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New collections and records for earwigflies and scorpionflies
(Mecoptera: Meropeidae and Panorpidae) in Florida

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New collections and records for earwigflies and scorpionflies (Mecoptera: Meropeidae and Panorpidae) in Florida

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Abstract. I add new collection and phenological data on the North American earwigfly, *Merope tuber* Newman, and new county records for the red scorpionfly, *Panorpa rufa* Gray, and veined scorpionfly, *Panorpa venosa* Westwood, in Florida. Additionally, I report on a new Georgia county record for the extralimital species, *Panorpa ferruginea* Byers, the ferruginous scorpionfly, and speculate on its potential occurrence in Florida.

Introduction

Mecoptera are a small assemblage of ancestral, largely understudied, and undoubtedly paraphyletic taxa of insects represented by fewer than 700 extant species arranged in as many as 33 genera and 9 families worldwide, and the subject of vigorous systematic debate (Penny 1975; Willmann 1987; [Novokshonov] 1997; Kluge 2004; Byers 2005; Grimaldi and Engel 2005; Beutel and Baum 2008; Beutel et al. 2008, 2009; Dunford and Somma 2008a, b; Mickoleit 2008; Machado et al. 2009; Ren et al. 2009; Bicha 2010; Friedrich and Beutel 2010; Minet et al. 2010). At least 12 species of mecopterans have been documented from Florida (Dunford et al. 2007; Somma and Dunford 2008, 2009a, b; Somma 2010), representing the families Meropeidae (one species), Bittacidae (4 species) and Panorpidae (7 species). Herein, I provide data on new collections and county records for Floridian Mecoptera. These new data are represented by the families Meropeidae, *Merope tuber* Newman 1838; and Panorpidae, *Panorpa rufa* Gray 1832 and *P. venosa* Westwood 1846. Additionally, I report on a southern Georgia county record for *Panorpa ferruginea* Byers 1993, near the Florida/Georgia border, and speculate on its possible occurrence in northern Florida. My ultimate goal is to stimulate greater interest in studying Mecoptera in Florida.

Methods and Materials

I examined two *M. tuber* and identified an undetermined panorpid collected from the Apalachicola Bluffs and Ravines Preserve (ABRP), Liberty County, Florida, and deposited in the Bug Closet, University of Central Florida Collection of Arthropods (UCFC). All UCFC specimens have individual accession numbers. Moreover, Wesley J. Bicha examined a specimen of panorpid in the Florida State Collection of Arthropods (FSCA) listed as undetermined (Alachua County, Florida) by Somma and Dunford (2008), and another undetermined panorpid in FSCA collected from Georgia, and determined the species identifications for each.

Results and Discussion

***Merope tuber* Newman**, the North American earwigfly, is one of two extant species of the family Meropeidae (Byers 1973, 2005; Abbott et al. 2007; Dunford et al. 2008a, b). The distribution of this seemingly secretive meropeid is in eastern North America, from southeastern Canada to northern Georgia and southern Alabama, west to eastern Kansas, central Iowa and Minnesota, with more recently discovered populations in Leon and Liberty counties in the Florida Panhandle (Byers 1973, 1993, 2002; Schiefer and Dunford 2005; Cheung et al. 2006; Dunford et al. 2006, 2007, 2008a, b; Somma and Dunford 2007; N. Penny pers. comm. 2010).

On 14 September 2008 a male *M. tuber* (UCFC 0402 713) was collected by Preserve staff with a Malaise trap set up on a seepage slope in a steephead ravine at ABRP, Liberty County, Florida (30.495183°N,

84.978461°W). On 28 December 2008 a female *M. tuber* (UCFC 0405 732) was collected from the same trap and locality by Preserve staff. These two specimens represent the first individuals collected from Florida in approximately 12 years (Dunford et al. 2007). Moreover, the female *M. tuber* represents the latest recorded season for which this species has ever been collected (Dunford et al. 2007).

***Panorpa rufa* Gray**, the red scorpionfly, is an elusive, xerophilous, autumnal-winter panorpid sparsely distributed throughout much of the southeastern United States, in sandy ecosystems east of the Mississippi River, and previously known from eight counties in northern Florida as far south as Alachua and Bay counties (Hagen 1861; Hine 1901a, b; Esben-Petersen 1921; Carpenter 1931; Byers 1954, 1993; Somma and Dunford 2008, 2009b).

A female *P. rufa* (UCFC 0414 950) was collected by Preserve staff with a Malaise trap on 16 November 2008 from ABRP, Liberty County, Florida (30.494725°N, 84.97955°W), in restored sandhills habitat dominated by longleaf pine, turkey oak and wiregrass. This specimen represents the first record for *P. rufa* in Liberty County; adding a ninth county from which this species has been collected in Florida.

***Panorpa venosa* Westwood**, the veined scorpionfly, is principally a coastal and eastern Georgian species that has recently been discovered in Baker and Leon counties, northern Florida (Byers 1993; Somma and Dunford 2008; W. Bicha pers. comm. 2009). This suggests an overall Coastal Plains distribution. Habitat for *P. venosa* collected by W. Bicha (pers. comm. 2010) in Baker County, Florida, was the upper leaf surfaces of a Japanese Honeysuckle thicket inside the edge of mixed hardwood forest on the outskirts of Glen St. Mary.

An adult female *P. venosa* in FSCA was collected with a Malaise trap from the J. & E. Turf Farm, north of LaCrosse, in the Santa Fe River floodplain east of State Route 121, Alachua County, Florida (29.8942°N, 82.4044°W), on 19-26 July 1996 by G. J. Steck and B. D. Sutton. This specimen was erroneously listed as collected in 1986 and described as an undetermined member of the *P. virginica* species group by Somma and Dunford (2008). The trap was periodically partially immersed in rising river water while in use (G. Steck pers. comm. 2010). This specimen is a county record, approximately 42.5 km southwest of the nearest recorded locality for specimens collected from Baker County in late November (Somma and Dunford 2008; W. Bicha pers. comm. 2010), and represents the southernmost record for *P. venosa* in continental North America.

***Panorpa ferruginea* Byers**, the ferruginous scorpionfly, is indigenous to west-central Georgia, extreme northeastern Mississippi, and much of eastern Alabama as far south as Wing, Covington County, approximately 3.2 km from the border of Okaloosa County in the Florida panhandle (Byers 1993). The preferred habitat of this panorpid is dense undergrowth in pine woods mixed with a scattering of hardwoods, and a ground cover of pine needles (Byers 1993).

A male *P. ferruginea* housed in FSCA was collected by E. I. Hazard on 12 November 1962 from an unspecified locality in Lowndes County, Georgia. This is a first county record for this species and approximately 243 km south-southeast from the nearest record in Georgia (Byers 1993). Lowndes County, Georgia, shares its southern border with Hamilton County in northern peninsular Florida. The records for *P. ferruginea* in southernmost Alabama and southernmost Georgia suggest that this species eventually could be found in northern Florida if searched for in suitable habitat.

Somma and Dunford (2008, 2009b) have previously emphasized the dearth of information on and collecting of mecopterans in Florida. Important new data on distribution and phenology of Mecoptera was derived from a mere five specimens reported herein, and clearly underscores the need for further intensive collecting. Undoubtedly *P. ferruginea* will be added to Florida's indigenous fauna in the future. The state of Florida could be the "undiscovered country" for North American Mecoptera.

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Literature Cited

- Abbott, I., T. Burbidge, and A. Wills. 2007.** *Austromerope poultoni* (Insecta, Mecoptera) in southwest Western Australia: Occurrence, modelled geographic distribution, and phenology. *Journal of the Royal Society of Western Australia* 90: 97-106.
- Beutel, R. G., and E. Baum. 2008.** A longstanding entomological problem finally solved? Head morphology of *Nannochorista* (Mecoptera, Insecta) and possible phylogenetic implications. *Journal of Zoological Systematics and Evolutionary Research* 46: 346-367.
- Beutel, R. G., F. Friedrich, and M. F. Whiting. 2008.** Head morphology of *Caurinus* (Mecoptera: Boreidae) and its phylogenetic implications. *Arthropod Structure & Development* 37: 418-433.
- Beutel, R. G., N. P. Kristensen, and H. Pohl. 2009.** Resolving insect phylogeny: The significance of cephalic structures of the Nannomecoptera in understanding endopterygote relationships. *Arthropod Structure & Development* 38: 427-460.
- Bicha, W. J. 2010.** A review of scorpionflies (Mecoptera) of Indochina with the description of a new species of *Neopanorpa* from northern Thailand. *Zootaxa* 2480: 61-67.
- Byers, G. W. 1954.** Notes on North American Mecoptera. *Annals of the Entomological Society of America* 47: 484-510.
- Byers, G. W. 1973.** Zoogeography of the Meropeidae (Mecoptera). *Journal of the Kansas Entomological Society* 46: 511-516.
- Byers, G. W. 1993.** Autumnal Mecoptera of southeastern United States. *University of Kansas Science Bulletin* 55: 57-96.
- Byers, G. W. 2002.** Scorpionflies, hangingflies, and other Mecoptera. *Kansas School Naturalist* 48: 3-15.
- Byers, G. W. 2005 [2004].** Order Mecoptera. Scorpionflies and hangingflies. p. 662-668. *In*: C. A. Triplehorn and N. F. Johnson (editors). *Borror and DeLong's introduction to the study of insects*. Seventh edition. Thomson Brooks/Cole; Belmont, CA. 864 p.
- Carpenter, F. M. 1931.** Revision of the Nearctic Mecoptera. *Bulletin of the Museum of Comparative Zoölogy at Harvard College* 72: 205-277, pl. 1-8.
- Cheung, D. K. B., S. A. Marshall, and D. W. Webb. 2006.** Mecoptera of Ontario. *Canadian Journal of Arthropod Identification* 1: 1-13.
- Dunford, J. C., P. W. Kovarik, L. A. Somma, and D. Serrano. 2007.** First state records for *Merope tuber* (Mecoptera: Meropeidae) in Florida and biogeographical implications. *Florida Entomologist* 90: 581-584.
- Dunford, J. C., D. Serrano, and L. A. Somma. 2006.** Earwigflies in the Great Smokies. *Southeastern Biology* 53: 27-29.
- Dunford, J. C., and L. A. Somma. 2008a.** Scorpionflies (Mecoptera). p. 3304-3310, pl. 97. *In*: J. L. Capinera (editor). *Encyclopedia of entomology*. Second ed. Vol. 4. S-Z. Springer; [Dordrecht].
- Dunford, J. C., and L. A. Somma. 2008b.** Scorpionflies (Mecoptera). Available on URL: <http://springerlink.com/content/134653515g813298/fulltext.html>. *In*: J. L. Capinera (editor). *Encyclopedia of entomology* (e-book). Springer Science + Business Media B. V.; [Dordrecht]. (Last accessed 28 October 2010.)
- Dunford, J. C., L. A. Somma, and D. Serrano. 2008a.** Earwigflies (Mecoptera: Meropeidae). p. 1261-1264. *In*: J. L. Capinera (editor). *Encyclopedia of entomology*. Second ed. Vol. 2. D-K. Springer; [Dordrecht].
- Dunford, J. C., L. A. Somma, and D. Serrano. 2008b.** Earwigflies (Mecoptera: Meropeidae). Available on URL: <http://springerlink.com/content/t26418954r355x4t/fulltext.html>. *In*: J. L. Capinera (editor).

- Encyclopedia of entomology (e-book). Springer Science + Business Media B. V.; [Dordrecht]. (Last accessed 28 October 2010.)
- Esben-Petersen, P. 1921.** Mecoptera. Monographic revision. Collections Zoologiques du Baron Edm. de Selys Longchamps; Catalogue Systématique et Descriptif, Publié par les Soins de ses Fils (Bruxelles) Fascicule 5(2): 1-172, pl. I-II.
- Friedrich, F., and R. G. Beutel. 2010.** The thoracic morphology of *Nannochorista* (Nannochoristidae) and its implications for the phylogeny of Mecoptera and Antliophora. *Journal of Zoological Systematics and Evolutionary Research* 48: 50-74.
- Grimaldi, D. [A.], and M. S. Engel. 2005.** Evolution of the insects. Cambridge University Press; Cambridge. 772 p.
- Hagen, H. 1861.** Synopsis of the Neuroptera of North America. With a list of South American species. *Smithsonian Miscellaneous Collections* 4(1): i-xx, 1-347.
- Hine, J. S. 1901a.** A review of the Panorpidae north of Mexico. *Bulletin of the Science Laboratories of Denison University* 11: 241-264, pl. LIX-LX.
- Hine, J. S. 1901b.** A review of the Panorpidae north of Mexico. *University Bulletin. Ohio State University, Series V* 7: 241-264, pl. LIX-LX.
- Kluge, N. J. 2004.** Larval leg structure of *Nannochorista* Tillyard, 1917 and characteristics of Mecoptera. *Russian Entomological Journal* 2003 12: 349-354.
- Machado, R. J. P., F. S. P. Godoi, and J. A. Rafael. 2009.** Neotropical Mecoptera (Insecta): New generic synonymies, new combinations, key to families and genera, and checklist of species. *Zootaxa* 2148: 27-38.
- Mickoleit, G. 2008.** Die Sperma-Auspreßvorrichtung der Nannochoristidae (Insecta: Mecoptera). *Entomologia Generalis* 31: 193-226.
- Minet, J., D.-Y. Huang, H. Wu, and A. Nel. 2010.** Early Mecopterida and the systematic position of the Microptysmatidae (Insecta: Endopterygota). *Annales de la Société Entomologique de France (N. S.)* 46: 262-270.
- [Novokshonov, V. G.] 1997.** [Early evolution of scorpionflies] (Insecta: Panorpidae). [Nauka, Moscow.] 140 p., plates I-IX. [in Russian]
- Penny, N. D. 1975.** Evolution of the extant Mecoptera. *Journal of the Kansas Entomological Society* 48: 331-350.
- Ren, D., C. C. Labandeira, J. A. Santiago-Blay, A. Rasnitsyn, CK Shih, A. Bashkuev, M. A. V. Logan, C. L. Hotton, and D. Dilcher. 2009.** A probable pollination mode before angiosperms: Eurasian, long-proboscid scorpionflies. *Science* 326: 840-847 + Supplement [online] available on URL: <http://www.sciencemag.org/cgi/content/full/326/5954/840/DC1>. (Last accessed 28 October 2010.)
- Schiefer, T. L., and J. C. Dunford. 2005.** New state record for *Merope tuber* Newman (Mecoptera: Meropeidae) in Alabama. *Journal of Entomological Science* 40: 471-473.
- Somma, L. A. 2010.** A state record for the Oconee scorpionfly, *Panorpa oconee* Byers (Mecoptera: Panorpidae), in Florida. *Insecta Mundi* 0135: 1-4.
- Somma, L. A., and J. C. Dunford. 2007.** Etymology of the Earwigfly, *Merope tuber* Newman (Mecoptera: Meropeidae): Simply dull or just inscrutable? *Insecta Mundi* 0013: 1-5.
- Somma, L. A., and J. C. Dunford. 2008.** Preliminary checklist of the Mecoptera of Florida: Earwigflies, hangingflies, and scorpionflies. *Insecta Mundi* 0042: 1-9.
- Somma, L. A., and J. C. Dunford. 2009a.** The Florida scorpionfly, *Panorpa floridana* Byers (Mecoptera: Panorpidae). Florida Department of Agriculture & Consumer Services, Division Plant Industry, Entomology Circular 420: 1-3. Also available on URL: <http://www.doacs.state.fl.us/pi/enpp/ento/entcirc/ent420.pdf>. (Last accessed 20 December 2010.)
- Somma, L. A., and J. C. Dunford. 2009b.** Records for *Bittacus* hangingflies and *Panorpa* scorpionflies (Mecoptera: Bittacidae and Panorpidae) in Florida. *Insecta Mundi* 0084: 1-5.
- Willmann, R. 1987.** The phylogenetic system of the Mecoptera. *Systematic Entomology* 12: 519-524.

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