

***Ochlerotatus rempeli* (Vockeroth) (Diptera: Culicidae):  
habitats and water temperatures for larvae and pupae;  
notes on autogenous oogenesis; photos of the egg; description of the pupa.**

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This archive contains data relating to the mosquito *Ochlerotatus rempeli* (Vockeroth) <formerly known as *Aedes (Ochlerotatus) rempeli* Vockeroth> at Baker Lake (Qamanittuaq), Nunavut, Canada. The data comprised a portion of the thesis

Smith, S.M. 1970.

The biting flies of the Baker Lake region, Northwest Territories (Diptera: Culicidae and Simuliidae).  
Ph.D. Thesis, The University of Manitoba, Winnipeg.

A copy of the thesis is available at:

[https://dl.dropboxusercontent.com/u/3686717/SmithSM\\_1970\\_PhD\\_Thesis.pdf](https://dl.dropboxusercontent.com/u/3686717/SmithSM_1970_PhD_Thesis.pdf)

This is a PDF portfolio — it contains both the scanned original and the new, text version.

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Some of the observations of this species were published as:

Smith, S.M. and Brust, R.A. 1970.

Autogeny and stenogamy of *Aedes rempeli* (Diptera: Culicidae) in arctic Canada.  
*Canadian Entomologist*, **102**: 253–256.

Included in this “Read Me” file are:

- photographs of the typical, highly unusual habitat of the larvae and pupae;
- temperature records from that pool;
- photographs of autogenous oogenesis;
- data on egg size and photographs of the eggs and egg chorion;
- description and figures of the pupa.

The data files in the file-set are:

- **Pool 19 Temperatures.syz** — A SYSTAT data file. For the “Date” variable, use the format “yyyy MMM dd HH:mm”.
- **Pool19.dat** — An ASCII copy of the data.

The variables are:

**Date** (a numeric variable), The integer portion is the day of the century and the fractional portion is the time. Thus the first record is “25019.875”. 25019 is 1 July 1968; the reading was taken at 2100 h (21/24=0.875)

**Temperature** (°C)

**Notes** (Comments)

**Valid** “Yes” if the probe reading is valid; “No” if not (the last 4 readings were after the sudden drainage of the pool when the probe was left out of water).

**DayofYear** (Int (DATE-DOC (1967, 12, 31))) where DOC is the SYSTAT function for “Day of Century”. Thus, 1 January 1968 would have the value “1”.

- **Pool19.xlsx** — An Excel-formatted copy of the data. See the ASCII-formatted file for details of the variables.
- **Thermograph Sheets** — Scans of 8 thermograph sheets from which the temperature data were read.

The study sites were situated on a rocky outcrop north of the community of Baker Lake, at approximately 64°19'58" N, 95°59'32" W.

### The Habitat

At Baker Lake, *Oc. rempeli* was found breeding only in rock-crevice pools situated in a boulder terrain several hundred m<sup>2</sup> in size. Extensive, deep, macro-riving of the exposed bed-rock by frost action has produced a series of large rock pools that interrupt the vegetation cover at irregular intervals. The pools therefore owe their origin to processes of periglacial weathering and their rarity at Baker Lake (and apparently elsewhere in the low Arctic) is attributed to the varying frequency with which such periglacial rock weathering is encountered. The incidence and extent of frost-riving is a function of many factors, such as the lithology of the bed-rock and the particular conditions of the local environment. Where it occurs, the changes in the environment often proceed quite rapidly; differences in the morphology of two pools were noted between the years 1967 and 1968.

Where the bed-rock reaches to the surface, as at Baker Lake where the *Oc. rempeli* sites occur, riving penetrates very deep because the active layer (that layer involved in the annual freeze-thaw cycle) increases as the shattered mantle develops (Bird 1967). Thus, in the *Oc. rempeli* habitats, crevices between the heaved bed-rock reached depths of 1 m or more and much of the frost-heaved zone lay below the surface level of the surrounding terrain. Very little micro-riving of the bed-rock had taken place so that the pools are formed by shattered boulder fragments, no tendency toward *felsenmeer* or scree being noted.

During the winter, these crevice pools become completely filled with drifting snow, which, in the late 1960s and early 1970s, melted in mid-June to produce semi-permanent pools of water of varying sizes, depths, shapes and exposures. Water remains in the pools until late summer when deep thawing of the subsurface layers finally occurs and the water disappears within a very short period. In 1968, the water disappeared during the afternoon of 21 August, having remained at a fairly constant level for several weeks prior to this.

Compared to the breeding sites of other low arctic *Ochlerotatus* mosquitoes, the habitat of *Oc. rempeli* is unusual in several respects. With the exception of a marginal vegetation (*Salix* spp., *Betula glandulosa* Michx., *Ledum decumbens* (Ait.) Lodd., *Empetrum nigrum* L.), which is submersed in June only, the pools are devoid of emergent and aquatic vegetation other than an encrusting alga that grows on the rock surfaces. Moreover, because of the depth of the frost action and the peculiar morphology of the pools, the water in the pools apparently lies in close contact with the underlying permafrost so that the pools are remarkably cold and stenothermal. In 1968, during the larval developmental period, which occupied most of July, the average, mean daily water temperature in a typical breeding site was only 3.7°C. (Range of the daily means: 1.8–6.1°C.), a temperature taken several inches below the surface of the water. There is a pronounced, regular, diel fluctuation in temperature but the mean daily range for the month of July was

only 4.1°C. Thus, *Oc. rempeli* completes its development and imaginal ecdysis on a small heat budget (in one typical site, the day-degree sum above 0°C. for the month of July was only 111.6°C.) the limitations of which are made even greater by the tendency of larvae of *Oc. rempeli* to remain at the bottom of the pools. This tendency was not noted in the other species found associated in small numbers with *Oc. rempeli* (*Oc. communis*, *Oc. nigripes*, *Oc. impiger*). This difference in larval habits may account for the fact that the other three species complete their development many days earlier than *Oc. rempeli* in the same habitats.

Thawing of these rock pool habitats in spring is delayed because of the accumulation of large amounts of snow and ice among the rocks of the pools and also because the morphology of the pools restricts receipts of solar radiation in the crevices. Thus, 2 yr' observations at Baker Lake have shown that larvae of the other tundra species usually hatch in the grassy pools about 1 June and that the peak of adult emergence occurs during the 1<sup>st</sup> and 2<sup>nd</sup> weeks of July. However, in 1968, *Oc. rempeli* did not hatch until the third week of June and adult emergence was not completed until the 1<sup>st</sup> week of August — a lag of about 3 wk as compared with the other species of mosquitoes of the Baker Lake region.

Some photographs of this unusual mosquito habitat follow.



My wife, Gloria, collecting poolside vegetation at Pool #19, Baker Lake, 24 July 1968. This view of a typical habitat of *Oc. rempeli* shows a large area of frost-riven boulders that have partially collapsed.





A view of the margin of Pool #19, 15 July 1968. The cable runs from the recording thermograph.



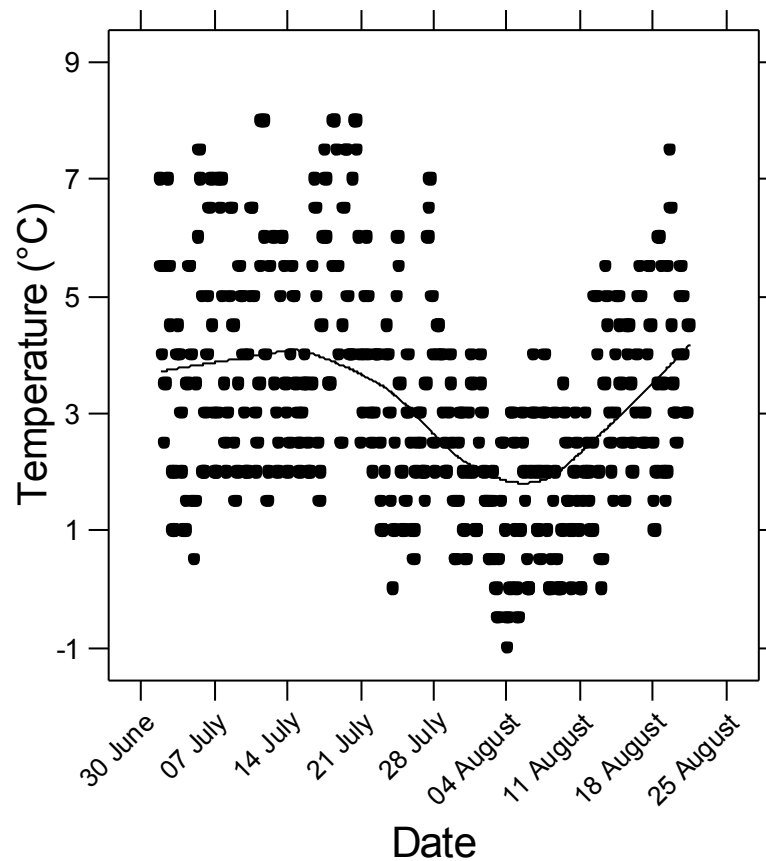
Pool #19, 24 July 1968. A view of the water pockets among frost-riven boulders.





Pool #19, 15 July 1968. A view of a small water pocket amidst frost-riven boulders.

## Water Temperature in a typical habitat for *Oc. rempeli*



Water temperature in Pool #19, Baker Lake, Nunavut, July–August 1968. Temperature was recorded by a battery-operated thermograph with the probe set several cm below the water surface. The data shown are temperatures read from the thermograph charts at 3-h intervals. 2<sup>nd</sup>-instar larvae of *Oc. rempeli* were present on 1 July and pupation and emergence were almost complete by the end of July. The mean temperature for the period 1–31 July was 3.7°C; the mean daily range for that period was 4.1°C. The fitted line is a locally weighted regression. Water in the pool disappeared abruptly between 1200 and 1500 on 21 August, when seasonal thawing of the permafrost reached the bottom of the pool. In a habitat for *Ae. rempeli* in Québec, Maire *et al.* (1978) reported a July temperature of 9–11°C.

**Table 1.** Sunrise and sunset times<sup>1</sup> at Baker Lake.

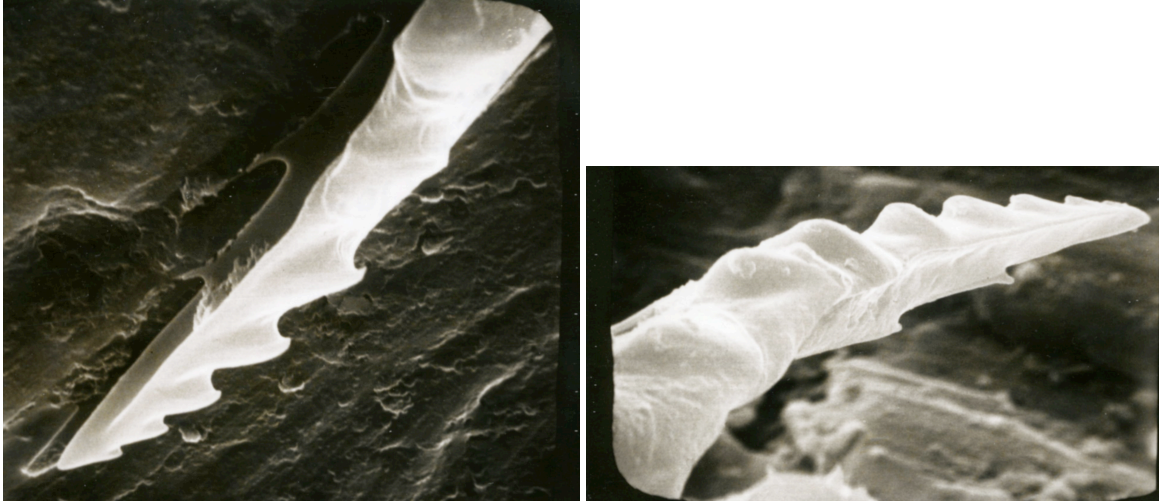
| Date        | Sunrise (hh:mm) | Sunset (hh:mm) | Duration of sunlight (hh:mm) |
|-------------|-----------------|----------------|------------------------------|
| 01 Jul 1968 | 02:58           | 23:56          | 20:58                        |
| 08 Jul 1968 | 03:14           | 23:42          | 20:28                        |
| 15 Jul 1968 | 03:35           | 23:23          | 19:48                        |
| 22 Jul 1968 | 03:57           | 23:01          | 19:04                        |
| 29 Jul 1968 | 04:20           | 22:39          | 18:19                        |
| 05 Aug 1968 | 04:42           | 22:15          | 17:33                        |
| 12 Aug 1968 | 05:05           | 21:51          | 16:46                        |
| 19 Aug 1968 | 05:27           | 21:26          | 15:59                        |
| 26 Aug 1968 | 05:48           | 21:01          | 15:13                        |

<sup>1</sup>All times are Central Daylight Savings time, computed by MICA (US Naval Observatory, Multiyear Interactive Computer Almanac, version 2.2.1).



## Oogenesis

*Oc. rempeli* is obligatorily autogenous (Smith and Brust 1970) but the mouthparts of the female are armed and differ little from those of *Oc. nigripes* (Zetterstedt), so autogeny may be a quite recent evolutionary development. Nulliparous and parous females derived from field-reared pupae would sometimes probe the human skin but would not attempt to take blood, even when maintained in the laboratory for up to 40 days, long after eggs had been laid. Wood (in Maire *et al.* 1978) reported a single female of *Oc. rempeli* caught among other host-seeking *Ochlerotatus* in Algonquin Park, ON.



Scanning-electron micrographs of the maxillae of *Oc. nigripes* (left) and *Oc. rempeli* (right).  
Photographs by Anne Hudson.

## Eggs

**Shape:** Broadly fusiform, dorsum almost straight; slightly knobbed at the anterior pole.

**Length:**  $1017.1 \pm 5.38 \mu\text{m}$  (mean  $\pm$  SE,  $n = 100$  eggs); range 901.6–1136.8  $\mu\text{m}$ .

**Width:**  $318.0 \pm 2.10 \mu\text{m}$  in width; range 274.4–372.4  $\mu\text{m}$ .

**Color:** Satiny black.

**Exochorion:** This, easily removed.

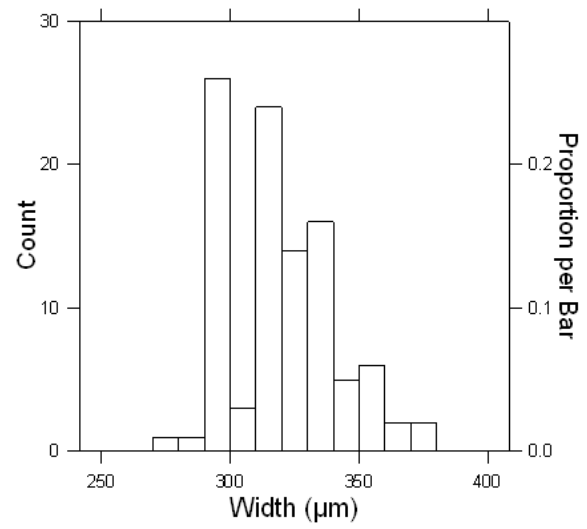
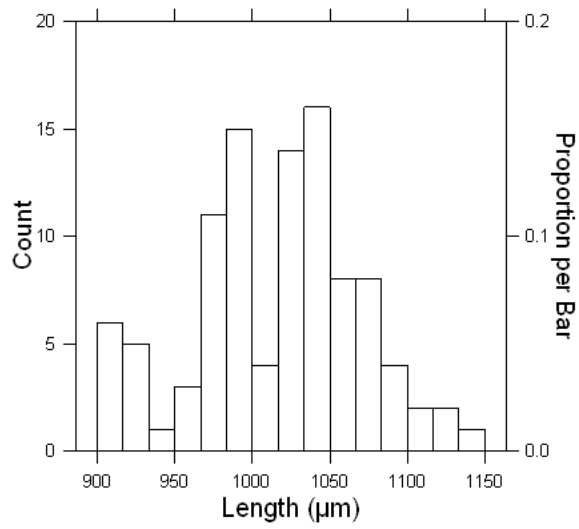
**Chorion:** Cells irregularly hexagonal, with distinctive beaded walls; cellules very indistinct and scarcely visible in bleached chorionic mounts; cellule wall complete (?).

**Distinctive Features:** Large size (only slightly smaller than the mean size of the eggs of *Oc. nigripes* and *Oc. hexodontus* (Dyar), with which species it shares overlapping ranges); indistinct cellules of chorion.

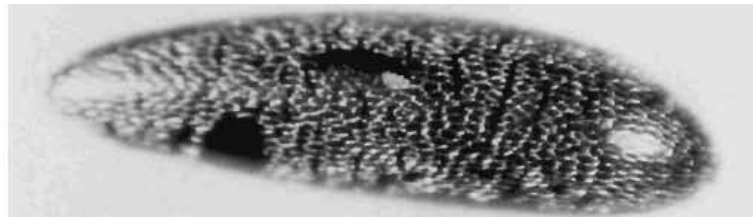
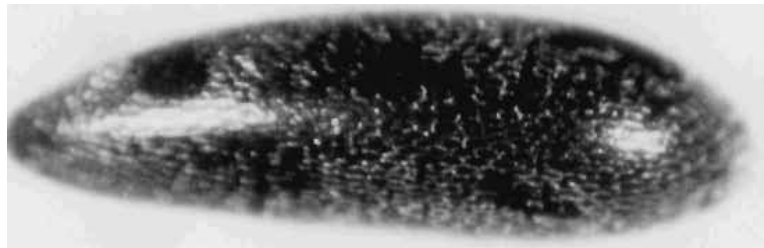
**Notes:** In the key to *Aedes* eggs provided by Kalpagé and Brust (1968), the egg of *Oc. rempeli* can be run to couplet 15, at which point further progression through the key is impossible because of the intermediate size of the egg. However, the egg of *Oc. rempeli* is large, and more closely resembles that of *Oc. nigripes* and *Oc. hexodontus* (tundra variety). It is separable from these two species by its somewhat smaller size and broader appearance. The length–diameter ratios of the three species are as follows:

|                       |       |
|-----------------------|-------|
| <i>Oc. nigripes</i>   | 3.34* |
| <i>Oc. hexodontus</i> | 3.62* |
| <i>Oc. rempeli</i>    | 3.20  |

\*after Kalpagé and Brust (1968)

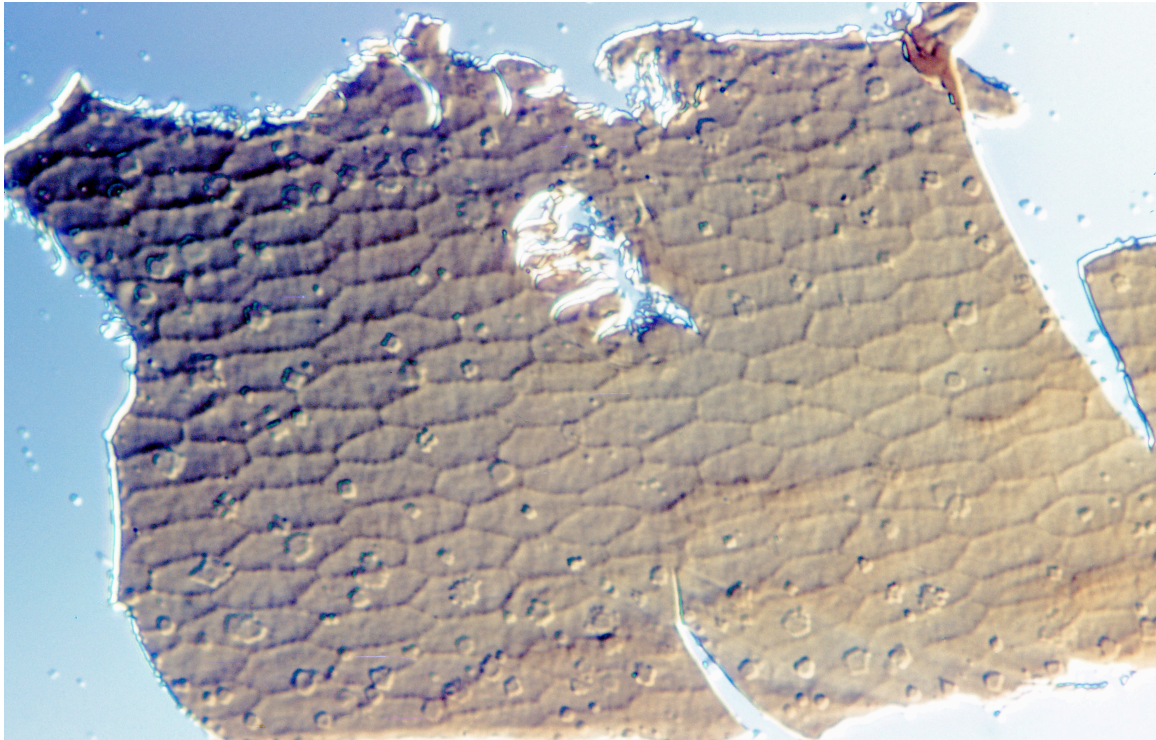


Length and width of 100 eggs of *Oc. rempeli*.

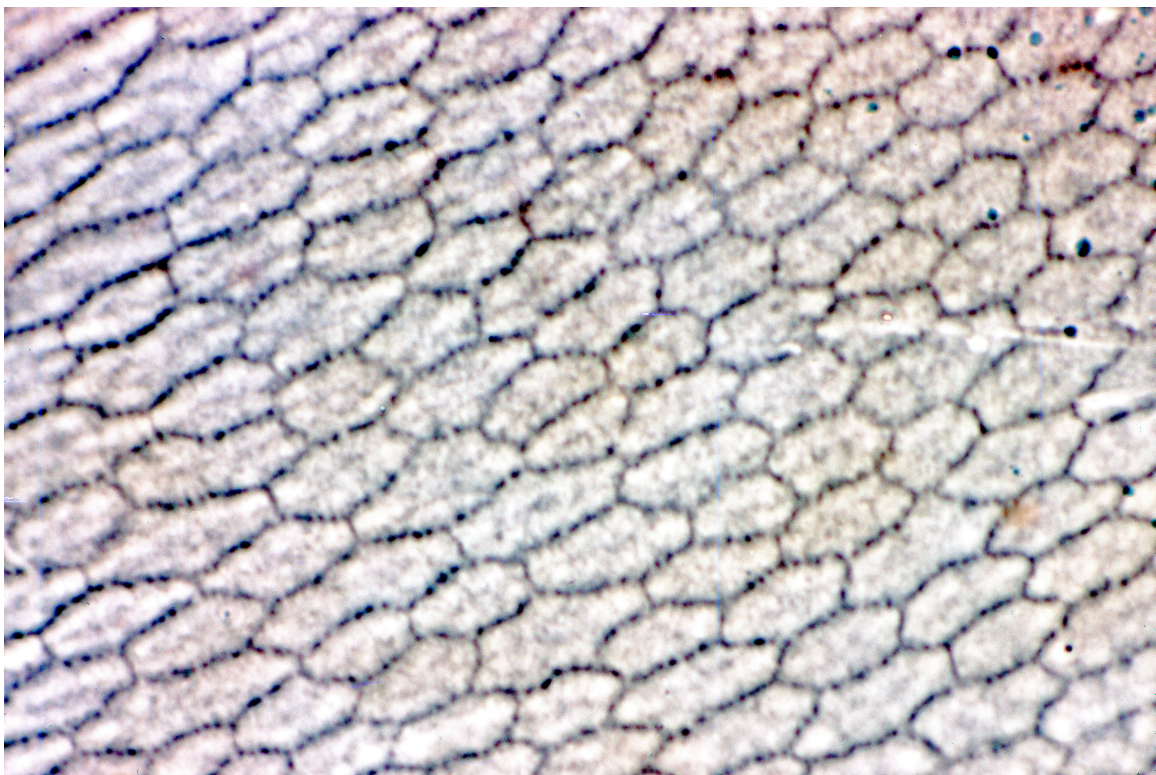


Two views of the egg of *Oc. rempeli*, as viewed under reflected light.





Chorion of the egg of *Oc. rempeli* viewed with Nomarski interference-contrast microscopy.  
Photo taken 12 January 1970.



Chorion of the egg of *Oc. rempeli* viewed with phase-contrast microscopy.  
Photo taken 10 November 1969.

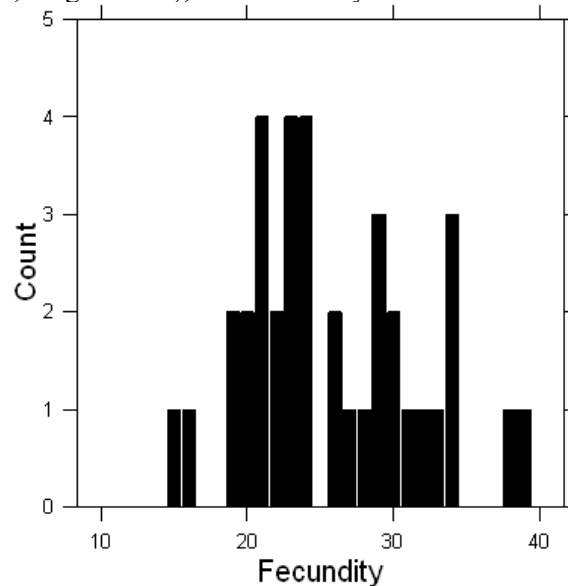
### Sex Ratio

Samples of late-instar larvae of *Oc. rempeli* were collected from two pools and reared in the laboratory over the period 1–30 July 1967. The sex ratio was unbalance, with females outnumbering males:

| Pool # | Number of ... |       |       |         | Sex Ratio (♂:♀) |
|--------|---------------|-------|-------|---------|-----------------|
|        | Larvae        | Pupae | Males | Females |                 |
| 19     | 255           | 190   | 51    | 139     | 0.37            |
| 25     | 330           | 227   | 93    | 134     | 0.69            |

### Fecundity

In 1967, females of *Oc. rempeli* reared from pupae collected in the field, a mean fecundity of 25.8 eggs/♀ was observed ( $n = 37$ , range 15–39), determined by dissection of the females:



Bar graph of the number of eggs produced by *Oc. rempeli*.

A sample of 26 ♀♀ confined with 9 ♂♂ in a cage (a foot<sup>3</sup>) laid 258 eggs ( $\bar{x} = 9.92/\text{♀}$ ); another sample of 52 ♀♀ confined with 29 ♂♂ laid 1291 eggs ( $\bar{x} = 24.8/\text{♀}$ ); about 40% of the cage females had been inseminated.

In 1968, a sample of 13 females had a mean fecundity of 32.2 (range 12–46).

### The Pupa

Trumpet: short, somewhat dilated; little or no tracheoid portion

CT-6 usually short to medium

Float hair on abdominal tergum 1 well developed, dendritic

A-II-VI usually minute, simple

4-II is shorter than 3-II

B is larger than C on abdominal segments IV–VI

A-VII and A-VIII are prominent, placed at or very near the lateral posterior corner on VIII

C' on abdominal segments II–VII usually a single thorn-like seta and placed posteromedially

V–IX usually absent but when present is distinctly ventral in position

Paddle is divided almost evenly by the mid-rib

The margin with varying sized marginal and submarginal denticles

A terminal paddle seta is present

Accessory seta absent



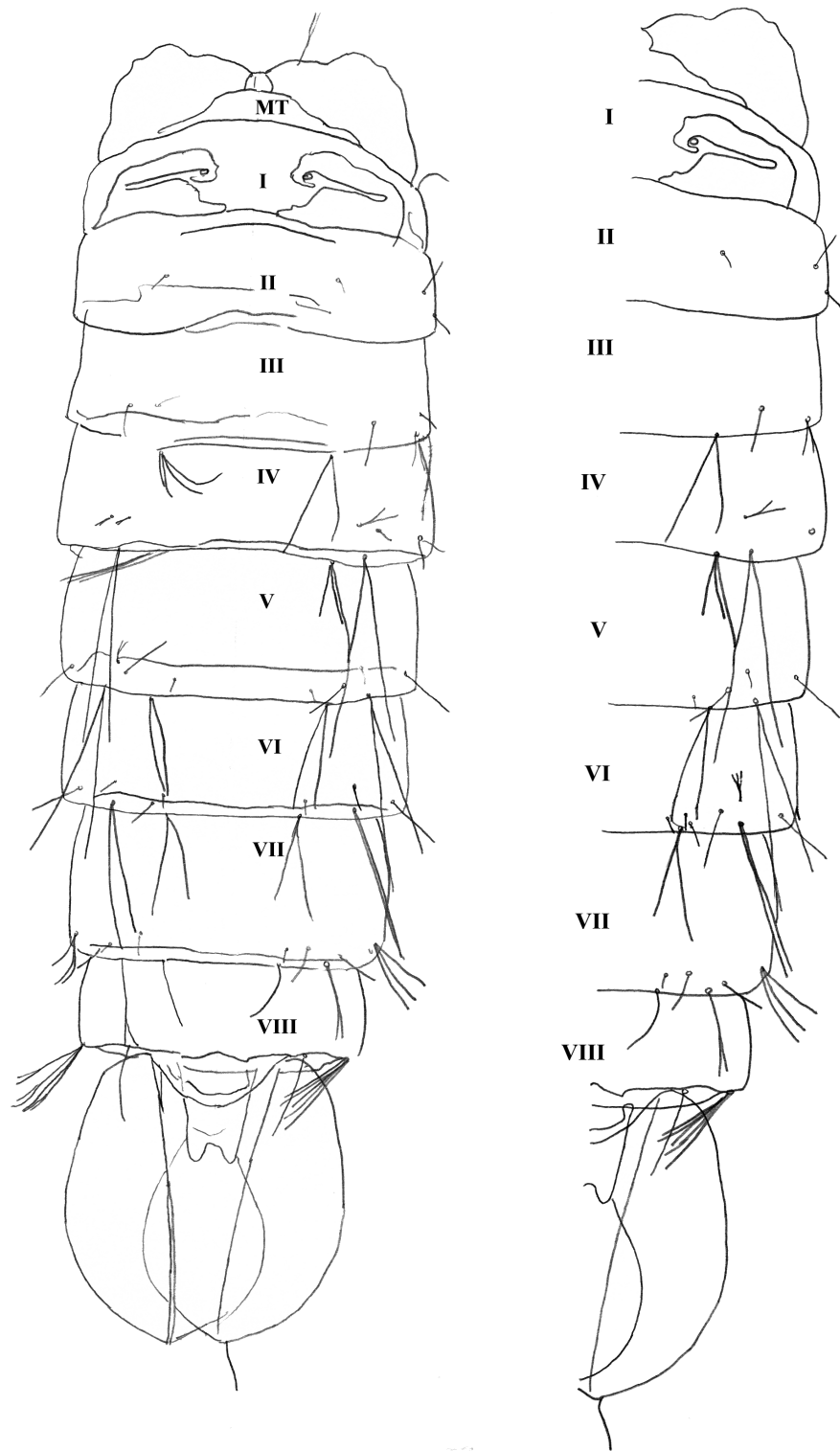
## Notes

Darsie<sup>1</sup> defined the subgeneric limits of *Ochlerotatus* for the first time. Of the 15 species studied, they had the following characters in common:

- CT-8 is just a little posterior to the base of the trumpet
- MT — setae are about equal in size
- A reticulation is found between the float hairs on tergum I
- K-I usually double
- B-II is shorter than 2-II
- C' is mediad to C on III–V
- The paddle has varying sizes of marginal and submarginal denticles

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1. Darsie, R.F. Jr. 1951. Pupae of the culicine mosquitoes of the northeastern United States (Diptera: Culicidae, Culicini). Cornell University, Agricultural Experiment Station, Memoir no. 304. 67 pp.



Pupa of *Ochlerotatus rempeli* (Vockeroth). *Left*: dorsal; *right*: ventral.



### Notes on Autogeny in *Ochlerotatus rempeli* (Vockeroth)

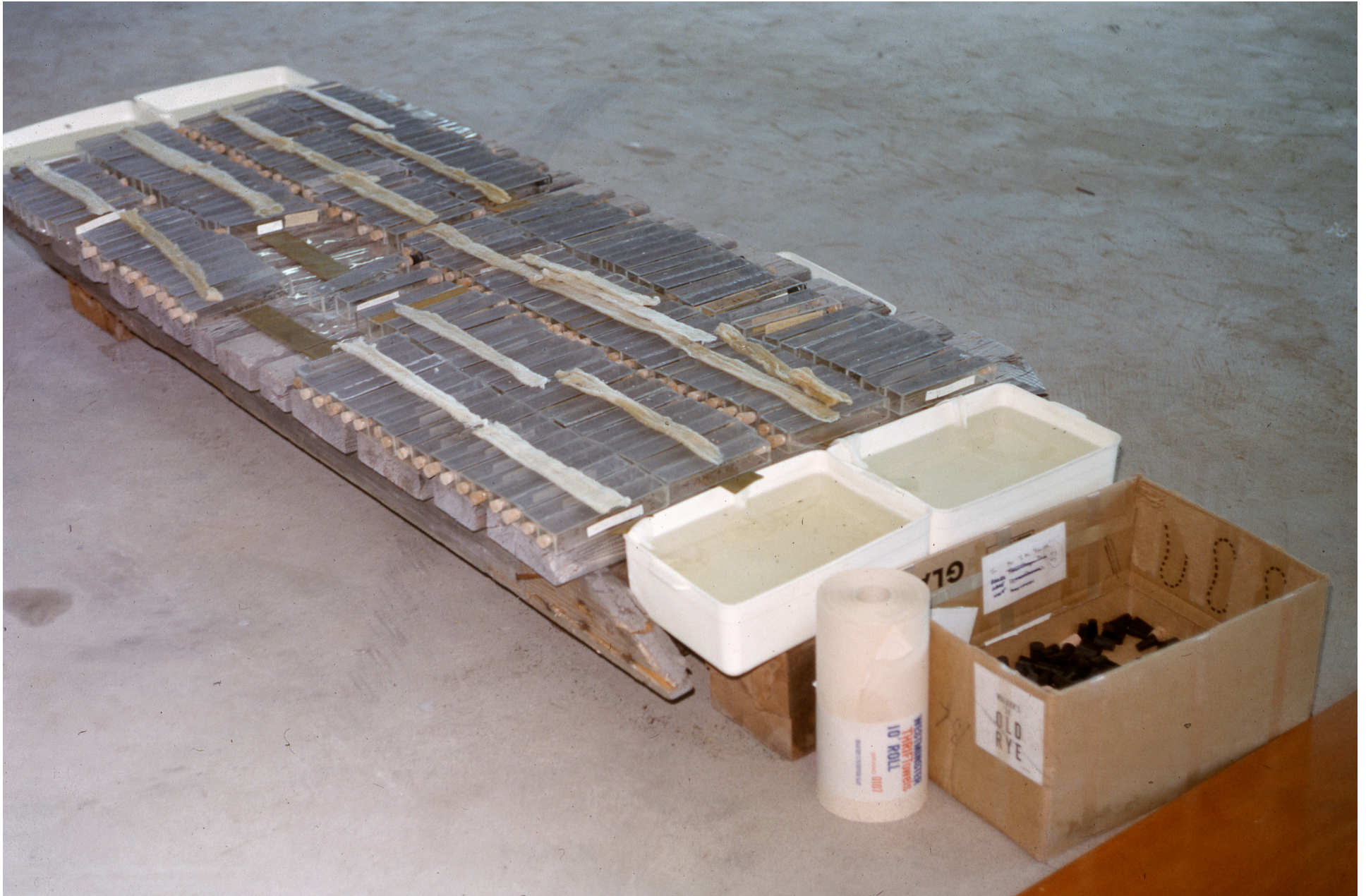
| ♀ # | Status <sup>1</sup> | Age (d) | Fatbody                               | Ovaries <sup>2</sup>    | # Follicles | Comments <sup>3</sup>  |
|-----|---------------------|---------|---------------------------------------|-------------------------|-------------|--|
| 1   | FR                  | <7      | very large                            | IIIa                    | —           | ♀ was dead.  |
| 2   | FR                  | 6       | largely depleted but still many lobes | IVb (14+9)              | 23          | In 6×1 cage (4 ♂♂, 11 ♀♀), honey-fed; not inseminated.   |
| 3   | LR                  | <6      | large                                 | IIIb                    | 29          | ♀ dead when dissected; honey fed; in 6×1 cage with ♀♀ only.  |
| 4   | FR                  | 9       | quite large in spite of mature ova    | V (10+11)               | 21          | ♂ and ♀ in 6×1 cage; not inseminated.  |
| 5   | FR                  | 5       | large                                 | IIIb (9+16)             | 25          | raisin-fed; 9 ♂♂, 26 ♀♀; dead when dissected; many regressing follicles.   |
| 6   | FR                  | 13      |                                       | V (2+3)                 | 20          | 15 eggs laid already by a group of 6 ♀♀; no ♂♂.  |
| 7   | FR                  | 14      | moderate                              | IIb–IIIa                |             | ♀ parous; follicles are 2 <sup>nd</sup> cycle; 10 ♀♀ and 10 ♂♂ in a cube cage with raisins; sperm in 2 of 3 spermathecae.  |
| 8   | FR                  | 14      | large                                 | V                       | 21          | See comments for ♀#7; no sperm in spermathecae.  |
| 9   | FR                  | 14      |                                       | IIb–IIIa (12+12)        | 24          | follicles about half-yolked; parous ♀; no relict eggs; 1 follicle resorbing; sperm in all 3 spermathecae; 10 ♀♀ and 10 ♂♂ in a cube cage.  |
| 10  | FR                  | 17      | large                                 | IIB (10+10)<br>IIIa (5) |             | The IIIa follicles quite large; not parous; relict eggs; sperm in 1 spermatheca; 10 ♀♀ and 10 ♂♂ in a cube cage.   |
| 11  | FR                  | 17      |                                       | IIa–IIIa                |             | Recently parous; much sperm in 2 of 3 spermathecae; 10 ♀♀ and 10 ♂♂ in a cube cage.  |
| 12  | FR                  | 18      | large                                 | IIb (12+12)             | 19          | Parous; the 19 eggs were laid; the IIb follicles with large yolk plaques; 5 ♂♂, 1 ♀ in a cube cage.  |
| 13  | FR                  | 10      | nearly exhausted                      | V                       | 24          | 26 ♀♀, 9 ♂♂ in a cube cage; active sperm in 2 of 3 spermathecae.   |
| 14  | FR                  | 10      | considerable                          | V (12+20)               | 32          | Non-stage-V follicles at IIb with a prominent yolk plaque; considerable sperm in 1 spermatheca. 26 ♀♀, 9 ♂♂ in a cube cage.  |
| 15  | FR                  | 16      | small                                 |                         |             | parous; 1 relict egg; 6×1 cage, 4 ♂♂, 12 ♀♀; not inseminated.  |
| 16  | FR                  | 16      | almost exhausted                      | V (7+16)                | 23          | 6×1 cage, 4 ♂♂, 12 ♀♀, not inseminated.  |
| 17  | FR                  | 14      | almost exhausted                      | V (16+18)               | 34          | 6×1 cage, honey-fed; 5 ♂♂, 5 ♀♀; sperm in 2 of 3 spermathecae.   |
| 18  | FR                  | 13      |                                       | V                       | 22          | 6×1 cage, ♀♀ only; dead when dissected.  |
| 19  | LR                  | 13      | small                                 | V                       | 24          | 23 eggs laid; 1 retained.  |
| 20  | FR                  | 18      | large                                 | IIb (12+12)             |             | cube cage, 10 ♂♂, 10 ♀♀; parous; sperm in 2 of 3 spermathecae; 3 <sup>rd</sup> empty.  |
| 21  | FR                  | 12      | moderate                              |                         |             | cube cage, 9 ♂♂, 26 ♀♀; parous; no relict eggs; sperm present.   |
| 22  | FR                  | 19      | moderately large                      | IIIa (5+6)              |             | cube cage, 10 ♂♂, 10 ♀♀; parous; sperm in 2 of 3 spermathecae, very full; no relict eggs; the IIIa follicles in the posterior section of the ovary.  |
| 23  | FR                  | 19      |                                       | IIb (few)               |             | cube cage, 10 ♂♂, 10 ♀♀; parous; all 3 spermathecae with sperm (little in 1 lateral spermatheca).  |
| 24  | FR                  | 7       | exhausted                             | IIb–IIIa (5+9)          |             | 6×1 cage; water only; dead when dissected; other follicles devoid of yolk.   |
| 25  | FR/LR               | 8       | nearly exhausted                      | IIIa (13)               |             | collected as a 4 <sup>th</sup> -instar larva; rearing completed in the lab. 6×1 cage, water only, ♀♀ only. 13 follicles up to half yolk; others regressing.  |
| 26  | FR                  | 4       | exhausted                             | IIb (10+13)             |             | 6×1 cage, water only, ♀♀ only. IIb follicles small and some regressing.  |
| 27  | FR                  | 4       | nearly exhausted                      | IIb                     | 22          | ♀♀ only; water only.   |
| 28  | FR                  | 14      | large                                 | IIb                     |             | 6×1 cage for 5 d, cube cage for 9 d; 12 ♂♂, 11 ♀♀; very recently parous — length sacs; uninseminated.  |
| 29  | FR                  | 14      | large                                 | V (10+11)               | 21          | 6×1 cage for 5 d; cube cage for 9 d; 12 ♂♂, 11 ♀♀; inseminated (?).  |
| 30  | FR                  | 14      |                                       | V (11+12)               | 23          | 6×1 cage for 5 d; cube cage for 9 d; 12 ♂♂, 11 ♀♀; sperm in all 3 spermathecae.  |
| 31  | FR                  | 14      |                                       | V (17)                  |             | Emerged on 26 July; 10 ♂♂, 10 ♀♀, in the dark in a cube cage, placed together on 1 August; not inseminated; in addition to the 17 stage-V follicles, about 20 follicles had contracted sacs; are the 17 eggs relict or the result of a second cycle of oogenesis autogenously? |
| 32  | FR                  | 14      |                                       | IIb (few)               |             | 10 ♂♂, 10 ♀♀, in the dark in a cube cage, placed together on 1 August; not inseminated; parous.  |
| 33  | FR                  | 14      |                                       |                         |             | 10 ♂♂, 10 ♀♀, in the dark, in a cube cage, placed together on 1 August; not inseminated; some follicles with dispersed yolk — regressing?  |

|    |       |         |            |                  |    |  |
|----|-------|---------|------------|------------------|----|--|
| 34 | FR    | 14      |            | V (8)            |    | 10 ♂♂, 10 ♀♀, in the dark, in a cube cage, placed together on 1 August; not inseminated; parous. The 8 eggs are relict eggs.                         |
| 35 | FR    | 14      |            | IIb–IIIa (6+6)   |    | 10 ♂♂, 10 ♀♀, in the dark, in a cube cage, placed together on 1 August; not inseminated; parous.   |
| 36 | FR    | 14      |            | IIb (few)        |    | 10 ♂♂, 10 ♀♀, in the dark, in a cube cage, placed together on 1 August; not inseminated; parous; no relict eggs; a few sperm in 2 of 3 spermathecae. |
| 37 | FR    | 24      | moderate   | V (10+12)        | 22 | ♀♀ only.   |
| 38 | FR    | 24      | moderate   | V (15+15)        | 30 | ♀♀ only.   |
| 39 | LR    | 24      | small      | V                | 27 | ♀♀ only.   |
| 40 | FR    | 10      | small      | V                | 16 | 6×1 cage, 2 ♂♂, 1 ♀, honey-fed; 1 spermatheca full.  |
| 41 | FR    | 23      |            | IIb (~30)        | 15 | 6×1 cage, 5 ♂♂, 5 ♀♀; uninseminated; the 15 eggs were laid.  |
| 42 | FR    | 26      |            | V                | 24 | 6×1 cage, 6 ♀♀.  |
| 43 | LR    | 21–26   |            |                  | 30 | Laid 30 eggs.  |
| 44 | FR    | 25      | moderate   | V                | 20 | 6×1 cage, 4 ♂♂, 12 ♀♀; uninseminated.  |
| 45 | FR    | 19      | large      | IIb–IIIa (5+5)   |    | 52 ♀♀, 29 ♂♂ (probably a cube cage but not noted); parous; much sperm in 2 spermathecae; follicles about half yolk.                                  |
| 46 | FR    | 33–35   | very large | IIb–IIIa (7+5)   | 1  | 52 ♀♀, 29 ♂♂ (probably a cube cage but not noted); parous; inseminated; the 1 stage-V follicle was in the right ovary.                               |
| 47 | FR/LR | teneral |            | IA (25+26)       | 51 |  |
| 48 | FR    | 12      |            | V (39)           | 39 | uninseminated (?); 1 of the 39 eggs was laid.  |
| 49 | FR    | 17      |            | IIb (early)      | 19 | The 19 eggs were laid before death.  |
| 50 | FR    | 15      |            | V (5+7)          | 31 | Laid 19 eggs; 12 relict eggs.  |
| 51 | FR    | 14      |            | IIb–IIIa (32+34) | 33 | Laid 33 eggs.  |
| 52 | FR    | 14      |            | V (1+4)          | 30 | Laid 25 eggs   |
| 53 | FR    | 19      |            | IIb              | 28 | Cube cage; inseminated.  |
| 54 | FR    | 17      |            | V (1)            | 34 | Cube cage; inseminated; laid 33 eggs.  |
| 55 | FR    | 17      |            | IVb (16)         | 23 | Laid 7 eggs.   |
| 56 | FR    | 12      |            | V (9+2)          | 21 | Cube cage in the dark; honey-fed; laid 10 eggs.  |
| 57 | FR    | 9       |            | V (23)           | 26 | Cube cage in the dark; honey-fed; laid 3 eggs.   |
| 58 | FR    | 11      |            | IVb late (1)     | 34 | Cube cage in the dark; honey-fed; laid 33 eggs.  |
| 59 | FR    | 14      |            | V (18+20)        | 38 |  |
| 60 | FR    | 22      |            | V (17+12)        | 29 |  |
| 61 | FR    |         |            | IIIa–V           | 26 | Follicles are varying stages.  |

<sup>1</sup>. “FR” = field-reared (i.e. collected as pupae); “LR” = lab-reared (i.e. collected as larvae and rearing completed in the laboratory).

<sup>2</sup>. Stage of ovarian follicles (number in left ovary + number in right)

<sup>3</sup>. A 6×1 cage is a cage 6×1×1 inches made of Plexiglass on 2 sides and screen on the other 2 sides. One screen side was kept on moist toweling and strips of honey-soaked cheesecloth could be laid on the top as a source of carbohydrate; see following photograph. The “cube cage” was all Plexiglass, (7×7×7 inches) with a sleeve for entry on one side; a photo follows the photo of the 6×1 cages.



Baker Lake, 27 July 1967. An array of 6×1 cages to hold adult mosquitoes. The strips laid on top of the cages are cheesecloth embedded with honey. The screened side opposite the honey strip lay on a water-saturated layer of paper toweling, kept moist by wicks from the white tubs at either end.





Baker Lake, 24 July 1967. *Oc. rempeli* in a 7×7×7-inch Plexiglass cube cage with flowers of *Dryas integrifolia*. Humidity and water were supplied by the paper-towel roll (brown) (immersed in a beaker of water) at the back of the cage.



## Notes on Baker Lake Material (Pool #19, 1968)

Compiled by Reiny Brust and Gloria Smith

### Source material

#### Females #1–#4

*Oc. rempeli*. Not inseminated. #1 emerged on 24 July; #2–#4 emerged on 23 July 1968. Honey-fed.

#### Female #5

*Oc. impiger*. Emerged 18 July; not inseminated; honey-fed

#### Female #6

*Oc. rempeli*. Placed in a 6×1 cage with 2 ♂♂ on 25 July; ♀ transferred to a single-female cage (a photo follows) on 29 July; honey fed; inseminated?

#### Females #7–#9

*Oc. rempeli*, emerged on 24 July. Put in a cube cage with 4 ♂♂ on 24 July; honey-fed. Moved to single-female cages on 30 July. Mated?

#### Females #10–#12

*Oc. rempeli*, emerged 2 July (2) and 25 July (1); not inseminated. Kept in the dark in a cube cage; no honey. Transferred to single-female cages on 30 July (female #12 slightly damaged during move and may die before ovipositing — this then would not be due to a lack of carbohydrates).

#### Females #13–#15

*Oc. rempeli*; inseminated? Emerged 27 July; left with 14 ♂♂ in an 11-inch cube for 3 days; moved to single-female cages on 30 July. Honey-fed.



Baker Lake, 23 July 1967. An array of single-female cages to hold individual females of mosquitoes and blackflies.

## Observations of these females over time

### **Female #1 — *Oc. rempeli***

Emerged 23 July.

4 August (12 d): laid 1 egg.

5 August (13 d): dead; 38 (18 + 20 in left and right ovaries) stage-V follicles. Total fecundity: 39.

### **Female #2 — *Oc. rempeli***

Emerged 23 July.

2 August (10 d): laid 10 eggs.

10 August (18 d): dead. Laid 19 eggs; no eggs in ovary. Total fecundity: 29.

### **Female #3 — *Oc. rempeli***

Emerged 23 July.

6 August (14 d): laid 1 egg.

7 August (15 d): laid 18 eggs.

8 August (16 d): dead; ovary contained 7+5 stage-V follicles. total fecundity: 31.

### **Female #4 — *Oc. rempeli***

Emerged 23 July.

30 July (7 d): laid 13 eggs.

6 August (14 d): laid 33 eggs; female alive but weak.

7 August (15 d): dead. Total fecundity: 46. 32+34 follicles, of which >90% at stage IIb–IIIa.

### **Female #5 — *Oc. impiger***

Emerged 18 July.

4 August (17 d): dead; follicles at stage Ib.

### **Female #6 — *Oc. rempeli***

Emerged 24 July.

2 August (9 d): laid 1 egg

6 August (13 d): laid 25 eggs.

8 August (15 d): laid 4 eggs; female weak; dissected; not inseminated; ovary contained 1+4 stage-V follicles. Total fecundity: 35.

### **Female #7 — *Oc. rempeli***

Emerged 24 July.

6 August (13 d): no eggs.

8 August (15 d): no eggs.

11 August (18 d): 16 eggs laid.

12 August (19 d): 28 eggs laid; female weak; dissected: inseminated (2 of 3 spermathecae with sperm). 4+3 follicles regressing from stage IIb. Total fecundity: 44..

### **Female #8 — *Oc. rempeli***

Emerged 24 July.

6 August (13 d): no eggs.

8 August (15 d): laid 11 eggs.

9 August (16 d): laid 33 eggs; dissected; no developed follicles. Total fecundity: 44.

### **Female #9 — *Oc. rempeli***

Emerged 24 July.

2 August: (9 d): laid 1 egg.

4 August (11 d): laid 7 eggs.

6 August (13 d): laid 7 eggs.

8 August (15 d): laid 7 eggs.

10 August (17 d): dead; 16 stage-IV follicles in ovary (deformed).

**Female #10 — *Oc. rempeli***

Emerged 24 July.

4 August (10 d): laid 10 eggs; dead; on dissection, ovary contained 9 stage-IV and 2 stage-V follicles.

**Female #11 — *Oc. rempeli***

Emerged 24 July.

1 August (8 d): laid 3 eggs

2 August (9 d): dead; 23 fully developed (stage-V) follicles

**Female #12 — *Oc. rempeli***

Emerged 25 July.

4 August (10 d): laid 26 eggs; dead.

**Female #13 — *Oc. rempeli***

Emerged 27 July.

6 August (10 d): no eggs laid.

10 August (14 d): dead; ovary contained 18+20 stage-V follicles. Total fecundity: 38.

**Female #14 — *Oc. rempeli***

Emerged 27 July.

6 August (10 d): no eggs laid.

**Female #15**

Emerged 27 July.

4 August (8 d): 33 eggs laid (7 non-darkened).

7 August (11 d): dead. 9 stage-IVb follicles; 14 stage-V follicles; 24 stage IIb–IIIa follicles. Total fecundity: 33+14=47.

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