

Macho Megaspilidae: how males hold the key to revising *Conostigmus* (Hymenoptera: Megaspilidae) of the Nearctic



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Ceraphronoidea are awesome!

- Found worldwide¹
- Commonly collected²
- Models for studying parasitoids³
- Agriculturally important⁴
- Two families
 - Ceraphronidae
 - Megaspilidae ←



Dendrocerus scutellaris
Trietsch & Mikó

¹ Johnson & Musetti (2004)

² Martinez de Murgia et al., 2001; Mikó et al., 2013; Schmitt, 2004

³ Chow and Mackauer, 1999; Mackauer, 2017; Mackauer and Chow, 2016; Nakashima et al., 2016; Schwörer et al., 1999

⁴ Boenisch et al., 1997; Chow and Mackauer, 1999; Ferrière, 1933; Kamarudin et al., 1996; Ortiz-Martínez and Lavandero, 2017; Polaszek et al., 1994

Conostigmus Dahlbom 1858

- Over 170 spp. worldwide
 - 32 spp. in Nearctic (North America, north of Mexico), never revised¹



Conostigmus erythrothorax
Ashmead

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- Objectives
 - Revise Nearctic *Conostigmus* using morphological and molecular data
 - Create a key to Nearctic species

¹ Johnson & Musetti (2004)

Materials & Methods

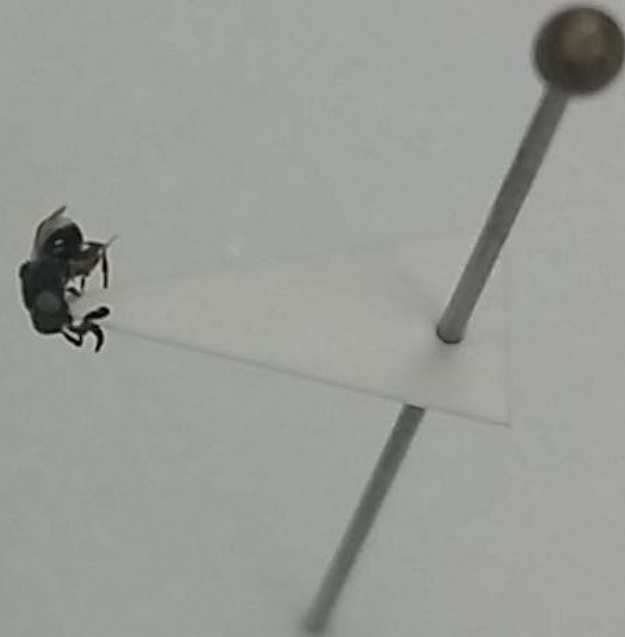
- Borrowed over 800 *Conostigmus* specimens from 13 museums and collections



**Sampling in: AZ, CT, MA,
NC, NJ, NY, PA, UT**



Morphological Approach



Morphological Approach





C. laeviceps

C. sp. C7A

C. laeviceps

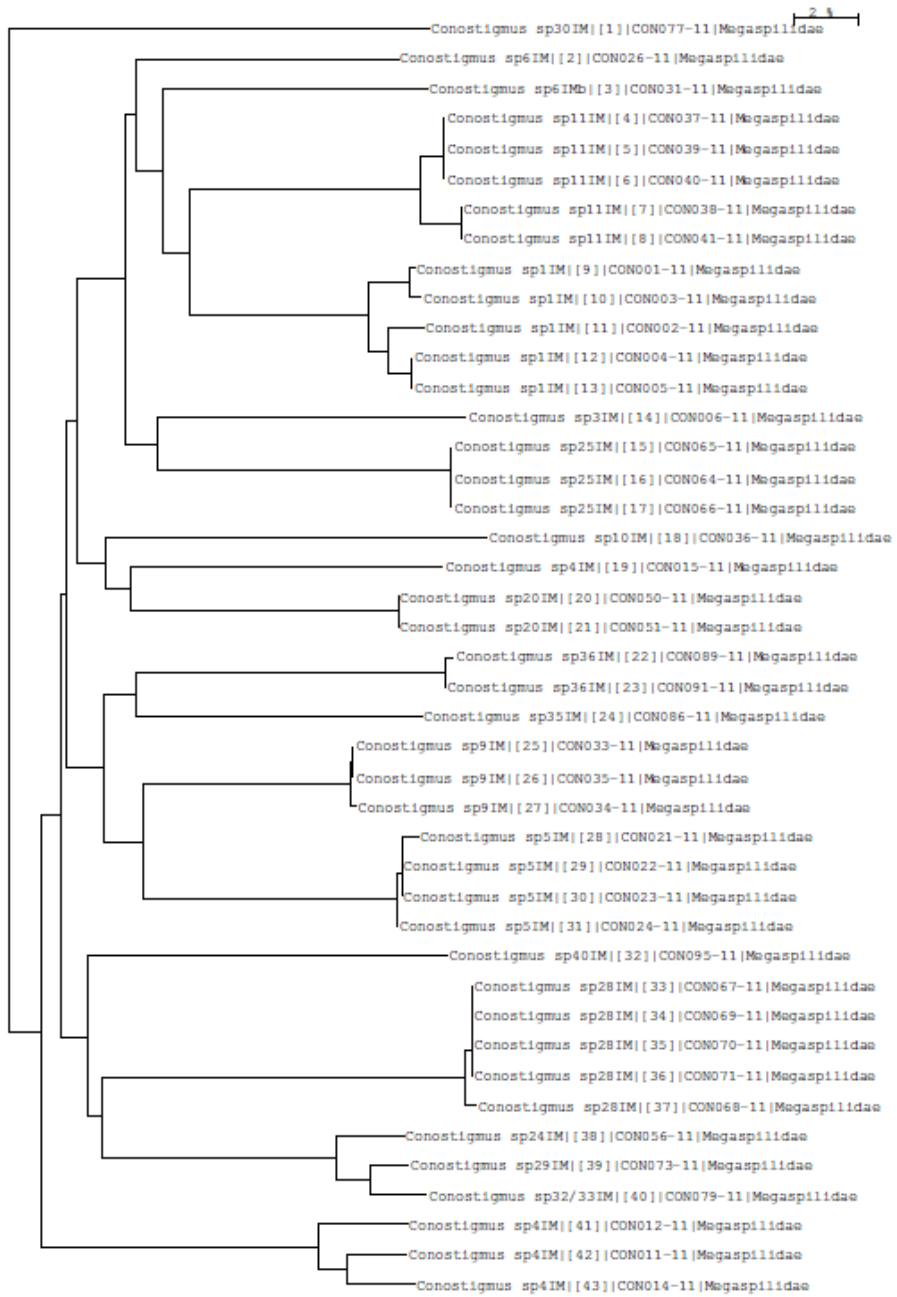
C. sp. C7D

C. sp. C7E

C. sp. C7G

C. sp. C8A





Molecular Results: Palearctic spp.



C. sp. C7D
(NA, PA)



C. bipunctatus
(NA, PA)



C. crassicornis

Results

- **Before: 32 species known in Nearctic**
- **After: 29 species**
 - 12 species *incertae sedis* (missing/damaged types)
 - Synonyms
 - *C. ambiguus* and *C. laeviceps*
 - *C. canadensis* and *C. ottawensis*
 - 1 species actually *Dendrocerus*
 - 2 European species found
 - 10 species new to science (so far!)



*Conostigmus
gestroi*

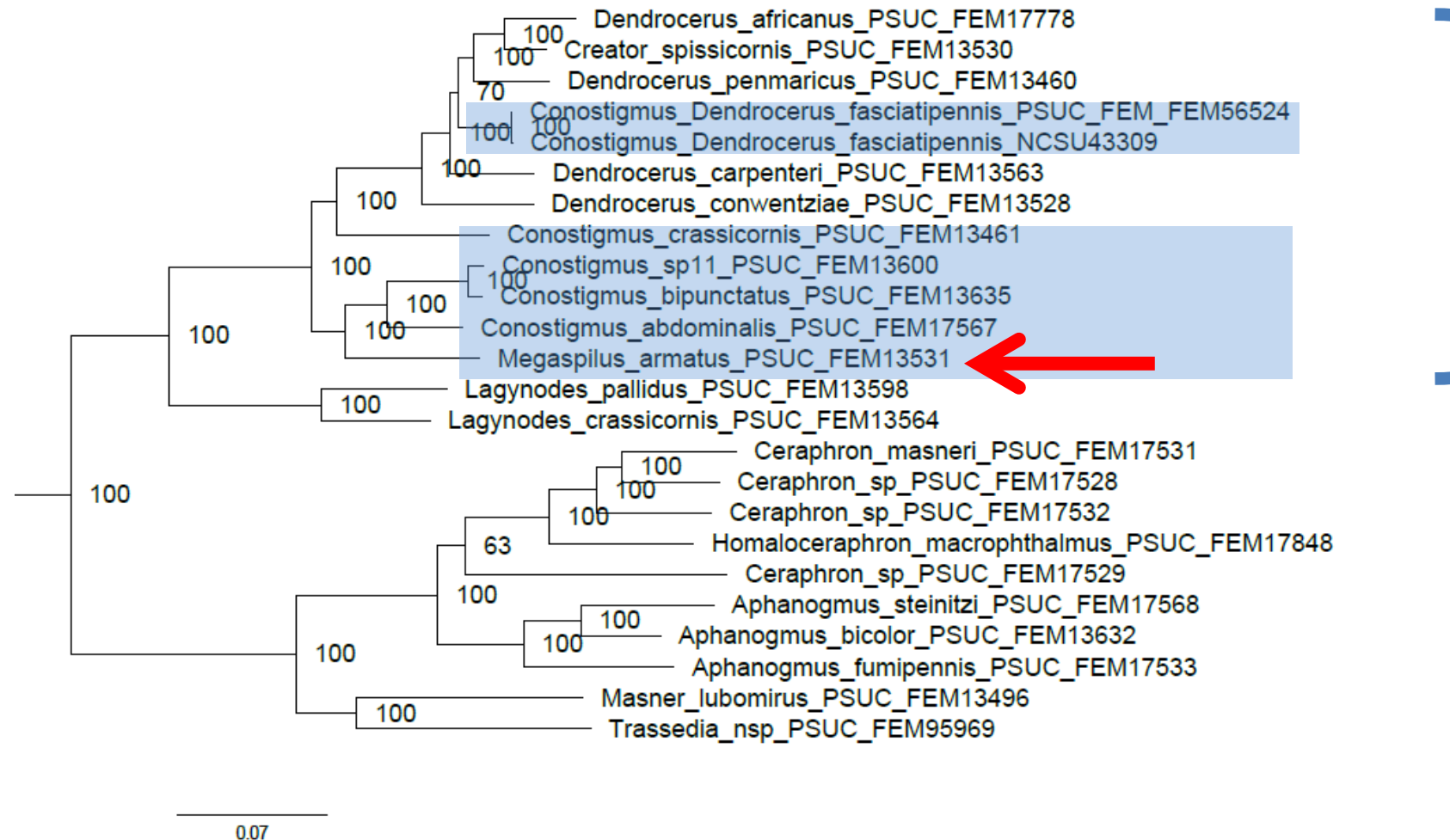


Megaspilus sp.





Preliminary Results using Ultraconserved Elements (UCEs)



Conostigmus talamasi
Mikó and Trietsch

500 μm



Surface rendered 3D model, using Synchrotron-based Micro-CT



Conostigmus talamasi
Mikó and Trietsch

Conclusions

- UCEs and synchrotron-based micro-CT are valuable for studying Ceraphronoidea
- *Megaspilus* and *Conostigmus* likely represent the same genus
- Future directions
 - Publish Nearctic revision of *Conostigmus*
 - Investigate higher level phylogeny of Ceraphronoidea

Acknowledgments

Presentation available on figshare at:



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