INSECTA MUNDI A Journal of World Insect Systematics

0467

Current disposition of earwigflies, *Merope tuber* Newman and *Austromerope poultoni* Killington (Mecoptera: Meropeidae), in the Florida State Collection of Arthropods

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Date of Issue: February 12, 2016

Center for Systematic Entomology, Inc., Gainesville, FL

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Insecta Mundi 0467: 1–14

ZooBank Registered: urn:lsid:zoobank.org:pub:626F7323-1E6B-48F8-8CEF-AE663E7702DF

Published in 2016 by
Center for Systematic Entomology, Inc.
P. O. Box 141874
Gainesville, FL 32614-1874 USA
http://centerforsystematicentomology.org/

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Layout Editor for this article: Eugenio H. Nearns

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Abstract. We provide the current holdings of Meropeidae in the Florida State Collection of Arthropods (FSCA). To date, FSCA holds a well-curated collection of extant meropeids representing 17 U.S. states and Western Australia (n = 316 *Merope tuber* Newman, five *Austromerope poultoni* Killington). *Merope tuber* records from Vermont, Texas, and South Carolina are published here for the first time. A total of 298 pinned *M. tuber* and four pinned *A. poultoni*; six *M. tuber* specimens preserved in 95% ethanol; and 12 *M. tuber* and one *A. poultoni* sputter-coated with gold-palladium for SEM are available for researchers interested in studying this unique family of insects.

Keywords. Meropeids, systematics, morphology, taxonomy, distribution, biogeography, SEM.

Introduction

Merope tuber Newman, 1838, from North America; *Austromerope poultoni* Killington, 1933, from Western Australia; and *Austromerope brasiliensis* Machado, Kawada, and Rafael, 2013, from the Atlantic Forest biome of Espirito Santo, southeastern Brazil; represent the three known extant species of Meropeidae. An extinct meropeid, *Boreomerope antiqua* Novokschonov, 1995, was described from a compression fossil wing taken from lacustrine claystone in Siberia near Kubekovo Village. Recently, one additional extinct species, *Burmomerope eureka* Grimaldi and Engel, 2013, was described from 99 myo amber found in northern Myanmar. The relationship of the fossil *Sinothauma ladinica* Hong and Zhu, 2007, described from Shaanxi, China, as a meropeid (Hong and Zhu 2007) is dubious (Grimaldi and Engel 2013).

Merope tuber, the North American earwigfly, historically has been considered a rare insect and at one time was seldom collected (Esben-Petersen 1915, 1921; Byers 1973, 1993; Kritsky 2011). A single female *M. tuber* was first collected by Edward Doubleday in Trenton Falls, New York in 1837 and subsequently described by Newman (1838; Westwood 1846; Fitch 1872; Somma and Dunford 2007). Fitch (1872) collected additional New York specimens that flew into his cabin, attracted to the lamplight at night. However, in recent years collection records and known geographical range have expanded largely due to passive collection methods using a variety of traps (e.g., pan, picric acid, pitfall, Lindgren funnel,

carbon dioxide, various flight intercepts, molasses, light, glue) (Byers 1973, 2005; Dunford et al. 2007; Barrows and Flint 2009, 2010; Pechal et al. 2011; Somma 2011; Bowles and Sites 2013; Skvarla et al. 2014). Recent active field collections also include finding individuals on carrion (Pechal et al. 2011).

The current known distribution of *M. tuber* includes the eastern deciduous forests or similar relict habitats of eastern and central North America, from southeastern Canada (Ontario and Quebec) southward to the Florida panhandle, and westward to Minnesota, Iowa, eastern Kansas, south to Arkansas, Alabama, and Mississippi (Barnes 1956; Weidner 1964; Byers 1973, 1993; Webb et al. 1975; Pothier 1997; Dunford and Krauth 2005; Schiefer and Dunford, 2005; Cheung et al. 2006; Dunford et al. 2007; Paiero et al. 2010; Somma 2011; Grimaldi and Engel 2013; Skvarla et al. 2014; Schiefer 2015). Although *M. tuber* adults are relatively frequently collected using modern techniques, the larvae remain undescribed and most of its life history remains unknown. Adults are nocturnal, sometimes attracted to lights, mostly spend daylight hours under tree bark, logs and stones, and are often collected in mesic deciduous forests near a water source or along margins of marshes (Byers 1973; Byers and Thornhill 1983; Dunford et al. 2007; Ferrington 2008; Barrows and Flint 2009, 2010; Bowles and Sites 2013), and more recently in tallgrass prairies (Paiero et al. 2010). The phenology of adult *M. tuber* varies depending on geographical location but appears to last throughout the summer months and into late fall–early winter (Maier 1984; Byers 1993; Schiefer and Dunford 2005; Dunford et al. 2007; Barrows and Flint 2009, 2010; Somma 2011).

Austromerope poultoni, the Australian earwigfly, is commonly associated with forest litter and appears to be active following rains; however, the larva has not been described, and despite being first collected over 100 years ago, most of its life history remains a mystery (Penniket 1977; Faithfull et al. 1985; Smithers 1988; Abbott et al. 2007). Edward Poulton first took a single specimen from under a stone on 31 July 1914 between Yallingup and Lake Caves west of Forest Grove, Western Australia (Killington 1933). This specimen was deposited in the Oxford University Museum of Natural History and remained undescribed for nearly 20 years until Frederick Killington realized its importance and described it as a new genus and species (Killington 1933; Abbott et al. 2007). Since that time, periodic collection records have been made with relatively significant numbers collected in southwestern Western Australia using pitfall traps and light traps in *Eucalyptus* L'Héritier woodland habitats, with capture records ranging from austral July–December (Abbott et al. 2007; Wills 2008). A significant range extension was noted in 1998, when a single female specimen was taken in sand plain vegetation near Eneabba, Western Australia, 240 km north from the known geographical distribution (Abbott et al. 2007).

Meropeidae is one of the best-known relict groups in Insecta and represents an intriguing case in biogeography (Penny 1975; Grimaldi and Engel 2013). The phylogenetic position of meropeids may place them close to Eomeropidae (Tillyard 1926, 1935; Grassé 1951; Remington 1968; Grimaldi and Engel 2005, 2013) (but see Friedrich et al. 2013), probably basal to more derived mecopterans (Willmann 1987, 1989; Whiting 2002), and possibly the sister group to Bittacidae (Friedrich et al. 2013). Meropeid larval morphology could provide a clue to the proposed phylogenetic link between mecopterans and siphonapterans (Richards 1965; Simiczyjew 2002; Whiting 2002; Grimaldi and Engel 2005; Misof et al. 2014); however, the lack of larval descriptions for Meropeidae and Eomeropidae impede an accurate reconstruction of the relationships and evolutionary changes of Mecoptera and related groups (Friedrich et al. 2013). Grimaldi and Engel (2013) hypothesize that the likely explanation for the extremely disparate ranges of the three extant meropeid species is due to extinction within intervening areas; thus, meropeids represent an interesting and perhaps declining insect lineage with evolutionary insights into some important relationships within the Holometabola. Rix et al. (2015) noted the biogeographical significance of the discovery of *A. poultoni* in southwestern Australia and hypothesized that despite changes in global vegetation during the time of their existence, fauna in this biodiversity hotspot have remained morphologically conservative in evolutionary terms and tolerant of global climate changes.

We report herein the current holdings of two species of Meropeidae in the Florida State Collection of Arthropods (FSCA), which we are using, in part, for a future study on biogeography and distribution. Additionally, we encourage collectors/researchers to use these specimen records to continue to pursue studies with the objectives of elucidating additional morphological, distributional, life history, and phylogenetic information about this unique family of insects.

Materials and Methods

The Mecoptera Collection at FSCA located in the Doyle Conner Center (Division of Plant Industry [DPI], Florida Department of Agriculture and Consumer Services [FDACS]) is adjacent to the University of Florida's McGuire Center for Lepidoptera and Biodiversity (MGCL), Florida Museum of Natural History (FLMNH), and is the largest in the southeastern U.S. The Collection presently contains 20 drawers of mostly pinned mecopteran adults, representing more than 4800 specimens (Dunford et al. 2013; Somma et al. 2014). Moreover, FSCA houses and curates MGCL mecopteran specimens. The Collection has been used extensively in recent years for several studies covering Florida Mecoptera (Dunford et al. 2007; Somma and Dunford 2008, 2009; Somma 2010; Somma et al. 2013, 2014) and *M. tuber* throughout its range in North America (Dunford et al. 2006).

Specimens were examined, counted, and dates, locality, and collector data were recorded from specimen labels. Specimens prepared for scanning electron microscopy (SEM) were sputter-coated with gold-palladium using a Denton Desk Vacuum III and imaged with a JEOL JSM-55-10LV (Low Vacuum) Scanning Electron Microscope. We captured SEM images for this study using accelerating voltages of 11 kV (*M. tuber*) or 14 kV (*A. poultoni*).

In 2004 the collection held only 15 *M. tuber* specimens (representing six states) and has expanded largely due to its discovery in Florida, numerous aquisitions from various states, and resurgence of interest in this insect (Fig. 1–2, 4) (Dunford et al. 2007; Somma et al. 2014). We aquired five *A. poultoni* (Fig. 3, 5–7) from a specimen exchange with the Department of Conservation and Land Management, Western Australia. During this exchange ten *M. tuber* (five males/five females, Essex County, Virginia, collected 9 September–6 October by David R. Smith) were gifted to the Western Australian Museum (WAM) on 27 April 2007.

Results and Discussion

FSCA holds a sizable and well-curated collection of meropeids representing 17 U.S. states and Western Australia (n = 316 *M. tuber*, five *A. poultoni*; Table 1). At present the collection holds 298 pinned *M. tuber* and four pinned *A. poultoni*; six *M. tuber* specimens preserved in 95% ethanol (Florida, Virginia, West Virginia, and Tennessee); and 12 *M. tuber* (Florida, North Carolina, Tennessee, and Wisconsin) and one *A. poultoni* sputter-coated with gold-palladium for SEM (Table 1).

Many states represented by *M. tuber* specimens housed in FSCA also have been documented or reviewed in previous literature derived from other collections: Massachussetts (Johnson 1913; Byers 1973), New York (Newman 1838; Fitch 1872; Byers 1973), Maryland (Byers 1973; Scarbrough 1980), North Carolina (Brimley 1938; Byers 1973), West Virginia (Byers 1973; Coffman 1982), Virginia (Barber 1904; Byers 1973), Florida (Somma 2011); Kentucky (Byers 1973; Byers and Covell 1981), Tennessee (Caron 1967; Byers 1973), Missouri (Byers 1973), Indiana (Byers 1973), Michigan (Byers 1973; Thornhill and Johnson 1974), Wisconsin (Byers 1973; Dunford and Krauth 2005), and Oklahoma (Byers 1993). Herein we publish for the first time *M. tuber* state records from Vermont, Texas, and South Carolina (Table 1); however, *M. tuber* from Texas and South Carolina previously have been reported from websites (Anonymous 2015; S. Moorman in McLeod 2015).

The meropeid collection at FSCA is a valuable tool providing reseachers a significant number of specimens that may be useful for detailed morphological or molecular studies. *Merope tuber* specimens are represented from throughout much of the eastern and midwestern United States, and two Central Plains states (Oklahoma and Texas), offering quick refererence to geographical variation that may not be otherwise apparent. Numerous specimens from some limited localities (e.g., Cambridge, New York: Table 1) suggest the presence of earwigfly hotspots that require further investigation. In addition, access to *A. poultoni* specimens allows for further comparison of functional morphologies between two highly disjunct meropeid species (Fig. 4–8). Herein we illustrate previously unreported details of the jugal lobe and associated ridged metanotum on *A. poultoni* (Fig. 7–8) which suggest presumptive fuctions of stridulatory or wing interlocking mechanisms similar to *M. tuber* (Hlavac 1974; Sanborne 1982; Gorb 1998, 1999; Machado et al. 2013). The function of the greatly elongate male genital claspers (basistyles

plus dististyles: Fig. 3–5) of meropeids remains unkown. We hypothesize they are used to reach around the broad wings of females during courtship and copulation, while simultaneously repelling rival males.

We hope that the preliminary data we provide encourages further work with meropeids and dissemination of associated collections data. This is crucial for a group representing a relict lineage extending from the mid-Mesozoic with only three extant species surviving an extensive extiction (Novokschonov 1995; Grimaldi and Engel 2013). A comprehensive review on the biology and biogeography of *M. tuber* is forthcoming from us.

Acknowledgments

We are indebted to Gary J. Steck (Curator of Diptera and Minor Orders, FSCA) and Bruce Sutton (Research Associate, FSCA) for allowing us to obtain and use specimens from their Malaise trap samples from their survey of insects in the Great Smoky Mountains National Park (Tennessee and North Carolina). We are grateful to Paul E. Skelley (Entomology Section Administrater and Collections Manager, FSCA) who helped us acquire specimens for FSCA and provided important technical assistance with the SEM. We thank Julieta Brambila (Entomologist-Domestic Identifier, U. S. Department of Agriculture; Research Associate, FSCA) who initially helped curate our specimens. We extend our gratitude to Edward I. Coher (Research Associate, FSCA), Bruce Harrison (School of Health Sciences, Western Carolina University), David P. Cowan (Department of Biological Sciences, Emeritus, Western Michigan University), Richard L. Hoffman (deceased; Recent Invertebrates Collection, Virginia Museum of Natural History), Oliver S. Flint, Jr. and David G. Furth (Department of Entomology, National Museum of Natural History, Smithsonian Institution), Jason B. Oliver (Otis L. Floyd Nursery Research Center, Tennessee State University), Zell Smith (Research Associate, FSCA), Craig M. Brabant (Department of Entomology, University of Wisconsin-Madison), Alistair S. Ramsdale (deceased; Entomology Collection, Bishop Museum), Wesley J. Bicha (Research Associate, FSCA), Joshua R. Jones (Department of Biology, Blinn College), John Leavengood (U.S. Department of Agriculture/APHIS/PPQ, Texas), Peter W. Kovarik (Department of Biological and Physical Sciences, Columbus State Community College; Research Associate, FSCA), and Howard Romack; all of whom generously gifted or donated additional specimens to FSCA (Massachusetts, North Carolina, Michigan, Virginia, West Virginia, Tennessee, Wisconsin, Indiana, Texas, Kentucky, Florida, New York and Vermont, respectively). Allan Wills (Department of Parks and Wildlife, Western Australia) generously gifted all of our *A. poultoni* and provided us with literature. We are pleased to thank Tom Burbidge, Charles V. Covell, Jr., Michael S. Engel, Oliver S. Flint, Jr., and Stanislav N. Gorb, for sending us crucial literature. We were greatly aided by the Marston Science Library and the Interlibrary Loan Department, University of Florida, for part of our literature search. We owe much gratitude to FSCA, DPI, and its Research Associates program for use of their collection and technological facilities. We are always pleased to thank Alice "Squirrel Girl" Sanders (DPI Library Technician [retired]) for obtaining important literature for us. Lastly, we are completely indebted to James R. "M. O. B." Wiley (Assistant Curator [retired], FSCA) for enthusiastically assisting Team *Merope* in our search for rare literature, assisting curating this collection, and continually educating us with his tireless, chipper, prescient insights. This manuscript was greatly improved by reviews provided by Allan Wills and Jimmie Griffiths.

Literature Cited

Abbott, I., T. Burbidge, and A. Wills. 2007. *Austromerope poultoni* (Insecta, Mecoptera) in southwest Western Australia: Occurrence, modelled geographical distribution, and phenology. Journal of the Royal Society of Western Australia 90: 97–106.

Anonymous. 2015. Entoblitz 2000. *In*: Entoblitz Texas. Department of Entomology, Texas A&M University; College Station. URL: http://insects.tamu.edu/entoblitz_2000/mecoptera.html (Last accessed on 18 November 2015).

Barber, H. S. 1904. The occurrence of the earwig-fly, *Merope tuber* Newman. (Neuroptera, Panorpidæ.). Proceedings of the Entomological Society of Washington 6: 50–51.

Barnes, J. W. 1956. Notes on Minnesota Mecoptera. Entomological News 67: 191–192.

Barrows, E. M., and O. S. Flint Jr. 2009. Mecoptera (Mecoptera: Bittacidae, Meropeidae, Panorpidae) flight periods, sex ratios, and habitat frequencies in a United States mid-Atlantic freshwater tidal marsh, low forest, and their ecotone. Journal of the Kansas Entomoogical Society 82: 223–230.

Barrows, E. M., and O. S. Flint Jr. 2010. Erratum. Mecopteran (Mecoptera: Bittacidae, Meropeidae, Panorpidae) flight periods, sex ratios, and habitat frequencies in a United States Mid-Atlantic freshwater tidal marsh, low forest, and their ecotone, 2009, Edward M. Barrows and Oliver S. Flint, Jr., Journal of the Kansas Entomological Society 83(3): 223–230. Journal of the Kansas Entomological Society 83: 100.

Bowles, D. E., and R. W. Sites. 2013. *Merope tuber* (Mecoptera: Meropeidae) from the interior highlands of the United States. Entomological News 123: 155–160.

Brimley, C. S. 1938. The insects of North Carolina. North Carolina Department of Agriculture; Raleigh. 560 p.

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. 2005 [2004]. Order Mecoptera. Scorpionflies and hangingflies. p. 662–668. *In*: C. A. Triplehorn and N. F. Johnson (eds.). Borror and DeLong's Introduction to the study of insects. Seventh edition. Thomson Brooks/Cole; Belmont, CA. 864 p.

Byers, G. W., and C. V. Covell, Jr. 1981. An annotated checklist of the scorpionflies (Mecoptera) of Kentucky. Entomological News 92: 196–198.

Byers, G. W., and R. Thornhill. 1983. Biology of the Mecoptera. Annual Review of Entomolology 28: 203–228.

Caron, D. M. 1967. Habitat and distribution of Mecoptera in east Tennessee. Journal of the Tennessee Academy of Science 42: 73–77.

Cheung, D. K. B., S. A. Marshall, and D. W. Webb. 2006. Mecoptera of Ontario. Canadian Journal of Arthropod Identification 1: 1–13.

Coffman, C. C. 1982. *Merope tuber* Newman (Mecoptera: Meropeidae) records from West Virginia collections. Proceedings of the West Virginia Academy of Sciences 54: 48–53.

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., and S. J. Krauth. 2005. Neither fly nor earwig: Earwigflies in Wisconsin. Wisconsin Entomological Society Newsletter 32(3): 3–4.

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. 2008. Scorpionflies (Mecoptera). p. 3304–3310, pl. 97. *In*: J. L. Capinera (ed.). Encyclopedia of entomology. Second edition. Vol. 4. S–Z. Springer, [Dordrecht].

Dunford, J. C., L. A. Somma, and D. Serrano. 2005. Earwigflies in the Great Smokies. ATBI Quarterly, All Taxa Biodiversity Inventory Newsletter (Great Smoky Mountains National Park) 6(2): 1.

Dunford, J. C., L. A. Somma, and D. Serrano. 2008. Earwigflies (Mecoptera: Meropeidae). p. 1261–1264. *In*: J. L. Capinera (ed.). Encyclopedia of entomology. Second edition. Vol. 2. D–K. Springer, [Dordrecht].

Dunford, J. C., L. A. Somma, and D. Serrano. 2013. FSCA Mecoptera resources: Mecoptera (scorpionflies, hangingflies, earwigflies, and allies) at the Florida State Collection of Arthropods. *In*: M. C. Thomas (ed.). Museum of Entomology FSCA (Gainesville). Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture and Consumer Services; Gainesville. URL: http://www.fsca–dpi.org/MecopteraPage.htm (Last accessed 18 November 2015).

Esben-Petersen, P. 1915. A synonymic list of the order Mecoptera. Entomologiska Meddelelser 10: 216–242.

Esben-Petersen, P. 1921. Mecoptera. Monographic revision. Collections Zoologiques du Baron Edm. de Selys Longchamps; Catalogue Systématique et Descriptif, Fascicule 5(2): 1–172, pl. I–II.

Faithfull, M. J., J. D. Majer, and A. C. Postle. 1985. Some notes on the occurrence and seasonality of *Austromerope poultoni* Killington (Mecoptera) in Western Australia. Australian Entomological Magazine 12: 57–60.

Ferrington, L. C., Jr. 2008. Global biodiversity of scorpionflies and hangingflies (Mecoptera) in freshwater. Hydrobiologia 595: 443–445.

Fitch, A. 1872. Fourteenth report on the noxious, beneficial, and other insects in the state of New York. Transactions of the New York State Agricultural Society 1870 30: 355–381.

Friedrich, F., H. Pohl, F. Beckmann, and R. G. Beutel. 2013. The head of *Merope tuber* (Meropeidae) and the phylogeny of Mecoptera (Hexapoda). Arthropod Structure & Development 42: 69–88.

Gorb, S. N. 1998. Frictional surfaces of the elytra-to-body arresting mechanism in tenebrionid beetles (Coleoptera: Tenebrionidae): Design of co-opted fields of microtrichia and cuticle ultrastructure. International Journal of Insect Morphology and Embryology 27: 205–225.

Gorb, S. N. 1999. Ultrastructure of the thoracic dorso-medial field (TDM) in the elytra-to-body arresting mechanism in tenebrionid beetles (Coleoptera: Tenebrionidae). Journal of Morphology 240: 101–113.

Grassé, P.-P. 1951. Ordre des Mécoptères. p. 71–124. *In*: P.-P. Grassé (ed.). Traité de zoologie. Anatomie, systématique, biologie. Tome X. Insectes superiéurs et Hémiptéroïdes. Fascicule I. Névroptéroïdes-Mécoptéroïdes Hyménoptéroïdes (Symphytes et Térébrants). Masson et C^{ie} Editeurs; Paris. 975 p.

Grimaldi, D. [A.], and M. S. Engel. 2005. Evolution of the insects. Cambridge University Press; Cambridge. 772 p.

Grimaldi, D. A., and M. S. Engel. 2013. The relict scorpionfly family Meropeidae (Mecoptera) in Cretaceous amber. Journal of the Kansas Entomological Society 86: 253–263.

Hlavac, T. F. 1974. *Merope tuber* (Mecoptera): A wing-body interlocking mechanism. Psyche 81: 303–306.

Hong, Y.-C., and L. Zhu. 2007. Discovery of the oldest fossil Meropeidae (Insecta, Mecoptera) from Shaanxi, China. Acta Zootaxonomica Sinica 32: 875–880.

Johnson, C. W. 1913. *Merope tuber* in Massachusetts. Psyche 20: 170.

Killington, F. J. 1933. A new genus and species of Meropeidae (Mecoptera) from Australia. Entomologist's Monthly Magazine (London) (Third Series V. 19) 69: 1–4, pl. I.

Kritsky, G. 2011. How rare is a rarely collected insect? American Entomologist 57: 2.

Machado, R. J. P., R. Kawada, and J. A. Rafael. 2013. New continental record and new species of *Austromerope* (Mecoptera, Meropeidae) from Brazil. ZooKeys 269: 51–65.

Maier, C. T. 1984. Habitats, distributional records, seasonal activity, abundance, and sex ratios of Boreidae and Meropeidae (Mecoptera) collected in New England. Proceedings of the Entomological Society of Washington 86: 608–613.

McLeod, R. 2015. Species *Merope tuber* - forcepfly. *In*: J. VanDyk (ed.). BugGuide. Department of Entomology, Iowa State University; Ames. URL: http://bugguide.net/node/view/36596 (Last accessed 18 November 2015).

Misof, B., S. Liu, K. Meusemann, R. S. Peters, A. Donath, C. Mayer, P. B. Frandsen, J. Ware, T. Flouri, R. G. Beutel, O. Niehuis, M. Petersen, F. Izquierdo-Carrasco, T. Wappler et al. (+ 87 others). 2014. Phylogenomics resolves the timing and pattern of insect evolution. Science 346: 763–767 + online suppl. (Available at ~ http://www.sciencemag.org/content/346/6210/763/suppl/DC1 . Last accessed 8 December 2015).

Newman, E. 1838. Entomological notes (continued from Vol. III. p. 501.). Entomological Magazine 5: 168–181.

Novokschonov, V. G. 1995. Der älteste Vertreter der Meropeidae (Mecoptera, Insecta). Paläeontologische Zeitschrift 69: 149–152.

Paiero, S. M., S. A. Marshall, P. D. Pratt, and M. Buck. 2010. Insects of Ojibway Prairie, a southern Ontario tallgrass prairie. p. 199–225. *In*: J. D. Shorthouse and K. D. Floate (eds.). Arthropods of Canadian grasslands (Volume 1): Ecology and interactions in grassland habitats. Biological Survey of Canada; Ottawa. 358 p.

Pechal, J. L., M. E. Benbow, and J. K. Tomberlin. 2011. *Merope tuber* Newman (Mecoptera: Meropeidae) collected in association with carrion in Greene County, Ohio, USA: An infrequent colleciton of an elusive species. American Midland Naturalist 166: 453–457.

Penniket, J .G. 1977. The primitive protomecopteran *Austromerope poultoni*. Proceedings of the Western Australian Entomology Workshop, 2 December (Western Australian Institute of Technology, Bentley) 1977: 20–21.

Penny, N. D. 1975. Evolution of the extant Mecoptera. Journal of the Kansas Entomological Society 48: 331–350.

Pothier, G. 1997. Les Mécoptères du Québec. Bulletin de l'Entomofaune (Chicoutimi, Québec) 19: 12–13.

Remington, C. L. 1968. A rare and primitive winged insect from Chile. Discovery 4: 36–41.

Richards, A. G. 1965. The proventriculus of adult Mecoptera and Siphonaptera. Entomological News 76: 253–256.

Rix, M. G., D. L. Edwards, M. Byrne, M. S. Harvey, L. Joseph, and J. D. Roberts. 2015. Biogeography and speciation of terrestrial fauna in the south-western Australian biodiversity hotspot. Biological Reviews 90: 762–793.

Sanborne, P. M. 1982. Stridulation in *Merope tuber* (Mecoptera: Meropeidae). Canadian Entomologist 114: 177–180.

Scarbrough, A. G. 1980. Recent collection records of *Merope tuber* Newman (Mecoptera: Meropeidae) in Maryland. Proceedings of the Entomolgical Society of Washington 82: 153–154.

Schiefer, T. L. 2015. First records of *Merope tuber* Newman (Mecoptera: Meropeidae) from Mississippi. Entomological News 124: 265–269.

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.

Simiczyjew, B. 2002. Structure of the ovary in *Nannochorista neotropica* Navás (Insecta: Mecoptera: Nannochoristidae) with remarks on mecopteran phylogeny. Acta Zoologica (Stockholm) 83: 61–66

Skelley, P. E., J. C. Dunford, L. A. Somma, and D. Serrano. 2007. What is it? American Entomologist 53: 124, 93.

Skvarla, M. J., J. A. Hartshorn, and A. P. G. Dowling. 2014. Report on a large collection of *Merope tuber* Newman, 1838 (Mecoptera: Meropeidae), from Arkansas, with notes on collection technique, sex ratio, and male clasper size. Psyche 2014(530757): 1–6.

Smithers, C. N. 1988. The female and egg of *Austromerope poultoni* Killington (Mecoptera: Meropeidae). Entomolologica Scandinavica 19: 109–111.

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. 2011. New collections and records for earwigflies and scorpionfies (Mecoptera: Meropeidae and Panorpidae) in Florida. Insecta Mundi 0165: 1–6.

Somma, L A., S. Cresswell, and J. C. Dunford. 2013. Rediscovery of the Florida scorpionfly, *Panorpa floridana* Byers (Mecoptera: Panorpidae). Insecta Mundi 0303: 1–5.

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. 2009. Records for *Bittacus* hangingflies and *Panorpa* scorpionflies (Mecoptera: Bittacidae and Panorpidae) in Florida. Insecta Mundi 0084: 1–8.

Somma, L. A., J. C. Dunford, and D. Serrano. 2014. The Mecoptera collection of the Florida State Collection of Arthropods: Scorpionflies, hangingflies, earwigflies, and allies. Southeastern Biology 61: 110–113.

Thornhill, A. R., and J. B. Johnson. 1974. The Mecoptera of Michigan. Great Lakes Entomologist 7: 33–53.

Tillyard, R. J. 1926. Kansas Permian insects. Part 7. The order Mecoptera. American Journal of Science, Fifth Series 11: 133–164.

Tillyard, R. J. 1935. The evolution of the scorpion-flies and their derivatives (Order Mecoptera). Annals of the Entomological Society of America 28: 1–45.

Webb, D. W., N. D. Penny, and J. C. Marlin. 1975. The Mecoptera, or scorpionflies, of Illinois. Illinois Natural History Survey Bulletin 31: 250–316.

Weidner, H. 1964. *Merope tuber* Newman in Canada (Mecoptera, Meropeidae). Entomologische Mitteilungungen aus dem Zoologischen Staatsinstitute und Zoologischen Museum Hamburg 3: 45–46.

Westwood, J. O. 1846. Monograph of the genus *Panorpa*, with descriptions of some species belonging to other allied genera. Transactions of the Entomological Society of London [Series I] 4: 184–196, pl. XIV: fig. 1-2*l*.

Whiting, M. F. 2002. Mecoptera is paraphyletic: Multiple genes and phylogeny of Mecoptera and Siphonaptera. Zoologica Scripta 31: 93–104.

Willmann, R. 1987. The phylogenetic system of the Mecoptera. Systematic Entomology 12: 519–524.

Willmann, R. 1989. Evolution und phylogenetisches System der Mecoptera (Insecta: Holometabola). Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft 544: 1–153.

Wills, A. 2008. Earwig flies? Ancient and mysterious insects. Western Wildlife (Perth) 12(1): 5.

Received December 9, 2015; Accepted December 25, 2015.
Review Editor Lawrence Hribar.

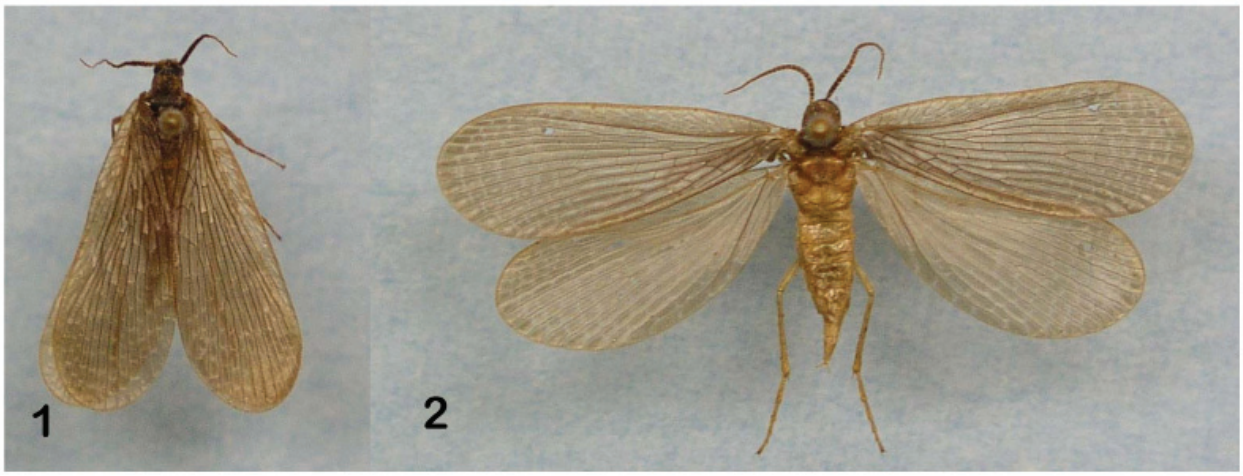
TABLE 1. Detailed holdings for meropeids, *Austromerope poultoni* (n=5) and *Merope tuber* (n=316), in the Florida State Collection of Arthropods current 25 December 2015. Data on locality, collection dates, collectors, and determiners were obtained from specimen labels. Some fine details of locality data from specimen labels are not listed. Important locality data not provided on specimen labels are in brackets. Acronyms used for localities on labels are TVA (Tennessee Valley Authority), NRC (Natural Resources Center), TSU (Tennessee State University), and NCRS (Nursery Crop Research Station). All individuals collected from Haywood County, North Carolina (except one male collected by B. A. Harrison); and Blount and Sevier Counties, Tennessee, were from within the Great Smoky Mountains National Park. All individuals collected from Hardy County, West Virginia; and Clarke and Essex Counties, Virginia, were obtained through a specimen exchange with the National Museum of Natural History (NMNH), Smithsonian Institution.

Locality	Dates	Number of Males/Females	Collector(s)
***Austromerope poultoni* – AUSTRALIA:**			
WESTERN AUSTRALIA			
near Yornup, FORESTCHECK Site 5	30 Nov. 2001	2[g]/3	I. Abbott, T. Burbidge & A. Wills
***Merope tuber* – U.S.A.:**			
VERMONT			
Bennington Co., Beartown, town of Sandgate	26–27 Sept. 2011	0/3	H. Romack
MASSACHUSETTS			
Essex Co., Merrimacport	11–16 June 1954	0/1	E. I. Coher
NEW YORK			
[Tompkins Co.], Ithaca	18 July 1938	0/1	J. G. Franclemont
[Tompkins Co.], Ithaca	8 July 1938	1/0	J. G. Franclemont
Washington Co., Cambridge	1–7 July 2009	6/7	H. Romack
Washington Co., Cambridge	8–15 July 2009	3/11	H. Romack
Washington Co., Cambridge	16–23 July	2/6	H. Romack
Washington Co., Cambridge	23 Sept. 2009	0/1	H. Romack
Washington Co., Cambridge	20 June 2010	2/2	H. Romack
Washington Co., Cambridge	21 June 2010	1/0	H. Romack
Washington Co., Cambridge	22 June 2010	1/0	H. Romack
Washington Co., Cambridge	27 June 2010	2/2	H. Romack
Washington Co., Cambridge	4 July 2010	1/3	H. Romack
Washington Co., Cambridge	11 July 2010	2/8	H. Romack
Washington Co., Cambridge	18 July 2010	1/3	H. Romack
Washington Co., Cambridge	25 July 2010	1/4	H. Romack
Washington Co., Cambridge	1 Aug. 2010	2/6	H. Romack
Washington Co., Cambridge	8 Aug. 2010	1/4	H. Romack
Washington Co., Cambridge	15 Aug. 2010	0/2	H. Romack
Washington Co., Cambridge	22 Aug. 2010	0/1	H. Romack
Washington Co., Cambridge	26 June 2011	1/0	H. Romack
Washington Co., Cambridge	27 June 2011	0/1	H. Romack
Washington Co., Cambridge	2 July 2011	1/0	H. Romack
Washington Co., Cambridge	9 July 2011	1/1	H. Romack
Washington Co., Cambridge	10 July 2011	1/0	H. Romack
Washington Co., Cambridge	12 July 2011	1/0	H. Romack
Washington Co., Cambridge	13 July 2011	0/1	H. Romack
Washington Co., Cambridge	16 July 2011	1/0	H. Romack
Washington Co., Cambridge	17 July 2011	1/0	H. Romack
Washington Co., Cambridge	29 July 2011	2/0	H. Romack
Washington Co., Cambridge	31 July 2011	2/1	H. Romack
Washington Co., Cambridge	1 Aug. 2011	0/1	H. Romack
Washington Co., Cambridge	4 Aug. 2011	1/0	H. Romack
Washington Co., Cambridge	6 Aug. 2011	0/1	H. Romack
Washington Co., Cambridge	12 Aug. 2011	0/2	H. Romack
Washington Co., Cambridge	13 Aug. 2011	0/1	H. Romack
Washington Co., Cambridge	15 Aug. 2011	0/2	H. Romack
Washington Co., Cambridge	18 Aug. 2011	1/0	H. Romack
MARYLAND			
[Montgomery Co.], Silver Spring	30 July 1970	0/1	D. H. Habeck
NORTH CAROLINA			
Haywood Co., The Purchase, Ferguson Cabin	15–17 Aug. 2003	0/3[a]	Gary Steck & Bruce Sutton
Haywood Co., The Purchase, Ferguson Cabin	29 Aug.-5 Sept. 2003	0/1	Gary Steck & Bruce Sutton
Haywood Co., The Purchase, Ferguson Cabin	12–15 Aug. 2003	0/1	Gary Steck & Bruce Sutton
Haywood Co., The Purchase, Ferguson Cabin	11–18 July 2003	0/1[b]	Gary Steck & Bruce Sutton
Haywood Co., The Purchase, The House	29 Jul.-3 Aug. 2003	0/1	Gary Steck & Bruce Sutton

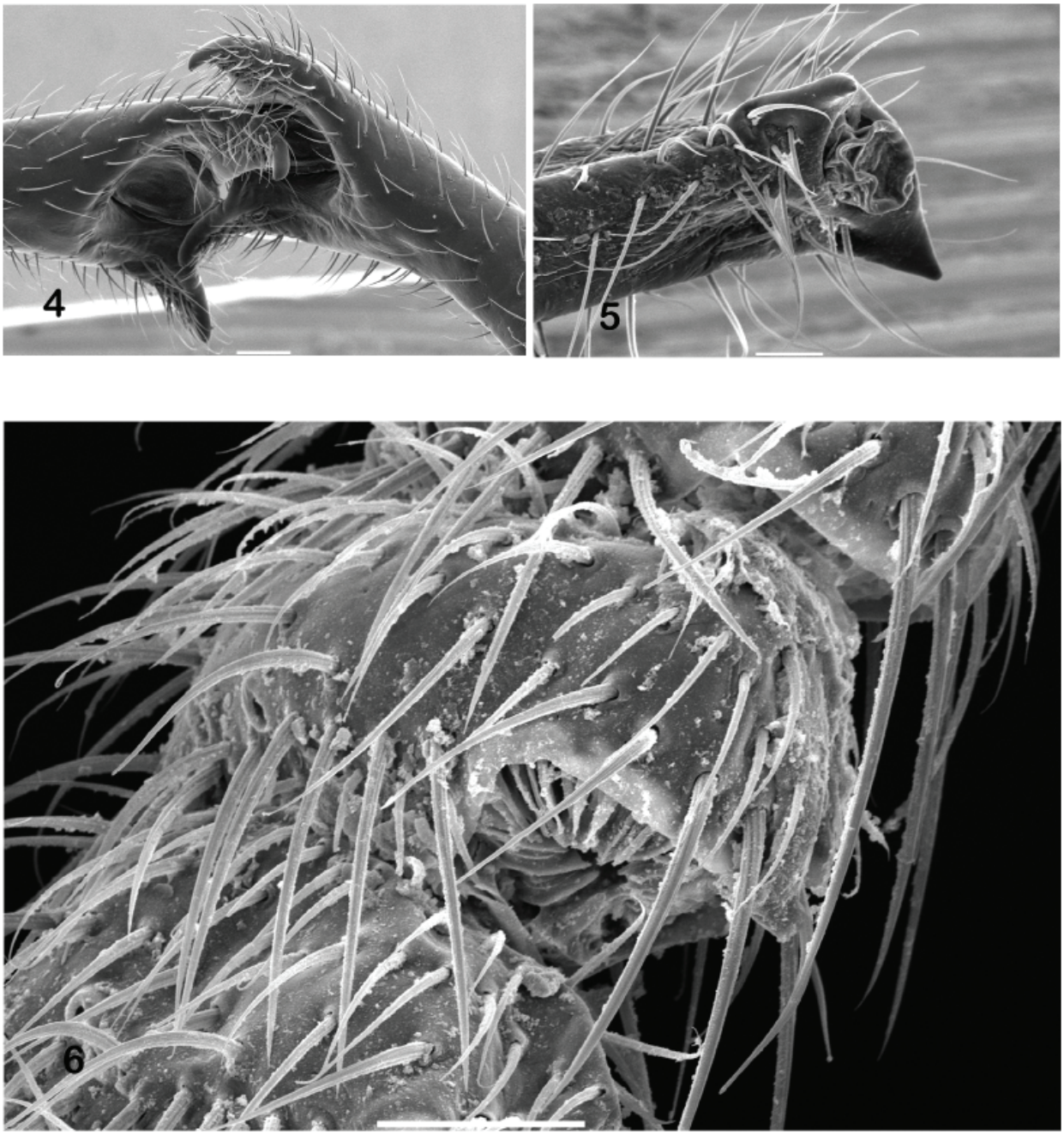
Haywood Co., The Purchase, The House	8–12 Aug. 2003	0/1	Gary Steck & Bruce Sutton
Haywood Co., The Purchase, The House	20–24 July 2004	1[b]/0	Gary Steck & Bruce Sutton
Haywood Co., Purchase Knob, unnamed spring	6 Aug. 2003	0/1	Gary Steck & Bruce Sutton
Haywood Co., Hwy 276, S turn on Edwards Cove Rd, Vance Enterprises, N°35.67361, W°83.08472	2 June 2007	1/0	Bruce A. Harrison
WEST VIRGINIA			
Hardy Co., 5 km NE Nathias, 38°55'N,78°49'W	2–16 July 2002	9[f]/12[f]	David R. Smith
VIRGINIA			
Clarke Co., University of Virginia, Blandy Exp. Station, 2 mi S Boyce	21 Aug. –8 Sept. 1993	6[f]/1[f]	David R. Smith
Essex Co., 1 mi SE Dunnsville, 37°2'N,76°48'W	9 Sept. –6 Oct. 1997	11/28	David R. Smith
Louisa Co., Kloke Farm, 4 mi S of Cuckoo	1–12 July 1988	1/4	David R. Smith
SOUTH CAROLINA			
Oconee Co.	26 Sept. 1967	0/1	P. J. Ely
FLORIDA			
Liberty Co., The Nature Conservancy, Apalachicola Bluffs Preserve, Travelers Tract	20 April–4 May 1996	2[c]/0	P. E. Skelley & P. W. Kovarik
Liberty Co., The Nature Conservancy, Apalachicola Bluffs Preserve, Travelers Tract	2–13 June 1996	0/1	P. W. Kovarik
Liberty Co., The Nature Conservancy, Apalachicola Bluffs [Preserve], Travelers Tract	10–24 Aug. 1996	0/1	P. W. Kovarik
Liberty Co., The Nature Conservancy, Apalachicola Bluffs [Preserve], Travelers Tract	7–21 Sept. 1996	0/1	P. W. Kovarik
Liberty Co., The Nature Conservancy, Apalachicola Bluffs [Preserve], Travelers Tract	16–30 Nov. 1996	1/0	P. W. Kovarik
Leon Co., Tall Timbers Research Station, Woodyard Hammock	4–17 May 1996	1/4	P. W. Kovarik
Leon Co., Tall Timbers Research Station, Woodyard Hammock	17–28 June 1996	2/5[d]	P. W. Kovarik & Zhang X.-c.
Leon Co., Tall Timbers Research Station, Woodyard Hammock	27 July–11 Aug. 1996	3/6	P. W. Kovarik & Zhang X.-c.
Leon Co., Tall Timbers Research Station, Woodyard Hammock	22 Sept.–5 Oct. 1996	1/0	P. W. Kovarik & Zhang X.-c.
Leon Co., Tall Timbers Research Station, Woodyard Hammock	20 Oct.–3 Nov. 1996	2/3	P. W. Kovarik & Zhang X.-c.
Leon Co., Tall Timbers Research Station, Woodyard Hammock	3–17 Nov. 1996	0/1	P. W. Kovarik & Zhang X.-c.
Leon Co., Tall Timbers Research Station, Gays Island	June–July 1996	4[d]/2	P. W. Kovarik & Zhang X.-c.
KENTUCKY			
"Lyon Co." [sic, Trigg Co.], TVA, Golden Pond	June 1964	2/0	——
"Lyon Co." [sic, Trigg Co.], TVA, Golden Pond	June 1964	0/1	——
"Lyon Co." [sic, Trigg Co.], Golden Pond	25 May–10 June 1964	0/1	Mac Tidwell
"Lyon Co." [sic, Trigg Co.], Golden Pond	Aug. 1964	1/0	Mac Tidwell
[Madison Co.], Cowbell Creek Area, Berea College Forest	22–29 July 2013	0/1	Chapman & Stedenfeld
[Madison Co.], Horse Cove Rd., Berea College Forest	22–29 July 2013	0/1	Chapman & Stedenfeld
TENNESSEE			
Blount Co., Cades Cove, Abrams Creek	7–9 July 2003	0/1	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Abrams Creek	20–23 July 2003	0/1[b]	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Abrams Creek	6–8 Aug. 2003	0/1	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Abrams Creek	27 June 2004	1[e]/0	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Mill Creek	8–10 June 2004	1/0	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Mill Creek	10–18 June 2004	0/1	V. Taylor & A. J. Mayor
Blount Co., Cades Cove, Wildcat Branch	17 July 2003	0/1	A. Nichter
Blount Co., Cades Cove, Wildcat Branch	3 June 2003	0/2[f]	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Wildcat Branch	22–28 June 2003	1[a]/0	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Wildcat Branch	17–23 July 2003	0/1	Gary Steck & Bruce Sutton
Blount Co., Cades Cove, Wildcat Branch	27 Jun-2 Jul 2004	0/1	V. Taylor & A. J. Mayor
Blount Co., Cades Cove, Wildcat Branch	20–23 July 2004	0/1	V. Taylor & A. J. Mayor
Sevier Co., Twin Creeks NRC	2-9 July 2004	0/1	V. Taylor & A. J. Mayor
Sevier Co., Twin Creeks NRC	10–17 Aug. 2004	0/1[b]	A. J. Mayor
Sevier Co., Twin Creeks NRC	10–17 Aug. 2004	0/1	A. J. Mayor
Sevier Co., Twin Creeks NRC	17–31 Aug. 2004	0/1	A. J. Mayor
Sevier Co., Old Sugarlands [Historic Site], N of Civilian Conserv. Corps Camp	27 June–15 July 2005	0/2[g]	A. J. Mayor
Warren Co., McMinnville, TSU NCRS	20–28 May 2002	0/1	J. B. Oliver
Warren Co., McMinnville, TSU NCRS	27 May–3 June 2002	1/0	J. B. Oliver
Warren Co., McMinnville, TSU NCRS	27 May–3 June 2002	1/0	J. B. Oliver

Warren Co., McMinnville, TSU NCRS	3–10 June 2002	1/1	N. N. Youssef
Warren Co., McMinnville, TSU NCRS	24–30 June 2002	0/1	N. N. Youssef
Warren Co., McMinnville, TSU NCRS	1–8 July 2002	0/1	J. B. Oliver
Warren Co., McMinnville, TSU NCRS	1–8 July 2002	1[b]/0	J. B. Oliver
Knox Co., Heiskell, East Bullrun Valley Dr	22 Sept. 2001	1/0	Z. Smith
MISSOURI			
Columbia Co.	7 Sept. 1967	1[h]/0	——
INDIANA			
Cass Co., Louisville Cement Quarry	4 Aug. 1980	0/1	W. Bicha
MICHIGAN			
Kalamazoo Co., T2S-R12W	13 June 1980	0/2	D. P. Cowan
Kalamazoo Co., T2S-R12W	10 July 1980	1/1	D. P. Cowan
Kalamazoo Co., T2S-R12W	12 July 1980	1/1	D. P. Cowan
Kalamazoo Co., T2S-R12W	13 July 1980	0/2	D. P. Cowan
Kalamazoo Co., T2S-R12W	15 July 1980	0/1	D. P. Cowan
Kalamazoo Co., T2S-R12W	21 July 1994	0/1	D. P. Cowan
Kalamazoo Co., T3S-R10W	28 Aug. 1980	1/0	D. P. Cowan
Kalamazoo Co., T3S-R10W	3 Sept. 1980	0/1	D. P. Cowan
Kalamazoo Co., T3S-R10W	11 Sept. 1980	0/1	D. P. Cowan
Kalamazoo Co.	16 July 1980	1/0	D. P. Cowan
Kalamazoo Co.	1 Aug. 1980	0/1	D. P. Cowan
WISCONSIN			
Lafayette Co., 3 mi N of Argyle	26 June–11 July 2001	0/1	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	26 June–11 July 2001	2[i]/0	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	11 July–5 Aug. 2001	0/3[j]	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	5–27 Aug. 2001	0/4	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	5–27 Aug. 2001	3[g]/0	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	27 Aug. –14 Sept. 2001	0/1	C. M. Brabant
Lafayette Co., 3 mi N of Argyle	27 Aug. –14 Sept. 2001	1/0	C. M. Brabant
Sauk Co., Hemlock Draw	7–13 July 1999	1/1	A. S. Ramsdale
OKLAHOMA			
Latimer Co.	Oct. 1992	1/0	Karl Stephen
Latimer Co.	Sept. 1991	1/0	Karl Stephen
Latimer Co.	Aug. 1990	0/2	Karl Stephen
Latimer Co.	Aug. 1991	0/1	Karl Stephen
TEXAS			
Sabine Co., 9 mi E of Hemphill “beech bottom”	5–17 June 1989	1/1	R. Anderson & E. Morris

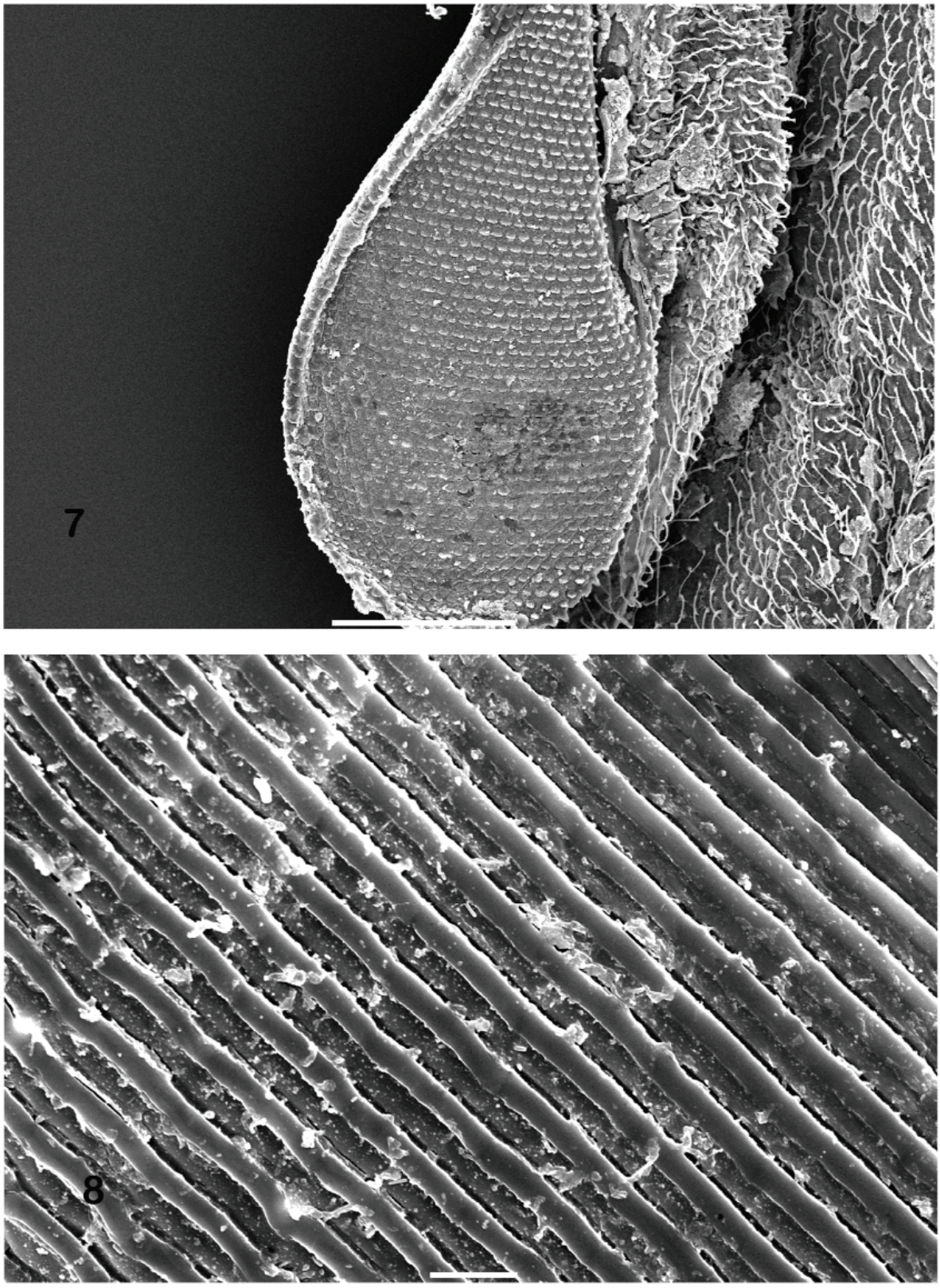
[a] One individual illustrated in Dunford et al. 2005, 2006; Dunford and Somma 2008.
[b] Gold-palladium sputter-coated for SEM and illustrated in Dunford et al. 2008.
[c] One individual gold-palladium sputter-coated for SEM and illustrated in this study; the other individual in vial of 95% ethanol.
[d] One individual illustrated Dunford et al. 2007.
[e] Gold-palladium sputter-coated for SEM and illustrated in this study.
[f] One individual in vial of 95% ethanol.
[g] One individual illustrated in Dunford et al. 2013 and this study, the other gold-palladium sputter-coated for SEM and illustrated in this study.
[h] Data previously published in Bowles and Sites 2013.
[i] One individual gold-palladium sputter-coated for SEM and illustrated in Dunford et al. 2005, 2006, 2008, 2013; Skelley et al. 2007.
[j] Two individuals gold-palladium sputter-coated for SEM.



Figures 1–3. Dorsal views of adult meropeids. **1)** Female *Merope tuber*, Cades Cove, Abrams Creek, Blount County, Tennessee, Great Smoky Mountains National Park, USA, collected 7–9 July 2003; wings unspread. Body length = 10.5 mm. Photograph by David Serrano. **2)** Female *Merope tuber*, Ferguson Cabin, The Purchase, Haywood County, North Carolina, Great Smoky Mountains National Park, USA, collected 15–17 August 2003; wings spread. Body length = 11 mm. Photograph by David Serrano. **3)** Male *Austromerope poultoni*, near Yornup, Western Australia, Australia, collected 11 November 2001; wings spread. Body length = 7.0 mm; basistyle length = 7.6 mm. Photograph by Louis A. Somma.



Figures 4–6. SEM images of male meropeids. **4)** *Merope tuber* Apalachicola Bluffs Preserve, Nature Conservancy, Liberty County, Florida, USA, collected 20 April–4 May 1996; anterodorsal view of distal tips of dististyles. Image originally shot at 130x; scale bar = 100 µm. **5)** *Austromerope poultoni* near Yornup, Western Australia, Australia, collected 11 November 2001; dorsocaudal view of distal tip of right dististyle. Image originally shot at 330x; scale bar = 50 µm. **6)** SEM image of undescribed sensila on flagellomeres of right antenna of *Austromerope poultoni*, near Yornup, Western Australia, Australia, collected 11 November 2001; dorsal view, lower left is distalmost. Image originally shot at 50x; scale bar = 500 µm. Photographs by Louis A. Somma.



Figures 7–8. SEM images of undescribed presumptive stridulatory or wing interlocking structures on male *Austromerope poultoni*, near Yornup, Western Australia, Australia, collected 11 November 2001. **7)** Jugal lobe of right wing; ventral view. Image originally shot at 250x; scale bar = 100 µm. **8)** Ridged surface of right metanotum; dorsal view. Image originally shot at 1200x; scale bar = 10 µm. Photographs by Louis A. Somma.