals April-May (rare in QC), July-October. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, flies to lights at night.

391. *Selenophorus (Selenophorus) hylacis* (Say, 1823)

General Range – An east-central species. Upper and Lower Austral Zones. East to southern ME (Mount Vernon), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, SC, GA, south to FL, MS, west to OK, KS, IL, north to MI, ON (drift at Point Pelee), NY (Rochester, Albany). **Local Range** – Vermont, several localities west of the Green Mountains, including South Burlington, Salisbury (Bryant Mountain), and Dorset. New Hampshire, nine localities, north to Conway. **Habitat** – Deciduous forest, especially dry forests with oak (*Quercus*) and hickory (*Carya*). **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal, shelters by day under bark of standing or fallen dead trees. Frequently climbs trees. **Dynamics** – Fully-winged, a frequent flier. Comes to lights at night.

392. *Selenophorus (Selenophorus) opalinus* (LeConte, 1863)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME, MA, CT, NY at Long and Staten Island, NJ, DE, VA, NC, SC, GA, south to FL, MS, TX, west to OK, KS, SD, north to MN, WI, MI, ON (Grand Bend, Ottawa), QC (Rigaud, Montreal, down the Saint Lawrence to Saint-Nérée in Bellechasse County, Clarenceville in the Richelieu Valley). **Local Range** – Vermont, 16 localities, in the Champlain Valley, east to Hancock, Montpelier city, W. Elmore, in the Connecticut Valley, north to Springfield and Grafton. New Hampshire, 13 localities, north to Mount Washington (probably a stray flier), also Romney, Tamworth, Ossippee. **Habitat** – Dry pastures, croplands, areas with sandy soils or rock ledges, open areas, forest edges. **Life Cycle** – Tenerals mid-July to October, rarely in May. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

Genus *Discoderus*

393. *Discoderus parallelus* (Haldeman, 1843)

General Range – A transcontinental species. Upper and Lower Austral Zones. East to NH, NJ, MD, VA, NC, SC, south to GA, MS, LA TX, NM, AZ, west to CA, OR, WA, north to BC (Okanagan Valley, Vernon), MT, SD, IA, WI, MI, ON (Southhampton on Lake Huron, Point Pelee, Long Point on Lake Erie), NY (Catskills, Long Island), CT (Clinton on the coast). **Local Range** – Vermont, no records. New Hampshire, Rockingham County. **Habitat** – Dry open areas, such as croplands and pastures. Originally on prairies. **Life Cycle** – Active in January, March-November (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, may be active in sunshine. Occasional climber on plants (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, frequent flier to lights. Occasionally found in drift (Larochelle and Larivière 2003).

Genus *Trichotichnus*

394. *Trichotichnus (Trichotichnus) dichrous* (Dejean, 1829)

General Range – An east-central species. Upper and Lower Austral Zones. East to MA, CT, NY at Long and Staten Islands, NJ, DE, NC, SC, south to GA, AL, MS, LA, TX, west to AR, KS, SD, north to IA, WI, MI, ON (Point Pelee, Isle of Quinte, near London), NY (Rochester, New Baltimore). **Local Range** – Vermont, three localities, all in the Champlain Valley, Grand Isle, Williston, Charlotte (Mount Philo). New Hampshire, three localities, Warner, Swanzey, Seabrook. **Habitat** – Deciduous forest. None of the VT specimens is from an elevation higher than 100 m. **Life Cycle** – Tenerals June. **Behavior** – It has been observed feeding on insects. It usually hides under logs. **Dynamics** – Fully-winged, a frequent flier. It comes to lights at night.

395. *Trichotichnus (Trichotichnus) vulpeculus* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (Waterville), MA, CT, NY at Long and Staten Islands, NJ, MD, NC, GA, south to FL, AL, west to KY, MO, IL, WI, north to MI, ON (Toronto, Ottawa), QC (Montreal area, down the Saint Lawrence valley to Portneuf, also in the Eastern Townships to Knowlton and Lake Memphremagog). **Local Range** – Vermont, 17 localities, north

to Grand Isle, Johnson, Rockingham. New Hampshire, five localities, north to Haverhill, in southeast, Durham, Hillsdale, Swanzey, Walpole. **Habitat** – Deciduous forests, especially humid areas near streams. Reaches much greater elevations than *T. dichrous*, highest elevation for this species is Nebraska Notch at 564 m. **Life Cycle** – Tenerals June and September. **Behavior** – Nocturnal. It usually hides under bark of fallen trees. **Dynamics** – Fully-winged, a frequent flier.

396. *Trichotichnus (Iridessus) autumnalis* (Say, 1823)

General Range – An east-central species. Upper Austral Zone. East to ME (Riley Township—C. Omland), MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, SC, south to GA, west to IL, north to WI, MI, ON (Pelee Island, Pelee Point, Long Point, all on Lake Erie, also on Lake Huron at Grand Bend; these records may be vagrant fliers), NY (Buffalo, Cortland). **Local Range** – Vermont, six localities, South Burlington, Salisbury (Bryant Mountain), Castleton, Manchester, Grafton, Wilmington. New Hampshire, three localities, Concord, Durham, Exeter. **Habitat** – Deciduous forest, both humid and relatively dry, such as on Bryant Mountain. **Life Cycle** – Tenerals September-October. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

TRIBE SPHODRINI

Three genera, six species. Three of the genera resemble Platynines except for having serrate claws. Recently the genus *Pseudamara* has been transferred here although the claws are not serrate and the head is adapted largely for plant feeding. It was formerly in Zabrini.

Genus *Pseudamara*

397. *Pseudamara arenaria* (LeConte, 1847)

General Range – An east-central species. Transition Zone. East to PE, NS, ME, MA, south to NY, PA, WV, OH, IL, west to WI, north to ON (Southampton, Prince Edward County, Ottawa), QC (Nominingue, Mont Tremblant, Lac Saint Jean, Témiscouata). **Local Range** – Vermont, six localities, north to Mount Mansfield, Westford, Stowe (Taber Hill), south to Lincoln and Bristol, usually about 400 m elevation. A specimen from Westford is from a lower altitude. New Hampshire, seven localities, Pittsburg (two localities), Atkinson and Gilmanton Academy Grant, in the White Mountains, Mount Washington and Pinkham Notch, in the

south, Concord and Hampton Beach. **Habitat** – As in other Carabidae with strong flight ability, it is hard to decide which individuals are in the breeding habitat and which are stray migrants. Most local specimens are from mountain forests and this is obviously the main habitat in our states. The species name suggests an affinity with sand. The VT specimen from Westford is from a lower elevation (140 m). If not a stray migrant, is likely from a sand area, and the same is probably to be true for one from Concord, NH. The specimen from Hampton Beach is also from a sand area, but it is likely a stray migrant. Mountain top specimens may also be migrants, although Darlington (notes) reported sweeping specimens from vegetation at the margin of Lake of the Clouds (1500 m) on Mount Washington. He also sifted specimens from grass and alder litter at Second Connecticut Lake. **Life Cycle** – Tenerals early May, October. **Behavior** – Nocturnal. **Dynamics** – Wings dimorphic, most individuals vestigial-winged. Fully-winged individuals are strong fliers and frequent in drift.

Genus *Calathus*

398. *Calathus (Neocalathus) gregarius* (Say, 1823)

General Range – An east-central species. Lower Canadian, Transition, and Upper Austral Zones. East to PE, Îles-de-la-Madeleine, NS, ME, MA, CT, NY (Long Island), NJ, DE, VA, NC, GA, south to AL, TN, MO, west to IA, SD, north to MN, WI, MI, ON (the peninsula), QC north to Lac Cayamant, Lac Saint Jean, north of the Saint Lawrence, south of the Saint Lawrence to Rimouski and to Grand Rivière on the south side of Gaspésie. **Local Range** – Vermont, 43 localities, throughout the state. New Hampshire, 11 localities, north to Pittsburg, south to Hinsdale and Hampton Falls, probably throughout except in the higher mountains. **Habitat** – Abundant in leaf litter of deciduous forests, often in brushy second growth, usually not in deep forests with large trees. Often at forest edges or nearby in pastures. I once collected a long series beneath the boards of a collapsed building amid grassy abandoned fields in Bolton Notch (360 m). **Life Cycle** – Mating in July; tenerals May to August, peaking in June (Larochelle and Larivière 2003). **Behavior** – Gregarious, especially in spring when it can be found underneath boards which are warmed by the sun. It has been observed feeding on caterpillars and pupae, and on pollen of timothy-grass (*Phleum*). **Dynamics** – Wings dimorphic. Vestigial-winged specimens greatly outnumber fully-winged ones. Chiolino (1970) found one long-winged out of 55. A captive specimen has been observed in flight.

399. *Calathus (Neocalathus) ingratus* Dejean, 1828

General Range – A transcontinental species. Hudsonian, Canadian, Transition Zones. East to LB, NF, Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, ME, south to NY (the Adirondacks), ON, MI, WI, MN, SD, CO, NM, AZ, west to UT, ID, eastern WA, BC, AK (including "inner Aleutian Islands"), west to Umnak, north to Fairbanks, YT, NT north to Norman, and probably to the tree line, ON to Hudson Bay, QC north to Inoucdjouac and Fort Chimo. **Local Range** – Vermont, 61 localities, southern records are from the hills or mountains (Putney, Whitingham), but there are a few records from the Champlain Valley (Burlington, Shelburne), most records are from mountain forests. New Hampshire, 10 localities, south to Mount Moosilauke, Mount Washington, also in Kilkenny Range and Errol in Pittsburg, six records at all elevations. **Habitat** – A species of both deciduous and coniferous forests, in leaf litter. Rarely in forest edges in VT; it ascends the mountains to 1300 m. In other regions with a cooler climate, it can be found in open fields. **Life Cycle** –Tenerals May-November, mostly before midsummer (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. Gregarious. Frequent climber on trees and plants (Larochelle and Larivière 2003). **Dynamics** – Wings dimorphic, but fully-winged specimens are very rare. Chiolino (1970) examined 164 specimens without finding a single fully-winged individual.

400. *Calathus (Neocalathus) opaculus* LeConte, 1854

General Range – East of the Rockies, from southern QC and ON west to MN and UT, south to AZ, TX, and FL, north to VT and NH (Dearborn et al. 2014). **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – Open, dry ground covered with sparse, low vegetation at all elevations, including meadows, orchards, and forest edges (Larochelle and Larivière 2003). **Life Cycle** – Activity observed January-December; tenerals in June-July (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal, may be active on sunny days in spring. Semi-gregarious in summer, gregarious in winter. Occasional climber and strong burrower (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, occasional flier to lights (Larochelle and Larivière 2003).

401. *Calathus (Acalathus) advena* (LeConte, 1846)

General Range – A transcontinental species. Upper Canadian Zone. East to LB (only at West Saint Modeste, in the extreme south) and NF. Lindroth (1955) gives detailed locality records in NF, most are from the west coast of the northern peninsula from the Bay of Islands to Saint Anthony. There are also one each from the Avalon Peninsula and from Miquelon, a French possession off the south coast. These are all near the sea, but there is also a record from Victoria Lake in the interior. The main range is in the western mountains, in the north to AK (along the south coast to the base of the Alaska Peninsula, also from the Aleutian islands out to Attu, and from Kodiak Island), to the south in the mountains to NM and OR. East of the Rockies, apparently restricted to multiple relict areas, in AB and SK (Cypress Hills), ON (Michipecotin Island), MI (Isle Royale in Lake Superior), QC (three areas: the north shore of the Saint Lawrence River and Gulf, from Baie Saint Paul all the way to extreme south of LB; Mont Albert and Île Bonaventure in Gaspésie; Anticosti), NY (high Adirondacks and Tug Hill plateau). **Local Range** – Vermont, no records; New Hampshire, two localities, Mount Washington and Mount Moosilauke. **Habitat** – According to Darlington (1931) "abundant in the higher wooded slopes of the White Mountains; rare above tree line on Mount Washington. Found under cover on the ground and especially under bark." The local habitat, in my opinion, is high, cool, rather open forests with a short growing season. It is surprising that it is absent from such habitats in VT, perhaps from lack of streams and early disappearance of snow? Eastern records seem restricted to 3 situations: high mountains, islands, and forests near large bodies of water. **Life Cycle** – Tenerals June-October, mostly July-August (Larochelle and Larivière 2003). **Behavior** – Has been observed at snowfields, sometimes climbing trees (Larochelle and Larivière 2003). **Dynamics** – Fully-winged. Flight shown by occasional presence in drift.

Genus *Synuchus*

402. *Synuchus impunctatus* (Say, 1823)

General Range – A transcontinental species. Upper Canadian to Upper Austral Zones. East to NF (widepread but absent from the northern peninsula), NS, PE, ME, MA, CT, NY (including Long and Staten Islands), MD, south GA ,KY, MO, SD, SK, AB, WA, west to BC (north to Fraser Lake, Quesnel), north to AB (Edmonton, McMurray), MB north to Husavick, ON north to Nipigon, Rainy River, QC east on the

north shore of the Gulf of Saint Lawrence to Sept-Îles, and north to Schaefferville. **Local Range** – Vermont, 50 localities, abundant in all sorts of forests, both dry and moist, and at all elevations. New Hampshire, 30 localities, from all parts of the state. **Habitat** – Abundant in forests except for floodplains. Particularly common in young second-growth forest and forest edges. It usually conceals itself by day in the leaf litter, and rarely hides under stones or logs. Only pitfall trapping reveals its true numbers. It occurs up to the tree line and sometimes beyond it. Darlington (1931) collected at 1495 m in the White Mountains. Lindroth (1966) reported it from open country, such as on dry moraines, often under *Rubus*. Perhaps leaf litter is one of its requirements. **Life Cycle** – Mating in September (Larochelle and Larivière 2003); tenerals April-September (mostly in June-July). **Behavior** – Nocturnal. It has been observed feeding on caterpillars. It also has the interesting habit of collecting seeds of cow-wheat (*Melampyron lineare*) in sheltered spots where it can feed on the elaiosomes. The beetle is not known to feed on the seeds themselves. **Dynamics** – Wings dimorphic. Chiolino (1970) found that only three VT specimens were fully-winged while 122 had wings reduced to minute "scales". The presence of *Synuchus* in marine drift and at a light trap in W. Elmore show that this species can be capable of flight.

TRIBE PLATYNINI

A large tribe (six genera). Unlike Pterostichini, which Platynini resemble, the elytra are not locked to the sixth sternum. Platynini differ from Sphodrini in not having serrate claws and many are black and colored differently.

Genus *Olisthopus*

403. *Olisthopus micans* LeConte, 1846

General Range – An east-central species. Transition, Upper Austral Zones. East to MA, CT, Long Island, NJ, DC, VA, SC, south to GA, MS, LA, west to AR, MO, IA, WI, north to MI, ON (to Parry Sound on Lake Huron) and QC (Rigaud and vicinity, Les Saules near Quebec City). **Local Range** – Vermont, four localities, all by river mouths along Lake Champlain, Swanton and Highgate (Missisquoi River), Milton (Lamoille River), and Ferrisburgh (Lewis Creek). New Hampshire, three localities, Pelham, Durham, Grafton. **Habitat** – In Vermont, it has been collected only in the forests which are flooded by Lake Champlain in the spring.

Life Cycle – Active in January-August, November-December (Larochelle and Larivière 2003). **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Fully-winged. Occasional specimens have been taken at lights.

404. *Olisthopus parmatus* (Say, 1823)

General Range – An east-central species. Lower Canadian and Upper Austral Zones. East to NS, MA, CT, NY (including Long Island), DE, VA, NC, SC, south to GA, MS, AR, west to MO, WI, MN, north to ON (to Pointe Aix Pins on Lake Superior, Parry Sound on Lake Huron) and QC (on the north shore to Saint-Fidèle; on the south shore to Saint Aubert in L'Islet County). **Local Range** – Vermont, 15 localities, north to Cambridge and Victory, south to Weathersfield. New Hampshire, 10 localities, from Atkinson and Gilmanton Academy Grant in the far north to Pelham and Winchester in the south. **Habitat** – Deciduous forests from 30-450 m. On dry ridges with oaks as on Bryant Mountain in Salisbury. It has also been taken in moist forests. It is rarely collected, probably partly explained by its habit of spending the day in leaf litter. **Life Cycle** – Mating in early June; tenerals late July to mid-August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Sometimes found in masses of dead leaves along temporary streamlets. **Dynamics** – Fully-winged. Occasional at light traps.

Genus *Sericoda*

405. *Sericoda obsoleta* (Say, 1823)

General Range – A transcontinental species. Hudsonian, Canadian, Transition, Upper Austral Zones. East to NF, Îles-de-la-Madeleine, Cape Breton, ME, MA, NY, MD, NC, GA, south to AL, LA, TX, KS, CO, ID, CA, west to OR, WA, BC (Vancouver Island), north to BC (Terrace, Fort Saint John), NT (Fort Smith), SK (Prince Albert), MB to Gillam, ON (Sioux Lookout, Ogoki, Moose Factory), QC (Inducojouac, 58˚ N lat., Bradore Bay). Note: Although this species has a wide range, it has not been recorded from the Great Plains states north of KS. **Local Range** – Vermont, two localities, South Burlington (light trap), Camel's Hump. New Hampshire, five localities, from Hampton north to Franconia. **Habitat** – Adults and larvae live in wood ashes. Adults have been taken under bark of standing dead trees, in fire places in campgrounds, and in houses which have wood stoves or furnaces. **Life Cycle** – Tenerals late May through August (Larochelle and Larivière 2003). **Behavior** –

Nocturnal. It is unknown how these beetles locate forest fires. They arrive often when the fire is still burning or when the ashes are still hot. They climb readily on burnt tree trunks. **Dynamics** – Fully-winged. The special ecological niche requires that the beetle be a strong and frequent flier. Flight has been witnessed at forest fires and at lights.

406. *Sericoda quadripunctata* (DeGeer, 1774)

General Range – A Holarctic species. In Eurasia, from the Pacific Ocean to Europe, south to Japan, Taiwan. Western China, the Himalayas of India, the Caucasus. In Europe, Scandinavia, Germany, Hungary, once recorded from Britain. In North America, Hudsonian, Canadian, Transition Zones. East to LB (Lake Melville), NF, QC at Anticosti, Îles-de-la-Madeleine, NS, ME, MA, PA south to NC, TN, IN, IL, NM, MN, SD, MT, ID, WA, west to BC, AK (Skagway, Anchorage, Kenai Peninsula, Yukon River), north to YT (Klondike), NT (Great Slave Lake), QC (Opinaca River), LB (Goose Bay). **Local Range** – Vermont, two localities, South Burlington at light trap, Camel's Hump. New Hampshire, six localities, Mount Washington, Mount Adams, Walpole, Franconia, Crawford Notch, Peabody River, Bean's Purchase (Imp Mountain). **Habitat** – Strongly similar to that of *S. obsoleta,* but probably not a competitor with that species as it is smaller. **Life Cycle** - Tenerals in July. **Behavior** – Largely nocturnal. Like *S. obsoleta*, this species comes to wood fires and behaves in the same way. **Dynamics** – Fully-winged. It has been seen flying to fires and electric lights.

Genus *Tetraleucus*

407. *Tetraleucus picticornis* (Newman, 1844)

General Range – An east-central species. Transition to Lower Austral Zones. East to NY, MD, NC, FL (south to Lake Okechobee), south to AL, LA, west to AR, KY, IA, north to MN, WI, ON (Long Point in Lake Erie), NY (Liebherr 1991). **Local Range** – Vermont, one locality, Ferrisburgh, at the point between the mouths of Lewis Creek and Little Otter Creek. New Hampshire, no records (Liebherr 1991). **Habitat** – The VTspecimens were found beneath driftwood along a seasonally flooded ditch beside a dirt road. The surrounding forest is dominated by silver maple (*Acer saccharinum*) and there is a large group of hemlock (*Tsuga canadensis*) across the road. Farther south this species has been taken in cypress swamps and along swampy shores of rivers. **Life Cycle** – Active in January-December (Larochelle and Larivière 2003). **Behavior** –

Nocturnal. The function of the conspicuous white outer antennomeres has not been demonstrated. **Dynamics** – Fully-winged. It has been collected at lights and has been found in drift.

Genus *Oxypselaphus*

408. *Oxypselaphus pusillus* (LeConte, 1854)

General Range – A nearly transcontinental species. Canadian, Transition Zones. East to NS, PE, ME, MA, CT, NJ, VA (in mountains), SC, GA, south to OH, IL, IA, SD, MT, ID,OR, west to WA, north to BC (Salmon Arm, Creston), SK (Saskatoon), MB (Cedar Lake), ON (Parry Sound, Marmora), QC (Mistassini). **Local Range** – Vermont, 13 localities, mostly from lakeside forest, from Highgate to Ferrisburgh, including an island record from South Hero, also away from Lake Champlain in Hinesburg, Richmond, Bolton. New Hampshire, 31 localities, almost throughout, including the Androscoggin Valley, areas near the seashore, and along the Connecticut and Merrimack Rivers. Apparently absent only from the White Mountains. **Habitat** – Among wet or damp leaf litter, frequent in lakeside forest, also in bottomland forest along rivers, and sometimes in numbers in small, permanently damp spots in upland forest, such as around shaded rock ledges or spots with sedges. Larochelle and Sexton (1976) once collected a series from a beaver house. **Life Cycle** – Tenerals April-November (Larochelle and Larivière 2003). **Behavior** – Nocturnal. A frequent climber on plants. When alarmed, it produces a cloud of droplets from the pygideal glands, accompanied by a popping sound. It is active under snow in October and November (Larochelle and Larivière 2003). **Dynamics** – Wings vestigial, flightless.

Genus *Agonum*

409. *Agonum (Platynomicrus) nigriceps* LeConte, 1846

General Range – A Holarctic species. In Old World, in Siberia on Kamchatka Peninsula. In New World, in Hudsonian, Canadian, Arctic, and Transition Zones. East to QC (Anticosti), NF, NB, ME, south to NY, PA, ON (Dunville on north side of Lake Erie), IL, IA, SD, MT, ID, west to WA, BC (to Copper Mountain, Salmon Arm), AK (Unalakleet, Kotzebue on the Bering Strait), north to YT, NT (Reindeer Depot in the MacKenzie delta), northern limit eastward is poorly known. In QC, north to Fort Rupert, Natashquan. It should be expected much further north.

Local Range – Vermont, no records (but to be expected in the Boreal Plateau). New Hampshire, seven localities, Lancaster, Mount Washington and the Boreal Plateau, north to Pittsburg. **Habitat** – Emergent tussocks of sedges along lakes and slow rivers (Landry 1994). **Life Cycle** – Gravid April to mid-August (mostly before mid-July). Eggs are laid on cat-tails (*Typha*) and *Carex* sedges. Breeding commences just after the spring thaw; tenerals June-September (Larochelle and Larivière 2003). **Behavior** – It rests head downwards on the plant with the aid of very long tarsi, which are as long as the hind tibia. The distinctive color pattern, pale with a median black stripe, conceals it (Landry 1994). **Dynamics** - Wings dimorphic, either full or reduced to a minute scale. Flight has been witnessed in daylight (Larochelle and Larivière 2003).

410. *Agonum (Europhilus) anchomenoides* Randall, 1838

General Range – A nearly transcontinental species. Canadian, Transition, Upper Austral Zones. East to NS, ME, MA, CT (south to Hartford), south to NY, (Schoharie, Ithaca), PA, OH IL, KS, MT, eastern WA, west to BC (New Westminster, Terrace), AK (Matanuska, Fairbanks, Circle), north to NT (Good Hope, Great Slave Lake), AB (McMurray), SK (Prince Albert), MB (Gillam), QC (Fort Rupert on James Bay, Moisie on the Gulf). **Local Range** – Vermont, 33 localities, throughout, from Highgate and Lemington to Pownal and Vernon. New Hampshire, 26 localities, throughout, from Pittsburg to Hinsdale and Nashua. **Habitat** – Borders of rivers, brooks, lakes, or ponds on bare or sparsely vegetated mud or sand. **Life Cycle** – Mating in late June, gravids in early and late June, tenerals, July-October. It is able to survive winter inundation (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Sometimes climbs on plants. **Dynamics** – Fully-winged, a frequent flier. It takes flight at dusk and comes to light traps at night. It has been found in lake drift.

411. *Agonum (Europhilus) canadense* Goulet, 1969

General Range – An east-central species. Lower Canadian, Transition Zones. East to NS, PE, ME, MA, CT (south to Mansfield), NY, south to NJ, IL (Utica), west to MB (Onah), north to ON (Muskoka Lakes), QC at Mont Tremblant, Berthierville, Dosquet (in Lotbinniere County, south of the Saint Lawrence River). **Local Range** – Vermont, 17 localities, throughout, except for the highest mountains. New Hampshire, throughout, except for the highest mountains (highest point Cherry Pond, Jefferson) and seacoast (closest records, Kingston and Durham), absent

from Pittsburg and from the Connecticut River, except for one record at Columbia. **Habitat** – Marshes and *Sphagnum* bogs, compared to *C. palustre*, this species is usually found in open, unshaded ground. **Life Cycle** – Activity observed in all months except February (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged. Frequent flier, takes flight at dusk.

412. *Agonum (Europhilus) darlingtoni* Lindroth, 1954

General Range – A northeastern species. Transition Zone. East to NS, south to ME (Mount Desert, Waterboro), MA, CT, NJ, west to ON, north to QC. **Local Range** – Vermont, five localities, Sunderland, Shelburne Bog, a bog in Belvidere, Mud Pond (a bog in Peru), and Beaver Meadow Bog in Bristol. New Hampshire, two localities, Lee, Durham. **Habitat** – Restricted to *Sphagnum* bogs. **Life Cycle** – Tenerals in September (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Its occasional presence in sea drift indicates that it can fly.

413. *Agonum (Europhilus) gratiosum* (Mannerheim, 1853)

General Range – A nearly transcontinental species. Hudsonian, Canadian, and Transition Zones. East to LB (Forteau), NF, QC (Anticosti and Îles de-la-Madeleine), PE, NS (Cape Breton Island), ME, MA, CT, NY (Long Island), NJ, south to PA, MI, northern OH, northern IN, northern IL, IA, KS, west to SD, MT, northeastern OR, eastern WA, BC (reaching the Pacific Ocean at Anyox on Observation Inlet), AK to Anchorage, Kodiak Island, in Yukon Valley to Circle, north to YT (Dawson), NT (Aklaville), MB (Churchill), ON (Cochrane), QC (Rivière Opinaca, Schaefferville). **Local Range** – Vermont, 65 localities, throughout, including the lake islands, up to 1000 m. New Hampshire, 42 localities, nearly throughout, but not recorded from the highest parts of the Presidential Range. **Habitat** – Wet areas with emergent vegetation, usually *Carex* sedges; very common next to beaver ponds, and occasional in beaver houses. Sometimes in *Sphagnum* bogs and by pools in gravel pits. It is occasional in moss mats in the mountains with *A. sordens* and is found with *A. thoreyi* in the big marshes along Lakes Champlain and Memphremagog. **Life Cycle** – Mating in July, gravid in early July, tenerals April-June and August- November. Overwinters either as adult or larva (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. It is an accomplished climber on bushes and herbs. **Dynamics** – Wings dimorphic, either full or slightly reduced (Chiolino

1970). Fully-winged specimens have been collected at lights and in seashore drift (Larochelle and Larivière 2003).

414. *Agonum (Europhilus) lutulentum* (LeConte, 1854)

General Range – A transcontinental species. Canadian, Transition Zones. East to Îles-de-la-Madeleine, NS (Cape Breton), MA, CT, NY (Long Island), NJ, south to PA, WV, OH, IN, IL, IA, KS, west to NE, ND, eastern WA, BC (Vancouver Island, Duncan), north to Cranbrook BC, AB, SK (Percival, Moose Jaw), MB (Stony Mountain), ON (Nipigon, Long Lac), QC (Abitibi, Lac Saint John, south side of Gaspésie). **Local Range** – Vermont, 35 localities, nearly throughout, but not above 600 m, in the north, eight localities at about 30 m by Lake Champlain. New Hampshire, 35 localities, throughout. Only one record from the high mountains, Mount Washington (possibly a stray flier), five localities near the sea. **Habitat** – Muddy borders of marshes, lakes, ponds, among cattails (*Typha*) or *Carex* sedges, common by the borders of beaver ponds. **Life Cycle** – Tenerals mostly August-September, some as early as May. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier.

415. *Agonum (Europhilus) palustre* Goulet, 1969

General Range – An east- central species. Lower Canadian, Transition, Upper Austral Zones. East to ME (Mount Desert), MA, CT (Litchfield, Cornwall), NJ, MD, VA, NC, south to KY, west to IL (Danville), WI, MN, north to MI, ON, QC (Calumet, Nomininge to Roberval, on Lac Saint Jean). **Local Range** – Vermont, 36 localities, throughout, except for the higher mountains. More common than *A. canadense* in the Champlain Valley, and especially so in the marshes bordering the lake. Common both sides of the Connecticut River. New Hampshire, 27 localities, throughout, except for the higher mountains. Commoner than *A. canadense* in the lower Merrimack Valley and near the seacoast. Four localities in towns bordering the sea. **Habitat** – Swamps, marshes, borders of slow rivers, bottomland forests (not in *Sphagnum* bogs), usually in shaded spots. **Life Cycle** – Tenerals, March, July-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Occasionally climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

416. *Agonum (Europhilus) picicornoides* Lindroth, 1966

General Range – A transcontniental species. Canadian Zone. East to PE, NS, QC north to Lake Mistassini, south to Mount Tremblant, isolated on Anticosti, ME, south to MI (Huron Mountains), isolated in ME, NH, VT, but not recorded from NY, in ON south to Nipigon Bay on Lake Superior and to Kenora, in AB at Lake LaBiche, Lake Wabamun, west to BC (Copper Mountain near Princeton and White Lake), northern limits uncertain in the western provinces. **Local Range** – Vermont, six localities, in the main range of the Green Mountains at Mount Mansfield, Waterville (Judevine Brook), Bolton (Bolton Notch), in Woodford (at Woodford Lake), also at Elmore in the Worcester Range, and on the Boreal Plateau in Morgan (Pherrins River), all localities over 300 m. New Hampshire, six localities, Mount Washington, five localities in Pittsburg. **Habitat** – In VT, usually by beaver ponds, bare mud in willow, alder thickets. Usually at 300 m or above (never at *Sphagnum* bogs). **Life Cycle** – Gravid in June; tenerals July- September (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged. No flight records.

417. *Agonum (Europhilus) retractum* LeConte, 1846

General Range – An east-central species. Upper Canadian to Transition Zones. East to NF, PE, Cape Breton Island, NB, ME, MA, CT, NY at Long and Staten Islands, south to PA, WV, IN, IL, MN, SD, MT, west to BC (only to Creston on Clark's Fork, Terrace, Pine River, Dawson Creek, Liard River, Hot Springs), north to NT, AB (McMurray), SK (North Battleford), MB (Winnipeg), ON (Sioux Lookout, Nakina, Malachi, Ogoki), QC. **Local Range** – Vermont, 56 localities, throughout, up to 1000 m. It has been found on South Hero and Burton Islands in Lake Champlain. New Hampshire, 33 localities, throughout, from Hollis and Seabrook to Pittsburg. **Habitat** – Leaf litter of deciduous forests, from 30-1000 m elevation. **Life Cycle** – Mating June-July, gravid July, tenerals April-May, also August- November (Larochelle and Larivière 2003). Overwinters either as adult or larva. **Behavior** – Nocturnal. Preys on larvae, spiders, springtails. It defends itself with an ill-smelling liquid secretion. **Dynamics** – Wings polymorphic. Chiolino (1970) found two distinct classes of brachyptery, suggesting that two different genes might be involved. He studied 72 Vermont specimens, none of them fully-winged. In contrast, Darlington (1936), found that 16% of 81 New Hampshire specimens were fully-winged. There are no flight records other than drift.

418. *Agonum (Europhilus) sordens* Kirby, 1837

General Range – A transcontinental species. Hudsonian, Canadian, and Transition Zones. East to LB (Goose Bay), NF, PE, NS (Cape Breton Island and Sable Island), ME, MA, NY, south in mountains of NJ, MD, NC, WV, in plains of IL, MN, SD, MT, in mountains of CO, ID, OR, west to WA, BC, AK (west to Anchorage, Kenai Peninsula, Nulato, 160˚ W long. on Yukon River, ON (Mattagami, Long Lac, Rainy River), QC. **Local Range** – Vermont, 27 localities, two from the Missisquoi Delta (30 m), one from Rutland town (165 m), all the remainder from 300 m or more elevation. In the main range are 17 from Westfield to Whitingham, also from Dorset in the Taconic Range, W. Elmore in the Worcester Range, Williamstown, on the Boreal Plateau from Brighton south to Victory. New Hampshire, 23 localities, nine on the Boreal Plateau, seven in or near the White Mountains, farther south at Rumney, Plymouth, and Gilmanton, and two in the far south at Pelham and Rye, nearly at sea level. **Habitat** – In VT, common in small depressions (usually less than 2 m wide) containing *Sphagnum* on the Long Trail, along the crest line of the main range of the Green Mountains. Also in the flood plain of the Missisquoi River in Swanton. **Life Cycle** – Mating May-July, gravid late June, tenerals August, (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged, a frequent flier. Sometimes flies by day or at sunset, has been taken at light traps.

419. *Agonum (Europhilus) superioris* Lindroth, 1966

General Range – A northern transcontinental species. Hudsonian, Canadian Zone. East to NB, PE, ME (Belgrade), south to VT, NH, ON (Timagami, Long Lac, Hurtkett), MI, ME, MB, AB (Lake Wabamun, Edmonton), west to AK (Circle), north to NT (Fort Resolution on the south shore of Great Slave Lake), QC (on the north shore to Chute-aux-Outardes, on south shore to Saint-Camille-de-Bellechasse). **Local Range** – Vermont, 10 localities, six of them in the main range of the Green Mountains, from Haystack Pond in Wilmington, north to Waterville, Johnson (Judevine Brook), the others include two in the northwest (Swanton and Franklin), one from Fairlee in the Connecticut Valley, one from Victory in the northeast, and Underpass Pond in Morgan. New Hampshire, eight localities, south to Rumney, others are Cherry Pond in Jefferson, Colebrook, Errol, Wentworth, and three places in Pittsburg. **Habitat** – Among emergent vegetation in marshes, bogs, and swamps, usually above 300 m. **Life Cycle** – Gravid mid-June to mid-July; tenerals

mid-June. **Behavior** – Nocturnal. **Dynamics** – Wings complete, but somewhat reduced in size. There are no flight records.

420. *Agonum (Europhilus) thoreyi* Dejean, 1828

General Range – A circumpolar species. Canadian, Transition Zones. In the Old World, in Europe from England and Ireland (but not Scotland), Scandinavia, south through most of continental Europe to southern France, central Italy, Corsica, Sicily, Albania, and Asia Minor. East across Russia to Amur and Ussuri Regions of Eastern Siberia. In North America, east to NF, QC (Anticosti, Îles de- la- Madeleine), NS (Cape Breton Island), ME, MA, CT, NY (Long and Staten Islands), NJ, south to DC, OH, IN, IA, KS, MT, ID, OR, west to WA, BC (Vancouver Island), AK (to Kenai Peninsula and to Fairbanks), north to YT, NT (Aklavik), MB, ON, QC to Fort Rupert, on James Bay, and Natashquan (on the north shore of the Gulf of Saint Lawrence). **Local Range** – Vermont 22 localities, south to Springfield, north to Isle La Motte, Swanton (the delta), Franklin, Newport, and Brighton. Absent from the highest mountains, otherwise probably state wide. New Hampshire, 12 localities, from Pittsburg in the north, to Brookline and Pelham in the south, absent in the White Mountains. Cherry Pond in Jefferson is probably the highest locality. **Habitat** – Dense emergent marsh vegetation where the close placement of the tufts of sedges, grasses, cattails (*Typha*), or buttonbushes (*Cephalanthus*) allow the beetles to move from one tuft to another. Common in big marshes by Lake Champlain, Lake Memphremagog. Not in bogs. **Life Cycle** – Gravid May-August, tenerals May-November (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Adults overwinter in leaf sheathes and hollow stems of marsh plants. The larvae have been found in hollow stems. **Dynamics** – Fully-winged. A frequent flier, takes flight at dusk.

421. *Agonum (Agonum) muelleri* (Herbst, 1784)

General Range – A Palearctic species. East to the Yenissei River of Siberia, south to the Caucasus, Albania, southern Italy, southern Spain, Azores, west to Britain, north in Scandinavia to 64º N lat. Lindroth (1963) documented the spread in North America. *Agonum muelleri* was introduced in NF before 1840. By 1881 it reached Cape Breton Island (NS), and Gaspésie and Îles-de-la-Madeleine in QC. By 1885, it reached NB and ME. It was in mainland NS by 1897, the Eastern Townships of QC by 1929 , Quebec City by 1933, Boston by 1932. A separate invasion of the west coast was first recorded in the city of Vancouver and

Vancouver Island about 1933. Current range is east to ME, MA, CT, NY (Long and Staten Islands), VA, south to WV, OH, north to ON (Rainy River, Longlac), QC (Fort Rupert on James Bay, Baie Trinité on the north shore of the Gulf of Saint Lawrence, also Anticosti). The western invasion now extends from CA through OR and WA to BC. **Local Range** – Vermont, 58 localities, throughout. First Vermont record was in 1950, but there were few collectors before this time, so *A. muelleri* could have reached the state much earlier. New Hampshire, 31 localities, the earliest record was from Portsmouth in 1930. **Habitat** – The same as for *A. cupripenne*. It appears to be more abundant than the latter species in man-made habitats, but less so on the mountain tops. **Life Cycle** – Mating June-July, eggs laid in June, tenerals July-August (Larochelle and Larivière 2003). **Behavior** – Mostly diurnal. Observed feeding on wireworms (elaterid larvae). Sometimes climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

422. *Agonum (Agonum) piceolum* (LeConte, 1879)

General Range – A transcontinental species. Hudsonian and Upper Canadian Zone. East to NF, MB (Winnipeg, Fort Selkirk), SK (Cypress Hills, Fort Walsh), AB (Crowsnest), west to BC (Vancouver City and Duncan on Vancouver Island, Terrace), AK, north to YT, NT, QC (Fort George, Natashquan, south to Abitibi, Quebec City, south side of Gaspésie), ME, MA, ON (Fort Severn). **Local Range** – Vermont, no records. New Hampshire, three localities, Mount Washington, Mount Adams, both in the Presidential Range, and Atkinson and Gilmanton Academy Grant in the far north. **Habitat** – "Usually occurring near rivers, in considerable distance (under poplars, etc.) on bare or sparsely vegetated soil, often among leaves" (Lindroth 1966). This description obviously cannot be applied to the population of the Presidential Range. Darlington (1931) gives the elevations of this population as 600-1600 m. He wrote, "This species is found up to, and rarely slightly above, the tree line on Mount Washington…It occurs on gravelly or grassy brook banks and, especially at the higher altitudes, under loose bark near brooks." **Life Cycle** – Tenerals June, July. **Behavior** – Nocturnal. **Dynamics** – Probably dimorphic. Most specimens with more or less miniaturized wings. Lindroth (1966) implies that a few individuals have wings almost as big as those of *A. bicolor*.

423. *Agonum (Agonum) placidum* (Say, 1823)

General Range – A transcontinental species. Upper Canadian to Lower Austral Zones. East to NF (perhaps only a straggler; Lindroth 1955), QC

at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, ME, MA, CT, NY at Long and Staten Islands, DE, VA, NC, south to GA, MS, AR, TX, NM, AZ, west to UT, OR, WA, BC (Terrace and Prince George), north to AB (Edmonton), MB (Winnipeg), ON (Sudbury), QC (Amos, Rivière-au-Tonnerre on the north shore of the Saint Lawrence). **Local Range** – Vermont, 44 localities, throughout, up to 1400 m in the mountains. New Hampshire, 32 localities, throughout. **Habitat** – Common in open, grassy or weedy locations. Lindroth (1966) considered that it had an affinity for sandy country with relatively thin vegetation. I suspect that this is where it is most easily caught, as I have collected it in large numbers from light traps by unmown, densely weedy fields growing on clay, where it would be difficult to find the beetles by day. Also in cultivated fields, gardens. **Life Cycle** – Mating mid-June; tenerals July-September. **Behavior** – Nocturnal and diurnal. Has been seen feeding on caterpillars, fly larvae, and plant parts. Climbs on herbs, sometimes on trees. **Dynamics** – Fully-winged, very frequent flier. Common at light traps.

424. *Agonum (Olisares) aeruginosum* Dejean, 1828

General Range – An east-central species. Transition and Austral Zones. East to NS, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, GA, south to FL, MS, LA, west to AR, IL, IA, SD, north to WI, MI, ON (Oliphant on Bruce Peninsula, Toronto, Prince Edward County), QC (Montreal area, Roberval on Lac Saint Jean). **Local Range** – Vermont, 21 localities, from lake level to 900 m on Mount Mansfield, probably throughout the state. New Hampshire, 29 localities, north to Colebrook, Errol, south from there, probably statewide, except in the White Mountains. **Habitat** – Soft, wet mud bordering lakes, ponds, swamps, fens, and bogs, among rich vegetation, especially sedges. Lindroth (1966) found it frequently under willows. **Life Cycle** – Mating in June; tenerals in August. **Behavior** – Partly diurnal, frequently climbs on herbs, shrubs, trees. **Dynamics** – Fully-winged, frequent flier. Comes to lights. Also occasional in drift.

425. *Agonum (Olisares) affine* Kirby, 1837

General Range – A transcontinental species. Hudsonian, Canadian, Transition Zones. East to LB (north to Henley Harbour), NF, QC (Anticosti, Îles-de-la-Madeleine), Cape Breton and NS, PE, ME, south to MA, CT, NY (Long Island), NJ, IN, IL, ON (Sudbury, Longlac), MB (Whitemouth Lake), MT, WY, ID, WA, west to BC, AK (Anchorage, Circle, Kodiak Island), north to YT, NT (Norman Wells), ON (Fort

Severn), QC (Abitibi, Rouyn, Blanc Sablon). **Local Range** – Vermont, two localities, Woodford Lake, a high altitude (732 m) lake in the extreme south, and Victory in the Boreal Plateau. D. Miller caught a series of this species among a mixture of insects clinging to bridge railings during a flood on the Moose River. New Hampshire, six localities, Pittsburg, Jefferson (Cherry Pond), Monroe in the north, Pelham, Hampton, Danbury in the south. Several other records for *affine* may actually apply to the species now called *harrisi*. **Habitat** – According to Lindroth (1966), associated with buckbean (*Menyanthes*) and brown mosses (*Scorpidium* and *Climacium*), and is thus a species of fens. **Life Cycle** – Tenerals in June (NF). **Behavior** – Nocturnal. Sometimes climbs on plants. **Dynamics** – Fully-winged, occasional flier. Caught at artificial lights and in seashore drifts.

426. *Agonum (Olisares) albicrus* Dejean, 1828

General Range – A southeastern species extending north near the Atlantic Coast. Austral Zone. East to Atlantic Coast, CT, NJ, VA, NC, SC, GA, south to FL, AL, LA, west to AR, OK, north to IA, IL, IN, ON (Point Pelee). **Local Range** – Vermont, no records. New Hampshire, two localities, Northwood (between Concord and Dover) and Pelham. **Habitat** – Flood plain forests in deep shade. **Life Cycle** – Tenerals in May in NC, in July in VA. **Behavior** – Nocturnal. **Dynamics** – Fully-winged, an occasional flier. Occasional in drift.

427. *Agonum (Olisares) corvus* (LeConte, 1860)

General Range – A nearly trancontinental species. Canadian Zone. East to Anticosti Island, south to Montreal, QC, ON (Hurkett on north shore of Lake Superior), MN (Duluth), SD, CO, AZ, OR, west to eastern WA, BC at Princeton, Chilcoten, north to BC at Canim Lake, Williams Lake, Frazier Lake, AB (Edmonton), SK (Saskatoon), MB (Victoria Beach). Localities east of the Great Plains are widely scattered and fail to form a coherent pattern. They may represent relict populations from the Hypsithermal period. **Local Range** – Vermont, two localities, Underhill and Mount Philo in Charlotte. New Hampshire, no records. **Habitat** – In most of the range it is a prairie species. The VT specimens may be stray fliers. **Life Cycle** – Tenerals in July (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Has been seen feeding on coccinellids. **Dynamics** – Fully-winged. It has been seen occasionally at artificial lights.

428. *Agonum (Olisares) crenistriatum* (LeConte, 1863)

General Range – An east-central species. Transition, Upper Austral Zones. East to NS, Cape Breton, PE, ME (East Millinocket, Sebago), MA, CT, NY at Long and Staten Islands, NJ, MD, VA, south to SC, KY, AR, west to KS, SD, north to MN (Duluth), ON (Marmora, Ottawa), QC (Montreal, Iberville, and Saint Croix in Lotbinière County). **Local Range** – Vermont, two localities, Colchester and Isle LaMotte in the northern Champlain Valley. New Hampshire, five localities, Rumney, Plymouth, and Webster in the Merrimack Valley, and Rye and Hampton on the coast. **Habitat** – The Colchester specimen was from an area of sand dunes (since destroyed). Those from Isle LaMotte were on limestone pavements (alvars). Elsewhere this species has been collected from other hot, dry habitats, such as gravel pits, sandy fields and croplands, sea and lake shores. **Life Cycle** – Tenerals June, July. **Behavior** – Nocturnal. It has been seen feeding on corn in the field. **Dynamics** – Fully-winged, occasional flier. It is occasional in drift.

429. *Agonum (Olisares) cupripenne* (Say, 1823)

General Range – A transcontinental species. Hudsonian to Upper Austral Zones. East to Anticosti QC, PE, NS (Cape Breton Island and mainland), ME, MA, CT, NJ, MD, VA, SC, south to GA, TN, MO, KS, NM, AZ, west to CA, OR, WA, BC (Vancouver City, Terrace), north to NT (Norman Wells), ON (Cochrane), QC (Abitibi, Chibougamau, Roberval, Saint-Fidèle, Gaspésie). **Local Range** – Vermont, 42 localities, throughout; New Hampshire, 21 localities, throughout. *Color Variation* – The most common color morph is metallic green with the inner intervals contrasting coppery red. Rare individuals are blue with the inner intervals gold, or dark green with the inner intervals black. In Vermont there are other individuals which are entirely green without contrast between inner and outer intervals. These may be 5-10% of the population in some areas. **Habitat** – Open, usually grassy habitats. Both natural and artificial, including pastures, lawns, croplands, open grassy ledges, alpine tundra. **Life Cycle** – Mating May-June; tenerals July-September. **Behavior** – Diurnal. It has been observed in the field feeding on flies, coccinellid beetles, and orthopterans (Larochelle and Larivière 2003). Sometimes climbs on plants. **Dynamics** – A frequent flier, fully-winged.

430. *Agonum (Olisares) deceptivum* (LeConte, 1879)

General Range – A northeastern species. Canadian Zone. East to NS (Kedgemakooge, Medway on the south coast), south to ME (Mount Desert), west to MA (Wayland, Sudbury, both on Sudbury River, slightly west of Boston), north to ME (Chesuncook Lake), Cape Breton Island (Orangedale on the Bras D'Or "Lake"). **Local Range** – Vermont, no records; New Hampshire, one locality, Hampton on the Atlantic coast. **Habitat** – The NH specimen was from a brackish marsh. Some of the ME examples are from freshwater marshes far inland. **Life Cycle** – Active in April-May, August (Larochelle and Larivière 2003). **Behavior** – Nocturnal. **Dynamics** – Fully-winged.

431. *Agonum (Olisares) decorum* (Say, 1823)

General Range – A transcontinental species. Transitional, Austral Zones. East to MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, GA, south to FL, AL, LA, TX, Mexico (Tehuantepec), also Cuba, Hispaniola, Jamaica, Cayman Islands, NM, AZ, CA, west to OR, WA, BC (Vancouver Island), north to MT, SK, MB, (Brandon, Winnipeg), ON (Lake Isaac in E. Oliphant, Lake Huron, Marmora, Ottawa), QC (Fort Coulonge, Saint Eustache, Orford Lake). **Local Range** – Vermont, 19 localities, mostly from the shores of Lake Champlain from Alburgh south to Benson, other localities are Bristol and Shoreham. New Hampshire, two localities, Pelham and Hampton. **Habitat** – Muddy shorelines of lakes and slow rivers, often amid vegetation. In our area, limited to very low elevations, 30-200 m. **Life Cycle** – Tenerals July-August. **Behavior** – Mostly nocturnal. Occasionally climbs on herbs, bushes. **Dynamics** – Fully-winged, frequent flier. Comes to lights. Also found in drift. **Variation** – Liebherr (1986) treated the complex polymorphism of this species. This beetle is either hairy or glabrous, and the pronotum either is colored like the head and elytra, or else is contrasting, with a clear orange color. All VT specimens are hairy, but bicolored and unicolored phases are common. The dark and hairy morph has a curious distribution, it is found in two widely separated areas: VT-QC and west TX-AZ.

432. *Agonum (Olisares) errans* (Say, 1823)

General Range – A transcontinental species. Transition, Upper Austral Zones. From QC (Saguenay River) to southeastern BC, south to OR, NM, and southeastern SC. **Local Range** – Vermont, recorded from VT in Bousquet 2012*a*. New Hampshire, recorded from NH in Bousquet

2012*a*. **Habitat** – River and lake shores, ponds, bogs and marshes. **Life Cycle** – Breeds in spring. **Behavior** – Nocturnal (Larochelle and Larivière 2003). **Dynamics** – Wings present, flight recorded.

433. *Agonum (Olisares) excavatum* Dejean, 1828

General Range – An east-central species. Transitional, Austral Zones. East to NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, south to GA, AL, LA, west to AR, IL, MN, north to ON (Long Point, Toronto, Ottawa), QC (Fort Coulonge, Roberval on Lac Saint Jean). **Local Range** – Vermont, 19 localities, in suitable habitats throughout the state except in the higher mountains. New Hampshire, 17 localities, north to Colebrook, Errol. A specimen from Mount Washington may be a stray flier. **Habitat** – Muddy ground by lakes, ponds, marshes, rivers, brooks, marshes, bogs. By day, hidden in burrows. **Life Cycle** – Mating May-June; tenerals July-August. **Behavior** – Nocturnal. Occasional climber. **Dynamics** – Fully-winged, occasional flier. Comes to lights.

434. *Agonum (Olisares) extensicolle* (Say, 1823)

General Range – An east-central species. Transitional, Upper and Lower Austral Zones. East to NS, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, central Mexico, west to CO, UT, WY (west of the Rockies only on the Green River), central AZ, MT (Helena), SK, north to MB (Victoria Beach), ON (Lake of the Woods, Sault Sainte Marie), QC (Nominingue, Roberval, Athabasca, Gaspésie). **Local Range** – Vermont, 129 localities, throughout; New Hampshire, 43 localities, throughout. **Habitat** – Abundant on many types of shoreline, from big rivers and lakes to shaded mountain brooks, up to 600 m. Most common on open, sandy or muddy shores with debris or stones to serve as cover. **Life Cycle** – Mating May-June; tenerals mid-June to September. **Behavior** – Usually nocturnal. Defensive fluid forms a cloud. **Dynamics** – Wings dimorphic, fully-winged specimens in the majority. Occasional flier, comes to light traps. Occasional in drift.

435. *Agonum (Olisares) ferreum* Haldeman, 1843

General Range – An east-central species. Upper Austral Zone, east to MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, south to GA, AL, MS, west to AR, KS, IL, WI, north to MI, ON (Bayfield on Lake Huron), NY (Rochester). **Local Range** – Vermont, present (no locality). New Hampshire, one locality, Grafton (collected by Schaeffer). This is likely

to be a stray flier rather than one from an established population. **Habitat** – Wet mud covered by dead leaves, usually shaded, by lakes, ponds, marshes, slow rivers. **Life Cycle** – Tenerals July. **Behavior** – Nocturnal. Occasional tree climber. **Dynamics** – Fully-winged, no flight records.

436. *Agonum (Olisares) fidele* Casey, 1920

General Range – An east-central species. Transition Zone. East to PE, Cape Breton Island, NS, ME, MA, CT, NY, MD, south (in mountains) to VA, NC, TN, (not in mountains) to OH, ON, MI, west to ON (Sault Sainte Marie), north to QC (Temiskaming, Port-au-Persil north of the Saint Lawrence, Bic south of the Saint Lawrence). **Local Range** – Vermont, 74 localities, throughout, at all elevations. New Hampshire, 26 localities, including all elevations from the White Mountains to the sea coast. **Habitat** – Muddy shorelines of lakes, rivers, ponds, and brooks. Less common than *A. melanarium* in the Missisquoi delta and the islands of Lake Champlain, but more common at beaver ponds and houses in the mountains, up to 1200 m. **Life Cycle** – Tenerals July-September. **Behavior** – Nocturnal. Sometimes climbs on plants. **Dynamics** – Fully-winged, an occasional flier. Flight in sunshine, also at night.

437. *Agonum (Olisares) harrisii* LeConte, 1846

General Range – A transcontinental species. Lower Canadian, Transition Zones. East to Îles-de-la-Madeleine, PE, Cape Breton, NS, ME, MA, CT, NY at Long Island, PA, south to OH, MI, WI, MN, MT, WY, west to OR, WA, BC, Vancouver Island, north to BC (Chilcotin), AB (Hussar), MB (Victoria Beach, Husavick), ON (Long Lac, Gravenhurst, Ottawa), QC (Mattagami, Lac Saint Jean). **Local Range** - Vermont, 44 localities, throughout the state. New Hampshire, 24 localities, throughout, including the White Mountains, the Boreal Plateau, and the coastal plain. **Habitat** – Among sedges in soft mud by ponds, lakes, and slow streams. Common by beaver ponds. It is found on islands in Lake Champlain and by the ponds on Mount Mansfield. Sometimes common in *Sphagnum* bogs. Habitat similar to *A. tenue*, but ascending to the highest mountain peaks. **Life Cycle** – Mating early June; tenerals July and August. **Behavior** – Largely nocturnal. **Dynamics** – Fully-winged frequent flier. Appears at artificial lights.

438. *Agonum (Olisares) melanarium* Dejean, 1828

General Range – A transcontinental species. Upper Canadian to Upper Austral Zones. East to PE and Cape Breton Island, NS. **Local Range** – Vermont, 75 localities, throughout, except in the higher mountains. New Hampshire, 51 localities, throughout, except in the highest mountains. **Habitat** – Soft, wet mud of shorelines of lakes and rivers, wet spots in bottomland forests, among sedges (*Carex*) or cattails (*Typha*), around beaver dams and in beaver houses, not above 800 m. **Life Cycle** – Mating in June; tenerals May-December, mostly after mid-July (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. Gregarious in winter. **Dynamics** – Fully-winged, a frequent flier. It flies in sunlight, at dusk, or in the dark.

439. *Agonum (Olisares) metallescens* (LeConte, 1854)

General Range – A nearly transcontinental species. Upper Canadian Zone. East to NF, QC (Anticosti, Îles-de-la-Madeleine), Cape Breton, NS, ME, south to MA, NY (Adirondacks), ON (Bala, Gravenhurst), MI, WI, MN, MT, AB (Crowsnest), west to BC (Manning Park, Quesnel Lake, Cranbrook, Revelstoke, Terrace), north to NT, QC (north Fort Rupert, Natashquan). **Local Range** – Vermont, 12 localities, in the main range of the Green Mountains from Waterville to Mount Tabor, also from the Worcester Range at Elmore, northeastern localities include Craftsbury, Hardwick, Wheelock, Barnet, and Morgan. New Hampshire, 12 localities, all in the White Mountains and the Boreal Plateau, north to the Canadian border, south to Monroe and Mount Washington. **Habitat** – Marshes and pond margins on soft mud, usually among sedges, 300 m and above. **Life Cycle** – Tenerals July-September. **Behavior** – Mostly nocturnal. Sometimes climbs on shrubs and herbs. **Dynamics** – Fully-winged, a frequent flier.

440. *Agonum (Olisares) moerens* Dejean, 1828

General Range – An east-central species. Transition and Austral Zones. East to ME (Waterville), CT, NJ, VA, SC (Gapsden in coastal plain), south to GA, FL, AL, LA, west to TN, IN (Elhart), WI, MB (Stonewall, 15 km northwest of Winnipeg), north to ON (Point Pelee), QC (La Trappe in extreme south). **Local Range** – Vermont, three localities, Colchester (mouth of the Lamoille River), Swanton (Long Marsh), Highgate (Metcalf Island). The last two localities are in the Missisquoi Wildlife Refuge, and the delta of the Missisquoi River. New Hampshire,

no records, but probably present. **Habitat** – Soft, wet mud by ponds, streams, and fens. In VT restricted to very low elevations, below 35 m near Lake Champlain. **Life Cycle** – Tenerals July. **Behavior** – Largely nocturnal. Occasionally climbs trees. **Dynamics** – Fully-winged. Occasionally taken at artificial lights and in malaise traps.

441. *Agonum (Olisares) mutatum* (Gemminger & Harold, 1868)

General Range – A transcontinental species. Hudsonian, Canadian, and Transition Zones. East to LB (Goose Bay), NF, Îles-de-la-Madeleine, Cape Breton Island, NS, ME, MA, CT, NJ, DE, NC, south to SC (Florence), WV, OH, IN, MI, WI, MN, MB, SK, BC (Oliver), west to AK (Circle), northern limit poorly known. The AK record suggests this species should be widespread in the YT and NT. In QC, north to Opinaca River. **Local Range** – Vermont, 33 localities, throughout; New Hampshire, 11 localities, throughout, from Pittsburg to Hinsdale and Hampton. **Habitat** – In *Sphagnum* mats. In lowland areas, confined to true bogs, but in higher areas, in patches of *Sphagnum* bordering beaver ponds and in small isolated patches wherever they occur in the mountains. Up to 900 m on Mount Mansfield. **Life Cycle** – Mating in July; tenerals July-August. **Behavior** – Nocturnal. Has been seen climbing on plants. **Dynamics** – Wings dimorphic in most specimens, reduced in size, though with complete venation. A few with full-sized wings are probably capable of flight.

442. *Agonum (Olisares) nutans* (Say, 1823)

General Range – An east-central species. Transition and Austral Zones. East to ME, MA, CT, NY at Long and Staten Islands, NJ, DE, south to FL, AL, MS, west to OK, KS, NE, SD, north to WI, MI, ON (Toronto, Trenton), QC (Port Neuf, Athabasca). **Local Range** – Vermont, three localities, South Burlington, Shelburne Pond, Snake Mountain. New Hampshire, four localities, Mount Washington, Durham, Hampton, Exeter. **Habitat** – The VT specimens (excepting the light trap one) were taken on limestone pavements (alvars). In MN, Tinerella and Rider (2001) found this species to be common in tallgrass prairies. **Life Cycle** – Tenerals early July-September. **Behavior** – Mostly nocturnal. Frequently climbs on trees. **Dynamics** – Fully-winged, a frequent flier. Common in lake drift.

443. *Agonum (Olisares) octopunctatum* (Fabricius, 1798)

General Range – An east-central species. Lower Canadian to Lower Austral Zones. East to NS, ME, MA, CT, NY (Long and Staten Islands), DE, VA, NC, GA, south to FL, MS, LA, TX, west to OK, KS, IA, MN, north to ON (Ingolf near Lake of the Woods, Sudbury), QC (Fort Coulonge, Lac Saint Jean). **Local Range** – Vermont, 11 localities, along Lake Champlain and along the big rivers. On the Lamoille River at E. Georgia, on the Winooski River at Jonesville, Richmond and Burlington, on the Connecticut River at Maidstone, Norwich, and Vernon. One specimen from the top of Mount Mansfield was probably a stray flier. New Hampshire, 12 localities, north to Monroe, not recorded from the White Mountains or north of them. Six localities are near the sea coast. **Habitat** – On bare, wet mud or mixed mud and sand, in VT along the larger rivers and Lake Champlain. In wet weather it invades open fields. **Life Cycle** – Mating June-July (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. Has been seen feeding on caterpillars. Occasionally climbs on trees. **Dynamics** – Fully-winged, a frequent flier. Flies at night, or at dusk, or in rain (Larochelle and Larivière 2003).

444. *Agonum (Olisares) propinquum* (Gemminger & Harold, 1868)

General Range – A transcontinental species. Canadian and Transition Zones. East to NF, QC at Anticosti, Îles-de-la-Madeleine, PE, ME (Lily Bay Township, Long Pond Township, all in the north), MA, CT (Thompson in the northeast corner), NY (south to Batavia), south to NJ, ON (Grand Bend), MI, IN, WI, MN, MB, WY, ID, OR, west to WA, BC (the coast, also Vancouver Island), AK (Circle), north to YT (Dawson), NT, QC (Lac Mistassini, also Rivière-au-Tonnere). **Local Range** – Vermont, 11 localities, all in the north, south to Ferrisburgh (Lewis Creek mouth), Elmore (Bedell Brook), Victory. New Hampshire, 13 localities, in the north, south to Littleton, Lancaster, and Errol, not in the White Mountains, also in the southeast in Durham, Hampton, Salem, and Pelham. **Habitat** – According to Lindroth (1966), this species is found at "borders of standing waters, often quite small pools. It prefers rather firm soil, usually with mixture of organic matters and moderate dense vegetation, e.g., *Carex rostrata*, *Eleocharis palustris*, often with moss carpet, *e.g*., *Drepanocladus aduncus* (hooked moss)." Most of the VT localities come from areas bordered by calcareous rocks. **Life Cycle** – Mating May-June, eggs laid early July, tenerals late June-November. **Behavior** – Nocturnal. **Dynamics** – Fully-winged. Flight toward lights observed in the laboratory.

445. *Agonum (Olisares) punctiforme* (Say, 1823)

General Range – A transcontinental species. Austral Zone. East to MA, CT, NY at Long and Staten Islands, NJ, DE, VA, SC, GA, south to FL, AL, LA, TX, west to KS, MO, WI, north to ON (Belleville), NY (Rochester, Hebron), MA. An isolated population in CA and AZ. **Local Range** – Vermont, one locality, East Dorset; New Hampshire, two localities, Exeter and Hampton. Limited to the extreme south in both states. **Habitat** – Open areas such as croplands, pastures, also forests. **Life Cycle** – Tenerals April-July, mostly in July. **Behavior** – Mostly nocturnal. Feeds on other insects, especially Chrysomelidae. Occasionally found climbing on bushes, trees. The pygidial glands give a cloud of vapor, as in bombardier beetles. **Dynamics** – Fully-winged, a frequent flier. It comes to lights at night.

446. *Agonum (Olisares) rufipes* Dejean, 1828

General Range – An east-central species. Transitional and Upper Austral Zones. East to CT, NY at Long and Staten Islands, MD, NC, south to AL, TN, AR, TX, west to KS, SD, north to MO, IL, MI, ON (Grand Bend, Toronto, Isle of Quinte). Isolated population in CA, AZ. **Local Range** – Vermont, no records. New Hampshire, one locality, Hampton (1905). This specimen may have been in ocean drift or a stray flier. **Habitat** – Forests, including bottomlands and more open forests. **Life Cycle** – Active in all months except November (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. **Dynamics** – Fully-winged, an occasional flier. Occasional in drift.

447. *Agonum (Olisares) tenue* (LeConte, 1854)

General Range – An east-central species. Transition and Upper Austral Zones. East to Cape Breton, NS, ME, MA, CT, NJ, DE, NC, SC, GA, south to PA, OH, IN, WI, MN, west to ON (Sioux Lookout), north to ON (Parry Sound), QC (Fort Coulonge, Lac Saint Jean, Gaspésie). **Local Range** – Vermont, 42 localities, throughout. New Hampshire, 35 localities, throughout, except for the high mountains. **Habitat** – On soft, usually wet mud, among cattails (*Typha*) and *Carex* sedges bordering ponds or slow streams, sometimes in *Sphagnum* bogs. Habitat like that of *A. harrisi*, but restricted to lower elevations, not recorded over 400 m. **Life Cycle** – Tenerals July-August. **Behavior** – Occasional climber of trees. **Dynamics** – Fully-winged, frequent flier. It comes to artificial lights and is frequent in drift.

448. *Agonum (Olisares) trigeminum* Lindroth, 1954

General Range – An east-central species. Lower Canadian and Transition Zones. East to NS (Yarmouth), ME, MA, CT, PA, NC, south to OH, WI, west to MB (Victoria Beach), north to ON (Parry Sound), QC (Mattagami in Mistassini District, Kamouraska on south shore of the Saint Lawrence). **Local Range** – Vermont, 14 localities, throughout; New Hampshire, 18 localities, throughout. **Habitat** – Among sedges, alders, or willows. Along small, slow streams, and near beaver ponds. It appears to require less shade than *A. melanarium*. **Life Cycle** – Tenerals July-August (Larochelle and Larivière 2003). **Behavior** – Mostly nocturnal. Occasional climber on plants (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, occasional flier. Flight demonstrated by presence at artificial lights and in ocean drift.

Genus *Platynus*

449. *Platynus (Platynus) decentis* (Say, 1823)

General Range – A transcontinental species. Canadian, Transition and Upper Austral Zones. East to LB (Goose Bay), NF, QC at Anticosti, Gaspésie, Îles-de-la-Madeleine, NS, Cape Breton Island, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to AL, AR, TX, NM, west to UT, ID, OR, WA, BC, AK (Anchorage), north to NT (Norman Wells, Yellowknife), ON (Moose Factory), QC (Opinaca River at 60° N. lat.). **Local Range** – Vermont, 121 localities, common in all parts of the state, from Lake Champlain to the highest mountains. New Hampshire, 37 localities, throughout. **Habitat** – Forests of almost every type, especially abundant near pools or ponds. In beaver dams and occasionally in beaver houses. **Life Cycle** – Mating late June; tenerals April-December, mostly from mid-July to early November in VT. **Behavior** – Mostly nocturnal, but occasionally active by day on shrubs such as willows, dogwoods, and hazels. Feeds on caterpillars and other larvae, considered to be an important predator on spruce budworm (*Choristoneura fumiferana*). Although common on the ground, it is also a frequent climber, ascending trees and sometimes sheltering there by day. Krinsky and Godwin (1990) captured it by using pyrethrum spray in the canopy of hickory trees. It is a good swimmer at the water surface. **Dynamics** – Hind wings complete but small. There are no flight records, probably flightless.

450. *Platynus (Platynus) indecentis* Liebherr & Will, 1996

General Range – NS, ME, CT, MD, south to WV, west to eastern OH, north to ON, QC. **Local Range** – Vermont, seven localities, Waterville, Bolton, Morristown, Huntington, Bristol, Clarendon, Whitingham. New Hampshire, recorded from NH in Bousquet 2012*a*. **Habitat** – In or near *Sphagnum* bogs. **Life Cycle** – A spring breeder. **Behavior** – Nocturnal. Regular climber on trees (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, no flight records.

451. *Platynus (Platynus) opaculus* LeConte, 1863

General Range – A northeastern species, Transition Zone. East to NH, MA, CT, NY at Long Island, south to NJ, OH, IN, west to WI, north to ON, QC (southwest only, from Nomininge to Phillipsburg). **Local Range** – Vermont, 19 localities, south to Peru, north to the Missisquoi delta and North Hero island, many records along Lake Champlain, south to Ferrisburgh, east to W. Elmore, also Mount Mansfield, Camels Hump. New Hampshire, three localities, Pelham, Salem, Durham. **Habitat** – Usually found beneath loose bark or living or dead trees standing in water. Fairly frequent in such trees in beaver ponds. Common in lakeside forest in the spring, where it is behind the loose plates of bark of living silver maple trees and can be collected from a canoe. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. A nimble climber on tree trunks. If pursued, it readily dives in the water, and may remain submerged for up to four minutes, it is a strong swimmer. **Dynamics** – Hind wings complete, a strong flier. The specimen from Camel's Hump was observed to take flight just after sunset, and to fly immediately to a flashlight.

452. *Platynus (Platynus) daviesi* Bousquet, 2012

General Range – An eastern species, recently split from *P. parmarginatus* (Bousquet 2012*b*). Upper Austral Zone. East to MA, CT, MD, VA, NC, SC, south to AL, west to TN, PA, north to NY, VT, NH. **Local Range** – Vermont, one locality, Bryant Mountain in Salisbury (this represents a NEW STATE RECORD). It was captured in a study of foci of gypsy moth infestations on a dry limestone ridge with oak forest. New Hampshire, one locality, New Boston, in the Merrimack Valley in Hillsborough County (this represents a NEW STATE RECORD). **Habitat** – The VT specimen was found in oak forest. Further south it is reported to favor humid ravines. **Life Cycle** – Tenerals late July–August. **Behavior** – Mostly nocturnal. By day, usually rests under loose bark.

Probably more arboreal than *P. tenuicollis*, it has been caught under bands of burlap around tree trunks. It has been seen preying on caterpillars. **Dynamics** – Fully-winged, occasional flier.

453. *Platynus (Platynus) tenuicollis* (LeConte, 1846)

General Range – An east-central species. Lower Canadian to Lower Austral Zones. East to NS, Cape Breton Island, ME, MA, CT, NY at Long and Staten Islands, NJ, VA, NC, SC, GA, south to FL, AL, LA, west to AR, MO, IA, SD, MN, north to ON (Nipigon, Michipicoten Island, Ottawa), QC (Lake Mistassini, Roberval, Gaspésie). **Local Range** – Vermont, 18 localities, throughout the state at all elevations. New Hampshire, 12 localities, from Pittsburg to Hollis, probably throughout except above tree line. One record from Mount Washington (Darlington 1931) perhaps was a flier intercepted by the peak.
Habitat – Forests at all elevations. Commonest along small, tumbling brooks where it may be found among the stones. Elsewhere it has been found in caves. Up to 800 m elevation. **Life Cycle** – Tenerals mid-June to September. **Behavior** – Nocturnal. By day, usually rests under rocks along streams. An occasional tree climber. **Dynamics** – Fully-winged, occasional flier. Has been caught in light and Malaise traps.

454. *Platynus (Batenus) cincticollis* (Say, 1823)

General Range – An east-central species. Transitional and Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, WV, NC, GA, south to FL, AL, LA, TX, west to AR, IL, north to MI, ON (Point Pelee, Ottawa), QC (Lake Nominingue, Rouville County on Richelieu River). **Local Range** – Vermont, three localities, Shelburne, Burlington, Mount Mansfield. New Hampshire, three localities, all in the southeast, Hampton Beach, Seabrook, Pelham. **Habitat** – Floodplain forests and forests bordering ponds, slow streams. Occasionally found in beaver houses, in tree cavities, or under plant debris on beaches. **Life Cycle** – Tenerals April and September. **Behavior** – Nocturnal. It has been seen feeding on corn in the field. This is unlikely to be more than an occasional exception to a largely carnivorous diet. It is a frequent climber on trees and smaller plants. **Dynamics** – Fully-winged, occasional flier. Frequent in drift.

455. *Platynus (Batenus) hypolithos* (Say, 1823)

General Range – Largely an Appalachian species with a limited spread into the upper Midwest. Transition Zone. East to NY, PA, MD, south to

WV, KY, west to IA, north to MI, ON (Bayfield, Toronto, Coburg). **Local Range** – Vermont, 19 localities, southern two-thirds of the state. New Hampshire, no records. This species was not known east of the Hudson River until 1939 (Bell 1992). In NY east of the Hudson, it appeared in New Lebanon, probably as a result of the construction of several bridges over the Hudson. The oldest Vermont record is from 1965 in Weston. By 1970, this beetle occupied the two southern counties, north to Dorset and Weston, and east to Westminster, on the Connecticut River. Since then it has continued to spread. By 1987, it reached Lincoln, Ripton, and Rochester. In 2008, it reached Hartford on the Connecticut River. **Habitat** – Deciduous forests and their margins, up to 518 m elevation. The most northern locality is also the highest, indicating that the present northern limit is not caused by intolerance of winter cold, but rather from the slow advance northward of a flightless species. **Life Cycle** – Tenerals late May-September, mostly after mid-July. **Behavior** – Nocturnal. It has been seen feeding on caterpillars. Frequently climbs on bushes and trees. **Dynamics** – Wings vestigial, flightless.

456. *Platynus (Batenus) mannerheimii* (Dejean, 1828)

General Range – A Holarctic species. Hudsonian and Canadian Zones. In the Old World, in the far north and the mountains of Scandinavia, in Russia, south to Nizhne Novgorod, in western Siberia, north to the mouth of the Ob, and to Obskaya Guba, in eastern Siberia to the Altai Mountains, and from Lake Baikal to the Pacific Ocean. In North America, east to LB (Cartwright 53º N lat., Red Bay), NF, QC at Îles-de-la-Madeleine, NS, ME, south to NY (Adirondacks), MI, WI, MN, MB, SK, AB (Edmonton), BC, west to AK (south coast to Anchorage, Kenai Peninsula, Kodiak Island, interior to Fairbanks), north to NT (Wrigley 62º N lat.), MB (Churchill), ON (Moose Factory), QC (Schefferville). **Local Range** – Vermont, 38 localities, in all segments of the main range of the Green Mountains, Westfield south to Stratton, Mount Equinox in the Taconic Range, Elmore in the Worcester Range, and Victory, Newark, and Morgan (Pherrins River Bog) on the Boreal Plateau. New Hampshire, eight localities, in the north, on the Boreal Plateau in Pittsburg, Stewartstown, Dixville, and Errol. In the White Mountains, from Mount Washington and Moosilauke. An isolated record from Durham. **Habitat** – In VT, usually in or around small *Sphagnum* patches in coniferous forest about 600 m elevation. On the Boreal Plateau, around beaver ponds as low as 320 m elevation. Apparently *not* in relict bogs in lowlands (unless the Durham, NH specimen is an exception). **Life Cycle** – Tenerals June-August (mostly August). **Behavior** – Mostly nocturnal, but sometimes observed by day climbing on alders and willows.

Frequently climbs shrubs, bushes, trees. Observed eating insect larvae. **Dynamics** – It has complete hind wings, but they are small and there are no flight records, probably flightless.

TRIBE PERIGONINI

One species in our fauna belongs to this tribe.

Genus *Perigona*

457. *Perigona (Trechicus) nigriceps* (Dejean, 1831)

General Range – Originally from southeast Asia or islands to the east of there, including New Guinea. Now nearly cosmopolitan in temperate and tropical climates. In North America, east to NS, ME, MA, CT, MD, NC, SC, GA, south to FL, LA, west to AR, IL, North to OH, ON (Rondeau Provincial park, Oakville, Burlington), QC (Gatineau, Deux Montagnes, Montreal, Quebec City, Sainte Catherine), isolated in the west in CA, OR. According to Lindroth (1957), it has been in Western Europe since the nineteenth century and in central Europe since 1902. **Local Range** – Vermont, four localities, Burlington, Castleton, Dorset, Manchester. New Hampshire, six localities, Bath and Haverhill in the Connecticut Valley, Manchester and Brookline in the Merrimack Valley, Lee and Durham in the southeast. **Habitat** – A secretive species, usually caught at light traps. It has been found in compost heaps, among vegetable refuse, in straw in animal enclosures, in sheep folds, and around the roots of peanuts. These habitats have scarcely been investigated in our states, so *Perigona nigriceps* may be much more common than indicated in local records. In New Guinea, we caught it in litter on the forest floor. **Life Cycle** – Tenerals in July, August. **Behavior** – Nocturnal and crepuscular. **Dynamics** – Fully-winged. It takes flight at dusk, flight has also been observed at lights.

TRIBE ATRANINI

One species, *Atranus pubescens*. Appearance like a Platynine, particularly like *Oxypselaphus* (both genera have pronotum and elytra pubescent) but *Atranus* has long, straight sides to the pronotum, while *Oxypselaphus* has a long, cordiform pronotum. *Atranus* has spongy pubescent front tarsi in the male, while *Oxypselaphus* has two rows of adhesive hairs. Also the *Atranus* larva has unequal claws, while claws

are equal in all Platynini. The adult *Atranus* has a bifid tooth on the mentum, as in *Olisthopus*, while all other Platynini have a single tooth.

Genus *Atranus*

458. *Atranus pubescens* (Dejean, 1828)

General Range – An east-central species. Transition and Upper Austral Zones. East to NB, ME, MA, NY (Long Island), MD, NC, GA, south to AL, LA, TX, west to KS, IA, north to IL, ME (north to Millinocket), MI, ON (Ottawa), QC (Roberval, near Lac Saint John). **Local Range** – Vermont, two localities, Underhill, about one mile from Nebraska Notch, Warren, at beaver pond on Clay Brook (Larochelle and Larivière 2003). New Hampshire, eight localities, north to Plymouth and Ossipee. **Habitat** – The specimens from Clay Brook were taken from an abandoned beaver house. Elsewhere, it has been found in heaps of leaves, sticks, and mud along rivers and brooks (flood debris) as well as beaver houses. The larva has been found in beaver houses (Bousquet 1985). **Life Cycle** – Tenerals late June-November (mostly after mid-July; Larochelle and Larivière 2003). **Behavior** – Nocturnal. A capable swimmer. **Dynamics** – Fully-winged. There are no records of flight.

TRIBE PENTAGONICINI

One species, *Pentagonica picticornis*. It looks similar to a *Lebia*, particularly *L. tricolor* or *L. viridipennis*, with an orange pronotum but dark head and elytra, however, the pronotum is unique, there are no hind angles or angular setae. Instead, the lateral margins converge obliquely, nearly meeting at the very short basal margins.

Genus *Pentagonica*

459. *Pentagonica picticornis* Bates, 1883

General Range – An east-central species. Transition and Upper Austral Zones. East to NH, NJ, MD, south to PA, OH, IN, IL, MO, KS, TX, west to NM, north to MI, ON (Batchawana Bay, Isle of Quinte), QC (Montreal area, north to Saint Hippolyte). Also recorded from Mexico and Central America. **Local Range** – Vermont, four localities, Shelburne (Shelburne Bay Park), Richmond, Stowe (specimen from a light trap), Bolton ("Trestle Hill" at 750 m). New Hampshire, one locality, Bath. **Habitat** – VT specimens are from rock ledges, quartzite in Shelburne, schist at

Bolton and Richmond. It has also been found under moss clumps on boulders near Montreal. **Life Cycle** – Active in February, May-October (Larochelle and Larivière 2003). **Behavior** – Largely diurnal. It climbs on plants. **Dynamics** – Fully-winged. It flies at least occasionally.

TRIBE ODACANTHINI

One species, *Colliuris pensylvanica*. Head and pronotum black. Elytra red, with transverse row of three black spots, also black spot at apex. Head tapers into long neck, pronotum very narrow, tubular.

Genus *Colliuris*

460. *Colliuris (Cosnania) pensylvanica* (Linnaeus, 1758)

General Range – An east-central species. Upper and Lower Austral Zones. East to ME (Waterville, Pittston), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, Mexico, west to TX, KS, NE, SD, north to ND, MN, MI, ON. **Local Range** – Vermont, 11 localities, north to Burlington and Stowe, in the Connecticut Valley at Putney, in the Champlain Valley, also in Richmond and Huntington, in the southwest at Rutland Town, Pawlet, Dorset, Sunderland, and Shaftsbury. New Hampshire, 11 localities, north to Bath and Haverhill, also a presumed stray flier on Mount Washington. Probably everywhere south of the White Mountains. **Habitat** – Open areas such as croplands, pastures, lawns and gardens, often in clumps of bushes or shrubs, or in tall grass areas. It has been found on leaves of corn. Not above 500 m, except for strays on mountain tops. **Life Cycle** – Activity observed in all months of the year (Larochelle and Larivière 2003). **Behavior** – Diurnal and nocturnal. A frequent climber on herbaceous plants. It feeds on caterpillars, insect eggs, and on seed bugs (Lygaeidae) and damsel bugs (Nabidae). **Dynamics** – Fully-winged, a frequent flier.

TRIBE CYCLOSOMINI

One species, *Tetragonoderus fasciatus*. It is small (4.5-5.0 mm), with a metallic head and pronotum, and elytra crossed by two pale fasciae. It looks similar to a *Bembidion*, but the last article of the maxillary palpus is nearly as long as the second to last, and the elytron is truncated.

Genus *Tetragonoderus*

461. *Tetragonoderus (Crossonychus) fasciatus* (Haldeman, 1843)

General Range – A transcontinental species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, Mexico, AZ, west to CA, north to IA, WI, MI, ON (shores of Great Lakes, from Grand Bend, Bayfield to Point Pelee, and to Belleville and the Isle of Quinte), NY (Buffalo, Finger Lakes) and VT. **Local Range** – Vermont, four localities, Vernon in the southeast, Milton (island in the mouth of the Lamoille River), Colchester, and South Burlington in the northwest. New Hampshire, eight localities, north to Walpole in the Connecticut Valley, to Litchfield in the Merrimack Valley, and to Lee in the east. **Habitat** – Dry sand areas near large rivers and lakes. In sunny spots, but usually near to shade. The specimens from the mouth of the Lamoille River were in a low ridge of fine gravel, a few centimeters high, which had been pushed up by ice expansion in the winter. All VT localities are from elevations of less than 90 m. **Life Cycle** – Tenerals in August. **Behavior** – Largely diurnal. When pursued, it takes wing. **Dynamics** – Fully-winged, a frequent flier.

TRIBE LEBIINI

A large tribe with truncate elytra, two supraorbital setae, pronotum with distinct hind angles. Four subtribes are: Cymindiina, Dromiina, Lebiina, Calleidina.

SUBTRIBE CYMINDIDINA

Middle tibia grooved on lateral face with row of lateral spines; tarsi pubescent dorsally, claws pectinate. Labial palpi with penultimate segments with three or more setae. Most species with hairy elytra. One genus, *Cymindis*. Two subgenera: *Tarulus* (6 species) and *Pinacodera* (2 species).

Genus *Cymindis*

Cymindis (Tarulus) Comparison of Ecology – *Cymindis cribricollis* and *C. neglecta* are species of dry forests. *C. neglecta* is smaller than *C. cribricollis* (7.5-9.0 mm vs. 8.5-11.0 mm). Three other species are species of more open country. Although *C. americana* is sometimes found in forests, it is bigger than *C. cribricollis* (10.5-16.0 mm vs. 8.4-

11.0 mm), and bigger than the other two open country species, *C. borealis* (7.5-10.0 mm) and *C. pilosa* (9.5-11.0 mm). The latter two species seem to be competing directly. However, *C. borealis* is a species of the Canadian Zone, while *C. pilosa* ranges from the Upper Austral Zone. They meet in the Transition Zone, where microclimates may determine which species occurs. *C. unicolor* is an arctic-alpine species, found in our states only on Mount Washington, where it doesn't compete with any other *Cymindis* species.

462. *Cymindis (Tarulus) americana* Dejean, 1826

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, SC, GA, south to FL, AL, LA, west to AR, KS, IA, SD, north to ON (Belleville, Isle de Quinte), QC (Montreal area). **Local Range** – Vermont, eight localities, Isle LaMotte and Shelburne Pond in the north, Bryant Mountain in Salisbury, north to Springfield in the Connecticut Valley. New Hampshire, six localities, north to Rumney in the Connecticut Valley, north to Walpole, other records from Swanzey, Concord, Durham, and Campton. **Habitat** – Both open ground and forest edges and clearings, up to 400 m elevation. **Life Cycle** – Tenerals in late July. **Behavior** – Nocturnal. It often shelters by day under imbedded rocks. **Dynamics** – Wings dimorphic. The fully-winged form is rare and is an occasional flier.

463. *Cymindis (Tarulus) borealis* LeConte, 1863

General Range – A largely east-central, Rocky Mountain species. Canadian, Transition Zones. East to NF, QC at Îles-de-la-Madeleine, Cape Breton Island, NS, NB, ME, CT, south to NY (Elmira), Long Island (Rockaway Beach), ON (Ottawa), MI WI, MN, SD, in the mountains south to NM, west to CO, WY, BC, BC (Vernon, Creston), north to AB (Edmonton), SK, MB, QC (Nominingue, Lac Saint Jean, Gaspésie). **Local Range** – Vermont, two localities, Dorset and Elmore. New Hampshire, three localities, all northern, Franconia, Whitefield, and Eaton. **Habitat** – Dry, thin, open grassland, 300-450 m. **Life Cycle** – Tenerals June-July. **Behavior** – Nocturnal. It over-winters either as an adult or a larva. **Dynamics** – Wings dimorphic. Fully-winged form is rare, and is occasionally found in ocean drift.

464. *Cymindis (Tarulus) cribricollis* Dejean, 1831

General Range – A transcontinental species. Hudsonian, Canadian, Transition Zones. East to LB (Forteau), NF, PE, QC at Anticosti, Îles-de-la-Madeleine, NS at Cape Breton Island, NB, ME, MA, CT, NY (Ithaca, Buffalo), south to NJ, PA, OH, MI, WI, MN, SD, in the mountains to NM and AZ, west to OR, WA, Vancouver Island, BC, north to YT (Whitehorse), NT (Fort Wrigley, Yellowknife), MB (Gillam), ON (Cochrane), QC (Schaefferville). **Local Range** –Vermont, 57 localities, all parts of the state. New Hampshire, 17 localities, north to Pittsburg, south to Brookline and Seabrook. It has been taken on Mount Washington. **Habitat** – Forest edges, thin forests, clearings, oak woods on limestone ridges, in mountain forests up to 600 m. **Life Cycle** – Tenerals, late June-August. **Behavior** – Nocturnal. Adult preys on caterpillars. It does *not* climb on plants. In late fall it sometimes collects in numbers under flat rocks which are warmed by the sun on south-facing slopes. **Dynamics** – Wings dimorphic, the fully-winged form is rare. Occasionally taken at light traps.

465. *Cymindis (Tarulus) neglecta* Haldeman, 1843

General Range – An east-central species. Lower Canadian, Transition, Upper Austral Zones. East to NS, NB, ME, MA, CT, NY at Staten Island, NJ, DC, VA, south to SC, OH, IN, IL, IA, west to SD, north to AB (Upper Hay River Post), SK, MB (Aweme), MN, WI, MI, ON (Toronto, Isle of Quinte), QC (Laniel, Nominingue, Lac Saint Jean, Portneuf). **Local Range** – Vermont, 17 localities, all parts of the state, except in the high mountains. New Hampshire, eight localities, Swanzey, Lyndeborough, and Brookline in the southwest, Eaton, Meredith, and Effingham are the most northern, Hampton Falls and Seabrook in the southeast. **Habitat** – Forest edges, thin forests, oak forests on limestone ridges, more restricted to shade than *C. cribricollis*. Up to 430 m elevation. **Life Cycle** – Tenerals July-August. **Behavior** – Nocturnal. **Dynamics** – 3% fully-winged, 97% vestigial-winged. Fully-winged individuals have been taken at light traps.

466. *Cymindis (Tarulus) pilosa* Say, 1823

General Range – An east-central species. Transition and Upper Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC in the mountains, south to GA, TN, AR, KS, west to NE, SD, north to ND, MN, WI, MI, ON (Toronto, Ottawa), QC (Pontiac

County, Aylmer, Shawbridge, Sainte Foy, Charlevoix, Kamouraska County). **Local Range** – Vermont, 12 localities, north to Colchester, Albany, and Newark. New Hampshire, six localities, north to Shelburne and Franconia, and southeast at Durham, Hampton, and Seabrook. **Habitat** – Usually on unshaded ground with sand, up to 400 m elevation. I have collected several from the lichen-covered bottoms of old cellar holes. **Life Cycle** – Tenerals late May-late July. **Behavior** – Nocturnal. **Dynamics** – Wings dimorphic, approximately one in three are fully-winged. A fully-winged specimen was taken at a light trap.

467. *Cymindis (Tarulus) unicolor* Kirby, 1837

General Range – A transcontinental species. Arctic-Alpine, Hudsonian Zones. East to LB, NF, south to ME (Mount Katahdin), NH, QC (Blanc Sablon, Mont Jacques-Cartier, Poste-de-la-Baleine), ON (Port Arthur), MB (Churchill), in mountains south to CO, CA, west to WA, BC, AK (Mount McKinley, New Rampart House), north to YT, NT (Padley, Aklavik), NU (Cornwallis Island at 75° N lat., Baffin Island). **Local Range** – Vermont, no records. New Hampshire, one locality, Mount Washington. **Habitat** – Alpine tundra. **Life Cycle** – Active in June-September; gravid females in early July (Larochelle and Larivière 2003). **Behavior** – Nocturnal. It shelters under flat stones. **Dynamics** – Probably constantly vestigial-winged and flightless.

468. *Cymindis (Pinacodera) limbata* Dejean, 1831

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, SC, GA, south to FL, AL, LA, west to TX, AR, MO, north to ND, MN, WI, MI, ON (Point Pelee, Grand Bend, Belleville, Petawawa), QC (Laniel, Chateauguay, Baie Missisquoi). **Local Range** – Vermont, seven localities, north to Essex, near Lake Champlain in South Burlington and Shelburne Bay, on limestone ridges in Bristol, Middlebury, and Salisbury, in the south at Pownal. There are no records east of the main range. New Hampshire, 14 localities, west to Brookline, New Boston, and Concord, north to Easton, Ossipee, and Cliftonborough, on the coast at Rye, Hampton, and Seabrook. Not recorded from the Connecticut Valley. **Habitat** – Forests and orchards, oak forest on dry limestone ridges. This species overlaps in ecology with *P. platicollis*. **Life Cycle** – Tenerals in July. **Behavior** – Largely nocturnal. Adult is arboreal, larva is terrestrial. Adult hides by day under

bark, under cover on the ground, and in squirrel nests; preys on caterpillars. **Dynamics** – Fully-winged, a frequent flier.

469. *Cymindis (Pinacodera) platicollis* (Say, 1823)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, SC, GA, south to FL, AL, LA, west to TX, OK, NE, north to IA, WI, MI, ON (Point Pelee, Rockway, Belleville), QC (Mont Saint Gregoire). **Local Range** – Vermont, four localities, Westford, Colchester, Richmond, Salisbury (Bryant Mountain). New Hampshire, 11 localities, west to Concord and Brookline, north to Easton and Ossipee, on the coast at Hampton and Seabrook. Not recorded from the Connecticut Valley. **Habitat** – Forests and orchards. In dry oak forest on limestone ridges, also on oaks and pines in sand barrens. This species not different in ecology from *C. limbata*, except this one has been reported from sand barrens. **Life Cycle** – Tenerals in August. **Behavior** – Largely nocturnal. Adult is arboreal, larva is terrestrial. Adult preys on caterpillars. **Dynamics** – Fully-winged, a frequent flier.

SUBTRIBE DROMIINA

Claws denticulate or smooth, never pectinate. Five genera:

Dromius (1 species) Larger than other Dromiina, 6 or 7 mm. Elytra with nearly straight sides, slightly wider posteriorly.

Microlestes (1 species) Small, 3.0-3.8 mm. Black. Pronotum sinuate anterior to and medial to hind angles. Apex of elytra completely transverse. Mentum without tooth.

Apristus (2 species) Small, 4.4 mm or less. Black, slightly bronzed. Striae impressed. Claws smooth. Mentum with small, single tooth.

Syntomus (1 species) Small, 2.7-3.5 mm. Black. Pronotum with lateral margin and base scarcely sinuate, but apex of elytron sinuate at level of stria IV. Mentum with bifid median tooth.

Axinopalpus (1 species) Small, 3.0-3.5 mm. Blackish, with large yellowish humeral spot. Labial palpus with last segment triangular, maxillary palpus with last segment elongate.

Genus *Dromius*

470. *Dromius (Dromius) piceus* Dejean, 1831

General Range – A transcontinental species. Canadian, Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, NC, SC, south to GA, AL, LA, TX, AZ, west to CA, OR, WA, Vancouver Island, north to BC (Terrace), AB (Edmonton), MB (Miami, Treesbank), ON (Lake Nipigon), QC (Abitibi, Lac Saint Jean, Gaspésie). **Local Range** – Vermont, 17 localities, probably statewide except in the high mountains and the Boreal Plateau, northeast to Sheffield. New Hampshire, 17 localities, statewide, including Mount Washington. **Habitat** – Forests of most types where it lives on tree trunks and in the canopy, up at least to 700 m elevation. **Life Cycle** – Egg-laying May-June; tenerals July-September. **Behavior** – Nocturnal. Adults, larvae, and eggs are in trees. Adults fly from one tree to another; active on trunks just after sunset, move into the tree canopy later. The eggs are laid singly in depressions in bark, each is covered by fragments of bark and algae. This highly arboreal species descends to the ground only for hibernation. **Dynamics** – Fully-winged, a frequent flier.

Genus *Microlestes*

471. *Microlestes linearis* (LeConte, 1851)

General Range – A transcontinental species. Upper Austral Zone. East to NS, (Halifax), ME (Bristol), MA, CT, NY at Long Island, south to OH, IN, IL, AR, NE, CO, AZ, CA, west to OR, WA, BC, north to AB (Lethbridge), SK (North Battleford), MB (Brandon), ON (Ottawa), QC (Labelle, Val Racine by Lake Megantic). **Local Range** – Vermont, two localities, South Burlington, Underhill. New Hampshire, five localities, Rumney, and four in the southeast, Durham, Rye, Hampton, and Pelham. **Habitat** – Dry, unshaded ground with sparse vegetation, such as roadsides, gardens, upper parts of river banks. **Life Cycle** – Mating in May; tenerals in August. **Behavior** – Largely diurnal. **Dynamics** – Wings polymorphic. Mostly fully-winged, fully-winged morph is at least an occasional flier.

472. *Apristus latens* (LeConte, 1846)

General Range – An east-central species. Upper and Lower Austral Zones. East to NS at Cape Breton Island (Cheticamp), NH, MA, MD, VA, south to AL, TX, west to NM, CO, NE, MT, north to SK, MB, ON (Point Pelee), QC (Limbour in Gatineau). Note: discounting coastal records, south only to ON, MN, NE. **Local Range** – Vermont, two localities, Putney and Richmond. New Hampshire, four localities, Pittsburg, Hinsdale, Brookline, and Rye. **Habitat** – Dry, unshaded sand along rivers. **Life Cycle** – Tenerals in August. **Behavior** – Diurnal. It flies by day and will take wing to escape. **Dynamics** – Fully-winged, a frequent flier.

473. *Apristus subsulcatus* (Dejean, 1826)

General Range – An east-central species. Canadian, Transition, Upper and Lower Austral Zones. East to Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, SC, south to GA, AL, MS, AR, west to IL, MI, north to ON (Toronto, Ottawa), QC (Port-au-Saumon, Rimouski). **Local Range** – Vermont, 14 localities, probably statewide except in the highest mountains. New Hampshire, 11 localities, in the north, including Pittsburg, Errol, and Hart's Location. **Habitat** – Dry, unshaded sand, usually upper banks of rivers, also gravel pits, occasionally on bedrock. **Life Cycle** – Tenerals August-September, rarely in April. **Behavior** – Diurnal. It flies by day and will take wing to escape. **Dynamics** – Fully-winged, a frequent flier.

474. *Syntomus americanus* (Dejean, 1831)

General Range – A transcontinental species. Hudsonian, Canadian, Transition, Upper Austral Zone. East to LB, NF, QC at Anticosti, Îles-de-la-Madeleine, PE, Cape Breton Island, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, MD, VA, ND, south to OH, IN, IL, IA, NE, TX, NM, AZ, west to UT, OR, WA, Vancouver, AK (Circle, McKinley Park), north to YT (Carmacks), NT (Yellowknife), MB (between Oxford House and Norway House), ON (Lake Nipigon), QC (Opinaca River, Gaspésie). **Local Range** – Vermont 49 localities, statewide. New Hampshire, 24 localities, statewide. **Habitat** – Open or partly shaded lands, including clearings in forests, gardens, croplands, pastures. At all elevations including alpine tundra on Mount Mansfield. Especially common in some apple orchards. **Life Cycle** – Tenerals June-September,

also rarely in April. **Behavior** – Largely diurnal. Flies by day or by night. **Dynamics** – Wings dimorphic, largely vestigial-winged. The fully-winged form an occasional flier.

475. *Axinopalpus biplagiatus* (Dejean, 1825)

General Range – A transcontinental species. Transition, Upper and Lower Austral Zones. East to ME (Monmouth), MA, CT, NY at Long Island, NJ, DE, NC, GA, south to FL, AL, MO, KS, NM, AZ, west to CA, OR, WA, Vancouver Island, north to BC, AB (Medicine Hat, Lethbridge), SK, ON (Toronto, Ottawa), QC (Montreal area and down the Saint Lawrence to Portneuf). **Local Range** – Vermont, two localities, Dorset and Rutland Town. New Hampshire, five localities, Swanzey, Hampton, Rye, Durham, and Rumney (the most northern). **Habitat** – Open areas with short grass, also on flowers. **Life Cycle** – Tenerals in July. **Behavior** – Diurnal. Active in bright sunshine; flies largely at night. Adult climbs on trees and lower plants; visits flowers. **Dynamics** – Fully-winged, a frequent flier.

SUBTRIBE LEBIINA

Claws pectinate, head and pronotum relatively small, elytra short, wide. Elytron with three setae forming a triangle at outer apical angle, male with a notch near apex on the medial side. Larvae are parasitic on pupae of chrysomelid beetles.

One genus, two subgenera:

Loxopeza (3 species) Front tibia with two spurs (one of them proximal to antenna cleaner).

Lebia (12 species) Front tibia with only one spur, which is apical.

Genus *Lebia*

476. *Lebia (Loxopeza) atriventris* Say, 1823

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to ME (Auga, Vassalboro), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, west to NM, OK, KS, NE, SD, MT (Billings), north to SK (Saskatoon), MB (Winnipeg), ON (Grand Bend, Ottawa), QC

(Saguenay Valley, Lac Saint Jean, Kamouraska). **Local Range** – Vermont, 14 localities, in the west from Alburgh to Manchester, also Stowe and Elmore in the center of the state, no records from the Connecticut Valley. New Hampshire, eight localities, north to Bath, not in or north of the White Mountains. **Habitat** – Open areas, cultivated fields, abandoned fields, roadsides, areas with ragweed (*Ambrosia*), goldenrod (*Solidago*), and similar plants. **Life Cycle** – Tenerals June-August. **Behavior** – Largely diurnal. Usually found climbing on goldenrod, goosefoot (*Chenopodium*), dock (*Rumex*), golden aster (*Heterotheca*), ragweed. The host for the larva is the chrysomelid, *Zygogramma heterothecae*. **Dynamics** – Fully-winged, a frequent flier.

477. *Lebia (Loxopeza) grandis* Hentz, 1830

General Range – Before European settlement, a central species. Now an east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, south to GA, AL, LA, west to TX, OK, KS, NE, north to SD, MN, WI, MI, ON (Preston, Ottawa), QC (Mont Saint Hilaire). **Local Range** – Vermont, two localities, Hinesburg and Cornwall, both in the Champlain Valley. New Hampshire, four localities, Haverhill, Farmington, Durham, and Hampton. **Habitat** – Abandoned and cultivated fields, especially potato fields. **Life Cycle** – Active in January-December. Eggs laid singly in the soil (Larochelle and Larivière 2003). Larval host in this area is the Colorado potato beetle, *Leptinotarsa decemlineata*. **Behavior** – Diurnal. **Dynamics** – Fully-winged, frequently flies to lights. Occasionally found in drift, indicating flight (Larochelle and Larivière 2003).

478. *Lebia (Loxopeza) tricolor* Say, 1823

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, GA, south to FL, AL, LA, west to TX, AR, IA, MN, north to WI, MI, ON (Trenton, Toronto), QC (Hull area to Montreal, and down the Saint Lawrence to the Île-d'Orleans). **Local Range** – Vermont, 11 localities, eight of them from Chittenden County, also Manchester and Dorset in the southeast, and one in the Boreal Plateau at Lewis. New Hampshire, 14 localities, including Colebrook and Lancaster north of the White Mountains, also Mount Washington. **Habitat** – Open forests, thickets, orchards, hedges, and abandoned fields. **Life Cycle** – Tenerals August-September. Larval host unknown. **Behavior** – Diurnal. Found on flowers, especially on spirea (*Spiraea*), goldenrod (*Solidago*), dogwood

(*Cornus*), others. Possibly involved in mimicry with *Calleida punctata*. **Dynamics** – Fully-winged, a frequent flier.

479. *Lebia (Lebia) analis* Dejean, 1825

General Range – An east-central species. Upper and Lower Austral Zones. East to VT, MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, NM, west to AZ, CO, NE, SD, north to MN, WI, MI, ON. **Local Range** – Vermont, one locality, Burlington (Madge 1967), this is perhaps a single stray. New Hampshire, no records. **Habitat** – Cultivated and abandoned fields. **Life Cycle** – Larval host is probably the chrysomelid *Disonycha glabrata.* **Behavior** – Largely diurnal. Adults commonly found with flea beetles *Capraita* and *Disonycha*, which they mimic. Adult feeds on insect larvae, nymphs, pupae, and eggs. **Dynamics** – Fully-winged, frequent flier by day or night. Adult comes to light.

480. *Lebia (Lebia) fuscata* Dejean, 1825

General Range – A transcontinental species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL (Florida Keys), AL, LA, west to TX, KS, NE, MT (Bearpaw Mountains), south on coast to CA and OR, WA, BC at Langley Prairie, Robson, Vancouver Island, north to MB, ON (Sudbury), QC (Abitibi, Lac Saint Jean, Temiscouata). **Local Range** – Vermont, 17 localities, probably statewide. New Hampshire, 17 localities, Mount Washington and the north side of the White Mountains (Whitefield, Jefferson, and Shelburne). There are no records from north of the White Mountains, but the distribution is general south of them. **Habitat** – Forest margins and clearings, also weedy open areas, from 30-350 m elevation. **Life Cycle** – Mating in May; tenerals in July, August. **Behavior** – Diurnal. Active in sunshine on many kinds of plants, from trees to herbs. Commonest on willows (*Salix*), goldenrod (*Solidago*), and aspen (*Populus*). Adults have been found feeding on pupae and tenerals of the chrysomelids *Galerucella cavicollis*, *Trirhabda borealis*, and *T. virgata*. **Dynamics** – Fully-winged, a frequent flier.

481. *Lebia (Lebia) moesta* LeConte, 1850

General Range – A transcontinental species. Hudsonian, Canadian, Transition Zones. East to LB (Thunder River), NS, NB, ME, south to MA,

NY, NJ, MI, IL, MN, west to Vancouver Island, BC (Salmon Arm), north to AB (McMurray), MN, SK (Swift Current), MB, ON (Simcoe, Michipicoten River, Lake Nipigon), QC (Abitibi, Rivière-au-Tonnere). **Local Range** – Vermont, nine localities, south to Arlington and Dorset, collected at Fairlee in the Connecticut Valley. New Hampshire, four localities, including Mount Washington and three places in the south, Durham, Hampton, and Seabrook. **Habitat** – Open areas, forest edges, reaches the high mountains. **Life Cycle** – Active March-September, November; tenerals late August (Larochelle and Larivière 2003). **Behavior** – Adults found overwintering in leaf litter on higher and drier ground, at the edge of woods and on hillocks (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, occasional flier to lights. Moderate runner and frequent climber on plants, shrubs and trees (Larochelle and Larivière 2003).

482. *Lebia (Lebia) ornata* Say, 1823

General Range – An east-central species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, SC, GA, south to FL, AL, LA, west to TX, MO, NE, SD, north to MN (Duluth), WI, MI, ON (Leamington, Constance Bay), QC (Nominingue, Lac Saint Jean). **Local Range** – Vermont, 11 localities, probably statewide. New Hampshire, seven localities, from Littleton and Mount Washington south. **Habitat** – Forest edges, fence rows, open areas with tall weeds. It reaches 300 m elevation. **Life Cycle** – Mating in May; tenerals June-August. Larval host probably is the chrysomelid *Altica chalybea*, on grape (*Vitis*). **Behavior** – Largely diurnal. Active in sunshine on plants, most commonly on willows (*Salix*), cherries (*Prunus*), and goldenrods (*Solidago*), but also on many other trees, shrubs, and herbs. A good climber. **Dynamics** – Fully-winged, a frequent flier.

483. *Lebia (Lebia) pectita* Horn, 1885

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, SC, GA, south to FL, AL, LA, TX, west to NM, KS, north to IL, IN, KY, PA, NY (Ashokan). **Local Range** – Vermont, no records. New Hampshire, four localities, Wakefield and Pittsfield (Madge 1967), also Tamworth and Hampton. **Habitat** – Dry open areas, especially with tall weeds. **Life Cycle** – Active in April-October (Larochelle and Larivière 2003). **Behavior** – Diurnal. Active by day on flowers,

especially goldenrod (*Solidago*). A good climber. **Dynamics** – Fully-winged. It flies to lights.

484. *Lebia (Lebia) pleuritica* LeConte, 1846

General Range – An east-central species. Upper Austral Zone. East to VT, MA, NY at Long and Staten Islands, south to NJ, DC, PA, IL, IA, west to KS, SD, north to SK, MN, WI, MI, ON (Marmora, Isle of Quinte), NY (Buffalo). **Local Range** – Vermont, one locality, E. Dorset. New Hampshire, no records. **Habitat** – Open forests and meadows. **Life Cycle** – Larval host is the Colorado potato beetle (*Leptinotarsa decemlineata*). **Behavior** – Frequent climber. Often seen on goldenrod (*Solidago*) flowers and oak (*Quercus*) leaves. **Dynamics** – Fully-winged, a frequent flier.

485. *Lebia (Lebia) pulchella* Dejean, 1826

General Range – Nearly transcontinental. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, TX, NM, AZ, west to CA, CO, WY, ND, north to AB (Edmonton), SK (Swift Current), MB (Winnipeg), ON (Campden), NY (Peekskill). **Local Range** – Vermont, no records. New Hampshire, one locality, Conway (Madge 1967), probably a stray. **Habitat** – Abandoned and cultivated fields. **Life Cycle** – Active in March-October (Larochelle and Larivière 2003). **Behavior** – Diurnal. Climbs on plants. **Dynamics** – Fully-winged, a frequent flier.

486. *Lebia (Lebia) pumila* Dejean, 1831

General Range – A transcontinental species. Lower Canadian, Transition, Upper and Lower Austral Zones. East to NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DC, VA, NC, SC, GA, south to FL, AL, LA, west to TX, OK, KS, NE, SD, ND, WA (Olympia region), BC, north to AB (Medicine Hat), SK (Torch River), MB (Saint Lazare), ON (Nipigon, Moosonee), QC (Abitibi, Lac Saint Jean, Saguenay River, Lac Trois Saumons in L'Islet County). **Local Range** – Vermont, 14 localities, probably statewide, it has been taken on Mount Mansfield and at Brighton in the Boreal Plateau. New Hampshire, eight localities, north to Littleton and Tamworth. No records from the White Mountains or north of them. **Habitat** – Open areas, such as gardens, croplands, unmown weedy fields, openings in forests. **Life Cycle** – Tenerals July-August. **Behavior** – Largely diurnal.

Found on a great many plants of all sizes, especially on their flowers. Associated with the cryptocephaline chrysomelid *Lexiphanes saponatus*. **Dynamics** – Fully-winged, a frequent flier.

487. *Lebia (Lebia) solea* Hentz, 1830

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NS, ME (Auga, Vassalboro), MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL (Homestead), AL, LA, west to TX, CO, NE, SD, ND, SK (Swift Current), north to MB (Rosebank), ON (Ottawa), QC (Nominingue, Becancour). **Local Range** – Vermont, 13 localities, mostly in the Champlain Valley, the only record east of the main range is from Randolph. New Hampshire, 14 localities, Claremont, Haverhill, and Bath along the Connecticut River; Jefferson, Franconia, and Rumney in the White Mountains; Concord, Manchester, and Pelham in the Merrimack Valley; and five localities near the sea, from Seabrook to Dover. Not found north of the White Mountains. **Habitat** – Roadsides, parks, open forests, forest edges. **Life Cycle** – Active in January, March-November; tenerals in August (MD; Larochelle and Larivière 2003). **Behavior** – Host is probably the chrysomelid *Xanthogaleruca luteola*. **Dynamics** – Fully-winged, a frequent flier.

488. *Lebia (Lebia) viridipennis* Dejean, 1826

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long Island, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, west to TX, OK, KS, NE, SD, north to ND, MN, WI, MI, OH, QC (Aylmer). **Local Range** – Vermont, one locality, N. Ferrisburgh. New Hampshire, three localities, all in the extreme southeast, Pelham, Lee, and Durham. **Habitat** – Open areas, especially marshy ones. **Life Cycle** – Adults emerge in late summer and autumn. **Behavior** – Largely diurnal. On goldernrod (*Solidago*), also on other herbs, shrubs, and trees. **Dynamics** – Fully-winged, a frequent flier.

489. *Lebia (Lebia) viridis* Say, 1823

General Range – A transcontinental species, from sea to sea, and from YT to Mexico. Hudsonian, Canadian, Transition, Upper and Lower Austral Zones. East to PE, NS, NB, ME, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, LA, TX, UT, west to CA, OR, WA, Vancouver Island, BC, north to YT (Rampart House), NT

(Fort Simpson), AB, (McMurray), SK, MB, ON (Sudbury), QC (Abitibi, Lac Saint Jean, Mont Albert). **Local Range** – Vermont, 39 localities, throughout the state. New Hampshire, 18 localities, throughout the state, including Pittsburg and Mount Washington. **Habitat** – Open areas of all kinds. On a great variety of plants, including herbs, shrubs, and trees. **Life Cycle** – Tenerals July-September. Larval hosts are *Altica* and *Leptinotarsa* chrysomelids. **Behavior** – Diurnal. Frequent climber. Adult feeds on chrysomelid eggs, larvae, and pupae. Adult mimics the flea beetle *Altica woodsi*. **Dynamics** – Fully-winged, a frequent flier.

490. *Lebia (Lebia) vittata* (Fabricius, 1777)

General Range – A transcontinental species. Transition, Upper and Lower Austral Zones. East to NS (Truro), ME, MA, CT, NY at Long Island, NJ, DE, VA, NC, GA, south to FL, AL, LA, TX, NM, AZ, west to CA, OR, WA, north to BC (Fernie), AB (Edmonton), SK (Atten Lake, Cut Knife), MB (Winnipeg), ON (Isle of Quinte), QC (Nominingue, Montreal area, along the Saint Lawrence to Portneuf, also Granby, Plessisville). **Local Range** – Vermont, one locality, Woodstock. New Hampshire, three localities, Concord, Dover, Durham. **Habitat** – Open areas, especially those bordering streams and lakes. **Life Cycle** – Larval host is the chrysomelid *Disonycha alternata*, which feeds on willow (*Salix*). **Behavior** – Diurnal. Good climber on flowers of goldenrod (*Solidago*), spirea (*Spiraea*), amaranth (*Amaranthus*), and others, also on foliage, especially willow. It feeds on chrysomelid larvae. **Dynamics** – Fully-winged, a frequent flier. It takes flight to evade capture.

SUBTRIBE CALLEIDINA

Tarsal claws serrate or pectinate. Elytra more or less elongate, glabrous. Terminal segment of labial palpus very broadly dilated.

Two genera:

Plochionus (1 species) Color entirely brown. Pronotum broad with broadly flattened sides. Last segment of labial palpus very broad, pear-shaped.

Calleida (2 species) Color metallic. Pronotum narrow. Last segment of labial palpus broad, triangular.

Genus *Plochionus*

491. *Plochionus (Menidius) timidus* Haldeman, 1843

General Range – A transcontinental species. (Mostly) Lower Austral Zone. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, MS, AR, TX, NM, AZ, west to CA, north to NV, MI, IN, PA, NY (Buffalo). **Local Range** – Vermont, no records. New Hampshire, two localities, Durham and Hollis. **Habitat** – Deciduous forest, under loose bark of dead trees. **Life Cycle** – Tenerals June-September. **Behavior** – Nocturnal and diurnal. Both larva and adult are arboreal. Adult feeds on caterpillars, in particular on fall webworm (*Hyphantria cunea*). Overwinters under bark. **Dynamics** – Fully-winged, a frequent flier.

Genus *Calleida*

492. *Calleida (Calleida) punctata* LeConte, 1846

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to ME (China), MA, CT, NY at Long and Staten Islands, NJ, VA, NC, GA, south to FL, AL, LA, west to TX, AR, KS, NE, SD, north to MB (Domain), MN, WI, MI, ON (Grand Bend, Ottawa), QC (down the Saint Lawrence to Port-au-Saumon). **Local Range** – Vermont, 28 localities, probably statewide, except in the high mountains. New Hampshire, eight localities, all in the southeast, north to Richmond, west to Litchfield. **Habitat** – Open areas with dense vegetation, also in the canopy of trees and shrubs. A typical site is among the stems of garden pea plants. **Life Cycle** – Mating mid-June; tenerals August-September. **Behavior** – Diurnal. Flies in sunshine, an agile climber. Adult feeds on caterpillars, also immature chrysomelids. **Dynamics** – Fully-winged, an occasional flier.

493. *Calleida (Calleida) purpurea* (Say, 1823)

General Range – An east-central species. Upper and Lower Austral Zones. East to NH, MA, CT (Lyme), NY to Long Island, NJ, NC, SC, GA, south to FL, AL, west to MO, KS, NE, SD, north to MB (Aweme, Victoria Beach), MI (Marquette, Escanaba), OH, PA, NH. **Local Range** – Vermont, no records. New Hampshire, two localities, Durham and Hampton. **Habitat** – Forests and tallgrass prairies. **Life Cycle** – Active in January-September (Larochelle and Larivière 2003). **Behavior** – Diurnal. Active climber on foliage of trees, shrubs, and grass in sunshine (Larochelle and Larivière 2003). **Dynamics** – Fully-winged, an occasional flier.

TRIBE GALERITINI

One species, *Galerita janus*. A large striking beetle, 15-20 mm, with pronotum, legs, basal antennomere, and triangular spot between the eyes orange, the rest of the body black (elytra more or less bluish). Entire body densely hairy. Head abruptly narrowed to a narrow neck.

Genus *Galerita*

494. *Galerita (Progaleritina) janus* (Fabricius, 1792)

General Range – An east-central species. Transition, Upper and Lower Austral Zones. East to NH, MA, CT, NY at Long and Staten Islands, NJ, DE, VA, NC, SC, GA, south to FL, AL, LA, west to TX, CO, NE, SD, north to ND, MB (Winnipeg), ON (Ingolf, Guelat, Belleville), QC (L'Île-du-Grand-Calumet, Saint Benoit, Philipsburg, an isolated record from Levis). **Local Range** – Vermont, 17 localities, north to Newport town, east to Cabot and Barre, most of our records are isolated, single specimens. Grand Isle and South Hero (both on the same island in Lake Champlain) furnish numerous examples, and the species must be breeding there. New Hampshire, 11 localities, seven localities are near the coast, likely indicating the species is successfully breeding there; Dover, Lee, Stratham, and Newton form the western limit to this area. Scattered records farther west and north in Rumney, Winchester, Webster, and Pelham are probably isolated, single specimens. **Habitat** – Deciduous forests, forest edges, and in pastures, cultivated fields. Larvae are exclusively forest inhabitants. **Life Cycle** – Tenerals in August. **Behavior** – Nocturnal. Both adults and larvae climb on trees. Feed on caterpillars, also on grass seeds. The beetle defends itself by producing a cloud of formic acid, the bright colors probably serve as a warning to potential predators. In winter it often hibernates in groups with aggregations of *Brachinus* and *Chlaenius*, which also have bright warning colors and repellent substances. **Dynamics** – Fully-winged, a powerful flier. This genus has been collected on oil-drilling platforms, far from land.

TRIBE HELLUONINI

One species, *Helluomorphoides praeustus bicolor*. A large, elongate, brown beetle, with elytra, except for the base, contrastingly very dark piceous. Elytra with lateral margins straight. Head with a narrow neck, antennae with transverse antennomeres which are strongly flattened. Tibiae, femora strongly flattened.

Genus *Helluomorphoides*

495. *Helluomorphoides praeustus bicolor* (Harris, 1828)

General Range – An east-central species. Upper Austral Zone (other subspecies from the southeastern states). East to NH, MA, CT, NY at Long Island, NJ, DE, south to VA, WV, OH, IN, IL, MO, west to KS, NE, SD, north to ND, MN, IA, MI, OH, NY (West Point), CT (Mansfield). **Local Range** – Vermont, no records. New Hampshire, two localities, Swanzey and Durham, both in the south. **Habitat** – Dry soil in forests. **Life Cycle** – Active in March-September (Larochelle and Larivière 2003). **Behavior** – Nocturnal. Probably lives like its congeners, devouring ants and their prey. The flattened antennae and leg segments would deny the ants any grip on them. **Dynamics** – Fully-winged, an occasional flier.

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Index to Scientific Names

Acalathus, 35, 251
Acupalpus, 32, 33, 229, 230, 231
adoxus, Pterostichus, 27, 175
adstrictus, Pterostichus, 26, 167
advena, Acalathus, 35, 251
aenea, Amara, 28, 186
aeneopolita, Amara, 28, 187
aeneus, Notiophilus, 16, 45
aeruginosum, Agonum, 36, 263
aestivus, Chlaenius, 29, 198
affine, Agonum, 36, 263
affine, Bembidion, 22, 121
affinis, Dyschirius, 19, 93
affinis, Harpalus, 34, 241
Aganoleptus, 32, 222
Agonoderus, 31, 32, 220, 221
Agonoleptus, 32, 222, 223
Agonum, 35, 36, 37, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 302, 303
Agostenus, 29, 197, 202
agricola, Anisodactylus, 30, 211
albicrus, Agonum, 36, 264
alpina, Amara, 27, 178
alternans, Philodes, 33, 232
Amara, 27, 28, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 197, 297, 301
Amarocelia, 28, 185, 186
amaroides, Oodes, 29, 195
americana, Clivina, 19, 91
americana, Cymindis, 38, 281
americanum, Bembidion, 21, 111
americanum, Omophron, 19, 86
americanus americanus, Elaphrus, 19, 84
americanus, Syntomus, 38, 286
Amerizus, 20, 102, 103
Amphasia, 31, 216, 217
amphibius, Schizogenius, 19, 91
Anadaptus, 31, 214, 215
analis, Lebia, 38, 289
Anatrichis, 29, 194, 195
anchomenoides, Agonum, 35, 256
ancocisconensis, Cicindela, 18, 65
angulata, Tachyta, 24, 140
angustata, Amara, 28, 193
angustatoides, Amara, 28, 193
Anisodactylina, 30, 209
Anisodactylus, 30, 31, 211, 212, 213, 214, 215
Anisotarsus, 30, 209, 210
Anomoglossus, 29, 197, 198

antiquum, Bembidion, 21, 112
apicalis, Trechus, 20, 100
apricaria, Amara, 27, 181
Apristus, 38, 284, 286
aquaticus, Notiophilus, 16, 45
Archicarabus, 17, 59
arctica, Miscodera, 20, 99
arcticola, Pterostichus, 27, 176
arenaria, Pseudamara, 35, 248
arenaria, Pseudoamara, 35
Argutor, 26, 159, 164, 165, 298
Asaphidion, 20, 103, 297, 299, 301
Asioperyphus, 21, 105, 117
assimilis, Diplocheila, 29, 203
Atranini, 37, 277
Atranus, 37, 152, 277, 278, 297
atrimedius, Bradycellus, 32, 226
atriventris, Lebia, 38, 287
aulica, Amara, 27, 178
auratus auratus, Carabus, 17, 59
autumnalis, Trichotichnus, 35, 248
avida, Amara, 28, 181
Axinopalpus, 38, 284, 287
badipennis, Bradycellus, 32, 227
Badister, 30, 203, 206, 207, 208
basicorne, Bembidion, 23, 131
basillaris, Amara, 28, 187
Batenus, 37, 275, 276
Baudia, 30, 208
bellorum, Bembidion, 21, 112
Bembidiina, 20, 102
Bembidiini, 20, 102, 300
Bembidion, 20, 21, 22, 23, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 142, 216, 279, 297, 298, 299, 301, 303, 304
bifrons, Amara, 28, 183
biguttatus, Notiophilus, 16, 46
bilobus, Scaphinotus, 17, 52
biplagiatus, Axinopalpus, 38, 287
bipustulata, Paraclivina, 19
bisulcatus, Porotachys, 24, 146
Blemus, 20, 100
Blethisa, 18, 79, 80, 81, 302
borealis, Cymindis, 38, 281
borealis, Notiophilus, 16, 47
Boreonebria, 16, 41, 42, 43
Bothriopterus, 26, 167, 168
Brachininae, 25, 153
Brachinini, 25, 153
Brachinus, 25, 60, 153, 154, 155, 156, 157, 158, 295
Brachylobus, 29, 197, 201

Bracteon, 21, 104, 105, 109, 110
Bradycellus, 32, 223, 224, 225, 226, 227, 228
Bradytus, 27, 28, 181, 182
brevicornis brevicornis, Pterostichus, 27, 176
brevilabris, Chlaenius, 29, 200
brevis, Oodes, 29, 196
brevispinus, Dyschirius, 19, 94
Broscinae, 20, 98
Broscini, 98
bruxellense, Bembidion, 21
Calathus, 35, 249, 250, 251
calidum, Calosoma, 17, 56
californicus, Elaphrus, 19, 84
caliginosus, Harpalus, 33, 236
Calitropa, 17, 55
Calleida, 39, 289, 293, 294
Calleidina, 39, 280, 293
Calodrepa, 17, 55
Calosoma, 17, 53, 54, 55, 56, 298, 302, 305
canadense, Agonum, 35, 256
canadensis canadensis, Sphaeroderus, 16, 49
canadensis, Acupalpus, 32, 229
Carabinae, 16, 49
Carabini, 17, 53
Carabus, 17, 53, 56, 57, 58, 59, 60, 299, 302, 305, 306
carbo, Stenolophus, 31, 217
carbonarius, Anisodactylus, 30, 211
carinata, Amara, 27, 179
carinula, Bembidion, 21, 109
carolinense, Bembidion, 23, 131
carus, Acupalpus, 32, 229
castor, Bembidion, 22, 125
castor, Pterostichus, 26, 169
Catharellus, 32, 223
caudicalis, Pterostichus, 27, 173
Celia, 28, 183, 184, 185
Celiamorphus, 34, 245
chalcea, Amara, 28, 183
chalceum, Bembidion, 21, 112
chalcites, Poecilus, 26, 161
chamissonis, Carabus, 17, 57
cheyennense, Bembidion, 21, 111
Chlaeniellus, 29, 197, 200, 201
Chlaeniini, 29, 196
Chlaenius, 2, 29, 196, 197, 198, 199, 200, 201, 202, 295
Chrysostigma, 17, 56
cicatricosus, Elaphrus, 18, 81
Cicindela, 17, 18, 58, 62, 63, 64, 65, 67, 68, 69, 70, 72, 73, 74, 75, 77, 134, 238, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306
Cicindelidia, 17, 62, 63, 64
Cicindelinae, 17, 60, 303, 304
Cicindelini, 17, 60, 298, 302
cincticollis, Platynus, 37, 275

clairvillei, Elaphrus, 18, 82
Clivina, 19, 88, 89, 90, 91
Clivinini, 19, 88
cognatus, Dicheirotrichus, 32, 228
collaris, Clivina, 19, 89
Colliuris, 37, 279
comma, Stenolophus, 31, 220
commutabilis, Pterostichus, 26, 164
compar, Harpalus, 33, 233
concretum, Bembidion, 23, 129
confusum, Bembidion, 20, 108
congener, Bradycellus, 32, 223
conjunctus, Agonoleptus, 32, 222
conjunctus, Aganoleptus, 32, 222
constrictum, Bembidion, 22, 126
contractum, Bembidion, 22, 126
convexa, Amara, 28, 188
coracinus, Myas, 26, 164
coracinus, Pterostichus, 27, 171
cordatum, Bembidion, 22, 126
cordicollis, Brachinus, 25, 154
cordicollis, Chlaenius, 29, 199
corrusculus, Pterostichus, 26, 165
corvinus, Pterostichus, 26, 169
corvus, Agonum, 36, 264
Cosnania, 37, 279
crassiscapus, Trechus, 20, 101
crassispina, Amara, 28, 188
crenistriatum, Agonum, 36, 265
cribricollis, Cymindis, 38, 282
Crossonychus, 37, 280
Cryobius, 27, 159, 176, 177, 297
cupreolata, Amara, 28, 188, 301
cupripenne, Agonum, 36, 265
Curtonotus, 27, 178, 179, 180
curtum curtum, Asaphidion, 20, 103
cyanescens, Myas, 26, 164
cyanipennis, Brachinus, 25, 154
cyanochroaticus, Brachinus, 25, 155
Cychrini, 16, 49
Cyclosomini, 37, 279
Cyclotrachelus, 27, 160, 177
Cylindrocharis, 27, 160, 174
Cymindiina, 38, 280
Cymindis, 38, 168, 280, 281, 282, 283, 284
darlingtoni, Agonum, 35, 257
daviesi, Platynus, 37, 274
decentis, Platynus, 37, 273

deceptivum, Agonum, 36, 266
decorum, Agonum, 36, 266
dejeanii, Dyschirius, 19, 94
Dicaelus, 30, 203, 205, 206
Dicheirotrichus, 32, 228
dichrous, Trichotichnus, 34, 247
dilatatus dilatatus, Dicaelus, 30, 205
diligendus, Pterostichus, 27, 174, 297
Diocarabus, 17, 57
Diplocampa, 22, 105, 123
Diplocheila, 29, 30, 203, 204
Diplous, 25, 107, 149, 150
Discoderus, 34, 247
discoideus, Anisodactylus, 31, 214
discus discus, Blemus, 20, 100
Dromiina, 38, 280, 284
Dromius, 38, 284, 285
duodecimguttata, Cicindela, 18, 67
Dyschiriini, 93
Dyschirini, 19
Dyschirius, 19, 20, 87, 93, 94, 95, 96, 97, 98
Elaphrinae, 18, 79
Elaphrini, 18, 79, 300
Elaphropus, 24, 139, 141, 142, 143, 144, 145
Elaphrus, 18, 19, 79, 81, 82, 83, 84, 85, 300, 302
elevatus elevatus, Scaphinotus, 16, 51
Ellipsoptera, 17, 61
ellipticus, Selenophorus, 34, 245
elongatus, Dicaelus, 30, 205
emarginatus, Chlaenius, 29, 198
ephippiatus, Pericompsus, 24, 146
errans, Agonum, 36, 266
erratica, Amara, 28, 185
erraticus, Harpalus, 33, 237
erythrocerus, Dyschirius, 19, 95
erythropus, Harpalus, 33, 234
Euferonia, 27, 171, 172
Eupetedromus, 23, 106, 134, 135, 136
Europhilus, 35, 36, 256, 257, 258, 259, 260, 261
Eurydactylus, 29, 197
exarata, Amara, 28, 182
excavatum, Agonum, 36, 267
extensicolle, Agonum, 36, 267
externum, Calosoma, 17, 55
familiaris, Amara, 28, 189
fasciatus, Tetragonoderus, 37, 280
faunus, Harpalus, 33, 234
femoralis, Pterostichus, 26, 166
ferrea, Paraclivina, 19, 91
ferreum, Agonum, 36, 267
ferrugineus, Schizogenius, 19, 92
fidele, Agonum, 36, 268
flavicauda, Mioptachys, 24, 139

flebilis, Amara, 28, 193
fluvialis, Oodes, 29, 196
formosa generosa, Cicindela, 18, 67
fortestriatum, Bembidion, 23, 130
fossor fossor, Clivina, 19, 89
foveocollis, Patrobus, 25, 150
frigidum, Calosoma, 17, 53
frontale, Bembidion, 23, 130
fugax, Bembidion, 23, 137
fuliginosis, Stenolophus, 31, 218
fuliginosus, Elaphrus, 18, 82
fulminatus, Brachinus, 25, 155
fulvilabris, Harpalus, 33, 237
fumans, Brachinus, 25, 156
Furcacampa, 22, 105, 121, 122
fuscata, Lebia, 38, 289
fuscatus, Stenolophus, 31, 218
fuscipalpis, Harpalus, 34, 244
gagatinus, Selenophorus, 34, 245
Galerita, 39, 295
Galeritini, 39, 295
Gastrellarius, 26, 160, 163
Geopinus, 31, 216
globulosus, Dyschirius, 20, 95
Goniolophus, 33, 232
goryi, Carabus, 17, 56
graciliforme, Bembidion, 23, 134
granarius, Selenophorus, 34, 245
grandiceps, Badister, 30, 208
grandis, Lebia, 38, 288
grapii, Bembidion, 21, 118
gratiosum, Agonum, 35, 257
gregarius, Calathus, 35, 249
gyllenhali castanipes, Nebria, 16, 41
Gynandrotarsus, 31, 213, 214
haematopus, Stereocerus, 26, 160, 163
haemorrhoidalis, Dyschirius, 20, 95
Harpalina, 33, 209, 217, 233
Harpalinae, 25, 159
Harpalini, 30, 178, 209, 215, 298, 305
Harpalobius, 34, 244
Harpalus, 33, 34, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 299
harrisii, Agonum, 36, 268
harrisii, Anisodactylus, 30, 211
Helluomorphoides, 39, 295, 296
Helluonini, 39, 295
Hemicarabus, 17, 58
herbivagus, Harpalus, 34, 242
Hirmoplataphus, 20, 104, 106
Homoeocarabus, 17, 57
honestum, Bembidion, 21, 113

honestus, Gastrellarius, 26, 160, 163
hudsonica, Blethisa, 18, 79
humidus, Stenolophus, 31, 219
Hydriomicrus, 20, 104, 107
Hydrium, 23, 105, 134
hydropicus, Acupalpus, 32, 230
hylacis, Selenophorus, 34, 246
hyperborea, Amara, 27, 179
Hypherpes, 27, 160, 175
hypolithos, Platynus, 37, 275
immaturum, Bembidion, 23, 135
impotens, Bembidion, 22, 122
impressefrons, Clivina, 19, 90
impressicollis, Diplocheila, 29, 204
impunctatus, Synuchus, 35, 251
impuncticollis, Amara, 28, 189
impunctifrons, Chlaenius, 29, 200
inaequale, Bembidion, 21, 109
incrassatus, Geopinus, 31, 216
incrematum, Bembidion, 23, 135
indecentis, Platynus, 37, 274
indigens, Harpalus, 33, 238
ingratus, Calathus, 35, 250
inornata, Tachyta, 24, 140
insulsus, Bradycellus, 32, 224
intermedium, Bembidion, 22, 127
interstitalis, Amphasia, 31, 217
Irichroa, 17, 52
Iridessus, 35, 248
iridipenne, Bembidion, 23, 136
Isorembus, 29, 30, 203, 204
janthinipennis, Brachinus, 25, 156
janus, Galerita, 39, 295
julii, Blethisa, 18, 80
kirbyi, Anisodactylus, 30, 212
kirbyi, Bradycellus, 32, 227
kirbyi, Tachyta, 24, 141
Lachnocrepis, 29, 194, 195
lachrymosus, Pterostichus, 27, 172
lacunarium, Bembidion, 21, 119
lacustris, Nebria, 16, 42
lacustris, Platypatrobus, 25, 152, 298, 300
laeva, Polyderis, 24, 147
laevipennis, Amara, 28, 185
laevipes, Harpalus, 33, 238
Lamenius, 27, 159, 173
larochellei, Dyschirius, 20, 96
latens, Apristus, 38, 286
laticeps, Harpalus, 33, 239
laticollis, Chlaenius, 29, 198
latior, Amara, 28, 182

Lebia, 38, 153, 278, 287, 288, 289, 290, 291, 292, 293, 304
Lebiina, 38, 280, 287
Lebiini, 38, 280
lecontei, Bradycellus, 32, 223
lecontei, Stenolophus, 32, 221
Lenapterus, 27, 159, 173
Leucocara, 19, 91
levettei carrianum, Bembidion, 21, 110
levettei, Bembidion, 21, 110
levigatum, Bembidion, 23, 134
levipes, Elaphropus, 143
lewisii, Harpalus, 34, 239
Licinini, 29, 203
limbalis , Cicindela, 18, 69
limbalis, Cicindela, 18, 69
limbata, Cymindis, 38, 283
linearis, Microlestes, 38, 285
lineola, Stenolophus, 32, 221
lineolatus, Schizogenius, 19, 92
Lipalocellus, 32, 226
Lithochlaenius, 29, 197, 199
lithophilus, Chlaenius, 29, 201
littoralis, Amara, 28, 190
longicornis, Patrobus, 25, 151
longilabris longilabris, Cicindela, 18, 70
Lophoglossus, 26, 160, 162
Loricera, 18, 78
Loricerinae, 18, 78
Loricerini, 18, 78
louisella, Bembidion, 21, 113
Loxopeza, 38, 287, 288
luctuosus, Pterostichus, 26, 169
lucublandis, Poecilus, 26, 161
lugubris, Bradycellus, 32, 228
lugubris, Xestonotus, 30, 210
lunicollis, Amara, 28, 190
lutulentum, Agonum, 35, 258
maeander maeander, Carabus, 17, 57
mannerheimii, Platynus, 37, 276
marginata, Ellipsoptera, 17, 61
marginipennis , Cicindela, 17, 62
marginipennis, Cicindela, 17, 62
meander meander, Carabus, 17, 57
medius, Brachinus, 25, 157
megacephalus, Stenolophus, 31, 219
Megapangus, 33, 236
melanarium, Agonum, 36, 269
melanarius melanarius, Pterostichus, 26, 170
melanarius, Pterostichus, 26, 170
Melanius, 26, 159, 169
melanopus, Anisodactylus, 31

Menidius, 39, 294
merula, Anisodactylus, 31, 213
metallescens, Agonum, 36, 269
Metophonus, 33, 233
micans, Badister, 30, 208
micans, Olisthopus, 35, 252
Microlestes, 38, 284, 285
mimus, Bembidion, 22, 122
minuta, Anatrichis, 29, 195
Mioptachys, 24, 139
Miscodera, 20, 99, 303
moerens, Agonum, 36, 269
moesta, Lebia, 38, 289
Monoferonia, 27, 160, 174
Morphnosoma, 26, 159, 170, 172
muelleri, Agonum, 36, 261
muscicola, Bembidion, 22, 124
musculis, Amara, 28, 184
mutatum, Agonum, 36, 270
mutatum, Bembidion, 22, 120
mutus, Pterostichus, 26, 167
Myas, 26, 160, 164, 172
nanellus, Acupalpus, 33, 230
Nebria, 16, 41, 42, 43, 44, 45, 103, 177, 301, 306
Nebriinae, 16, 41
Nebriini, 16, 41, 301
neglecta, Cymindis, 38, 282
neglectus, Bradycellus, 32, 224
nemoralis nemoralis, Carabus, 17, 59
nemoralis, Chlaenius, 29
nemoralis, Notiophilus, 16, 47
Neobrachinus, 25, 154, 155, 156, 157, 158
Neocalathus, 35, 249, 250
Neoelaphrus, 18, 19, 81, 82, 83
neopulchellus, Badister, 30, 206
neoscotica, Amara, 28, 191
niger, Chlaenius, 29, 202
nigerrimus, Anisodactylus, 31, 212
nigriceps, Agonum, 35, 255
nigriceps, Bradycellus, 32, 224
nigriceps, Perigona, 37, 277
nigrinus, Bradycellus, 32, 226
nigrita, Anisodactylus, 31, 213
nigritarsis, Harpalus, 34, 240
nigrivestis, Bembidion, 22, 124
nigrum, Bembidion, 20, 106
nitidicollis brevoorti, Sphaeroderus, 50
nitidicollis, Sphaeroderus, 16, 50
nitidipennis, Notiobia, 30, 209
nitidum, Bembidion, 23, 134
nivalis gaspesiana, Nebria, 16, 43
Nomaretus, 17, 52
Notaphus, 22, 105, 125, 126, 127, 128, 129
notatus, Badister, 30, 207
Notiobia, 30, 209, 210

Notiophilini, 16, 45
Notiophilus, 16, 45, 46, 47, 48, 305
novemstriatus, Notiophilus, 16, 48
nutans, Agonum, 36, 270
oberthueri, Bembidion, 22, 127
obesa, Amara, 28, 182
oblitus, Tachys, 24, 147
obscurellum obscurellum, Bembidion, 21, 115
obsoleta, Sericoda, 35, 253
obtusa, Diplocheila, 30, 204
obtusum, Bembidion, 23, 138
obtusus, Badister, 30, 207
occultator, Bembidion, 23, 132
ochropezus, Stenolophus, 31, 219
Ochthedromus, 21, 105, 111
octopunctatum, Agonum, 36, 271
Ocydromus, 21, 105, 114
Odacanthini, 37, 279
Odontium, 20, 104, 108
Olisares, 36, 37, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273
Olisthopus, 35, 252, 253, 278
olivaceus, Elaphrus, 19, 83
Omophron, 19, 83, 86, 87, 118, 216, 302
Omophroninae, 19, 86
Omophronini, 19, 86
Oodes, 29, 194, 195, 196
Oodini, 29, 194
opacipennis, Harpalus, 34, 242
opaculus, Calathus, 35, 250
opaculus, Platynus, 37, 274
Opadius, 33, 34, 237, 238, 239, 240, 241
opalinus, Selenophorus, 34, 246
Ophonus, 33, 233
ornata, Lebia, 38, 290
otiosa, Amara, 28, 191
ovata, Amara, 28, 191
ovipennis, Brachinus, 25, 157
Oxypselaphus, 35, 255, 277
pallipes, Amara, 28, 194
pallipes, Nebria, 16, 43
palustre, Agonum, 35, 258
Paracelia, 28, 192
Paraclivina, 19, 88, 91
Paradicaelus, 30, 205, 206
paraenulum, Bembidion, 20, 108
parallela, Lachnocrepis, 29, 195
parallelus, Discoderus, 34, 247
Paratachys, 24, 25, 147, 148, 149
parmarginatus, Platynus, 37, 274
parmatus, Olisthopus, 35, 253
partiarius, Acupalpus, 33, 231
Patrobinae, 25, 149
Patrobini, 25, 149, 153
Patrobus, 25, 149, 150, 151

patruela patruela, Cicindela, 18, 72
patruele, Bembidion, 22, 128
patruelis, Amara, 28, 186
patruelis, Brachinus, 25, 157
patruelis, Pterostichus, 26, 166
pauperculus, Acupalpus, 33, 231
pectita, Lebia, 38, 290
pennsylvanica, Amara, 27, 180
pennsylvanicus pennsylvanicus, Chlaenius, 29, 200
pensylvanica, Colliuris, 37, 279
pensylvanicus, Harpalus, 33, 234
pensylvanicus, Pterostichus, 26, 168
Pentagonica, 37, 278
Pentagonicini, 37, 278
Percosia, 28, 182
Pericompsus, 24, 139, 146, 300
Perigona, 37, 277
Perigonini, 37, 277
Peryphanes, 21, 22, 105, 118, 119
Peryphus, 21, 105, 115, 116, 117
petrosum petrosum, Bembidion, 21, 116
Philodes, 33, 232
Phonias, 26, 159, 165, 166
Phyla, 23, 106, 138
piceolum, Agonum, 36, 262
piceus, Dromius, 38, 285
picicornoides, Agonum, 35, 259
picticornis, Pentagonica, 37, 278
picticornis, Tetraleucus, 35, 254
pilicornis pilicornis, Loricera, 18, 78
pilosa, Cymindis, 38, 282
pilosus, Dyschirius, 20, 96
Pinacodera, 38, 280, 283, 284
pinguedineus, Pterostichus, 27, 177
placidum, Agonum, 36, 262
planum, Bembidion, 23, 137
Plataphus, 23, 105, 131, 132, 133
platicollis, Cymindis, 38, 284
Platidius, 25, 150
Platynini, 35, 159, 252, 278, 303
Platynomicrus, 35, 255
Platynus, 37, 273, 274, 275, 276, 298
Platypatrobus, 25, 149, 152, 298, 300
plebejus, Stenolophus, 31, 220
Plectralidus, 33, 237
plenalis, Harpalus, 34, 243
pleuritica, Lebia, 38, 291
Plochionus, 39, 293, 294
Poecilus, 26, 160, 161
politus politus, Dyschirius, 20, 96
politus, Dicaelus, 30, 206
politus, Dyschirius, 20, 96

Polyderis, 24, 140, 147
Porotachys, 24, 139, 146
postremum, Bembidion, 21, 117
praetermissus, Pterostichus, 26, 165
praeustus bicolor, Helluomorphoides, 39, 295, 296
praticola, Bembidion, 22, 125
Progaleritina, 39, 295
propinquum, Agonum, 37, 271
providens, Harpalus, 34, 240
proximus, Tachys, 24, 148
pseudagricola, Anisodactylus, 31, 213
Pseudamara, 35, 248
Pseudamphasia, 31, 216
pseudocautum, Bembidion, 23, 130
Pseudoperyphus, 21, 105, 112, 113, 114, 304
Pseudophonus, 33, 233, 234, 235, 236
Pterostichini, 26, 159, 160, 252, 297
Pterostichus, 26, 27, 152, 159, 160, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 297, 300, 301
pubescens, Atranus, 37, 152, 277, 278, 297
pulchella, Lebia, 38, 291
pumila, Lebia, 38, 291
pumilus, Acupalpus, 33, 230
pumilus, Tachys, 24, 148
punctata, Calleida, 39, 294
punctatissimus, Pterostichus, 27, 173
punctatostriatum, Bembidion, 21, 110
puncticeps, Ophonus, 33, 233
punctiforme, Agonum, 37, 272
punctulata punctulata, Cicindela, 17, 63
puritana, Ellipsoptera, 17, 61
purpurea purpurea , Cicindela, 18, 73
purpurea purpurea, Cicindela, 18, 73
purpurea, Calleida, 39, 294
purpuricollis, Chlaenius, 29, 202
pusillus, Oxypselaphus, 35, 255
quadratulum, Bembidion, 20, 107
quadricollis, Blethisa, 18, 81
quadrimaculatum oppositum, Bembidion, 22, 121
quadripennis, Brachinus, 25, 158
quadripunctata, Sericoda, 35, 254
quenseli quenseli, Amara, 28, 192
Randallius, 29, 197, 202
rapidum, Bembidion, 22, 128
rectangulus, Philodes, 33, 232

Reductonebria, 16, 43, 44
repanda repanda, Cicindela, 18, 74
retractum, Agonum, 35, 259
reversus, Harpalus, 34, 241
rhodeanus, Tachys, 24, 148
robusticolle, Bembidion, 20, 108
rolandi, Bembidion, 23, 137
rostratus, Pterostichus, 27, 174
rothfelsi, Bembidion, 21, 114
rotundicollis, Agonoleptus, 32, 222
rotundicollis, Aganoleptus, 32, 222
rubens, Trechus, 20, 102
rubrica, Amara, 28, 184
rubripes, Harpalus, 34, 243
rufipes, Agonum, 37, 272
rufipes, Harpalus, 33, 235
rufiventris rufiventris, Cicindela, 17, 64
rufotinctum, Bembidion, 21, 114, 299
rugicollis, Diplous, 25, 150
rupestris, Bradycellus, 32, 225
ruscarius, Elaphrus, 19, 85
rusticum rusticum, Bembidion, 23, 132
rusticus, Anisodactylus, 31, 214
salebratum, Bembidion, 20, 106
sanctaecrucis, Anisodactylus, 31, 215
sayi, Notiobia, 30, 209
Scaphinotus, 16, 17, 50, 51, 52, 299, 300
Scarites, 19, 87, 88, 90, 301
Scaritinae, 19, 87
Scaritinae, 87
Scaritini, 19, 87, 98, 301, 306
Schizogenius, 19, 89, 91, 92, 93, 306
scitulus, Tachys, 25, 149
scopulinum, Bembidion, 21, 114
scrutator, Calosoma, 17, 55
scrutator, Lophoglossus, 26, 162
scutellaris lecontei, Cicindela, 18, 74
Selenophorus, 34, 245, 246
Semicampa, 22, 105, 124, 125
semicinctum, Bembidion, 22, 125
semipubescens, Bradycellus, 32, 226
semistriatum, Bembidion, 20, 107
semistriatus, Notiophilus, 16, 48, 305
septentrionis septentrionis, Patrobus, 25, 151
sericea, Amphasia, 31, 216
sericeus, Chlaenius, 29, 199
Sericoda, 35, 253, 254, 303
serratus, Carabus, 17, 58
setosus, Dyschirius, 20, 97
sexguttata, Cicindela, 18, 75
simplex, Bembidion, 23, 133
sinuosa, Amara, 28, 185

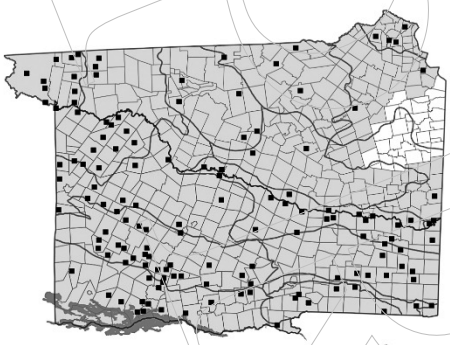
sodalis sodalis, Cyclotrachelus, 27, 177
solea, Lebia, 38, 292
solitaris, Harpalus, 34, 243
somnulentus, Harpalus, 34, 244
sordens, Agonum, 35, 260
spadiceus, Harpalus, 34, 241
sphaericollis, Dyschirius, 20, 98
Sphaeroderus, 16, 49, 50, 297
Sphodrini, 35, 248, 252
Spongopus, 31, 215
Stenocellus, 32, 223, 224, 225
Stenolophina, 31, 209, 217
Stenolophus, 31, 32, 217, 218, 219, 220, 221, 298
stenostomus lecontei, Sphaeroderus, 16, 50
stephensii, Bembidion, 22, 119
Stereocerus, 26, 160, 163
striatopunctata, Diplocheila, 30, 204
stygicus, Pterostichus, 27, 172
sublaevis, Dyschirius, 20, 98
subsulcatus, Apristus, 38, 286
subterraneus , Scarites, 19, 88
sulcifrons, Schizogenius, 19, 93
superioris, Agonum, 36, 260
suturalis, Nebria, 16, 44
sycophanta, Calosoma, 17, 54
sylvosus, Carabus, 17, 60
Syntomus, 38, 284, 286
Synuchus, 35, 251, 252
Tachistodes, 33, 231
Tachyina, 24, 139, 300
Tachypus, 17, 59
Tachys, 24, 25, 140, 147, 148, 149, 298
Tachyta, 24, 139, 140, 141, 300
Tanaocarabus, 17, 60
tantillus, Bradycellus, 32, 225
Tarulus, 38, 280, 281, 282, 283
tenax, Amara, 28, 192
tenue, Agonum, 37, 272
tenuicollis, Brachinus, 25, 158
tenuicollis, Platynus, 37, 275
tenuis, Pterostichus, 26, 170
terminata, Notiobia, 30, 210
tessellatum, Omophron, 19, 87
testaceus, Acupalpus, 33, 231
teter, Dicaelus, 30, 206
tetracolum tetracolum, Bembidion, 21, 117
Tetragonoderus, 37, 279, 280
Tetraleucus, 35, 254, 303
thoracicus, Agonoleptus, 32, 223
thoreyi, Agonum, 36, 261
timidus, Plochionus, 39, 294
tomentosus tomentosus, Chlaenius, 197

tomentosus, Chlaenius, 29, 197
torrida, Amara, 27, 180
tranquebarica tranquebarica, Cicindela, 18, 77
transparens transparens, Bembidion, 22, 123
transversus, Badister, 30, 208
Trechicus, 37, 277
Trechinae, 20, 100
Trechini, 20, 100
Trechus, 20, 100, 101, 102
Trepanedoris, 23, 105, 129, 130
Trichocellus, 32, 228
Trichoplataphus, 23, 106, 137
Trichotichnus, 34, 35, 247, 248
tricolor tricolor, Chlaenius, 29, 201
tricolor, Lebia, 38, 288
trigeminum, Agonum, 37, 273
Trigonognatha, 26, 164
Triliarthrus, 32, 226, 227, 228
tristis, Pterostichus, 27, 175
turbata, Amara, 28, 192
unicolor, Cymindis, 38, 283
vagans, Harpalus, 33, 236
variegatum, Bembidion, 23, 136
vernalis, Pterostichus, 26, 165
vernix, Lophoglossus, 26, 162
versicolor, Bembidion, 22, 122
versutum, Bembidion, 22, 129
verticalis, Anisodactylus, 31, 215
viduus, Scaphinotus, 17, 52
viridipennis, Lebia, 38, 292
viridis, Lebia, 38, 292
vittata, Lebia, 38, 293
vulcanoides, Brachinus, 25, 158
vulpeculus, Trichotichnus, 34, 247
wilcoxi, Calosoma, 17, 55
wingatei, Amerizus, 20, 103
Xenocelia, 28, 183
Xestonotus, 30, 210
Zabrini, 27, 159, 160, 178, 248
Zezea, 28, 193, 194

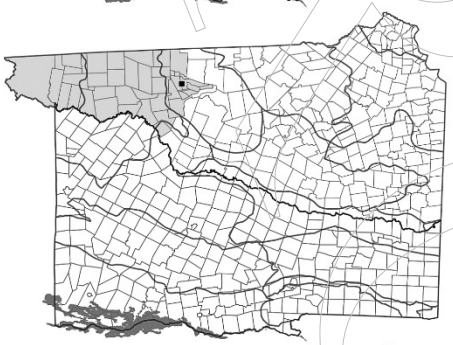
PROOF

Towns of Vermont and New Hampshire

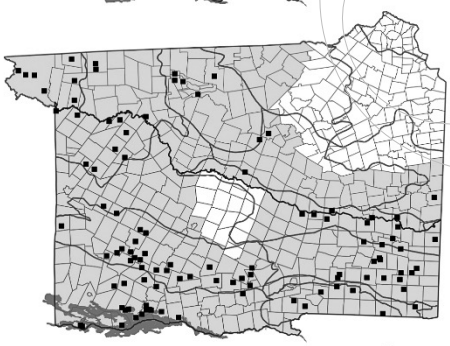
Map plates



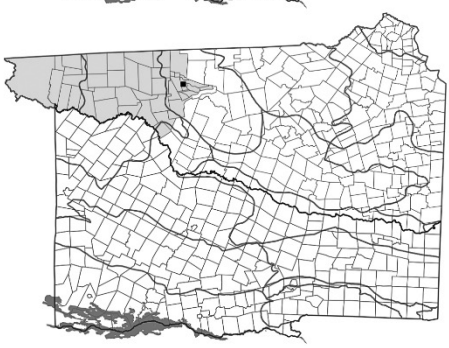
4. Nebria pallipes



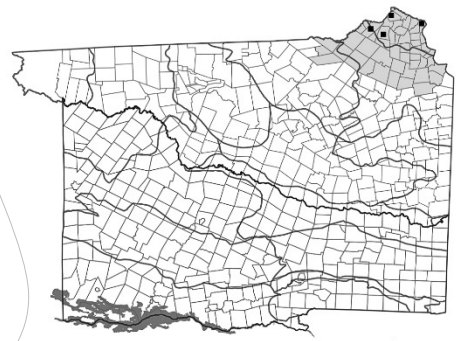
3. Nebria nivalis gaspesiana



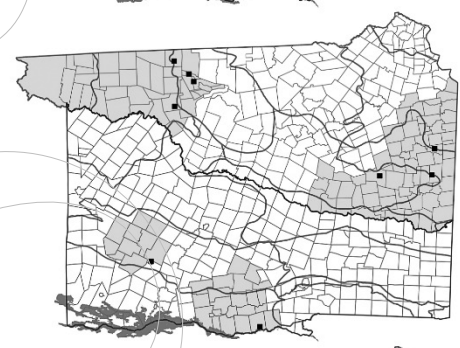
2. Nebria lacustris



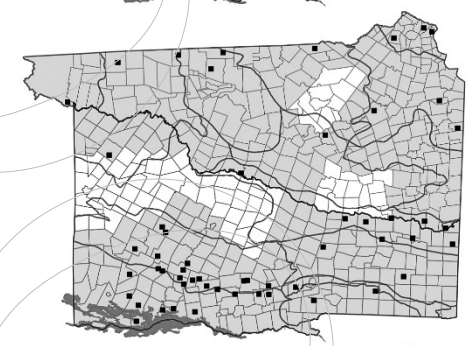
1. Nebria gyllenhaali castanipes



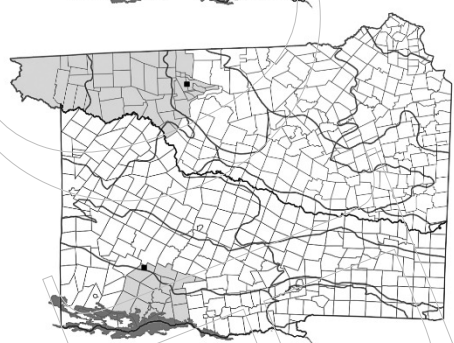
8. Notiophilus biguttatus



7. Notiophilus aquaticus

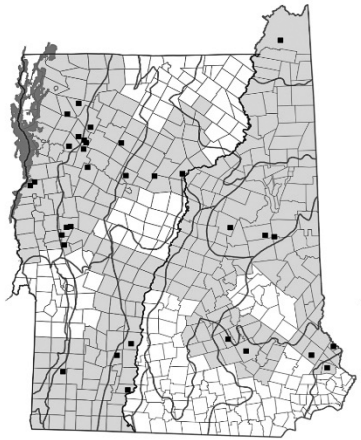


6. Notiophilus aeneus

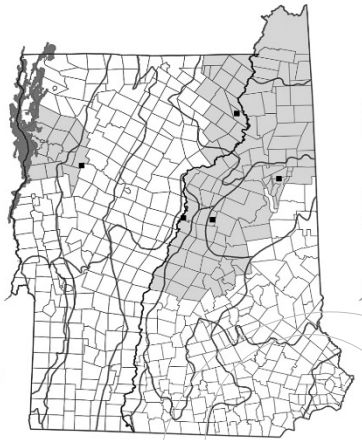


5. Nebria suturalis

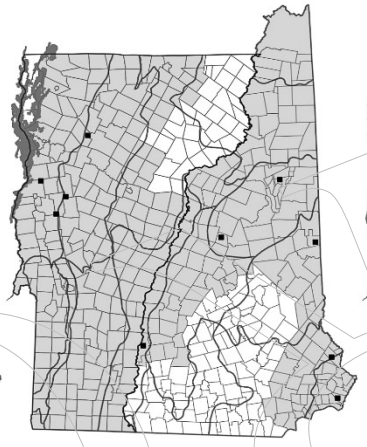
9. Notiophilus borealis
10. Notiophilus nemoralis
11. Notiophilus novemstriatus
12. Notiophilus semistriatus
13. Sphaeroderus canadensis canadensis
14. Sphaeroderus nitidicollis
15. Sphaeroderus stenostomus lecontei
16. Scaphinotus elevatus elevatus



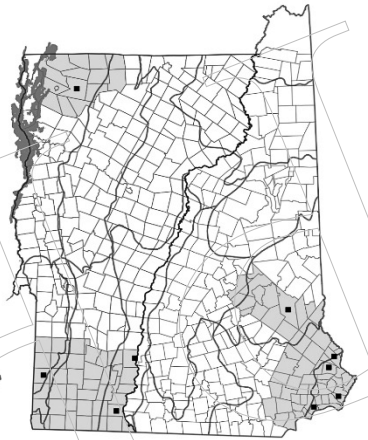
17. Scaphinotus viduus



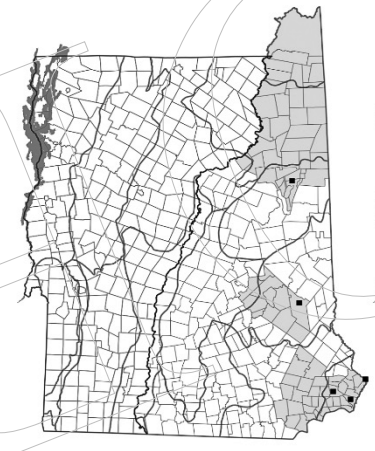
18. Scaphinotus bilobus



19. Calosoma frigidum



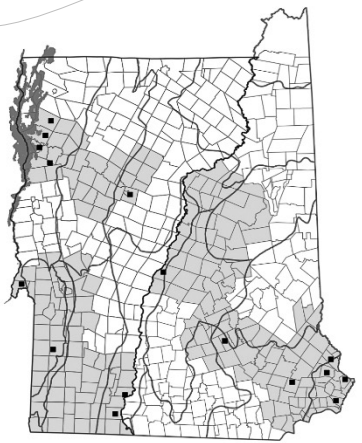
20. Calosoma sycophanta



21. Calosoma scrutator

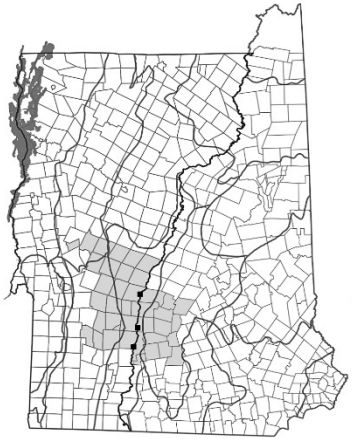
22. Calosoma wilcoxi

23. Calosoma externum

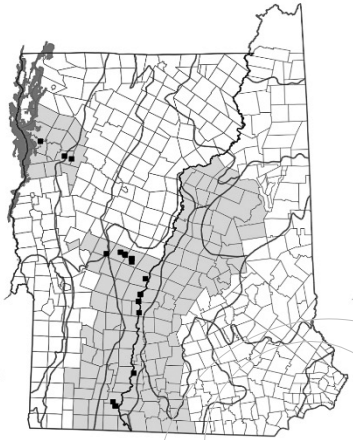


24. Calosoma calidum

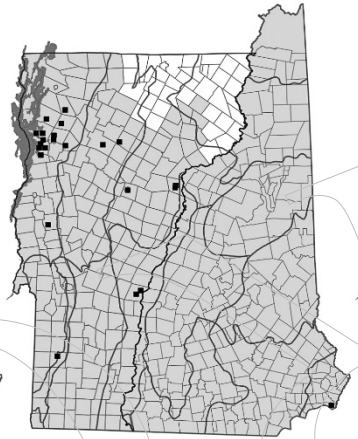
25. Carabus goryi
26. Carabus chamissonis
27. Carabus maeander maeander
28. Carabus serratus
29. Carabus nemoralis nemoralis
30. Carabus auratus auratus
31. Carabus sylvosus
32. Ellipsoptera marginata



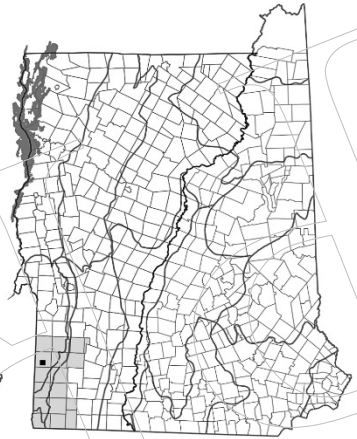
33. Ellipsoptera puritana



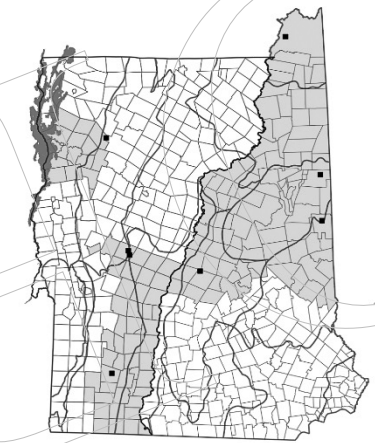
34. Cincindela marginipennis



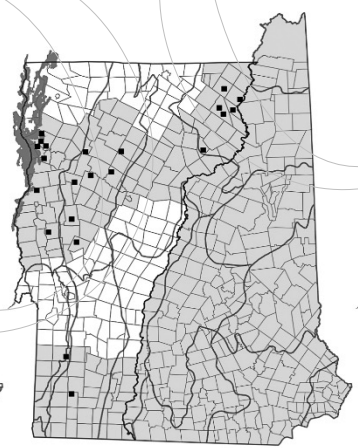
35. Cicindela punctulata punctulata



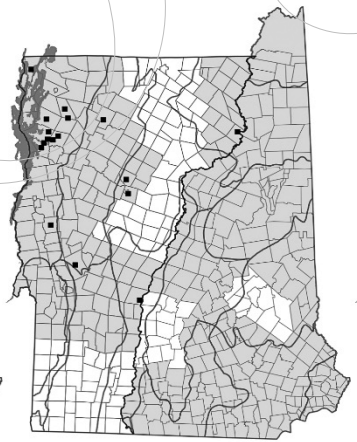
36. Cicindela rufiventris rufiventris



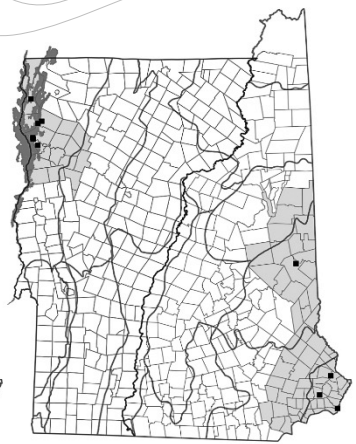
37. Cincindela ancocisconensis



38. Cicindela duodecimguttata

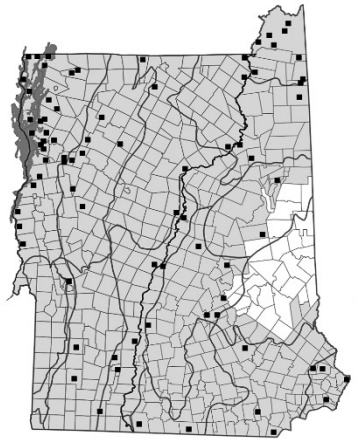


39. Cicindela formosa generosa

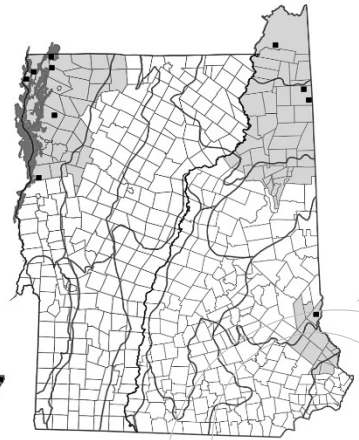


40. Cincindela hirticollis

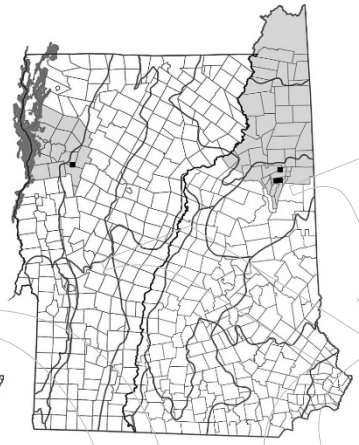
41. Cicindela limbalis
42. Cicindela longilabris longilabris
43. Cicindela patruela patruela
44. Cicindela purpurea purpurea
45. Cicindela repanda repanda
46. Cicindela scutellaris lecontei
47. Cicindela sexguttata
48. Cicindela tranquebarica tranquebarica



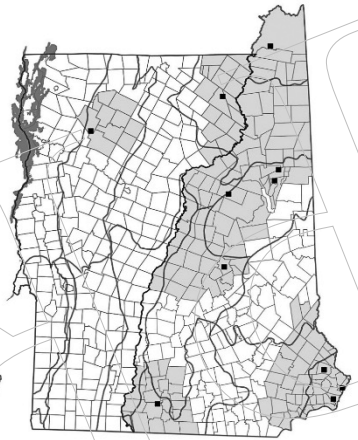
49. Loricera pilicornis pilicornis



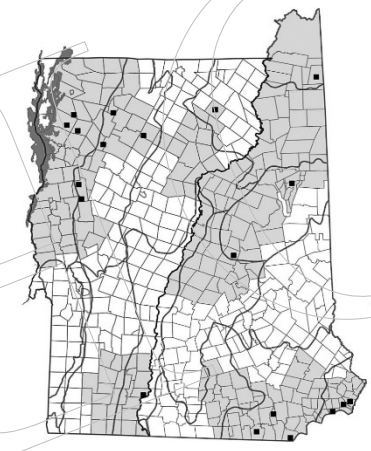
50. Blethisa hudsonica



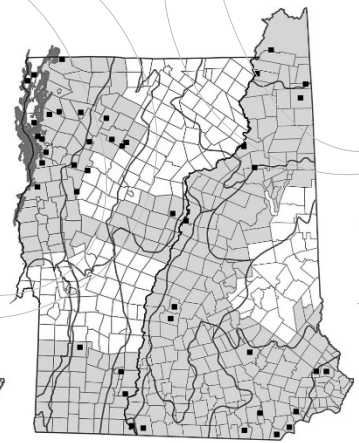
51. Blethisa julii



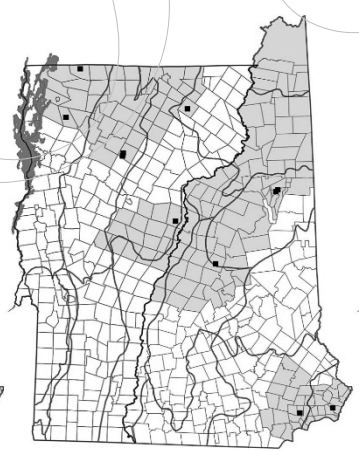
52. Blethisa quadricollis



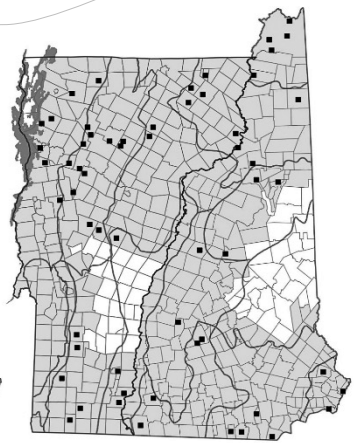
53. Elaphrus cicatricosus



54. Elaphrus clairvillei

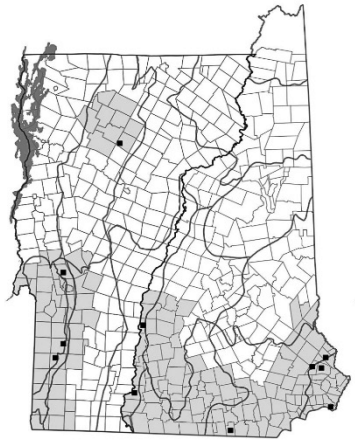


55. Elaphrus fuliginosus

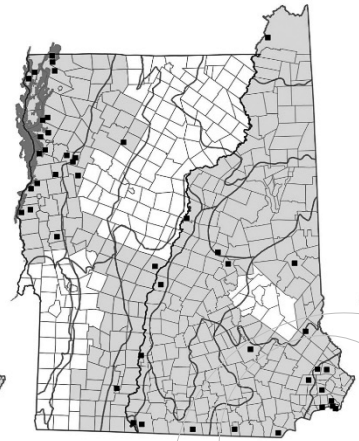


56. Elaphrus olivaceus

60. Omophron americanum
64. Clivina fossor fossor
59. Elaphrus ruscarius
63. Clivina collaris
58. Elaphrus californicus
62. Scarites subterraneus
57. Elaphrus americanus americanus
61. Omophron tessellatum

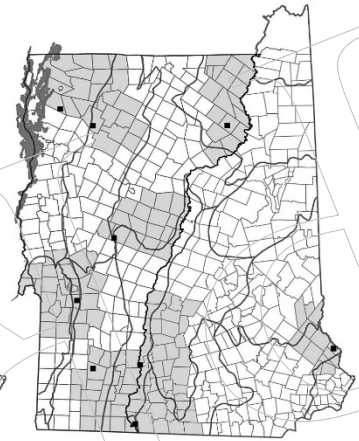


65. Clivina impressefrons

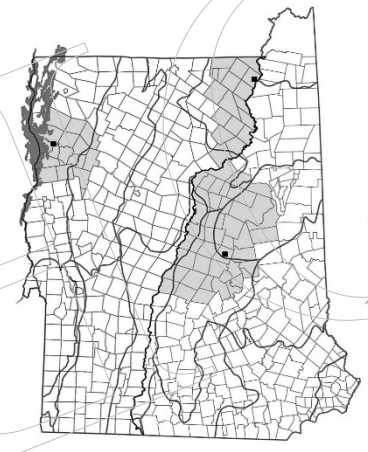


66. Clivina americana

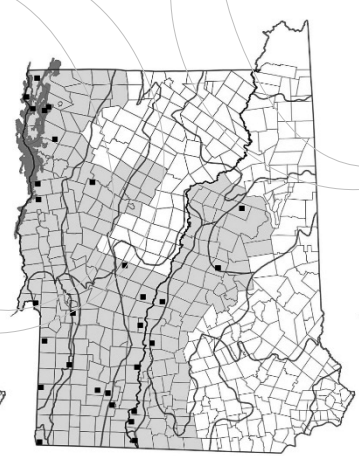
67. Paraclivina ferrea



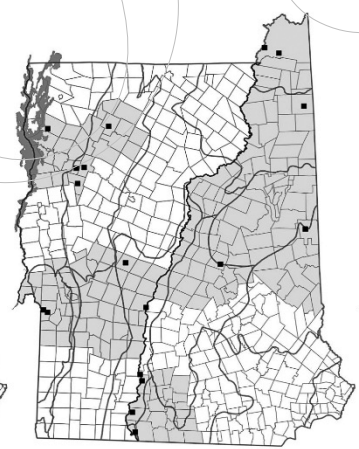
68. Schizogenius amphibius



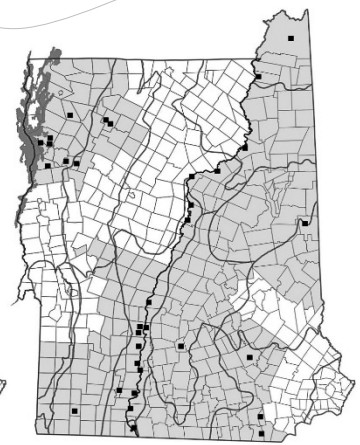
69. Schizogenius ferrugineus



70. Schizogenius lineolatus

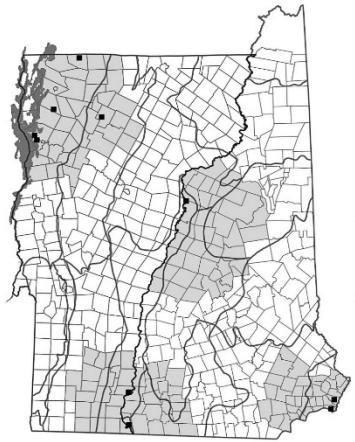


71. Schizogenius sulcifrons

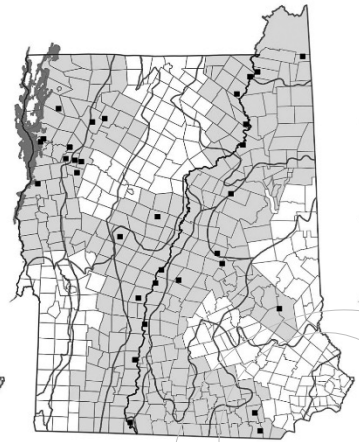


72. Dyschirius affinis

76. Dyschirius globulosus
80. Dyschirius politus politus
75. Dyschirius erythrocerus
79. Dyschirius pilosus
74. Dyschirius dejeanii
78. Dyschirius larochellei
73. Dyschirius brevispinus
77. Dyschirius haemorrhoidalis

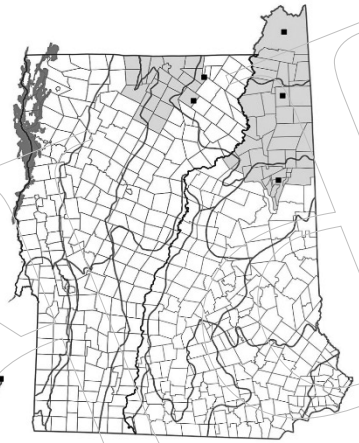


81. Dyschirius setosus

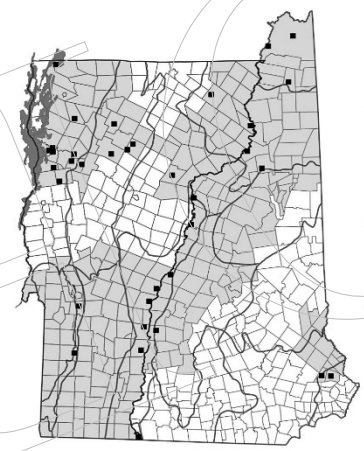


82. Dyschirius sphaericollis

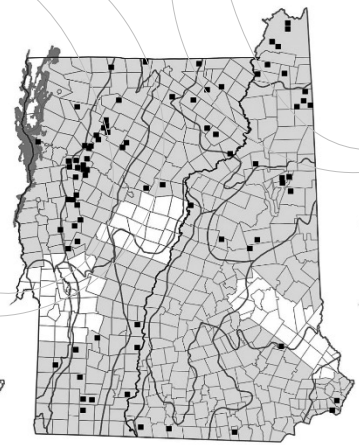
83. Dyschirius sublaevis



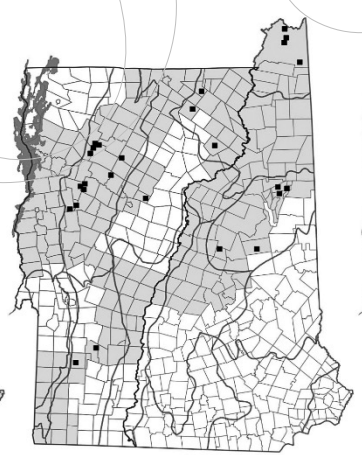
84. Miscodera arctica



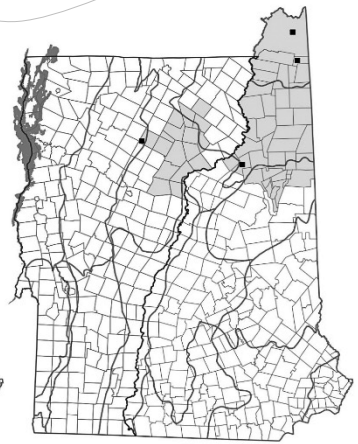
85. Blemus discus discus



86. Trechus apicalis

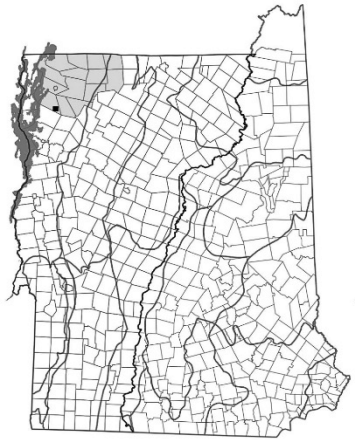


87. Trechus crassiscapus

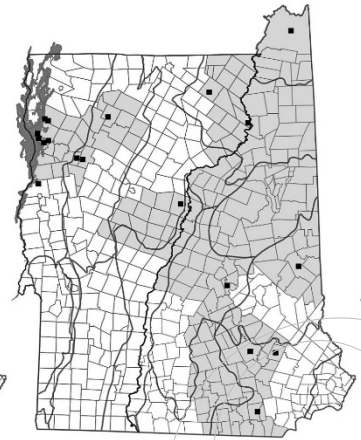


88. Trechus rubens

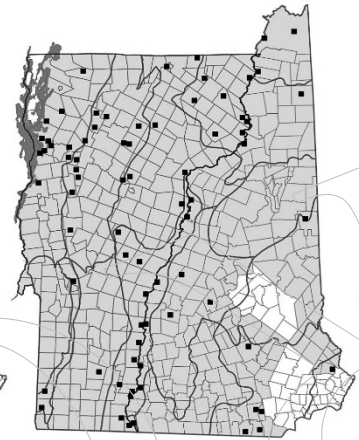
89. Amerizus wingatei
90. Asaphidion curtum curtum
91. Bembidion nigrum
92. Bembidion salebratum
93. Bembidion quadratulum
94. Bembidion semistriatum
95. Bembidion confusum
96. Bembidion paraenulum



97. Bembidion robusticolle

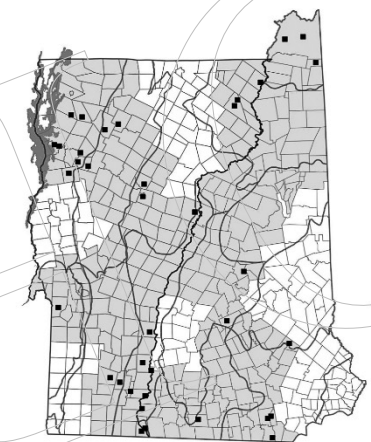


98. Bembidion carinula

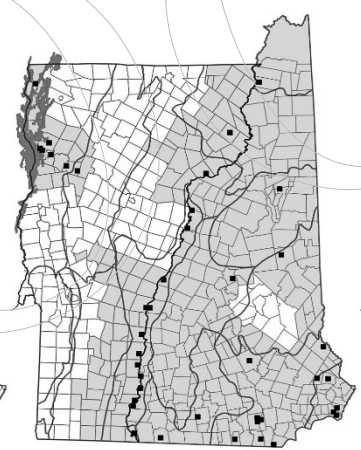


99. Bembidion inaequale

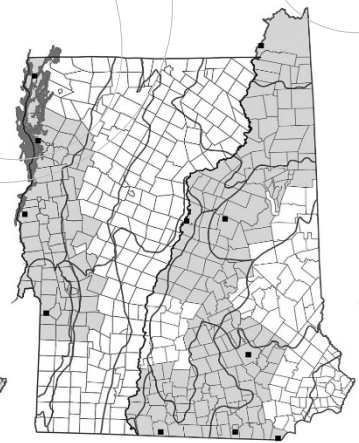
100. Bembidion levettei carrianum



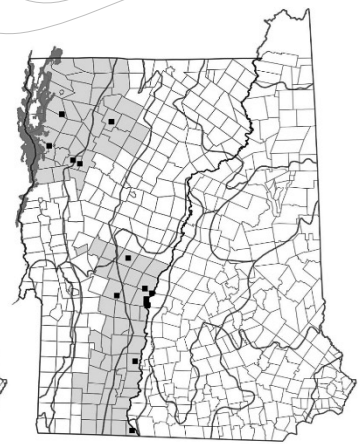
101. Bembidion punctatostriatum



102. Bembidion americanum

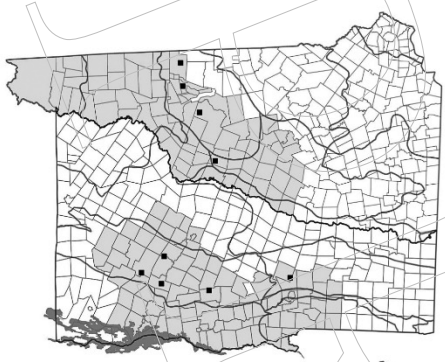


103. Bembidion cheyennense

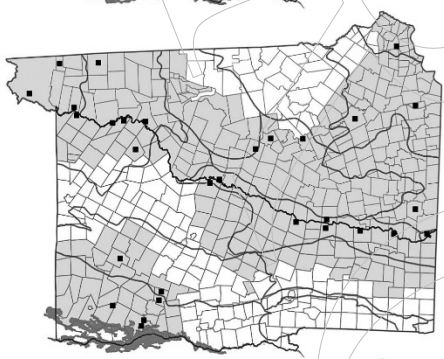


104. Bembidion antiquum

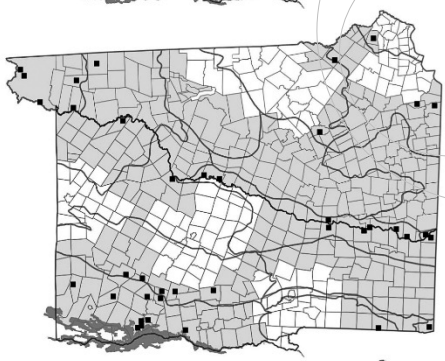
105. Bembidion bellorum
106. Bembidion chalceum
107. Bembidion honestum
108. Bembidion louisella
109. Bembidion rothfelsi
110. Bembidion rufotinctum
111. Bembidion scopulinum
112. Bembidion obscurellum obscurellum



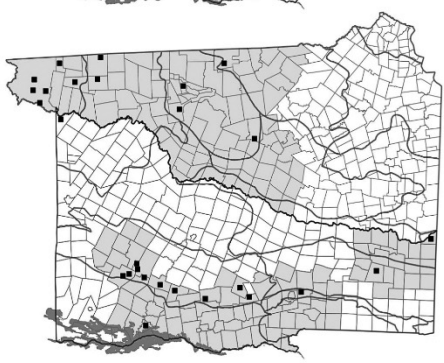
116. Bembidion grapii



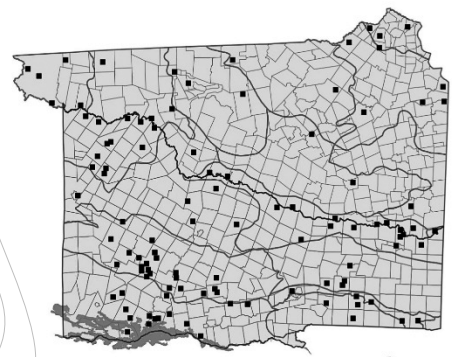
115. Bembidion postremum



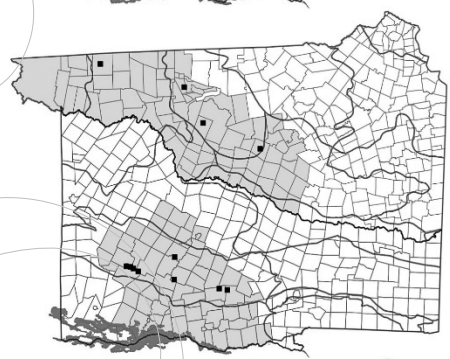
114. Bembidion tetracolum tetracolum



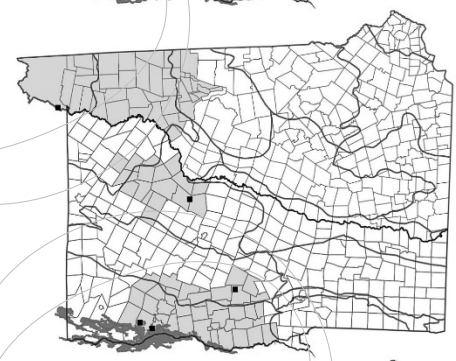
113. Bembidion petrosum petrosum



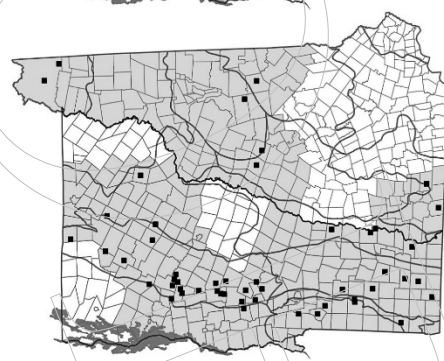
120. Bembidion quadrimaculatum oppositum



119. Bembidion mutatum

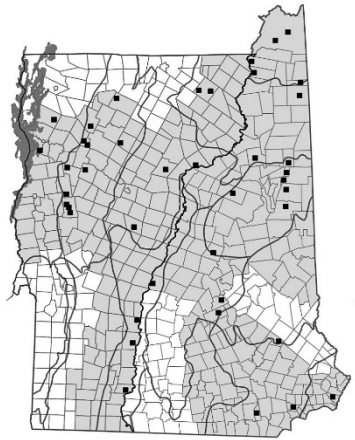


118. Bembidion stephensii

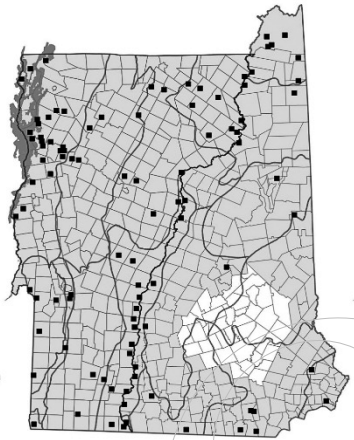


117. Bembidion lacunarium

124. Bembidion versicolor
128. Bembidion praticola
123. Bembidion mimus
127. Bembidion nigrivestis
122. Bembidion impotens
126. Bembidion muscicola
121. Bembidion affine
125. Bembidion transparens transparens

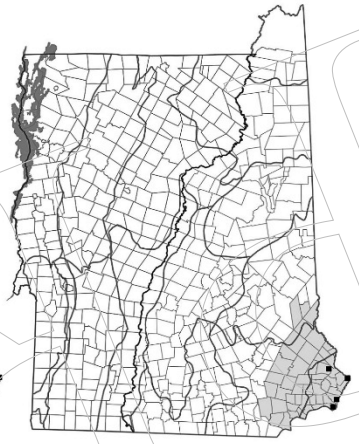


129. Bembidion semicinctum

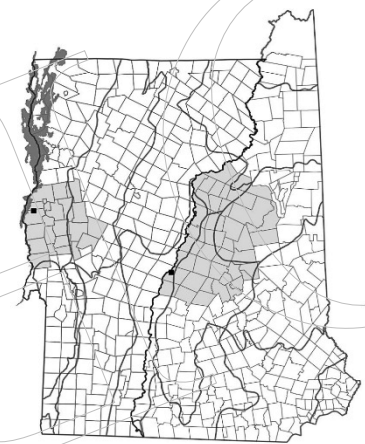


130. Bembidion castor

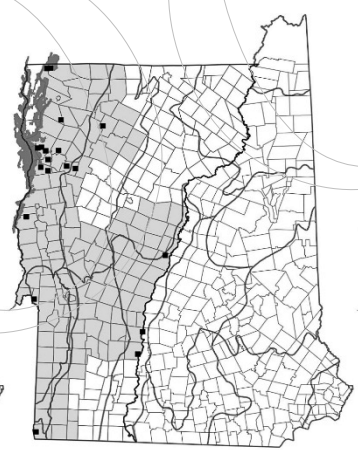
131. Bembidion constrictum



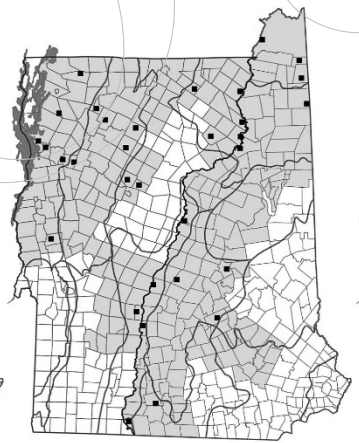
132. Bembidion contractum



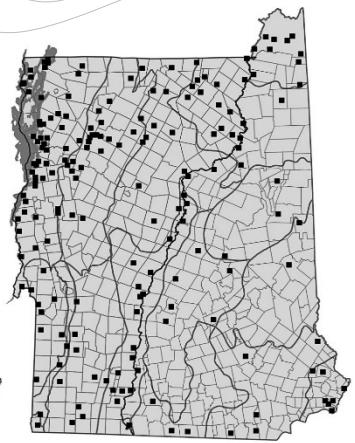
133. Bembidion cordatum



134. Bembidion intermedium

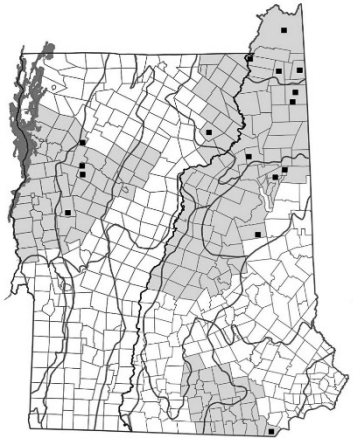


135. Bembidion oberthueri

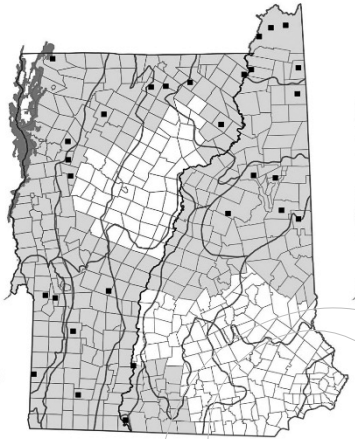


136. Bembidion patruele

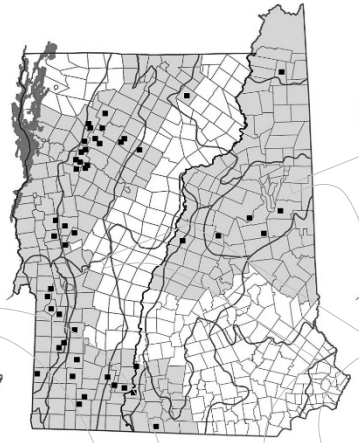
140. Bembidion fortestriatum
144. Bembidion carolinense
139. Bembidion concretum
143. Bembidion basicorne
138. Bembidion versutum
142. Bembidion pseudocautum
137. Bembidion rapidum
141. Bembidion frontale



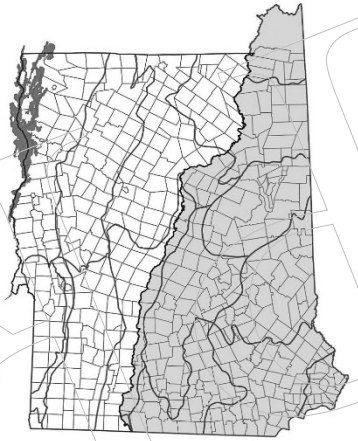
145. Bembidion occultator



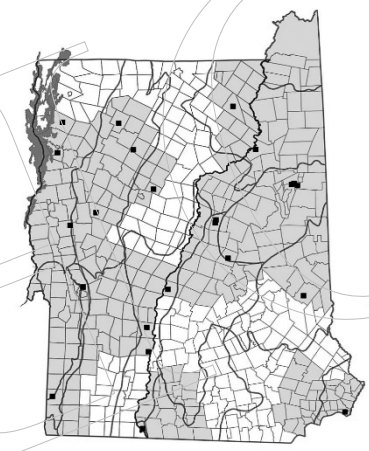
146. Bembidion rusticum rusticum



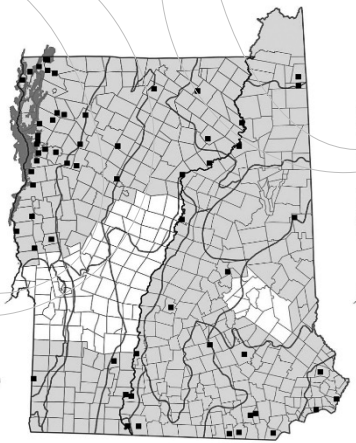
147. Bembidion simplex



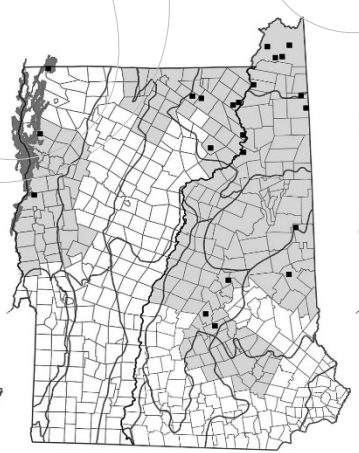
148. Bembidion levigatum



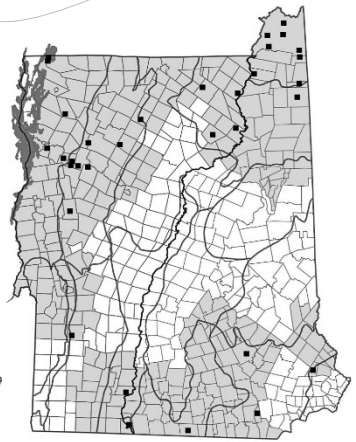
149. Bembidion nitidum



150. Bembidion graciliforme

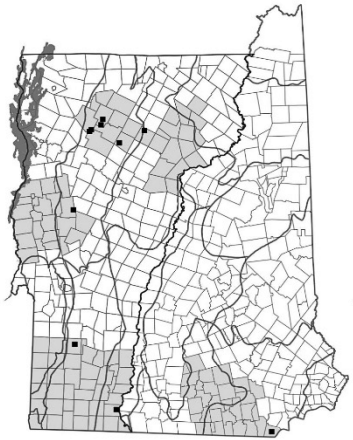


151. Bembidion immaturum

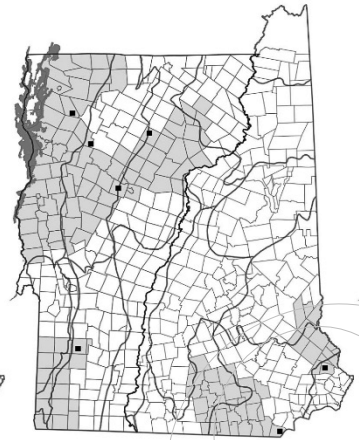


152. Bembidion incrematum

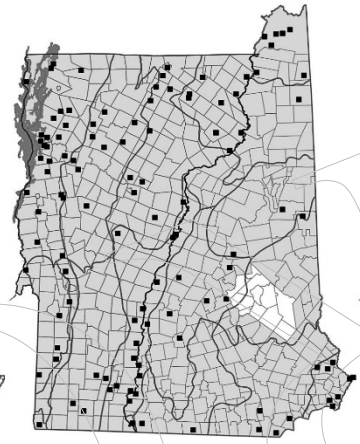
153. Bembidion iridipenne
154. Bembidion variegatum
155. Bembidion fugax
156. Bembidion planum
157. Bembidion rolandi
158. Bembidion obtusum
159. Mioptachys flavicauda
160. Tachyta angulata



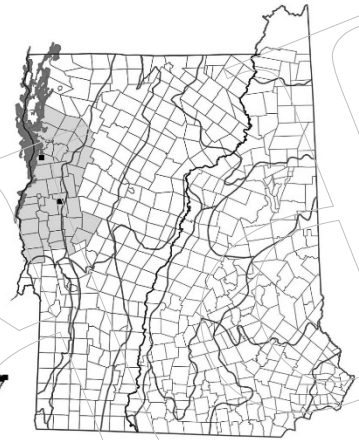
161. Tachyta inornata



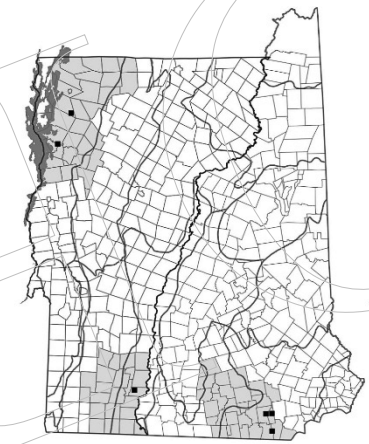
162. Tachyta kirbyi



163. Elaphropus anceps

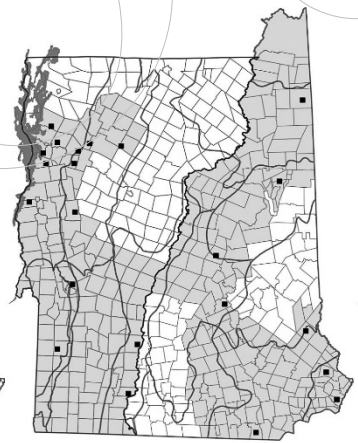


164. Elaphropus capax

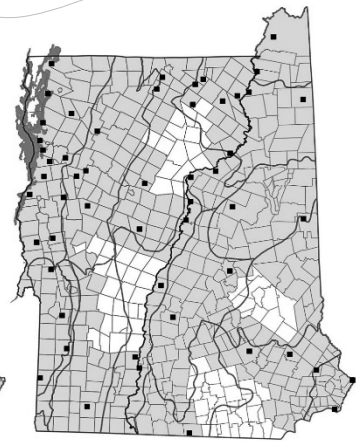


165. Elaphropus dolosus

166. Elaphropus ferrugineus

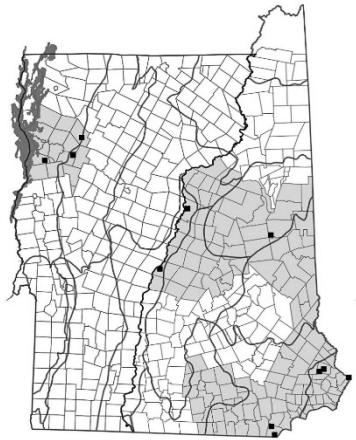


167. Elaphropus granarius

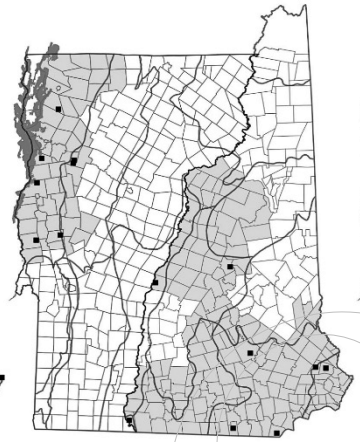


168. Elaphropus incurvus

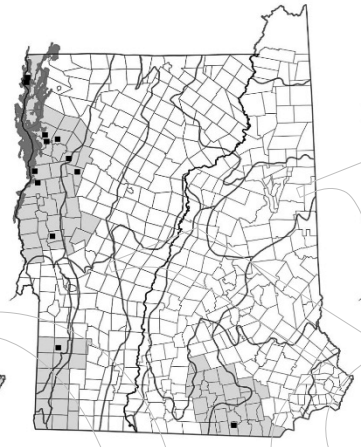
172. Elaphropus vermicatus
171. Elaphropus tripunctatus
170. Elaphropus saturatus
169. Elaphropus levipes
176. Porotachys bisulcatus
175. Pericompsus ephippiatus
174. Elaphropus xanthopus
173. Elaphropus vivax



177. Polyderis laeva

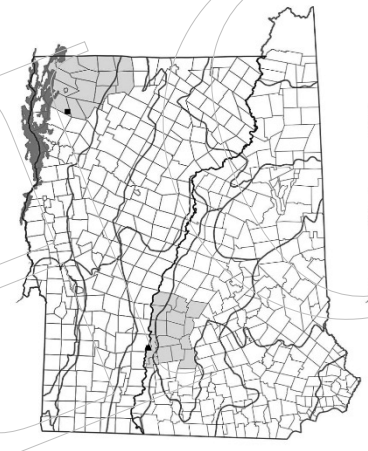


178. Tachys oblitus

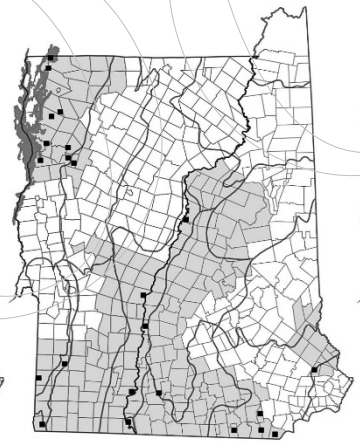


179. Tachys proximus

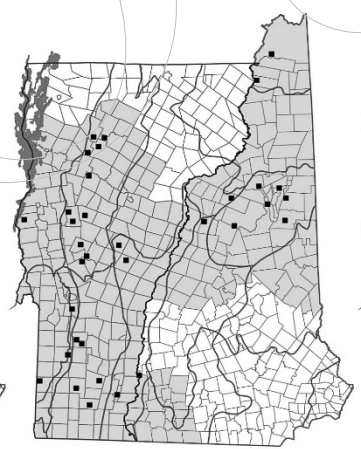
180. Tachys pumilus



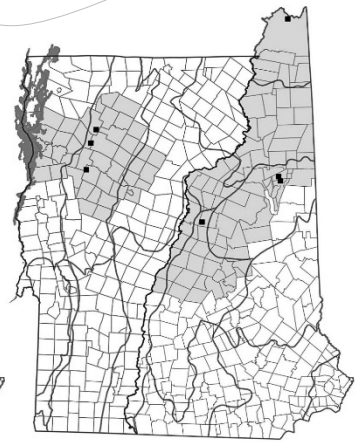
181. Tachys rhodeanus



182. Tachys scitulus

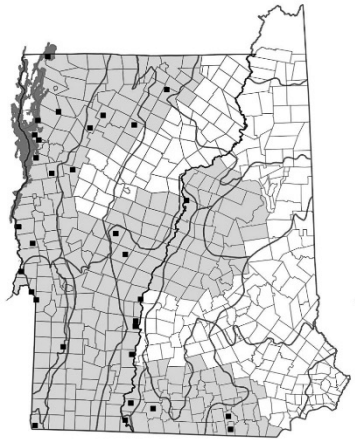


183. Diplous rugicollis

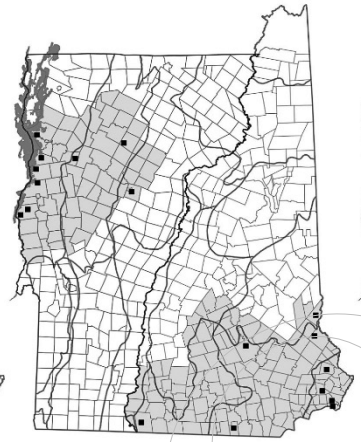


184. Patrobus foveocollis

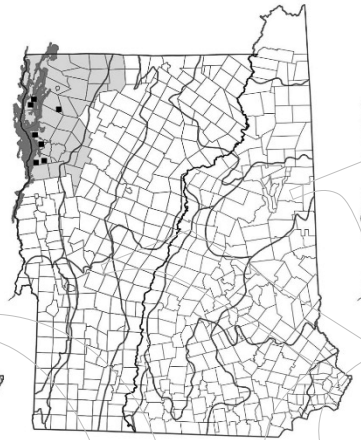
185. Patrobus longicornis
186. Patrobus septentrionis septentrionis
187. Platypatrobus lacustris
188. Brachinus cordicollis
189. Brachinus cyanipennis
190. Brachinus cyanochroaticus
191. Brachinus fulminatus
192. Brachinus fumans



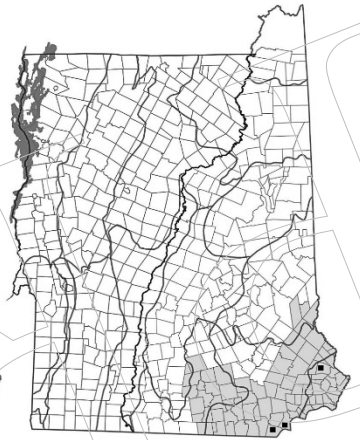
193. Brachinus janthinipennis



194. Brachinus medius

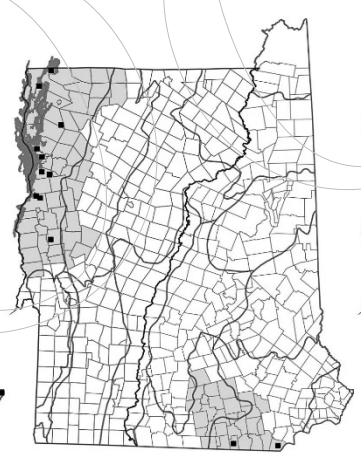


195. Brachinus ovipennis



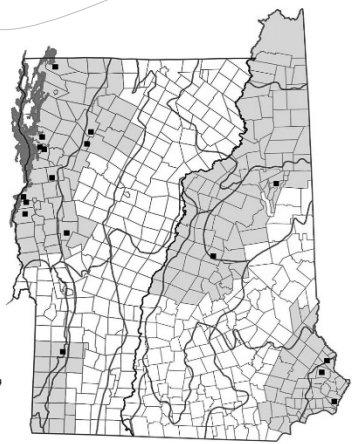
196. Brachinus patruelis

197. Brachinus quadripennis



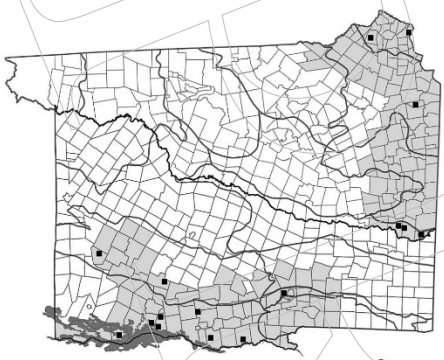
198. Brachinus tenuicollis

199. Brachinus vulcanoides

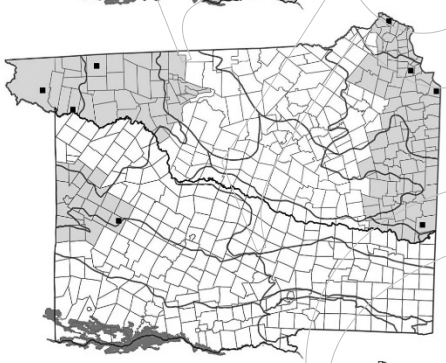


200. Poecilus chalcites

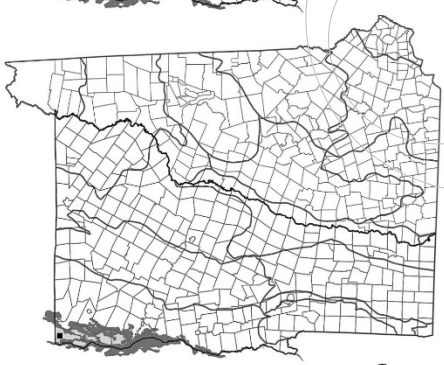
204. Gastrellarius honestus
208. Pterostichus commutabilis
203. Lophoglossus vernix
207. Myas cyanescens
202. Lophoglossus scrutator
206. Myas coracinus
201. Poecilus lucublandis
205. Stereocerus haematopus



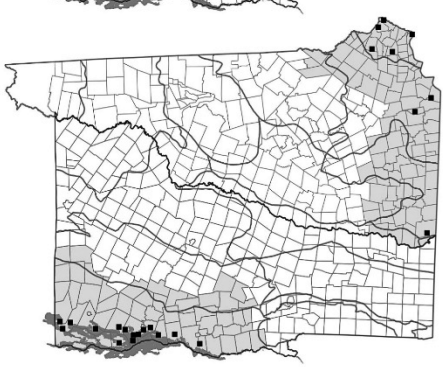
212. Pterostichus femoralis



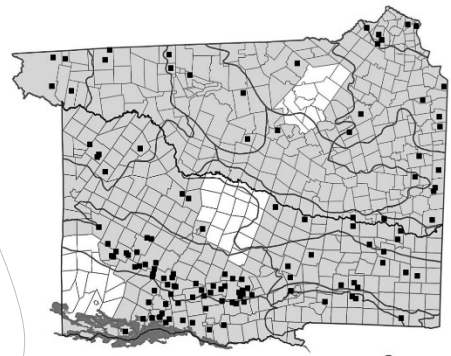
211. Pterostichus corruscolus



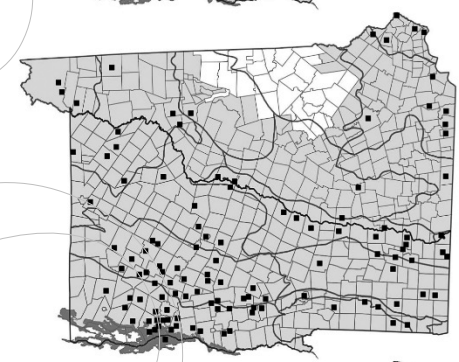
210. Pterostichus vernalis



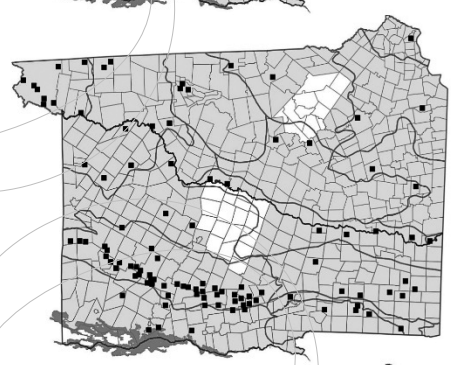
209. Pterostichus praetermissus



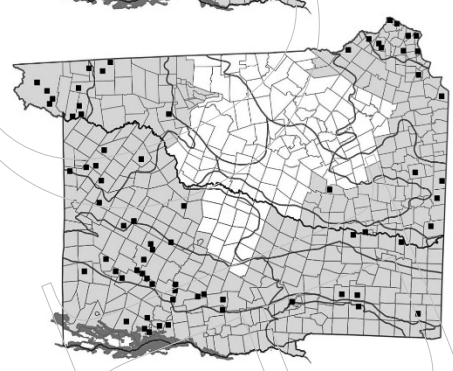
216. Pterostichus pensylvanicus



215. Pterostichus mutus

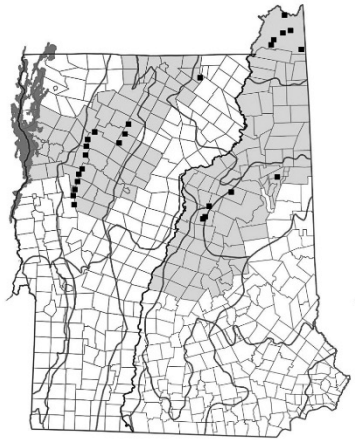


214. Pterostichus adstrictus

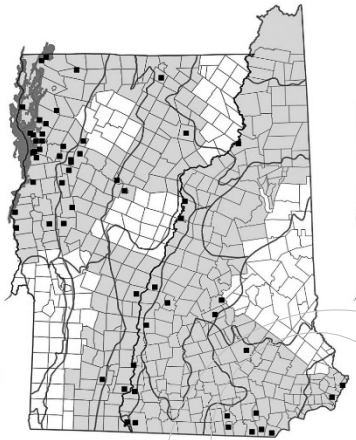


213. Pterostichus patruelis

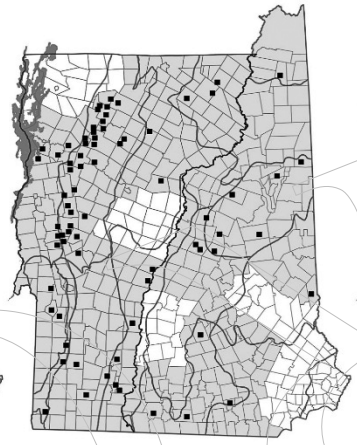
217. Pterostichus castor
218. Pterostichus corvinus
219. Pterostichus luctuosus
220. Pterostichus tenuis
221. Pterostichus melanarius melanarius
222. Pterostichus coracinus
223. Pterostichus lachrymosus
224. Pterostichus stygicus



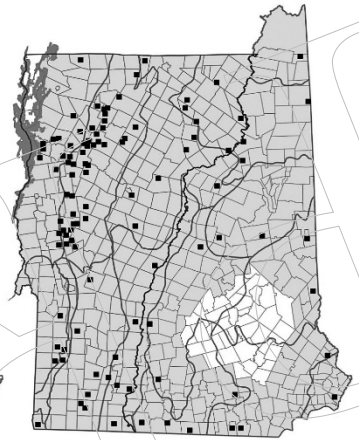
225. Pterostichus punctatissimus



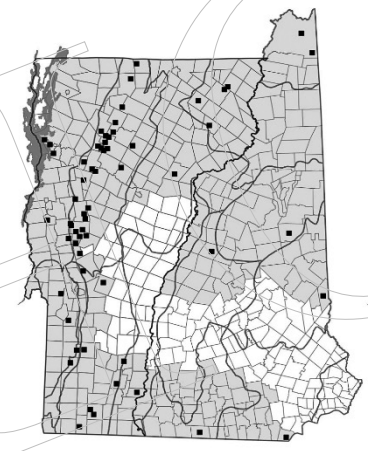
226. Pterostichus caudicalis



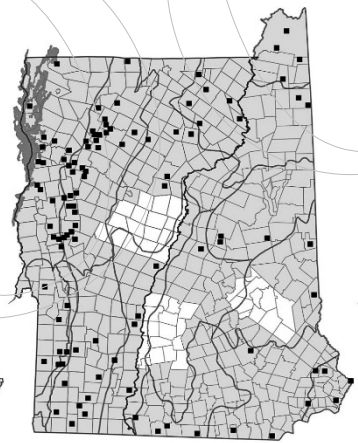
227. Pterostichus diligendus



228. Pterostichus rostratus

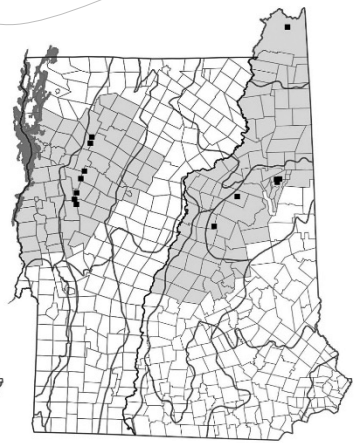


229. Pterostichus adoxus



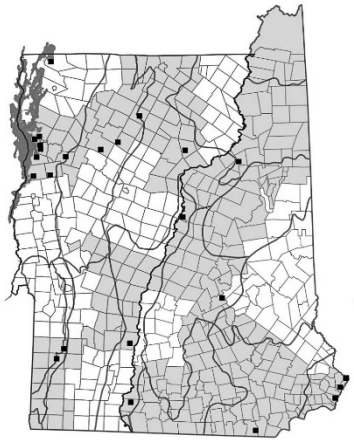
230. Pterostichus tristis

231. Pterostichus arcticola

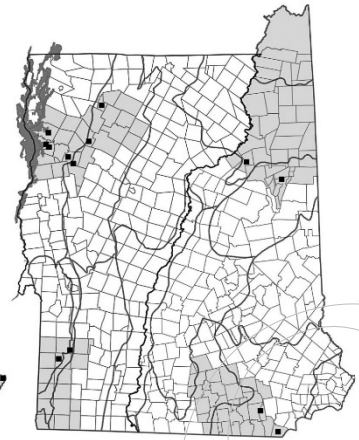


232. Pterostichus brevicornis brevicornis

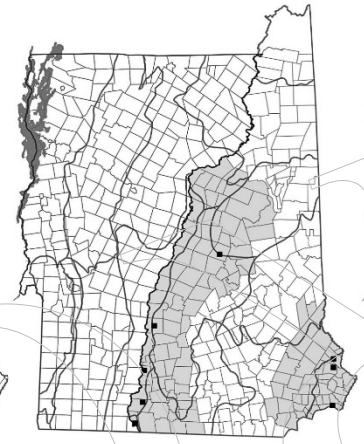
236. Amara aulica
240. Amara torrida
235. Amara alpina
239. Amara pennsylvanica
234. Cyclotrachelus sodalis sodalis
238. Amara hyperborea
233. Pterostichus pinguedineus
237. Amara carinata



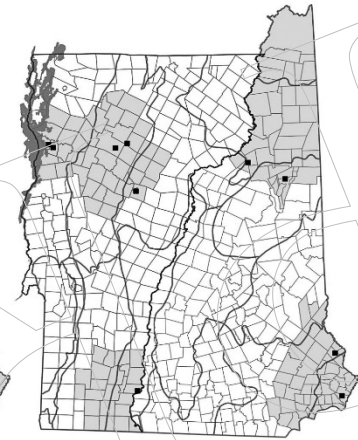
241. Amara apricaria



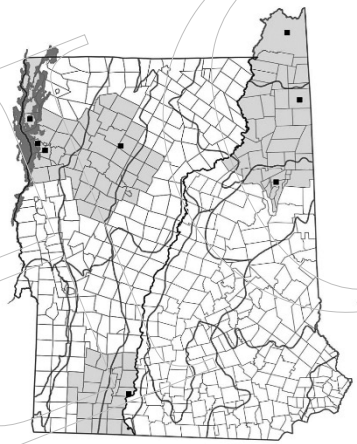
242. Amara avida



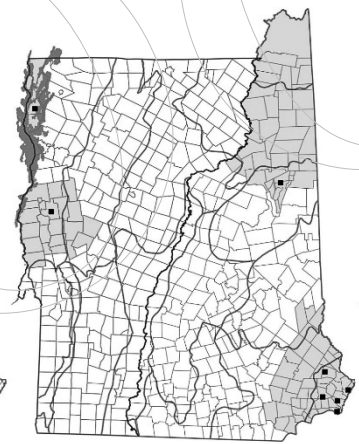
243. Amara exarata



244. Amara latior

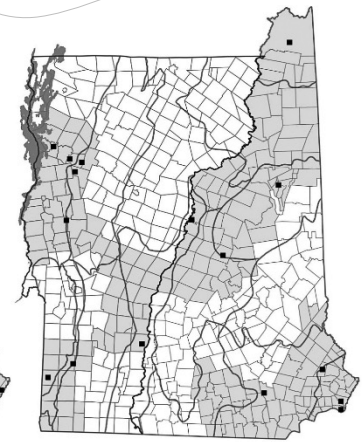


245. Amara obesa



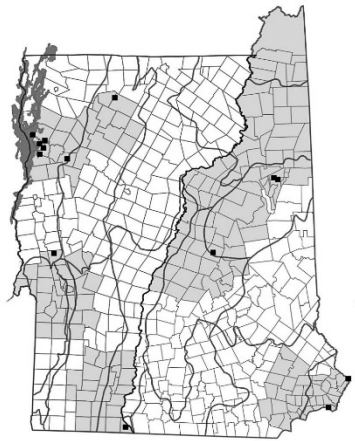
246. Amara chalcea

247. Amara bifrons



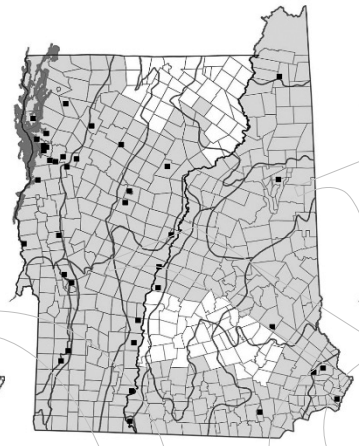
248. Amara musculis

252. Amara laevipennis
256. Amara basillaris
251. Amara erratica
255. Amara aeneopolita
250. Amara sinuosa
254. Amara aenea
249. Amara rubica
253. Amara patruelis

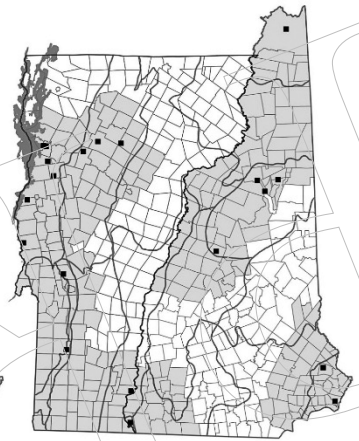


257. Amara convexa

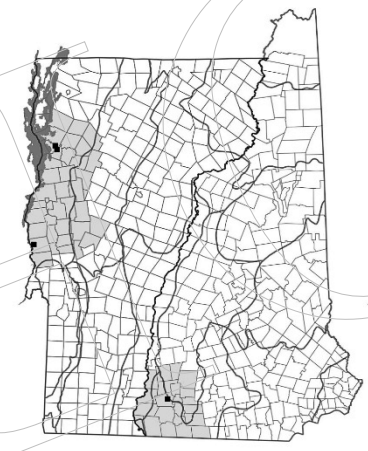
258. Amara crassispina



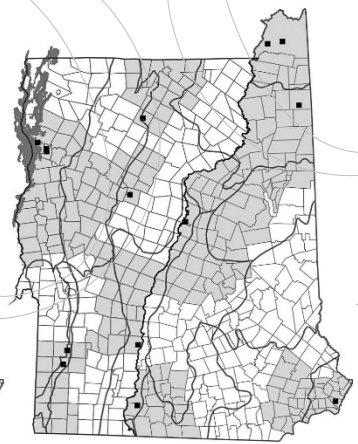
259. Amara cupreolata



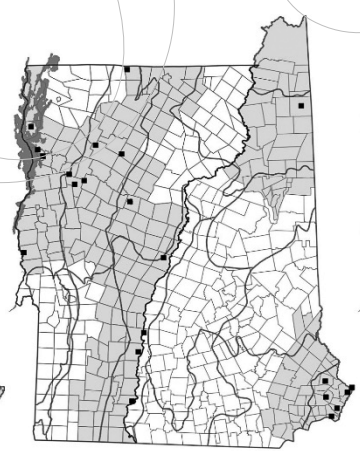
260. Amara familiaris



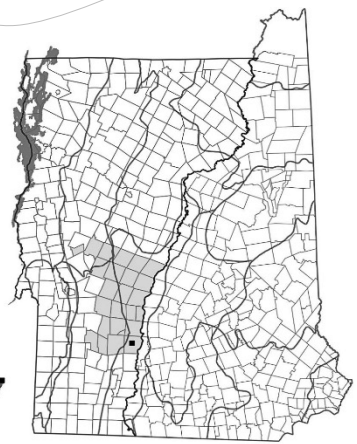
261. Amara impuncticollis



262. Amara littoralis

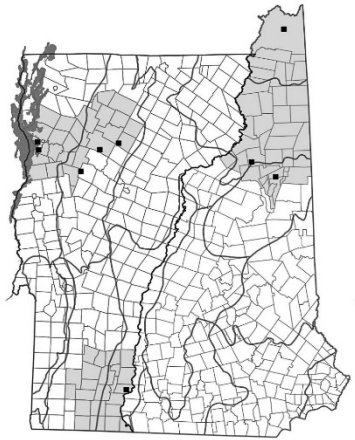


263. Amara lunicollis



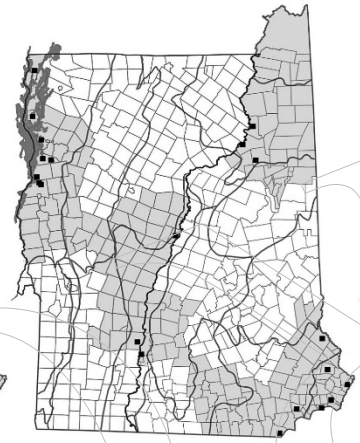
264. Amara neoscotica

268. Amara turbata
272. Amara flebilis
267. Amara tenax
271. Amara angustatoides
266. Amara ovata
270. Amara angustata
265. Amara otiosa
269. Amara quenseli quenseli

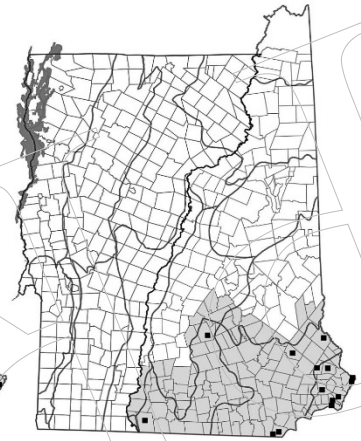


273. Amara pallipes

274. Anatrichis minuta

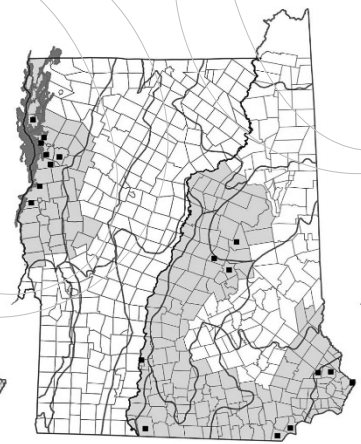


275. Lachnocrepis parallela

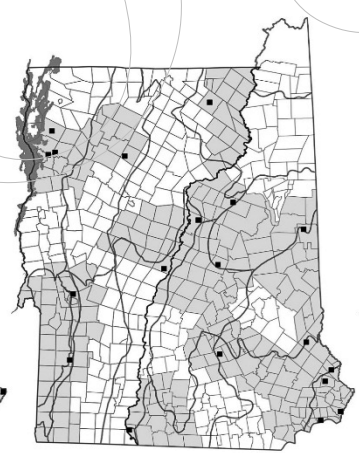


276. Oodes amaroides

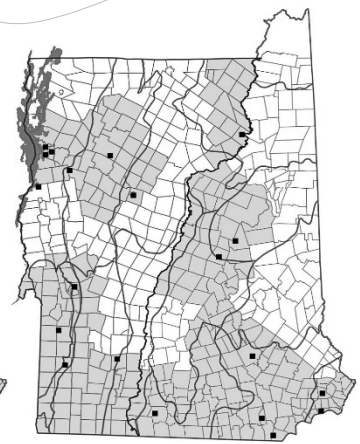
277. Oodes brevis



278. Oodes fluvialis

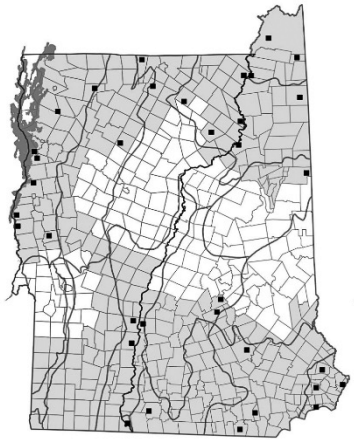


279. Chlaenius tomentosus

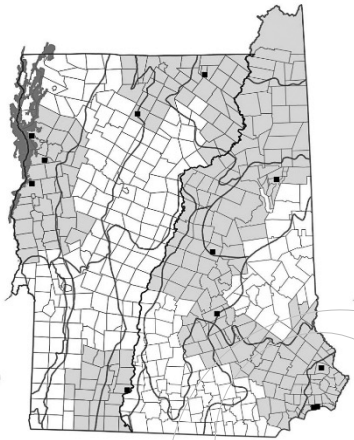


280. Chlaenius emarginatus

284. Chlaenius cordicollis
283. Chlaenius sericeus
282. Chlaenius laticollis
281. Chlaenius aestivus
288. Chlaenius tricolor
287. Chlaenius pennsylvanicus pennsylvanicus
286. Chlaenius impunctifrons
285. Chlaenius brevilabris

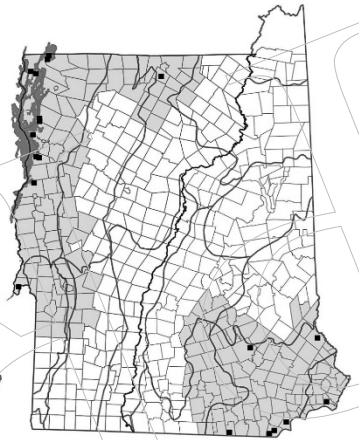


289. Chlaenius lithophilus

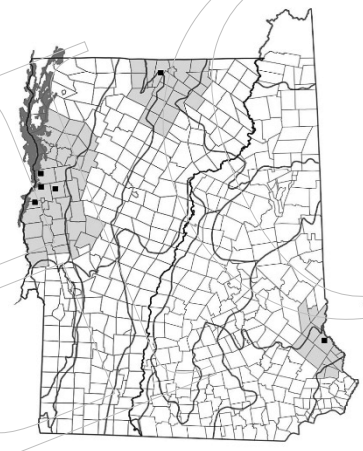


290. Chlaenius niger

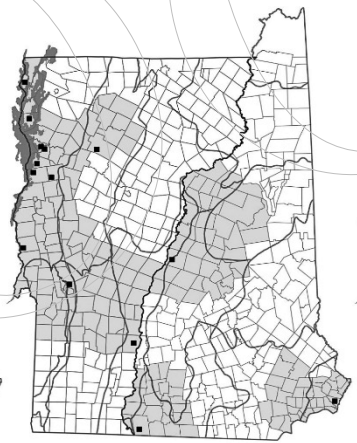
291. Chlaenius purpuricollis



292. Diplocheila assimilis

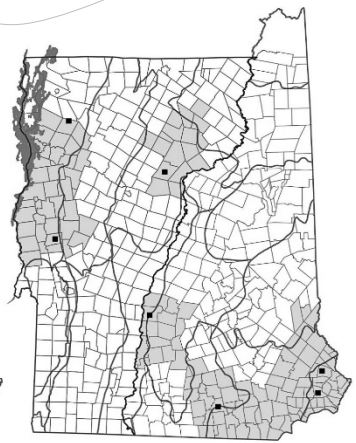


293. Diplocheila impressicollis



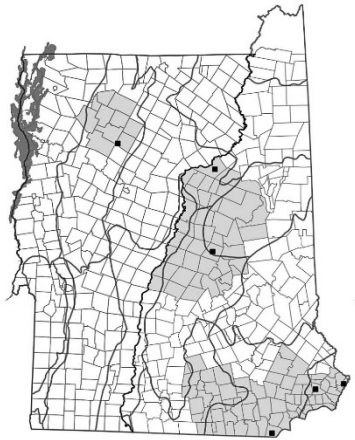
294. Diplocheila obtusa

295. Diplocheila striatopunctata

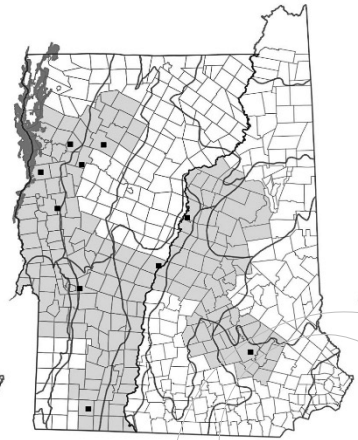


296. Dicaelus dilatatus dilatatus

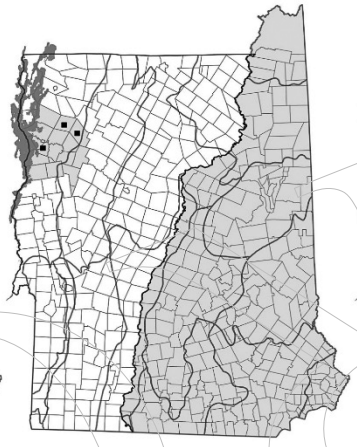
300. Badister neopulchellus
304. Badister micans
299. Dicaelus teter
303. Badister grandiceps
298. Dicaelus politus
302. Badister obtusus
297. Dicaelus elongatus
301. Badister notatus



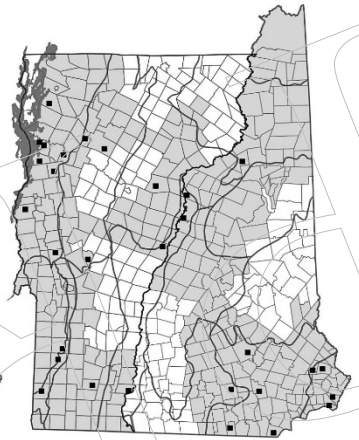
305. Badister transversus



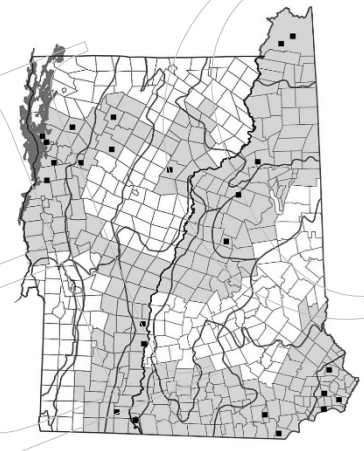
306. Notiobia nitidipennis



307. Notiobia sayi

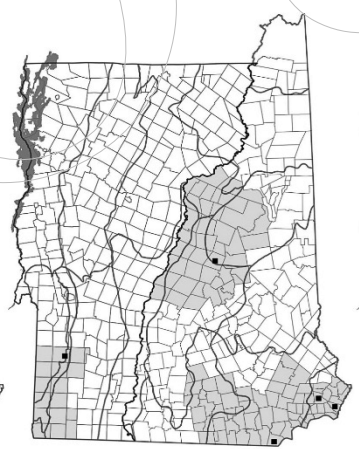


308. Notiobia terminata

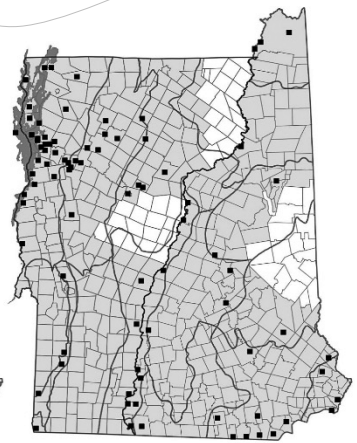


309. Xestonotus lugubris

310. Anisodactylus agricola

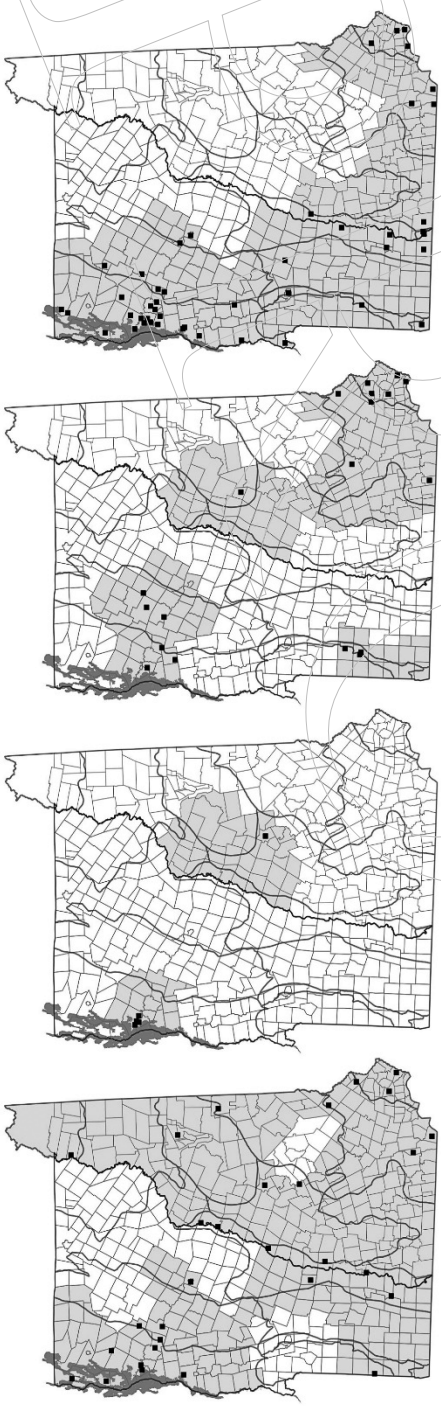


311. Anisodactylus carbonarius



312. Anisodactylus harrisii

313. Anisodactylus kirbyi
314. Anisodactylus nigerrimus
315. Anisodactylus nigrita
316. Anisodactylus pseudagricola
317. Anisodactylus merula
318. Anisodactylus rusticus
319. Anisodactylus discoideus
320. Anisodactylus sanctaecrucis



321. Anisodactylus verticalis

322. Geopinus incrassatus

323. Amphasia sericea

324. Amphasia interstitialis

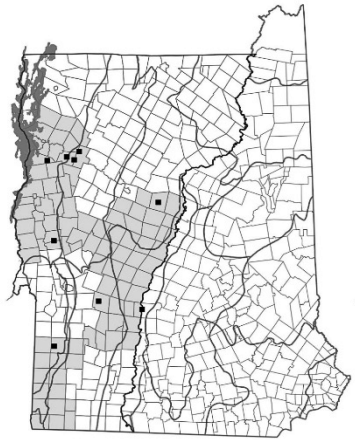
325. Stenolophus carbo

326. Stenolophus fuliginosus

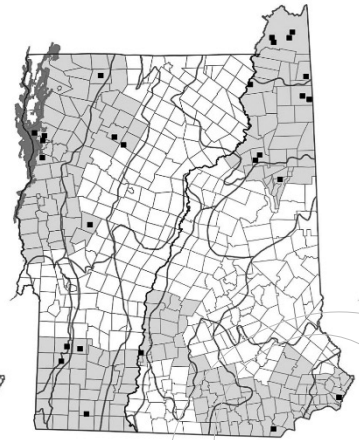
327. Stenolophus fuscatus

328. Stenolophus humidus

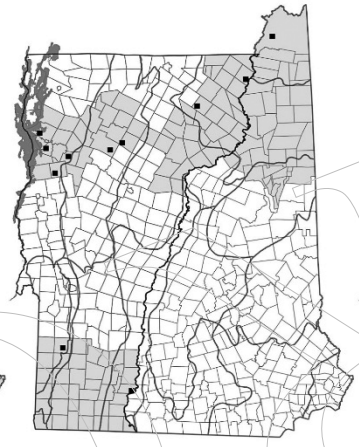
329. Stenolophus megacephalus
330. Stenolophus ochropezus
331. Stenolophus plebejus
332. Stenolophus comma
333. Stenolophus lecontei
334. Stenolophus lineola
335. Agonoleptus conjunctus
336. Agonoleptus rotundicollis



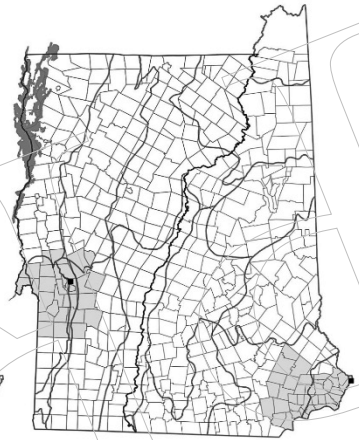
337. Agonoleptus thoracicus



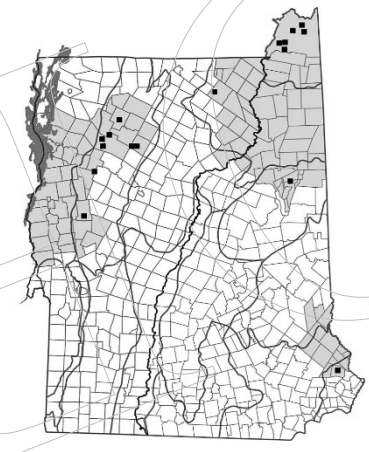
338. Bradycellus lecontei



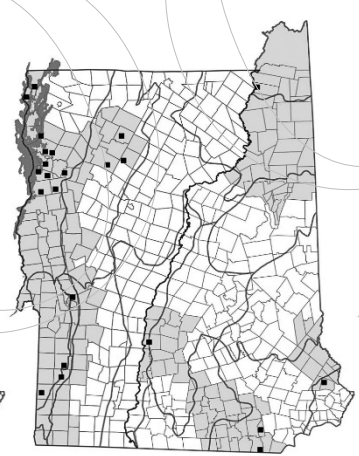
339. Bradycellus congener



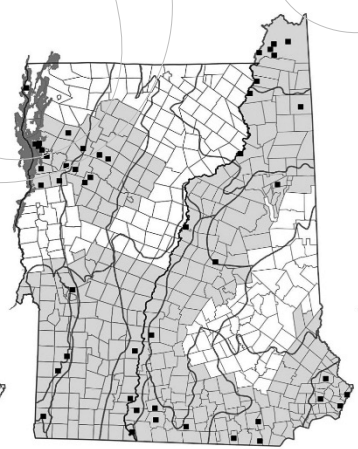
340. Bradycellus insulsus



341. Bradycellus neglectus



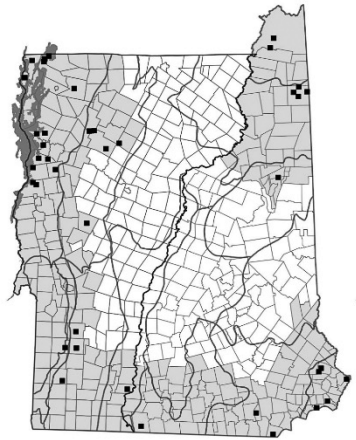
342. Bradycellus nigriceps



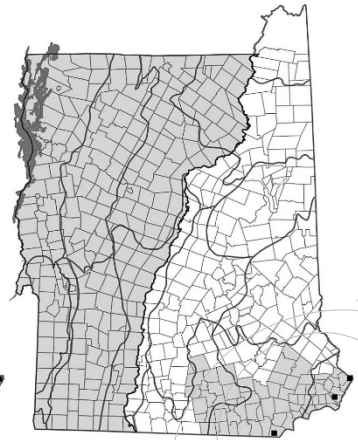
343. Bradycellus rupestris

344. Bradycellus tantillus

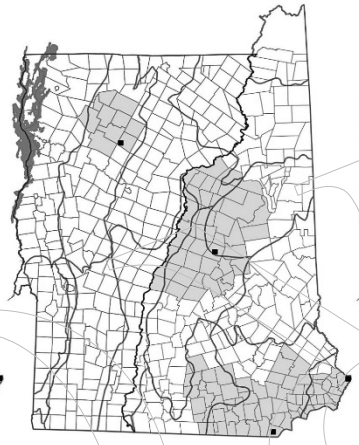
345. Bradycellus nigrinus
346. Bradycellus semipubescens
347. Bradycellus atrimedius
348. Bradycellus badipennis
349. Bradycellus kirbyi
350. Bradycellus lugubris
351. Dicheirotrichus cognatus
352. Acupalpus canadensis



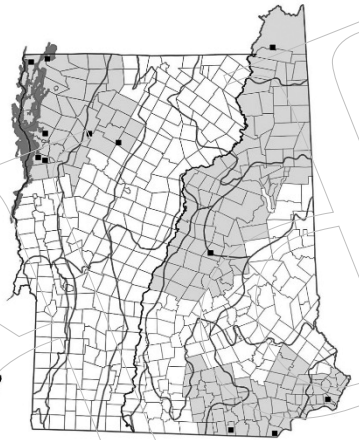
353. Acupalpus carus



354. Acupalpus hydropicus

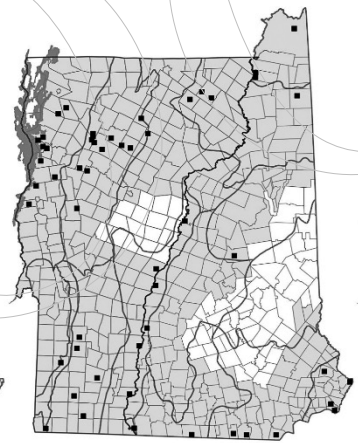


355. Acupalpus nanellus

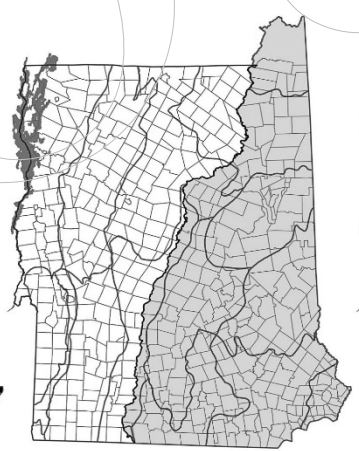


356. Acupalpus pumilus

357. Acupalpus partiarius



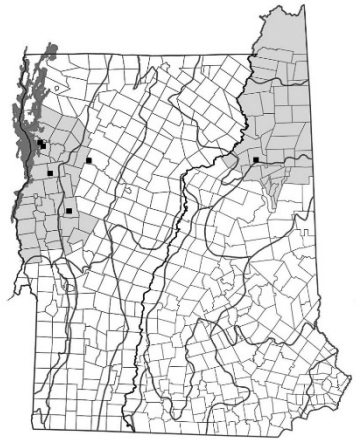
358. Acupalpus pauperculus



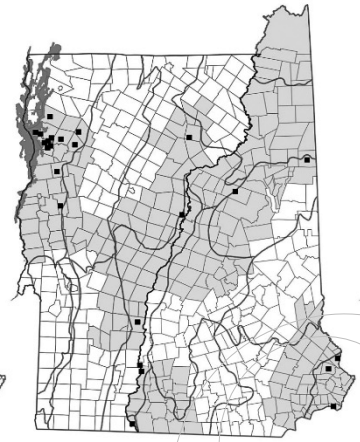
359. Acupalpus testaceus

360. Philodes alternans

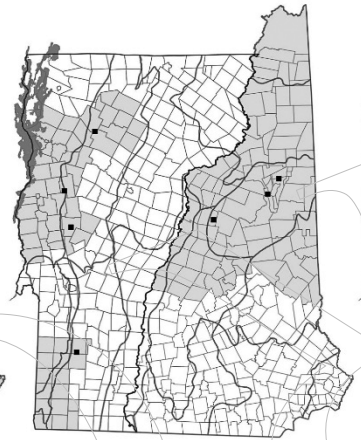
364. Harpalus erythropus
368. Harpalus vagans
363. Harpalus compar
367. Harpalus rufipes
362. Ophonus puncticeps
366. Harpalus pensylvanicus
361. Philodes rectangulus
365. Harpalus faunus



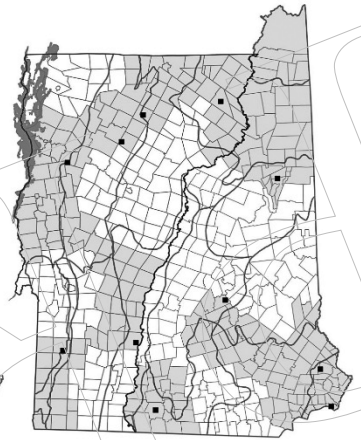
369. Harpalus caliginosus



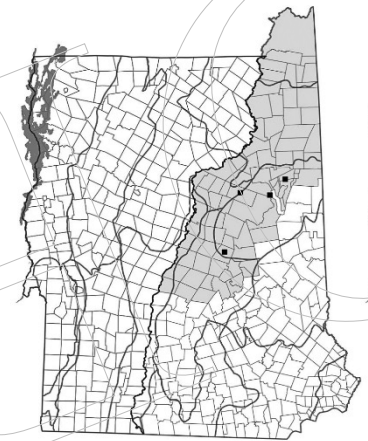
370. Harpalus erraticus



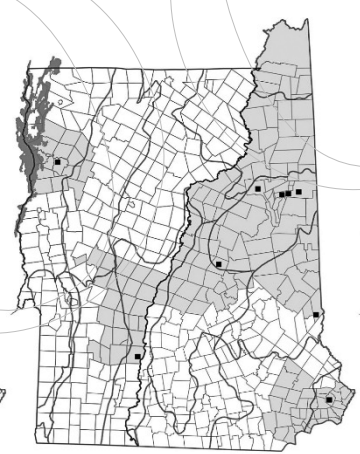
371. Harpalus fulvilabris



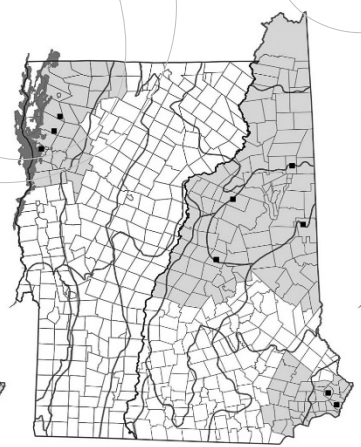
372. Harpalus indigens



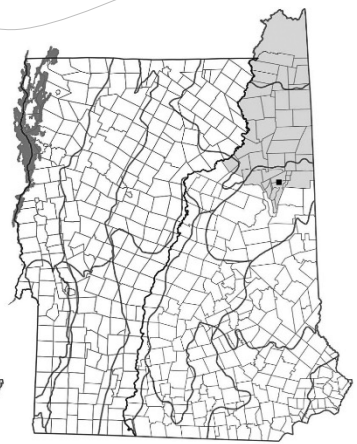
373. Harpalus laevipes



374. Harpalus laticeps

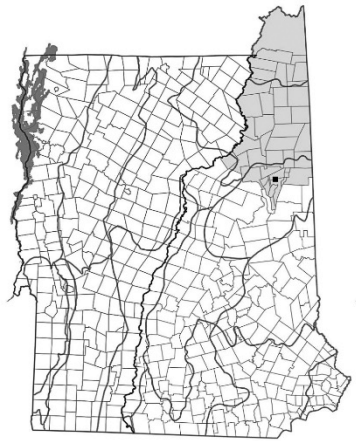


375. Harpalus lewisii

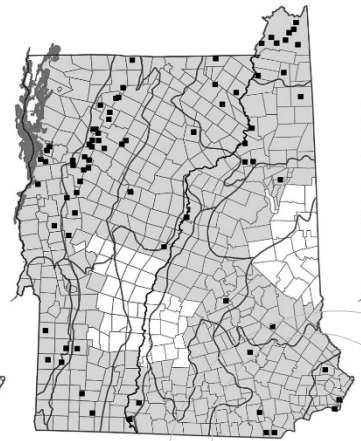


376. Harpalus nigritarsis

380. Harpalus affinis
384. Harpalus rubripes
379. Harpalus spadiceus
383. Harpalus plenalis
378. Harpalus reversus
382. Harpalus opacipennis
377. Harpalus providens
381. Harpalus herbivagus



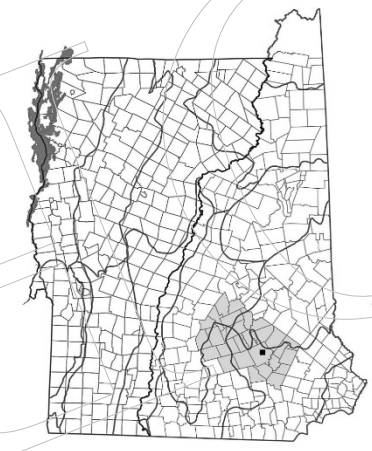
385. Harpalus solitaris



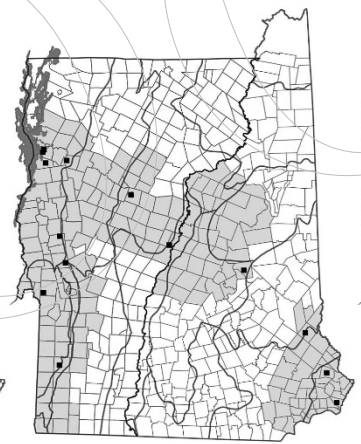
386. Harpalus somnulentus

387. Harpalus fuscipalpis

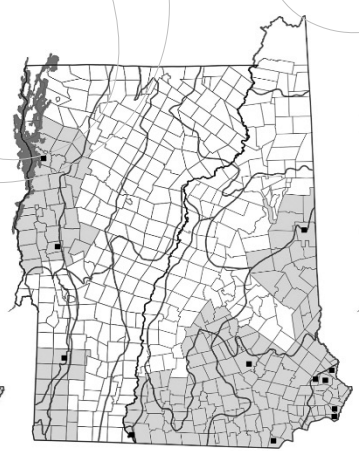
388. Selenophorus ellipticus



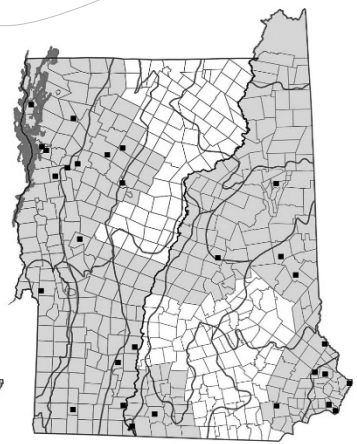
389. Selenophorus granarius



390. Selenophorus gagatinus

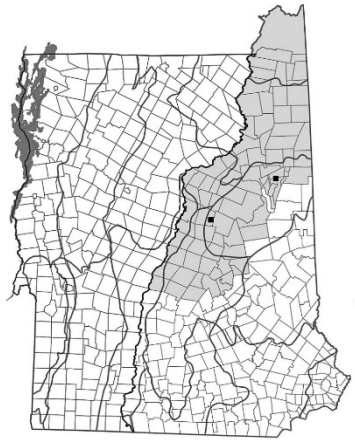


391. Selenophorus hylacis

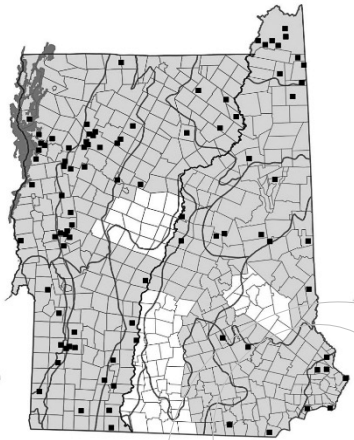


392. Selenophorus opalinus

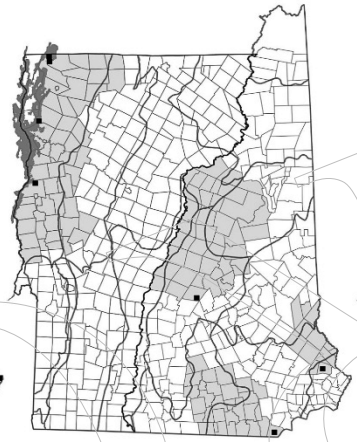
396. Trichotichnus autumnalis
400. Calathus opaculus
395. Trichotichnus vulpeculus
399. Calathus ingratus
394. Trichotichnus dichrous
398. Calathus gregarius
393. Discoderus parallelus
397. Pseudamara arenaria



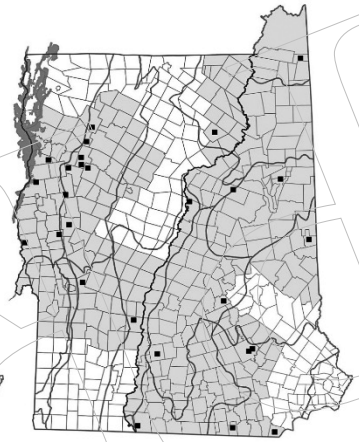
401. Calathus advena



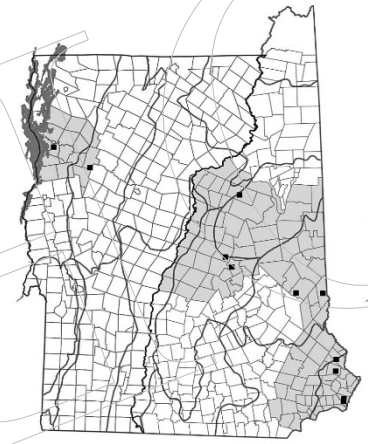
402. Synuchus impunctatus



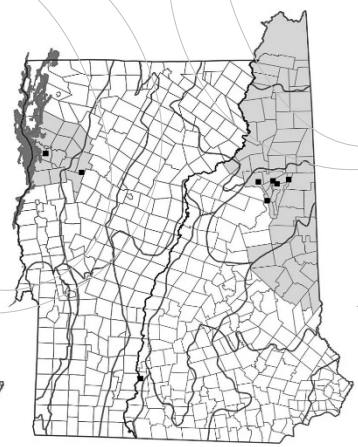
403. Olisthopus micans



404. Olisthopus parmatus

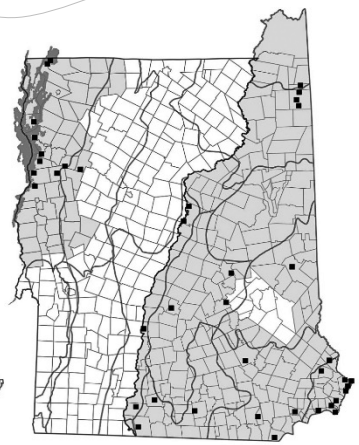


405. Sericoda obsoleta



406. Sericoda quadripunctata

407. Tetraleucus picticornis



408. Oxypselaphus pusillus

409. Agonum nigriceps

410. Agonum anchomenoides

411. Agonum canadense

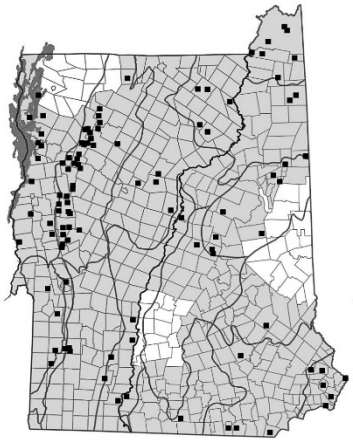
412. Agonum darlingtoni

413. Agonum gratiosum

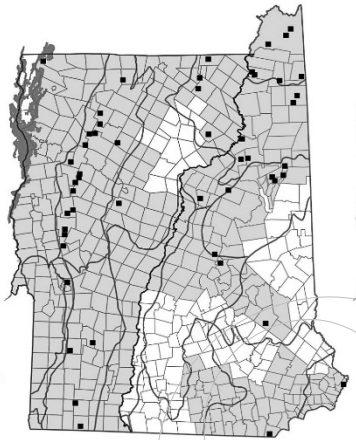
414. Agonum lutulentum

415. Agonum palustre

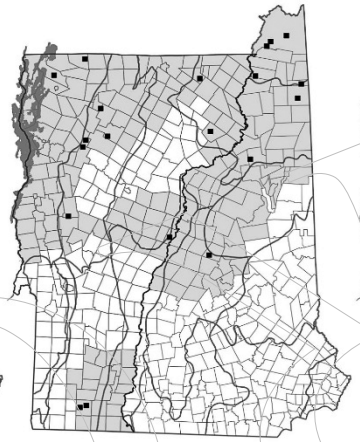
416. Agonum picicornoides



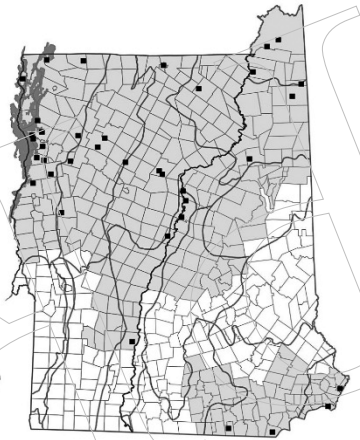
417. Agonum retractum



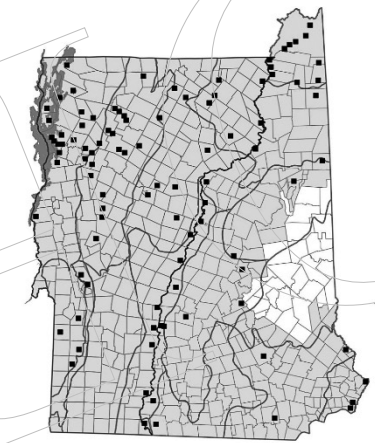
418. Agonum sordens



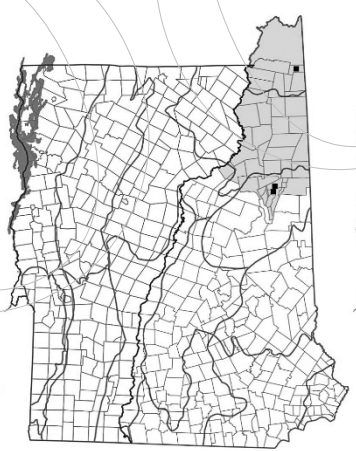
419. Agonum superioris



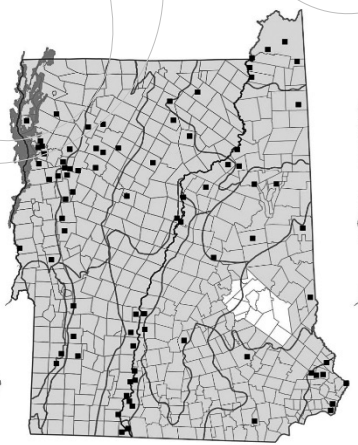
420. Agonum thoreyi



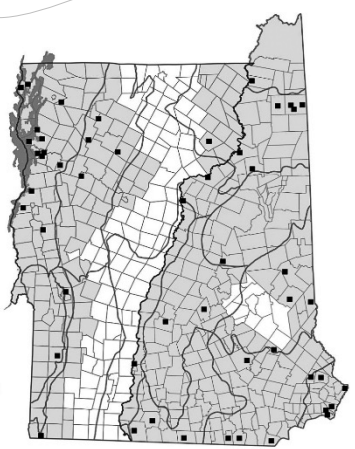
421. Agonum muelleri



422. Agonum piceolum

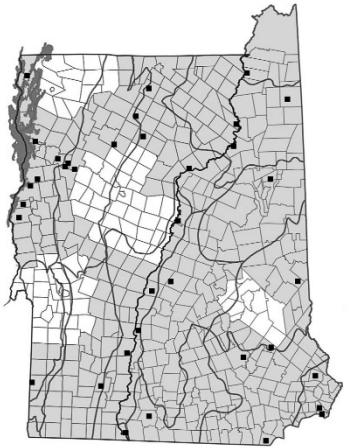


423. Agonum placidum

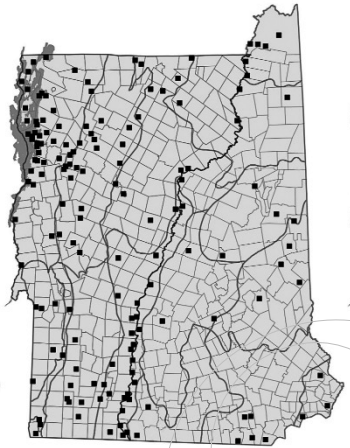


424. Agonum aeruginosum

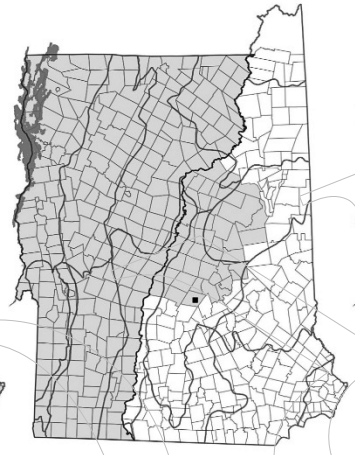
428. Agonum crenistriatum
427. Agonum corvus
426. Agonum albicrus
425. Agonum affine
432. Agonum errans
431. Agonum decorum
430. Agonum deceptivum
429. Agonum cupripenne



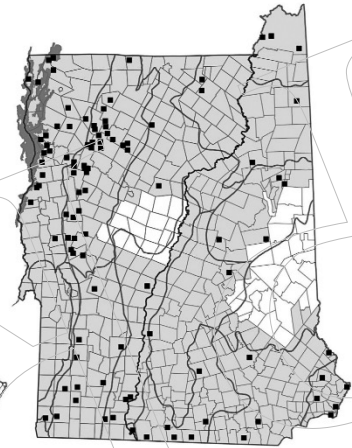
433. Agonum excavatum



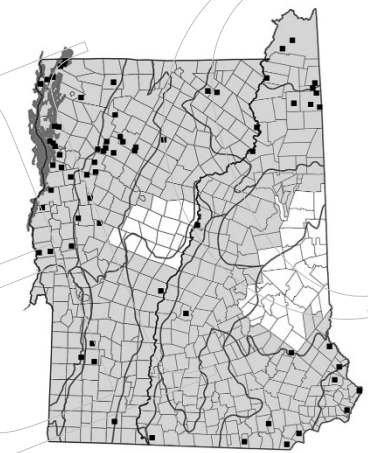
434. Agonum extensicolle



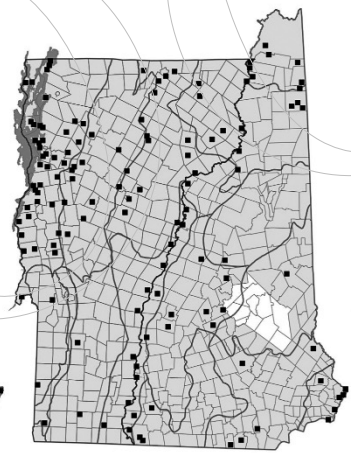
435. Agonum ferreum



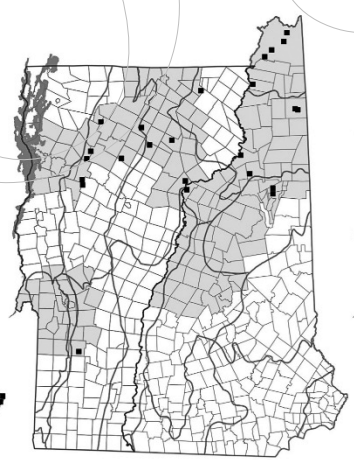
436. Agonum fidele



437. Agonum harrisii



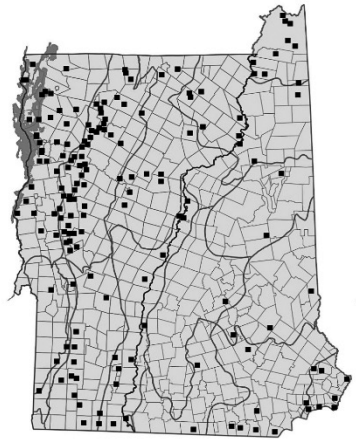
438. Agonum melanarium



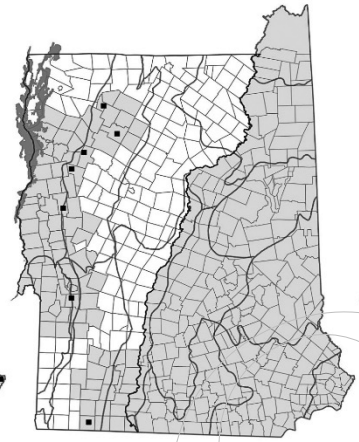
439. Agonum metallescens

440. Agonum moerens

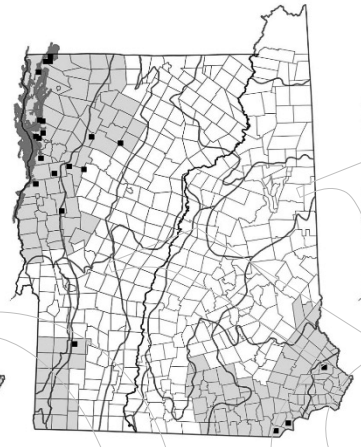
441. Agonum mutatum
442. Agonum nutans
443. Agonum octopunctatum
444. Agonum propinquum
445. Agonum punctiforme
446. Agonum rufipes
447. Agonum tenue
448. Agonum trigeminum



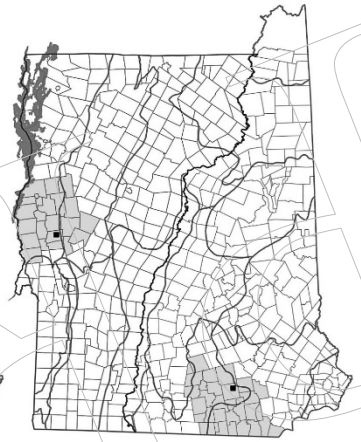
449. Platynus decentis



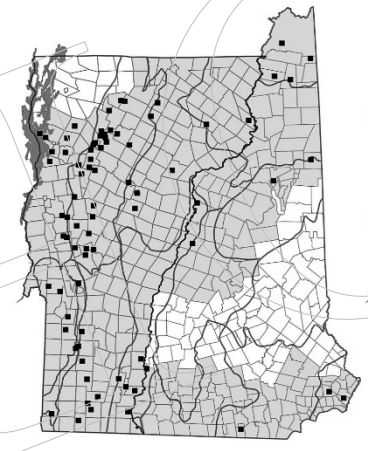
450. Platynus indecentis



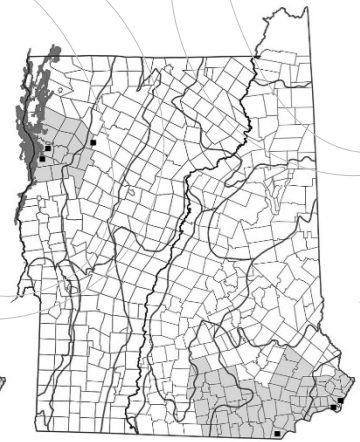
451. Platynus opaculus



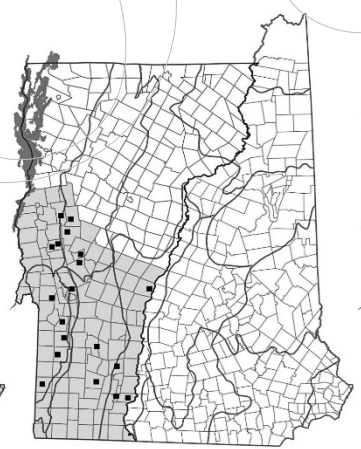
452. Platynus daviesi



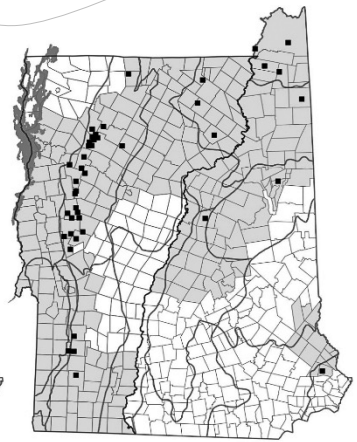
453. Platynus tenuicollis



454. Platynus cincticollis

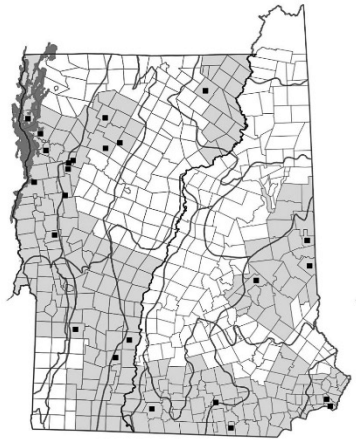


455. Platynus hypolithos

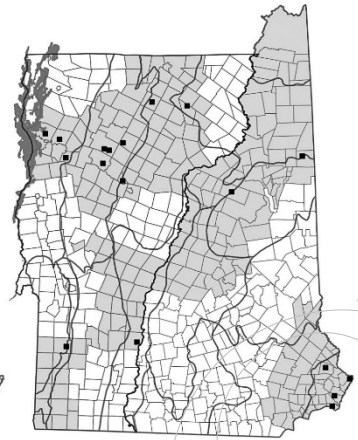


456. Platynus mannerheimii

460. Colliuris pensylvanica
464. Cymindis cribricollis
459. Pentagonica picticomis
463. Cymindis borealis
458. Atranus pubescens
462. Cymindis americana
457. Perigona nigriceps
461. Tetragonoderus fasciatus

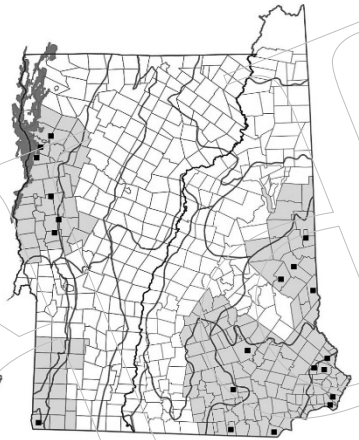


465. Cymindis neglecta

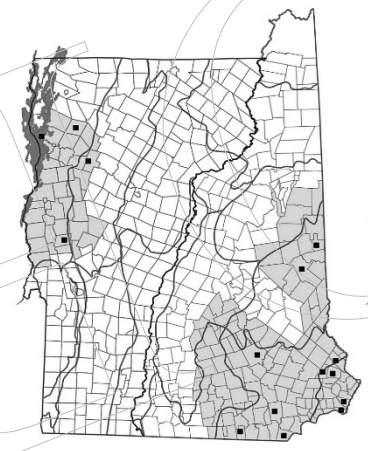


466. Cymindis pilosa

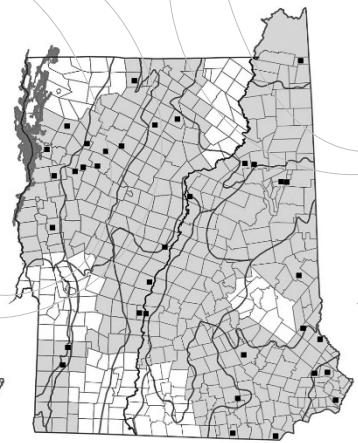
467. Cymindis unicolor



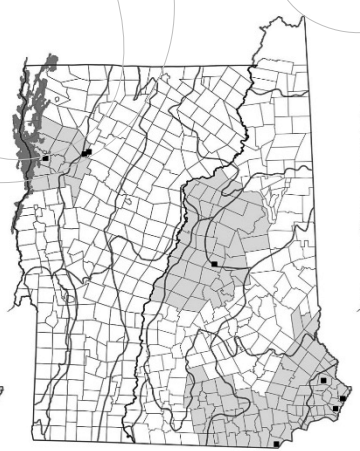
468. Cymindis limbata



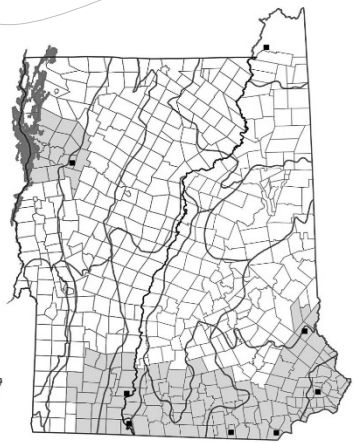
469. Cymindis platicollis



470. Dromius piceus

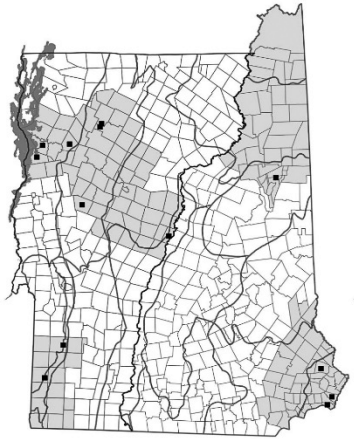


471. Microlestes linearis

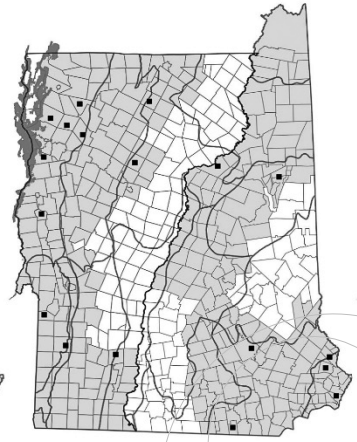


472. Apristus latens

476. Lebia atriventris
480. Lebia fuscata
475. Axinopalpus biplagiatus
479. Lebia analis
474. Syntomus americanus
478. Lebia tricolor
473. Apristus subsulcatus
477. Lebia grandis



481. Lebia moesta

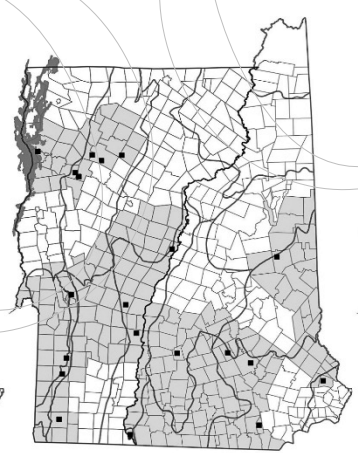


482. Lebia ornata

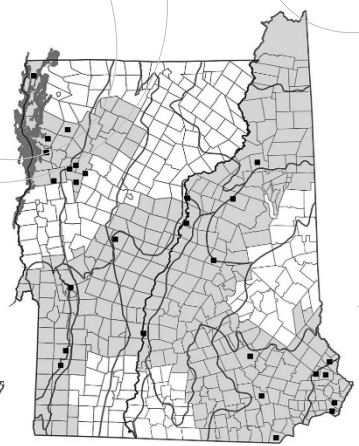
483. Lebia pectita

484. Lebia pleuritica

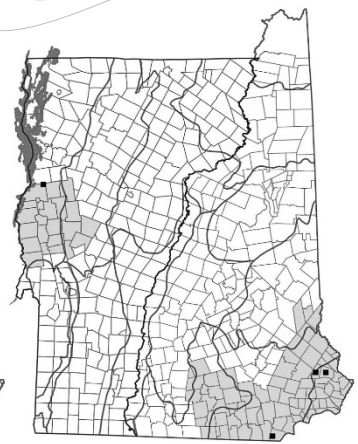
485. Lebia pulchella



486. Lebia pumila



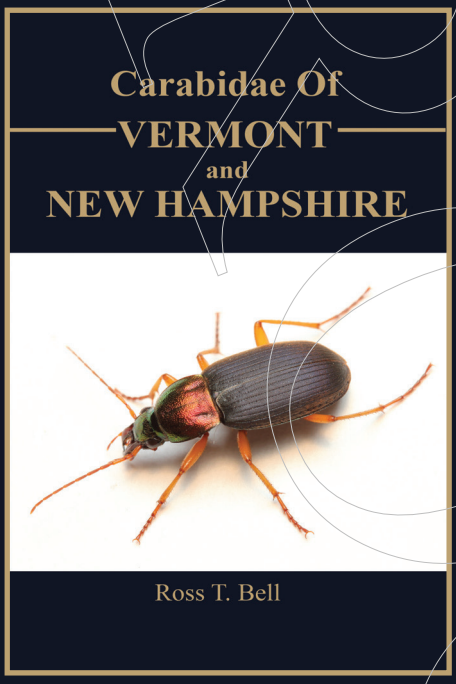
487. Lebia solea



488. Lebia viridipennis

489. Lebia viridis
490. Lebia vittata
491. Plochionus timidus
492. Calleida punctata
493. Calleida purpurea
494. Galerita janus
495. Helluomorphoides praeustus

PROOF



This book includes species accounts and summaries of the natural history of the 495 known species of ground beetles (Coleoptera: Carabidae) of Vermont and New Hampshire. Under each species, the general and local ranges are described, along with habitat, life cycle, behavior and flight dynamics. Maps of species distributions are presented and overlaid by Biophysical Regions of Vermont and New Hampshire. Nomenclatural and distributional information follows Bousquet's (2012) *Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico* and complements the 2003 work of Larochelle and Lariviere entitled *A Natural History of the Ground Beetles (Coleoptera: Carabidae) of America north of Mexico*.

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