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Taxonomic revision of the robber-fly genus *Leptopteromyia* Williston, 1907

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Introduction

The purpose of this revision of *Leptopteromyia* (Diptera: Asilidae: Leptogastrinae) is to improve the original species descriptions and describe new species using morphological characters. There are currently 8 described species of *Leptopteromyia*: *L. gracilis* Williston, 1908; *L. americana* Hardy, 1947; *L. lopesi* Martin, 1971; *L. peruae* Martin, 1971; *L. brasiliae* Martin, 1971; *L. colombiae* Martin, 1971; *L. mexicanae* Martin, 1971; and *L. argentinae* Martin, 1972 (Martin 1971, 1972).

One of the few things known about the ecology of *Leptopteromyia* is that the genus has a possible parasitic association with Embioptera (webspinners, an order of insects) (Fig. 1). Dr. R. H. Beamer also reported seeing adult *L. americana* in association with Aleyrodidae (white flies), presumably in the act of predation.



Fig. 1. *Leptopteromyia americana* (top) and an Embiopteran (bottom).

Leptopteromyia is restricted to the new world, ranging from Monrovia, California in the north to Tucumán, Argentina in the south (Fig. 2). Hawaiian specimens not shown. Some date points are overlapping and are not visible.

At the start of this revision, *Leptopteromyia americana* (Fig. 3, from Riverside, CA) was the only species described from the United States, ranging from California in the west to Georgia in the east. However, we currently divide *L. americana* into two species, with the western group representing *L. americana sensu stricto* and the eastern group representing *Leptopteromyia sp. n. 1* (Figure 4, from Gainesville, FL). Note that the dots for *L. mexicanae* are red, the same as for *L. americana* (Fig. 2). Refer to the "New Synonymies" section for more details.

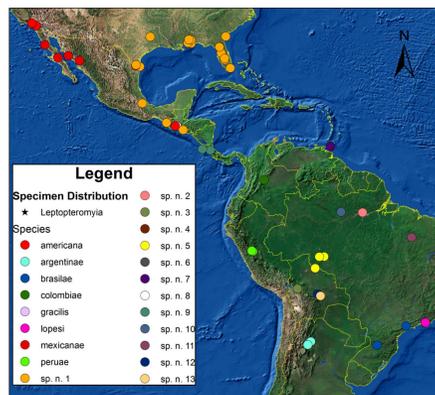


Figure 2. *Leptopteromyia* specimen distribution map.



Figure 3 *L. americana* lateral



Figure 4 *L. sp. n. 1* lateral

New Species

Preliminary results suggest the discovery of 13 new species. The two specimens shown below are among the best defined so far. *Leptopteromyia sp. n. 3* is predominantly grey with pigmented coxa and no stripes on the scutum (Fig. 5). *Leptopteromyia sp. n. 5* is predominantly yellow with one longitudinal stripe on the scutum and no spots on the pleura (Fig. 6).

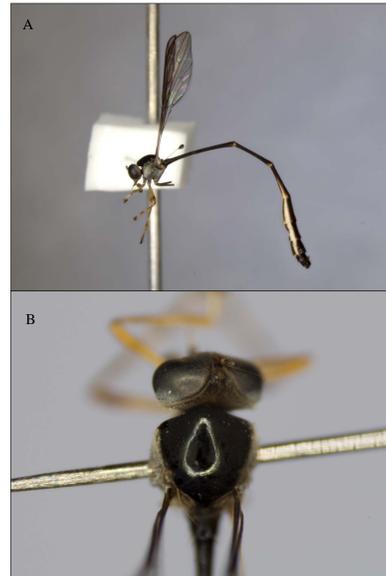


Figure 5. *L. sp. n. 3*. A. lateral. B. dorsal.

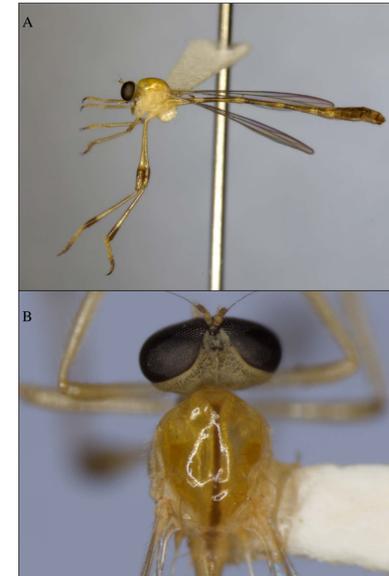


Figure 6. *L. sp. n. 5*. A. lateral. B. dorsal.

Leptopteromyia sp. n. 8 from Guatemala (Figs. 7-8) has several characteristics that separate it from all other known *Leptopteromyia* species. The distal wing margin is pigmented, and wing veins A_1 and CuA_1 are present (Fig. 10). This is problematic because the absence of these veins is a defining characteristic of *Leptopteromyia* (Fig. 11). The wing venation of *L. sp. n. 8* likely represents the plesiomorphic condition that characterizes most Leptogastrini genera, e.g. *Schildia* (Fig. 9).



Figure 7. *L. sp. n. 8* dorsal.



Figure 8. *L. sp. n. 8* lateral.

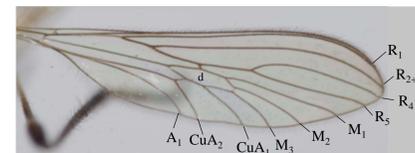


Figure 9. *Schildia microthorax* wing.

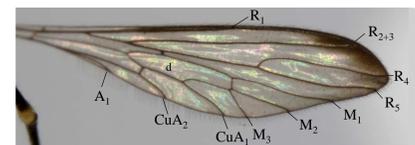


Figure 10. *L. sp. n. 8* wing.

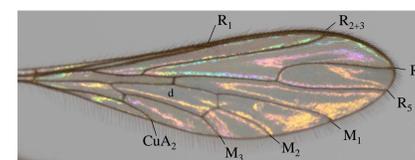


Figure 11. *L. sp. n. 4* wing.

Some authors may interpret these differences as warranting a new genus, but we currently place *L. sp. n. 8* within *Leptopteromyia*, as representing the sister group to all other *Leptopteromyia* species. We have found that the morphology of *L. sp. n. 8* agrees with most other characters associated with *Leptopteromyia*. Future phylogenetic studies and additional specimens may warrant the designation of a new genus.

New Synonymies

Preliminary results suggest that *L. lopesi* (Fig. 12) is synonymous with *L. gracilis*. The type localities of both species are only 3 miles apart, and we have found no significant morphological differences between the two. Our results also suggest that *L. mexicanae* (Fig. 13) is synonymous with *L. americana*. Both species share a unique pattern of scutum pubescence.

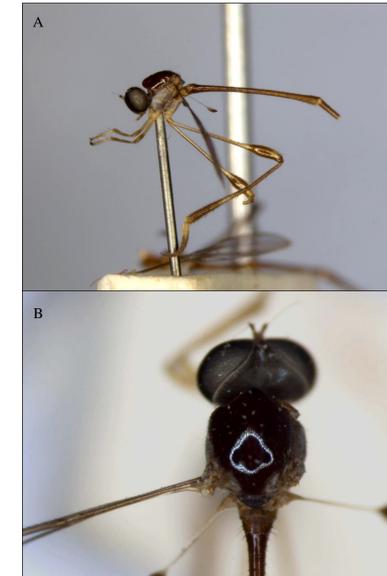


Figure 12. *L. lopesi* A. lateral. B. dorsal.

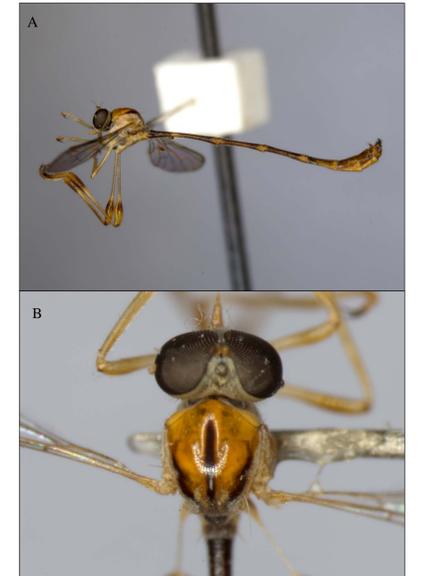


Figure 13. *L. mexicanae* A. lateral. B. dorsal.

Conclusion

The taxonomic revision of *Leptopteromyia* is still ongoing, and there is still much work to be done with this genus. Based on the current results, we will synonymize *L. lopesi* with *L. gracilis* and *L. mexicanae* with *L. americana*. We will also describe 13 new species, although the final number may change as more morphological evidence is accumulated.

While still preliminary, there is evidence that we have discovered a new species from the eastern US and Central America, which has previously been misidentified as *L. americana* or *L. mexicanae*. If true, this would be a rare example of a new species being described from the United States.

We have recently received specimens from Maui, Hawaii that we have identified as *L. americana*. There are no robber flies known from the Hawaiian Islands, so this is almost certainly an introduction. It is likely that *Leptopteromyia* pupae are transported in the webs of Embioptera, which are known to travel and become introduced around the world. It is thus possible that this genus has become established in areas in which it is not native, greatly complicating this revision.

Materials & Methods

Specimens examined in this revision were part of the National Museum of Natural History, Washington, D.C. (USNM) collection or were loaned from the following institutions or private collections: ABS - Archbold Biological Station, Venus, FL; AMNH - American Museum of Natural History, New York City, NY; CAS - California Academy of Sciences, San Francisco, CA; EMF - Coll. Fisher, El Dorado Hills, CA; CZMA - Coleção Zoológica do Maranhão, Universidade Estadual do Maranhão, Caxias, Maranhão, Brazil; FSCA - Florida State Arthropod Collection, Gainesville, FL; IMLA - Fundación e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Tucumán, Argentina; INPA - Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil; LACM - Natural History Museum of Los Angeles County, Los Angeles, CA; MCZ - Museum of Comparative Zoology, Harvard University, Cambridge, MA; MNRJ - Museu Nacional, Rio de Janeiro, Brazil; MZSP - Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil; SEMC - Snow Entomological Collection, University of Kansas, Lawrence, KS; TAMU - Texas A&M University, College Station, TX.

Specimens were examined using a Zeiss Discovery.V12 dissecting scope with a maximum magnification of 100x. An Olympus Pen Lite E-PL5 camera, attached to the stereomicroscope, was used to photograph the specimens. The computer software FileMaker Pro 12 was used to database specimen information and ArcMap™ was used to generate the specimen distribution map.

Acknowledgments & References

This project would not have been possible without the many specimens loaned to us from institutions all over the world. We thus sincerely thank all museum curators and private collectors who made their fragile specimens available for study. We also wish to thank the Natural History Research Experience (NHRE) program and the NSF for providing the resources and opportunities required for this revision. In particular, we would like to thank Gene Hunt, Elizabeth Cottrell, and Virginia Power for their role in making this experience possible.

Martin, C. H. 1971. A Review of the Genus *Leptopteromyia* in the Western Hemisphere (Diptera: Leptogastridae). *Pan-Pacific Entomologist* 47(4): 264-270.
Martin, C.H. 1972. A New Species of *Leptopteromyia* (Diptera: Leptogastridae). *Pan-Pacific Entomologist* 48(4): 270.

