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AN ANNOTATED CHECKLIST OF THE DELPHACID PLANTHOPPERS (HEMIPTERA: DELPHACIDAE) OF FLORIDA WITH THE DESCRIPTION OF THREE NEW SPECIES AND THE NEW GENUS, *MERISTOPSIS*

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ABSTRACT

An annotated checklist of the 128 delphacid planthopper species of Florida, including host data, is presented based on combined specimen and literature records. The list includes 39 genera with 7 new combinations, 6 new synonymies, 3 new species and 16 new state records. The new genus *Meristopsis* (Delphacini) is here described with 2 new species, *M. rhamphis* and *M. melanosteptos*. *Muellerianella meadi* **sp. nov.** is also described.

Key Words: Delphacini, Auchenorrhyncha, Fulgoroidea, Fulgoromorpha

RESUMEN

Basado en muestras compiladas y archivos literario, una lista anotada de los 128 saltahojas delfácidas de Florida, incluyendo datos de la especie huésped, sea presentado. La lista incluye 39 géneros con seis combinaciones nuevas, siete sinonimias, tres especies nuevas y 16 registros estatales. Y por la primera vez aquí se describe el nuevo género de *Meristopsis* (Delphacini) con dos especies nuevas, *M. rhamphis* y *M. melanosteptos*. *Muellerianella meadi* **sp. nov.** también es descrito.

Wilson & McPherson (1980a) provide the only recent compilation of distribution data for delphacids of the United States. Among the conterminous United States, Florida has the most diverse delphacid fauna with over 100 species currently reported. The best surveyed state is Illinois with 72 species (Wilson 1980; Wilson & McPherson 1980a, b). Texas (52 species) and California (45) have fewer species, but are incompletely surveyed; Hawaii has 143 native and 11 introduced delphacids (Asche 1997, 2000). A full understanding of the delphacid fauna of Florida is of particular importance to assist in the recognition of accidentally introduced species, as has already happened in Florida with *Harmalia anacharsis* Fennah, 1969 (Wooten et al. 1993) and the sugarcane planthopper, *Perkinsiella saccharicida* Kirkaldy, 1903 (Sosa 1985; Emeljanov 1994; White et al. 1995). The delphacid planthoppers include a number of important agricultural pests not known from the United States such as the brown rice planthopper, *Nilaparvata lugens* (Stål, 1854), the small brown planthopper, *Laodelphax striatellus* (Fallen, 1826), and the white-backed planthopper, *Sogatella furcifera* (Horvath, 1899) (Wilson 2005), the last of which has been erroneously reported from the New World in the past (see Beamer 1952; Asche & Wilson 1990). Both *L.*

striatellus and *N. lugens* have been intercepted at US ports (unpublished USDA-APHIS-PPQ data). Other delphacid pests from Florida include the native species *Liburnia pseudoseminigra* (Muir & Giffard, 1924, here transferred to *Syndelphax* Fennah, 1963a), reported as a pest of St. Augustine grass (Cherry et al. 2006), and the corn planthopper, *Peregrinus maidis* (Ashmead, 1890).

Here, a checklist of delphacid species from Florida is compiled from the literature and specimens at the Florida State Collection of Arthropods (Gainesville, Florida), with new combinations and synonymies. Three species from Florida are described: a new species of *Muellerianella* Wagner, 1963, and 2 new species placed in the new genus *Meristopsis*. This new genus is a member of the Delphacini (Delphacinae), which is most easily defined by the presence of a suspensorium (derived from part of the phallobase and linking abdominal segment 10 to the phallus, see Asche 1985: 56, Fig. 10b; Yang & Chang 2000, e.g., Fig. 339d), the absence of a subanal process on segment 10, and the complete fusion of the phallobase and the aedeagus into a theca (Asche 1985, 1990).

Our objectives are to provide a substantially complete and nomenclaturally accurate checklist of Florida delphacid species and to describe the available new taxa from Florida.

MATERIALS AND METHODS

The checklist of Florida species was updated from Wilson & McPherson (1980a) by compiling more recent literature records and combining them with specimen records compiled from the Florida State collection of Arthropods (FSCA) by Susan Halbert & Kurt Ahlmark (personal communication). Author and year described is reported for all species in Table 1. Host records were compiled from observations and specimen labels by Halbert & Wilson, along with literature records. Scientific names, common names, and authorities of plants are provided based on the USDA PLANTS database (USDA, NRCS 2010). Reported synonymies are made by comparison of primary types, except as otherwise indicated.

For descriptive taxonomy, all available specimens of new taxa were examined. Morphological terminology follows Asche (1985), except that "segment 10" (e.g., DuBose 1960; Gonzon & Bartlett 2008; Bartlett 2010) is used instead of "anal tube", and "armature" (*sensu* Muir & Giffard 1924) is used to describe the aedeagal brace on the diaphragm. The heading "genitalia" should be understood to refer to the genitalic and post-genitalic segments of the male. For descriptive purposes, the parameres will be referred to as having a proximal "basal angle" and the pygofer having "ventral angles" (*sensu* Metcalf 1949), and "aedeagus" is used instead of the more morphologically accurate "theca" (formed when the phallobase forms a tubular fold surrounding the aedeagus and subsequently became fused with the aedeagus, a feature of all Delphacini) to be consistent with other delphacid taxonomic works. Wing venation follows Kukalova-Peck (1978) as interpreted by Dworakowska (1988). Wing venation is illustrated by the right wing shown dorsum up, head left. The generic description of *Muellerianella* was written following Booi (1981).

Male genitalia were dissected for identification and description as needed using standard taxonomic techniques (e.g., Wilson & McPherson 1980b; Bartlett & Deitz 2000). For dissection, the abdomen was removed and cleared for 12-24 h in 15% potassium hydroxide (KOH), rinsed in water and transferred to glycerol for observation and manipulation. Dissected parts were retained with glycerin in microvials pinned beneath the specimen for storage.

Measurements and photographs were taken using a Nikon SMZ-1500 Digital Imaging Workstation. All photos include a scale bar measuring 0.5 mm unless otherwise noted. Reported measurements are averages in millimeters (mm \pm standard deviation), with number measured (*n*) specified. Total body length was defined as the length from the tip of the vertex to the wing tip;

length without wings was also included and was defined as the tip of the vertex to the tip of the abdomen. Width was defined as the width across the mesothorax, including the tegulae. Pronotal and mesonotal length were measured along their respective median carinae. Frontal length was measured along the median carina from the vertex to the frontal clypeal suture; frontal width was measured across the lateral margins, between the antennae. Widths of antennal segments I and II were measured at the widest point. Some measurements are expressed in the descriptions as ratios of length to width (l:w). Length of calcar was measured from the articulation with the tibia to the apex of the calcar.

The distribution of new taxa was inferred from the available specimens. Specimen data are reported as seen on specimen labels. Label data for holotypes are quoted top to bottom with "/" indicating a new line and each label separated by "/".

Collections from which specimens of described taxa were examined are abbreviated as follows (acronyms following Arnett et al. 1993, except SWWC and VGC):

AMNH—American Museum of Natural History, Division of Invertebrate Zoology, New York, New York.

FSCA—Florida State Collection of Arthropods, Division of Plant Industry, Gainesville, Florida.

NCSU—North Carolina State University, Department of Entomology, Raleigh, North Carolina.

OSUC—C.A. Triplehorn Insect Collection, Department of Entomology, Ohio State University, Columbus, Ohio.

SEMC—University of Kansas Biodiversity Institute, Snow Entomological Museum, Division of Entomology, Lawrence, Kansas.

SWWC—Collection of S. W. Wilson at the University of Central Missouri, Warrensburg, Missouri.

UDCC—University of Delaware, Department of Entomology and Wildlife Ecology, Insect Reference Collection, Newark, Delaware.

USNM—National Museum of Natural History, The Smithsonian Institution, Washington, District of Columbia.

VGC—Vince Golia Collection, associated with Archbold Biological Station Collection (ABSC), Lake Placid, Florida.

RESULTS

The compiled list of Florida delphacids (Table 1) includes 128 species in 39 genera, including 16 new state records. Some endemics (e.g., *Rotundifronta lutea* Beamer, 1950) have not been reported as collected since originally described. We

TABLE 1. DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
Asiracinae			
<i>Copicerus irroratus</i> Swartz, 1802	Yes	Wilson & McPherson 1980a	
<i>Pentagramma longistylata</i> Penner, 1947	No	Wilson & McPherson 1980a	<i>Schoenoplectus americanus</i> (Pers.) Volkart ex Schinz & R. Keller (chairmaker's bulrush) (Hedrick-Zeller & Wilson 2010)
Kelisiinae			
<i>Kelisia curvata</i> Beamer, 1945	Yes	Wilson & McPherson 1980a	<i>Carex lurida</i> Wahlenb. (shallow sedge) (Bartlett & Wheeler 2007)
<i>Kelisia parvicurvata</i> Beamer, 1951	No	Wilson & McPherson 1980a, Bartlett & Wheeler 2007	
Stenocraninae			
<i>Stenocranus acutus</i> Beamer, 1946	Yes	Wilson & McPherson 1980a	
<i>Stenocranus dorsalis</i> (Fitch, 1851)	No	Van Duzee 1909	Possibly in error.
<i>Stenocranus lautus</i> Van Duzee, 1897	Yes	New record	<i>Carex lurida</i> Wahlenb., <i>Carex cumberlandensis</i> Naczi, Kral & Bryson (Cumberland sedge), <i>Cyperus esculentus</i> L. (yellow nutsedge), <i>Cyperus strigosus</i> L. (strawcolored flatsedge) (Calvert & Wilson 1986, Bartlett & Wheeler 2007)
<i>Stenocranus ramosus</i> Beamer, 1946	Yes	Wilson & McPherson 1980a	
Delphacinae: Saccharosydmini			
<i>Saccharosydne saccharivora</i> (Westwood, 1833) = <i>Megamelanus rufocinctus</i> Ball, 1905 new syn.	Yes	Wilson & McPherson 1980a	<i>Andropogon bicornis</i> L. (barbas de indio), <i>A. glomeratus</i> (Walter) Britton, Sterns & Poggenb. (bushy bluestem), <i>Saccharum officinarum</i> L. (sugarcane), <i>Sorghum bicolor</i> (L.) Moench (sorghum) (Wilson et al. 1994); Sugarcane also observed here
Delphacinae: Delphacini			
<i>Aethodelphax aetiocephalus</i> (Beamer, 1948)	Yes	Wilson & McPherson 1980a, Bartlett & Hamilton 2011	
<i>Aethodelphax alatus</i> (Beamer, 1948)	No	Wilson & McPherson 1980a, Bartlett & Hamilton 2011	
<i>Aethodelphax concavus</i> (Beamer, 1948)	No	Wilson & McPherson 1980a, Bartlett & Hamilton 2011	
<i>Aethodelphax sagittatus</i> (Beamer, 1947)	No	Bartlett & Hamilton 2011	
<i>Bakerella angulata</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	
<i>Bakerella bullata</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Bakerella minuta</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	
<i>Bakerella pediforma</i> Beamer, 1950	No	Wilson & McPherson 1980a	
<i>Bostaera balli</i> Penner, 1952	Yes	Wilson & McPherson 1980a	
<i>Bostaera nasuta</i> Ball, 1902	Yes	Penner 1952	
<i>Caenodelphax teapae</i> (Fowler, 1905)	Yes	Wilson & McPherson 1980a	<i>Paspalum notatum</i> Flueggé (bahiagrass)*
<i>Chionomus balboae</i> Muir & Giffard, 1924	Yes	New record	
<i>Chionomus havanae</i> Muir & Giffard, 1924	Yes	Wilson 1983	<i>Oryza sativa</i> L. (Rice)*
<i>Delphacodes aculeata</i> Beamer, 1948	No	Wilson & McPherson 1980a	
<i>Delphacodes acuministyla</i> Dozier, 1926	Yes	New record	
<i>Delphacodes adunca</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	
<i>Delphacodes andromeda</i> (Van Duzee, 1907)	Yes	Wilson & McPherson 1980a	<i>Ipomoea batatas</i> (L.) Lam. (sweetpotato)*; also reported <i>Manihot esculenta</i> Crantz (cassava) (Wilson et al. 1994)
<i>Delphacodes arcuata</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	
<i>Delphacodes ardentis</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	
<i>Delphacodes culta</i> (Van Duzee, 1907)	No	Wilson & McPherson 1980a	
<i>Delphacodes detecta</i> (Van Duzee, 1897)	Yes	Wilson & McPherson 1980a	<i>Spartina</i> spp. (cordgrass)*; also reported <i>Spartina patens</i> (Ait.) Muhl. (saltmeadow cordgrass) (Wilson et al. 1994)
<i>Delphacodes luteivitta</i> (Walker, 1851)	No	Bartlett 2010	
<i>Delphacodes nigrifacies</i> Muir, 1918 = <i>Delphacodes xerosa</i> Caldwell, 1951 new syn.	Yes	Calvert et al. 1987	<i>Chamaecrista fasciculata</i> (Michx.) Greene (partridge pea)*; <i>Paspalum notatum</i> Flueggé*; also reported <i>Paspalum notatum</i> Flugge, <i>Cynodon dactylon</i> Pers. (Bermudagrass), <i>Stenotaphrum secundatum</i> Kuntze (St. Augustine grass) (Calvert et al. 1987)
<i>Delphacodes nigripennata</i> Beamer, 1946	No	Wilson & McPherson 1980a	
<i>Delphacodes penedetecta</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	<i>Spartina alterniflora</i> Loisel. (smooth cordgrass) (Ferrenberg & Denno 2003)
<i>Delphacodes penelutea</i> Beamer, 1948	No	Wilson & McPherson 1980a	
<i>Delphacodes penepuella</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Delphacodes puella</i> (Van Duzee, 1897)	Yes	Wilson & McPherson 1980a	<i>Secale cereale</i> L. (cereal rye)*; also reported <i>Galinsoga parviflora</i> Cav. (gallant soldier), <i>Panicum capillare</i> L. (witchgrass) (Wilson et al. 1994)
<i>Delphacodes quadridentis</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	<i>Phaseolus vulgaris</i> L. (kidney bean)*
<i>Delphacodes quadrispinosa</i> Muir & Giffard, 1924	Yes	New record	
<i>Delphacodes recurvata</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	
<i>Delphacodes seminigra</i> (Stål, 1854)	No	Wilson & McPherson 1980a	
<i>Delphacodes sucinea</i> Beamer, 1948	Yes	Wilson & McPherson 1980a, Wilson & Wheeler 2010	& <i>Eragrostis curvula</i> (Schrad.) Nees (weeping lovegrass) (Wilson & Wheeler 2010)
<i>Delphacodes trimaculata</i> Beamer, 1948	No	Wilson & Wheeler 2010	<i>Eragrostis curvula</i> (Schrad.) Nees (Wilson & Wheeler 2010)
<i>Delphacodes truncata</i> Beamer, 1948	Yes	Wilson & McPherson 1980a	
<i>Delphacodes turgida</i> Beamer, 1948	No	Wilson & McPherson 1980a	
<i>Delphacodes vaccina</i> Caldwell, 1951	Yes	New record	
<i>Euides fasciatella</i> (Osborn, 1935) = <i>Delphacodes cornuta</i> Beamer, 1948 new syn.	No	Wilson & McPherson 1980a (as <i>D. cornuta</i>)	
<i>Euides guaduae</i> (Muir, 1926)	Yes	New record	
<i>Harmalia anacharsis</i> Fennah, 1969	No	Wooten et al. 1993	<i>Guadua</i> sp. (Wilson et al. 1994)
<i>Isodelphax basivittata</i> Van Duzee, 1909	Yes	Wilson & McPherson 1980a	Introduced; FSCA specimen from India (no FSCA FL specimens); <i>Echinodorus paniculatus</i> Micheli ("Amazon Sword Plant") (Wooten et al. 1993); continued presence of this species not confirmed
<i>Kelisoidea versa</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	<i>Ludwigia grandiflora</i> (Michx.) Greuter & Burdet ssp. <i>hexapetala</i> (Hook. & Arn.) G.L. Nesom & Kartesz (Wilson, unpubl. data)
<i>Keyflana hasta</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	
<i>Liburniella ornata</i> (Stål, 1914)	Yes	Wilson & McPherson 1980a	<i>Rhynchospora globularis</i> (Chapm.) Small (globe beaksedge) (Wilson et al. 1994); <i>Carex pensylvanica</i> Lam.
<i>Macrotomella carinata</i> Van Duzee, 1907	Yes	Wilson & McPherson 1980a	(Pennsylvania sedge) (Wilson, unpubl. data)
<i>Megamelus aestus</i> Metcalf, 1923	Yes	New record	<i>Stenotaphrum secundatum</i> (Walter) Kuntze (St. Augustine grass)*, <i>Phyla nodiflora</i> (L.) Greene (hairy fogfruit)*

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Megamelus davisi</i> Van Duzee, 1897	Yes	Wilson & McPherson 1980a	<i>Alternanthera philoxeroides</i> (Mart.) Griseb. (alligatorweed)*; also reported <i>Nuphar lutea</i> (L.) Sm. (yellow pond-lily) (as <i>Nuphar advena</i> (Aiton)) (Wilson & McPherson 1981)
<i>Megamelus gracilis</i> Beamer, 1955	Yes	Wilson & McPherson 1980a	
<i>Megamelus hamatus</i> Beamer, 1955	Yes	New record	
<i>Megamelus lobatus</i> Beamer, 1955	Yes	Wilson & McPherson 1980a	
<i>Megamelus paleatus</i> (Van Duzee, 1897)	Yes	Wilson & McPherson 1980a	<i>Spartina alterniflora</i> Loisel. (Wilson, unpubl. data) <i>Jatropha integerrima</i> Jacq. (peregrina)*; <i>Eichhornia crassipes</i> (Mart.) Solms (common water hyacinth)*; <i>Sagittaria latifolia</i> Willd. (broadleaf arrowhead)*; <i>Kalmia</i> sp. (laurel; doubtful record)*; <i>Paspalum</i> sp. (crowngrass)*; also reported <i>Pontederia cordata</i> L. (pickerelweed) (Wilson & McPherson 1979) <i>Nymphaea</i> sp. (waterlily)
<i>Megamelus toddi</i> Beamer, 1955	Yes	New record	
<i>Megamelus trifidus</i> Beamer, 1955	Yes	Wilson & McPherson 1980a	
<i>Meristopsis rhamphis</i> sp. nov.	Yes	New record	
<i>Meristopsis melanosteptos</i> sp. nov.	No	New record	
<i>Metadelphax propinqua</i> (Fieber, 1866)	Yes	Gonzon & Bartlett 2008	<i>Echinodorus</i> sp. (burhead)*; <i>Stenotaphrum secundatum</i> (Walter) Kuntze*; <i>Paspalum</i> sp.*; also reported <i>Chloris gayana</i> Kunth (Rhodes grass) (Meagher et al. 1993); <i>Cynodon dactylon</i> Pers. (Wilson et al. 1973; Wilson et al. 1994); <i>Eragrostis curvula</i> (Schrad.) Nees (Wilson & Wheeler 2010); see also Gonzon & Bartlett (2008)
<i>Metadelphax wetmorei</i> Muir & Giffard, 1924	Yes	Gonzon & Bartlett 2008	
<i>Muellerianella laminalis</i> (Van Duzee, 1897)	Yes	Wilson & McPherson 1980a	<i>Leersia hexandra</i> Sw. (southern cutgrass) (Wilson et al. 1994)
<i>Muellerianella mead</i> , sp. nov.	Yes	New record	

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen		Literature records for Florida distribution		Comments/host records
	Yes	No	New record		
<i>Muirodelphax arvensis</i> (Fitch, 1851) (as <i>Delphacodes campestris</i> (Van Duzee, 1897)	Yes				<i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen (para grass)*; also reported <i>Achnatherum coronatum</i> (Thurb.) Barkworth (giant ricegrass), <i>Agropyron cristatum</i> (L.) Gaertn. (crested wheatgrass), <i>Agrostis</i> sp., <i>Calamovilfa longifolia</i> (Hook.) Scribn. (prairie sandreed), <i>Carex scoparia</i> Schkuhr ex Willdn. (broom sedge), <i>Festuca</i> sp., <i>Poa pratensis</i> L. (Kentucky bluegrass) (Wilson et al. 1994); <i>Deschampsia flexuosa</i> (L.) Trin. (hairgrass) (Wheeler & Bartlett 2006); <i>Eragrostis curvula</i> (Schrad.) Nees (Wilson & Wheeler 2010)
<i>Muirodelphax parvulus</i> (Ball, 1902) (as <i>Delphacodes rotundata</i> (Crawford, 1914))	No		DuBose 1960		<i>Schizachyrium scoparium</i> (Michx.) Nash (Wilson et al., 1994); <i>Eragrostis curvula</i> (Schrad.) Nees (Wilson & Wheeler 2010)
<i>Neomegamelanus elongatus</i> (Ball, 1905)	Yes		Wilson & McPherson 1980a		<i>Spartina bakeri</i> Merr. (sand cordgrass)*; <i>Uniola paniculata</i> L. (sea oats)*; also reported <i>Spartina patens</i> (Ait.) Muhl. (Denno 1978, Cummins et al. 1988)
<i>Neomegamelanus penilautus</i> McDermott, 1952	Yes		Wilson & McPherson 1980a		<i>Spartina spartinae</i> (Trin.) Merr. ex Hitchc. (gulf cordgrass) (Denno 1978)
<i>Neomegamelanus spartini</i> (Osborn, 1905) = <i>Neomegamelanus dorsalis</i> (Metcalf, 1923) new syn.	Yes		Wilson & McPherson 1980a		<i>Spartina</i> spp.*; also reported (as <i>N. dorsalis</i>) <i>Spartina patens</i> (Ait.) Muhl. (Denno 1980); <i>Distichlis spicata</i> (L.) Greene (saltgrass) (Tallamy & Denno 1979)
<i>Nilaparvata caldwelli</i> Metcalf, 1955	No		Bartlett 2007		
<i>Nilaparvata serrata</i> Caldwell, 1951	Yes		Bartlett 2007		
<i>Nilaparvata wolcottii</i> Muir & Giffard, 1924	Yes		Bartlett 2007		
<i>Nothodelphax slossonae</i> (Ball, 1903) = <i>Liburnia breviceps</i> (Dozier, 1922)	Yes		Wilson & McPherson 1980a		<i>Eleocharis quadrangulata</i> (Michx.) Roem. & Schult. (squarestem spikerush) (Bartlett 2010)
<i>Pareuidella avicephaliiforma</i> Beamer, 1951	Yes		Wilson & McPherson 1980a		
<i>Pareuidella spatulata</i> Beamer, 1951	Yes		Wilson & McPherson 1980a		
<i>Pareuidella triloba</i> (Metcalf, 1923) new comb. = <i>Euides triloba</i> (Metcalf, 1923) = <i>Euides vanduzeei</i> (Muir & Giffard, 1924) new syn.	Yes		Wilson & McPherson 1980a		<i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen (para grass)*
<i>Pareuidella weedi</i> (Van Duzee, 1897) new comb. = <i>Euides weedi</i> (Van Duzee, 1897)	Yes		Wilson & McPherson 1980a		

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Penepissonotus bicolor</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	<i>Schoenoplectus americanus</i> (Pers.) Volkart ex Schinz & R. Keller (Bartlett, unpubl. data)
<i>Peregrinus maidis</i> (Ashmead, 1890)	Yes	Wilson & McPherson 1980a	<i>Zea mays</i> L. (corn), <i>Sorghum halepense</i> (L.) Pers. (Wilson et al. 1994); see also Tsai (1996)
<i>Perkinsiella saccharicida</i> Kirkaldy, 1903	Yes	Nguyen et al., 1984; Sosa 1985, Emeljanov 1994, White et al. 1995	<i>Saccharum officinarum</i> L.; introduced (discovered in Canal Point, Palm Beach Co., 4 Aug 1982)
<i>Pissonotus agrestis</i> Morgan & Beamer, 1949	No	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus albivultus</i> Morgan & Beamer, 1949	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus albovenosus</i> Osborn, 1935	Yes	Wilson & McPherson 1980a	<i>Lygodesmia</i> sp. (Wilson et al. 1994); <i>Iva frutescens</i> L. (Jesus's bark), <i>Lygodesmia grandiflora</i> (Nutt.) Torr. & A. Gray (largeflower skeletonplant); <i>Borrichia frutescens</i> (L.) DC. (bushy seaside tansy) (Bartlett & Deitz 2000)
<i>Pissonotus binotatus</i> Spooner, 1912	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	<i>Eupatorium capillifolium</i> (Lam.) Small (dogfenel)*; also reported <i>Conyza canadensis</i> (L.) Cronquist var. <i>pusilla</i> (Nutt.) Cronquist (Canadian horseweed), <i>Eupatorium</i> sp. (Bartlett & Deitz 2000)
<i>Pissonotus brunneus</i> Van Duzee, 1897	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus delicatus</i> Van Duzee, 1897	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus dentatus</i> Morgan & Beamer, 1949	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	<i>Heterotheca subaxillaris</i> (Lam.) Britton & Rusby (camphorweed)*; also reported <i>Grindelia</i> sp., <i>Grindelia papposa</i> G.L. Nesom & Suh (Spanish gold; as <i>Haplopappus ciliatus</i> (Nutt.) DC.) (Wilson et al. 1994, Bartlett & Deitz 2000)
<i>Pissonotus flabellatus</i> Ball, 1903	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus guttatus</i> Spooner, 1912	Yes	Bartlett & Deitz 2000	
<i>Pissonotus marginatus</i> Van Duzee, 1897	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus merides</i> Morgan & Beamer, 1949	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus nigriculus</i> Morgan & Beamer, 1949	No	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus nitens</i> Van Duzee, 1909	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Pissonotus paludosus</i> Morgan & Beamer, 1949	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Pissonotus piceus</i> (Van Duzee, 1894)	Yes	Bartlett & Deitz 2000	<i>Ludwigia grandiflora</i> (Michx.) Greuter & Burdet (large-flower primrose-willow)*; <i>Liquidambar styraciflua</i> L. (sweetgum; unlikely host)*; also reported <i>Persicaria hydropiperoides</i> Michx. (swamp smartweed) (Wilson et al. 1994); <i>Ludwigia peploides</i> (Kunth) P.H. Raven (floating primrose-willow) (Bartlett & Deitz 2000)
<i>Pissonotus quadripustulatus</i> (Van Duzee, 1909)	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	<i>Borreria frutescens</i> (L.) DC. (bushy seaside tansy) (Bartlett & Deitz 2000)
<i>Pissonotus spooneri</i> Morgan & Beamer, 1949	No	Bartlett & Deitz 2000	
<i>Pissonotus tessellatus</i> (Ball, 1926)	Yes	Wilson & McPherson 1980a, Bartlett & Deitz 2000	
<i>Prokelisia crocea</i> (Van Duzee, 1897)	Yes	Wilson 1982	<i>Spartina pectinata</i> Bosc ex Link (prairie cordgrass) (Holder & Wilson 1992)
<i>Prokelisia dolus</i> Wilson, 1982	Yes	Wilson 1982	<i>Spartina alterniflora</i> Loisel. (Wilson et al. 1994)
<i>Prokelisia marginata</i> Van Duzee, 1897	Yes	Wilson & McPherson 1980a, Wilson 1982	<i>Spartina</i> spp.*; also reported <i>Spartina alterniflora</i> Loisel. (Wilson et al. 1994)
<i>Prokelisia salina</i> (Ball, 1902)	Yes	Wilson 1982	<i>Uniola paniculata</i> L.*; <i>Bouteloua dactyloides</i> (Nutt.) J.T. Columbus (buffalograss), <i>Calamovilfa longifolia</i> (Hook.) Scribn., <i>Distichlis stricta</i> (L.) Greene (Wilson 1982, Wilson et al., 1994); <i>Sporobolus wrightii</i> Munro ex Scribn. (big sacaton), <i>Eragrostis curvula</i> (Schrad.) Nees (Wilson & Wheeler 2010)
<i>Pygospina spinata</i> Caldwell, 1951	Yes	Doud et al. 1997	<i>Washingtonia robusta</i> H. Wendl. (Washington fan palm)*; also reported <i>Typha domingensis</i> (Pers.) Steudel (southern cattail) (Doud et al. 1997)
<i>Rotundifrons lutea</i> Beamer, 1950	Yes	Wilson & McPherson 1980a	
<i>Sogatella kolophon</i> (Kirkaldy, 1907)	Yes	Wilson & McPherson 1980a	<i>Paspalum notatum</i> Flueggé*; also reported <i>Panicum repens</i> L. (torpedo grass) (Ballou et al. 1987)
<i>Sogatella molina</i> (Fennah, 1963b)	Yes	Asche & Wilson 1990	<i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen* (also reported by Wilson et al. 1994); <i>Paspalum notatum</i> Flueggé*; <i>Origanum vulgare</i> L. (oregano)*; <i>Ipomoea alba</i> L. (tropical white morning-glory)*
<i>Stobaera affinis</i> Van Duzee, 1909	Yes	Wilson & McPherson 1980a	<i>Ambrosia artemisiifolia</i> L. (annual ragweed)*

TABLE 1. (CONTINUED) DELPHACID SPECIES OBSERVED OR REPORTED FROM FLORIDA AND OBSERVED HOSTS (SCIENTIFIC AND COMMON NAMES OF PLANTS FROM USDA PLANTS DATABASE (USDA, NRCS, 2010). NEW HOST RECORDS FROM LABEL INFORMATION OR BY OBSERVATION INDICATED BY AN ASTERISK (*). HOSTS OF MANY PLANTHOPPERS COMPILED BY WILSON ET AL. (1994). COMMON NAME OF PLANTS REPORTED ONLY FOR FIRST INCIDENCE.

Taxon	FSCA with Florida specimen	Literature records for Florida distribution	Comments/host records
<i>Stobaera concinna</i> (Stål, 1859)	Yes	Wilson & McPherson 1980a	<i>Ambrosia artemisiifolia</i> L.*; also reported <i>Parthenium hysterophorus</i> L. (Santa Maria feverfew) (Wilson et al. 1994)
<i>Stobaera pallida</i> Osborn, 1905	Yes	Wilson & McPherson 1980a	<i>Baccharis halimifolia</i> L.* (also reported by Wilson et al. 1994)
<i>Stobaera tricarinata</i> (Say, 1825)	Yes	Wilson & McPherson 1980a	<i>Ambrosia</i> spp., <i>Helianthus argophyllus</i> Torr. & A. Gray (silverleaf sunflower) (Wilson et al. 1994)
<i>Syndelphax alexanderi</i> (Metcalf, 1923) new comb. = <i>Delphacodes alexanderi</i> (Metcalf, 1923), = <i>Delphacodes uhleri</i> Muir & Giffard, 1924 New syn.	Yes	Wilson & McPherson 1980a	
<i>Syndelphax floridae</i> (Muir & Giffard, 1924) new comb.	Yes	Wilson & McPherson 1980a	
= <i>Delphacodes floridae</i> Muir & Giffard, 1924			
<i>Syndelphax fulvidorsum</i> (Metcalf, 1923) new comb.	Yes	Wilson & McPherson 1980a	Grasses
= <i>Delphacodes fulvidorsum</i> (Metcalf, 1923)			
<i>Syndelphax humilis</i> (Van Duzee, 1907)	Yes	Wilson & McPherson 1980a	<i>Oryza sativa</i> L.
<i>Syndelphax pseudoseminiger</i> (Muir & Giffard, 1924) new comb. = <i>Liburnia pseudoseminigra</i> (Muir & Giffard, 1924)	Yes	Wilson & McPherson 1980a	<i>Stenotaphrum secundatum</i> (Walter) Kuntze (St. Augustine grass)* (also reported by Cherry et al. 2006).
<i>Tagosodes albalineosus</i> (Fowler, 1905)	Yes	New record	<i>Phoenix canariensis</i> hort. ex Chabaud (Canary Island date palm)*; <i>Magnolia grandiflora</i> L. (southern magnolia, unlikely host)* Specimen at UDCC
<i>Tagosodes approximatus</i> (Crawford, 1914)	No	New record	
<i>Tagosodes cubanus</i> (Crawford, 1914)	Yes	New record	
<i>Tagosodes orizicolus</i> (Muir, 1926)	Yes	New record	<i>Oryza sativa</i> L., <i>Echinochloa</i> sp. <i>Cocos nucifera</i> L. (coconut palm) (Wilson et al. 1994)
<i>Toya boxi</i> (Muir, 1926)	No	Gonzon & Bartlett 2008	<i>Oryza sativa</i> L., <i>Echinochloa</i> sp. (Wilson et al. 1994)
<i>Toya goliae</i> Gonzon & Bartlett, 2008	Yes	Gonzon & Bartlett 2008	
<i>Toya idonea</i> (Beamer, 1947)	Yes	Wilson & McPherson 1980a, Gonzon & Bartlett 2008	
<i>Toya nigra</i> (Crawford, 1914)	Yes	Gonzon & Bartlett 2008	
<i>Tumidagena terminalis</i> (Metcalf, 1923)	Yes	Wilson & McPherson 1980a	

found only a single *Kelisoidea versa* Beamer, 1950 specimen (labeled Monroe Co. Little Torch Ter., 5 May 1975) collected since the species was originally described. A number of new Florida records, including *Chionomus balboae* (Muir & Giffard, 1924), *Delphacodes vaccina* Caldwell, 1951, *Euides guadauae* (Muir, 1926), *Tagosodes approximatus* (Crawford, 1914), *T. cubanus* (Crawford, 1914), and *T. orizicolus* (Muir, 1926) are primarily Neotropical species which have been observed in southern Florida; such species probably are adventive. A few additional widespread Neotropical species might be expected in Florida.

Taxonomic Changes

Several new combinations are made through transfer of species from *Delphacodes* Fieber, 1866 or *Liburnia* Stål, 1866. Both *Delphacodes* and *Liburnia* are polyphyletic genera with complex taxonomic histories. Recently, the type species of *Liburnia* was established to be *Embolophora monoceros* Stål, 1855 (Bartlett 2008; ICZN 2010), an African species in the Stenocraninae; a decision which unequivocally placed all New World *Liburnia* into *incertae sedis*. *Delphacodes s.l.* is a polyphyletic genus (Urban et al. 2010) with about 164 species worldwide; however *Delphacodes s.s.* is a western Palearctic genus of 10 species (Asche & Remane 1983). The generic placement of

all New World *Delphacodes s.l.* requires reassessment.

Of 6 new combinations, 5 species are transferred from *Delphacodes* or *Liburnia* into *Syndelphax* Fennah, 1963a. The features of *Syndelphax* (type species *Delphax matanitu* Kirkaldy, 1907, a junior synonym of *Delphax disonymos* Kirkaldy, 1907) were recently discussed by Gonzon & Bartlett (2008) in contrast to the closely related genera *Toya* Distant, 1906, and *Metadelphax* Wagner, 1963 (see Urban et al. 2010). We treat the generic name *Syndelphax* as masculine following the decision of ICZN (1961) concerning *Delphax* Fabricius, 1798. Specimens of *Syndelphax* have conspicuous facial carinae and may be brachypterous (often with dark tegmina contrasting with a yellow or stramineous body) or macropterous (with clear wings and a stramineous body). The male pygofer has a conspicuously expanded dorsocaudal angle of the pygofer, which is not medially inflected (as in *Toya* and *Metadelphax*), and the genital diaphragm has armature which is much taller than wide and tends to be narrowly spoon-shaped. Here we transfer 4 Florida species from *Delphacodes* into new combinations in *Syndelphax* as follows (Table 2): *Syndelphax alexanderi* (Metcalf, 1923) **new comb.**, *Syndelphax floridiae* (Muir & Giffard, 1924) **new comb.** (including *Syndelphax floridiae puertoricensis* (Caldwell, 1951)

TABLE 2. NEW COMBINATIONS AND SYNONYMIES.

Species transfers

Old combination	New combination
<i>Delphacodes alexanderi</i> (Metcalf, 1923)	<i>Syndelphax alexanderi</i> (Metcalf, 1923)
<i>Delphacodes floridiae</i> (Muir & Giffard, 1924)	<i>Syndelphax floridiae</i> (Muir & Giffard, 1924)
<i>Delphacodes floridiae puertoricensis</i> (Crawford, 1951)	<i>Syndelphax floridiae puertoricensis</i> (Crawford, 1951)
<i>Delphacodes fulvidorsum</i> (Metcalf, 1923)	<i>Syndelphax fulvidorsum</i> (Metcalf, 1923)
<i>Delphacodes humilis</i> (Van Duzee, 1907)	<i>Syndelphax humilis</i> (Van Duzee, 1907)
<i>Liburnia pseudoseminigra</i> (Muir & Giffard, 1924)	<i>Syndelphax pseudoseminiger</i> (Muir & Giffard, 1924)
<i>Delphacodes nigripennis</i> (Crawford, 1914)	<i>Syndelphax nigripennis</i> (Crawford, 1914)
<i>Euides weedi</i> (Van Duzee, 1897)	<i>Pareuidella weedi</i>
<i>Euides triloba</i> (Metcalf, 1923)	<i>Pareuidella triloba</i> (Metcalf, 1923)
<i>Euides magnistyla</i> (Crawford, 1914)	<i>Pareuidella magnistyla</i> (Crawford, 1914)

Species synonyms

Junior synonym	Senior synonym
<i>Euides vanduzeei</i> (Muir & Giffard, 1924)	<i>Pareuidella triloba</i> (Metcalf, 1923)
<i>Delphacodes uhleri</i> Muir & Giffard, 1924	<i>Syndelphax alexanderi</i> (Metcalf, 1923)
<i>Delphacodes cornuta</i> Beamer, 1948	<i>Euides fasciatella</i> (Osborn, 1935)
<i>Delphacodes xerosa</i> Caldwell, 1951	<i>Delphacodes nigrifacies</i> Muir, 1918
<i>Liburnia breviceps</i> (Dozier, 1922)	<i>Nothodelphax slossonae</i> (Ball, 1903)
<i>Megamelanus rufivittatus</i> Ball, 1905	<i>Saccharosydne saccharivora</i> (Westwood, 1833)
<i>Neomegamelanus dorsalis</i> (Metcalf, 1923)	<i>Neomegamelanus spartini</i> (Osborn, 1905)

New taxa

Meristopsis **new genus**

Meristopsis rhamphis **sp. nov.**

Meristopsis melanosteptos **sp. nov.**

Muellerianella meadi **sp. nov.**

new comb.), *Syndelphax fulvidorsum* (Metcalf, 1923) **new comb.**, *Syndelphax humilis* (Van Duzee, 1907) **new comb.**; and 1 species from *Liburnia*: *Syndelphax pseudoseminiger* (Muir & Giffard, 1924) **new comb.** We also transfer *Delphacodes nigripennis* (Crawford, 1914) known from localities in the Caribbean and Central America to *Syndelphax nigripennis*, **new comb.** In addition, we synonymize *Delphacodes uhleri* Muir & Giffard, 1924 with *Syndelphax alexanderi*. The type specimen of *D. uhleri* is a macroppterous male at the USNM.

Additional new combinations are the transfer of 3 *Euides* species to *Pareuidella* Beamer, 1951. The genus *Euides* Fieber, 1866 (type *Delphax basilinea* Germar 1821), is comprised of 25 species, of which 17 are in the New World. The name *Euides* is evidently formed from “Eu-“, a Greek prefix meaning good, plus “eidos” from Greek meaning form or image. *Euides* has been consistently treated as feminine by Fieber (1866) and subsequent authors. The monophyly of *Euides* has not been established, either with respect to the Old and New World species, or the New World species alone. Phylogenetic analysis of the Delphacini consistently placed *Euides speciosa* (Boheman, 1830) near, but not monophyletic with, 4 New World *Euides* (Urban et al. 2010; *Pareuidella* was not included in this analysis). *Euides basilinea* and other European species have in common unbranched parameres, a simple genital diaphragm, and strongly asymmetrical processes on segment 10 (and apparently a medioventral tooth on the opening of the pygofer). Most New World *Euides* have branched parameres, elaborate strongly caudally projecting genital diaphragms, and processes on segment 10 symmetrical or strongly reduced.

Pareuidella Beamer, 1951 (type *Pareuidella spatulata* Beamer, 1951), was described to include 2 species from the southeastern USA (including Florida), which resemble *Euides* but with “crown about one-third longer than basal width, narrowing towards apex and diaphragm with an avicephaliform brace just ventrad of aedeagal shaft” (Beamer 1951: 198). *Pareuidella* shares with *Euides magnistyla* (Crawford, 1914), *Euides triloba* (Metcalf, 1923), and *Euides weedi* (Van Duzee, 1897) general habitus, branched parameres, avicephaliform genital diaphragm and symmetrical processes on segment 10, and so these species are transferred here to *Pareuidella*: *Pareuidella magnistyla* **new comb.**, *P. triloba* **new comb.**, and *P. weedi* **new comb.** (Table 2). In addition *Euides vanduzeei* (Muir & Giffard, 1924) **new syn.** is synonymized here with *P. triloba*.

The remaining *Euides* reported here from Florida, *E. fasciatella* (Osborn, 1935) and *E. guadae* (Muir, 1926) do not share the avicephaliform genital diaphragm and branched parameres with *Pareuidella*. These 2 species probably do not

belong in *Euides* s.s., but their generic position would probably be best revealed in the context of a review of allied Neotropical taxa. *Delphacodes cornuta* Beamer, 1948 **new syn.** described from Florida, is here considered a synonym of *Euides fasciatella*. The primary type of *Euides fasciatella* is a female at OSUC. The primary type of *Delphacodes cornuta* is a male at SEMC (synonymy based on paratypes of *D. cornuta*).

Additional synonymies are as follows. *Megamelanus rufivittatus* Ball, 1905 **new syn.** is a junior synonym of *Saccharosydne saccharivora* (Westwood, 1833). The type specimen of *Megamelanus rufivittatus* is at the USNM. *Delphacodes xerosa* Caldwell, 1951 **new syn.** is a junior synonym of *D. nigrifacies* Muir, 1918. The type of *Delphacodes xerosa* at the USNM is badly damaged, consisting of the dissected genitalia in a microvial with only the hind legs remaining on the point, and as noted by Bartlett (2007: 57), the body may be glued to the point of the type specimen of *Nilaparvata gerhardi* (Metcalf, 1923). The type specimen of *Delphacodes nigrifacies* is a brachypterous male at the AMNH. *Liburnia breviceps* (Dozier, 1922) is reaffirmed as a junior synonym of *Nothodelphax slossonae* (Ball, 1903). The synonymy was suggested by Metcalf (1923: 148), and later made by Beamer (1946: 87), but *Liburnia breviceps* has been treated as valid since that time (e.g., Wilson & McPherson 1980a). The type specimen of *Liburnia breviceps* is probably at OSUC, but could not be found; our synonymy is based on a paratype male from the type locality from NCSU. The type specimen of *Nothodelphax slossonae* is at the USNM.

Based on examination of descriptions and detailed illustrations of male genitalia it is apparent that *Neomegamelanus dorsalis* (Metcalf, 1923) **new syn.** is a synonym of *N. spartini* (Osborn, 1905). *Neomegamelanus spartini* was described by Osborn (1905) (as *Megamelanus spartini*) from specimens collected on *Spartina patens* in New York and Maryland. McDermott (1952) stated that the types of *N. spartini* had been lost. Metcalf (1923) described *N. dorsalis* from specimens collected in New Jersey and Mississippi. McDermott (1952) apparently examined these specimens and a number of others from Florida, Louisiana, and Maryland and redescribed and illustrated *N. dorsalis*. Comparison of specimens of all *Neomegamelanus* species - *N. dorsalis*, *N. elongatus* (Ball, 1905), *N. lautus* (Metcalf, 1923), and *N. penilautus* McDermott, 1952 - with Osborn's (1905) description resulted in only 1 species, *N. dorsalis*, corresponding closely to *N. spartini*. Furthermore, Metcalf (1923) misinterpreted Osborn's description of *N. spartini* as his illustrations do not correspond to the description. The type specimen of *Neomegamelanus dorsalis* is at the USNM.

DESCRIPTIVE TAXONOMY

MERISTOPSIS NEW GENUS

Type Species

Meristopsis rhamphis sp. nov.

Description

Uniformly brownish-orange, macropters greater than 3.0 mm long, including wings. Head slightly narrower than pronotum. Frons parallel-sided, median carina forked near fastigium, arms closely approximated onto vertex. Antennal segment I much longer than wide, II longer than I, II bearing rows of sensory pustules. Pronotal lateral carinae just reaching hind margin. Hind tibiae with one spine near femoral joint, a second near midlength, and 5 apical teeth grouped 2 + 3. Basitarsus with 7 apical teeth grouped 2 + 5 and second tarsomere with 4 teeth. Calcar tectiform bearing many fine black-tipped teeth. Male pygofer with ventral angles distinct, diaphragm well-developed, armature thickened, carinate along midline, caudally expanded. Parameres flattened, unbranched, diverging with basal angles developed into elongate projections. Suspensorium conspicuous, ring-like. Aedeagus flattened with 1 or more processes. Segment 10 bearing 2 thick, symmetrical, widely separated processes angled caudally or laterocaudally. Female genitalia with tergite 9 (T9) elongate, with a longitudinal groove on midline. Anal tube with caudal aspect of ventral margin broadly notched. Gonacoxae of segment 8 broadest anteriorly, narrowing posteriorly, ca. 1/4 length of T9 and covering base anteroventrally. Lateral gonapophyses of segment 9

elongate, subacute at apex. In lateral view, lateral gonapophyses of segment 9 (LG9) elongate, broadly spatulate and enclosing the heavily sclerotized, saber-shaped median gonapophyses of segment 9 (MG9) which bear a row of teeth on dorsal margin (Fig. 6F).

Remarks

Meristopsis bears a cursory resemblance to *Euides*, *Pareuidella*, and *Nilaparvata* in general size and color, and all have processes on segment 10 and more than 15 teeth on the calcar. As noted above, both *Pareuidella* and New World *Euides* have branched (often multiply branched) parameres and strongly projecting processes of the armature (Old World *Euides* tend to have unbranched parameres but strongly asymmetrical processes on segment 10). *Meristopsis* is superficially similar to *Nilaparvata*, but lacks the teeth on the basitarsus characteristic of *Nilaparvata*. In *Meristopsis* the stout, laterocaudally or caudally projecting processes of segment 10 are unique, and in combination with the flattened, unbranched parameres and the simple genital diaphragm serve to separate it from all other North American genera. Superficially, the glossy, uniformly brownish-orange color, with the slight infuscation of the fastigium and wings help distinguish this genus.

Etymology.

The genus name is formed from the Greek adjective *meristo* meaning "divided" and the noun *-opsis* meaning "face", and refers to the conspicuous frontal carinae. The name is feminine in gender.

KEY TO SPECIES OF *MERISTOPSIS*

1. Smaller species (male approximately 3.2, female 3.8 mm); parameres (Fig. 6E) widest subapically with sharp, laterally projecting apices, basal angles developed into elongate projections; aedeagus (Fig. 6C-D) with prominent dorsal projection in basal third; opening above genital diaphragm triangular (Fig. 2D); apices of segment 10 processes projected caudally (Fig. 2E); Florida and Central America *Meristopsis melanosteptos*
- 1'. Larger species (male approximately 4.2, female 4.5 mm); parameres (Fig. 5F) widest in basal third with dorsally directed apices, basal angles developed into short, flattened processes; aedeagus (Figs 5C-E) parallel sided with a subapical flange on right and an elongate apical process curved left; opening above genital diaphragm roughly quadrate (Fig. 1D); apices of segment 10 processes curved laterad (Fig. 5B); Florida *Meristopsis rhamphis*

MERISTOPSIS RHAMPHIS SP. NOV.
(Figs. 1 and 5)

Type Locality

USA; Florida, Palm Beach County, Lake Worth.

Diagnosis

Uniformly light brown, over 4 mm. Parameres widest in basal third with dorsally directed apices, basal angles developed into short, flattened processes. Aedeagus parallel sided bearing a subapical flange on right side and an elongate apical process curved left. Genital diaphragm thickened, with

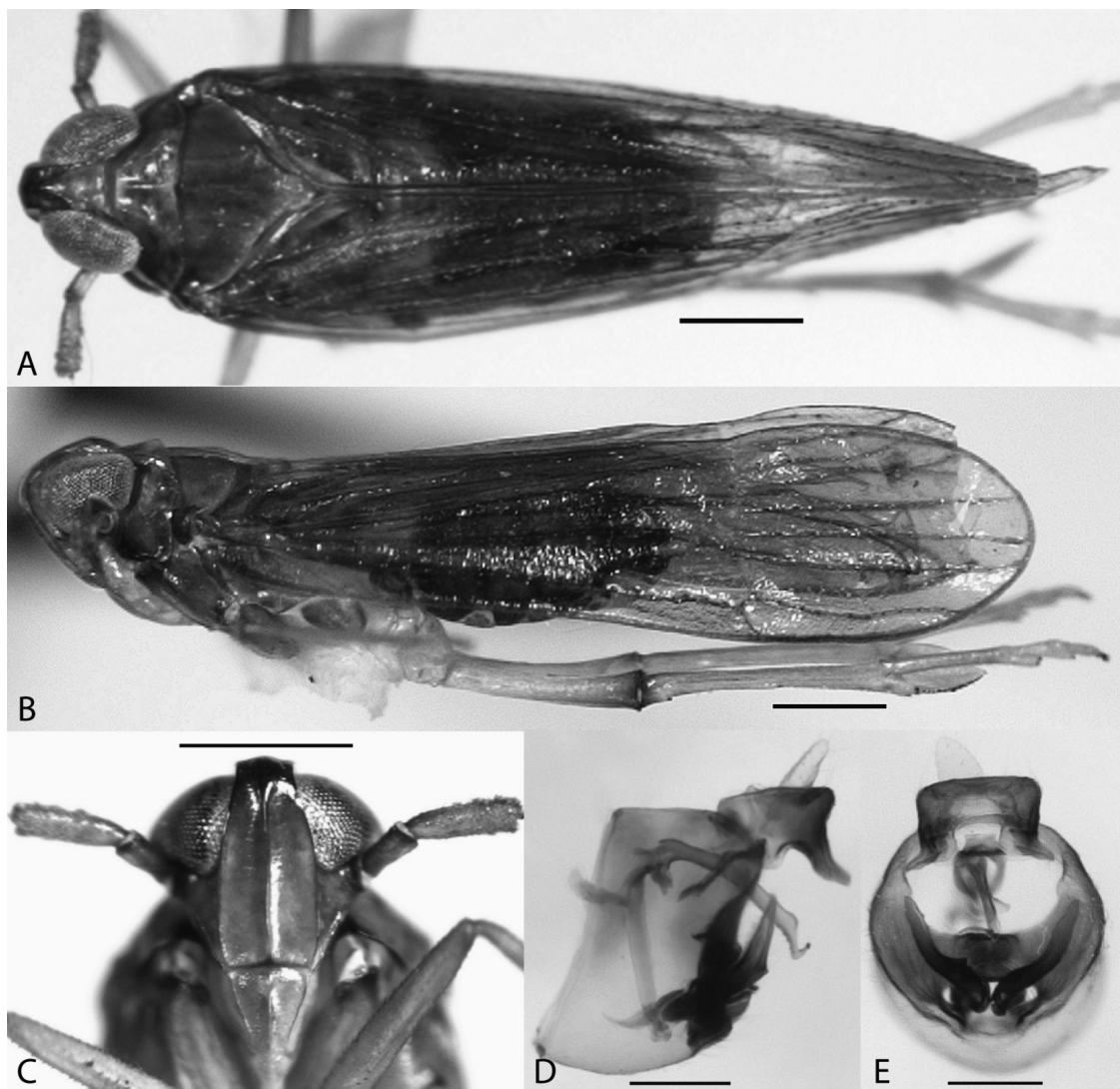


Fig. 1. Features of *Meristopsis rhamphis* sp. nov. (paratype, scale = 0.5 mm A-C, 0.2 mm D-E). A. Dorsal habitus, B. Lateral habitus, C. Frons, D. Male pygofer, lateral view, and E. Male pygofer, caudal view.

median ridge, caudally projected dorsally; opening above genital diaphragm roughly quadrate. Processes of segment 10 curved laterad apically.

Description

Color. General body color light brown (Figs. 1A-B), paler ventrally, glossy. Vertex infuscate at fastigium; paler posterior to submedian carinae. Carinae of head lightly infuscate. Frons paler ventrad; rostrum apex infuscate. Antennae light brown, darker at junction of segments I and II. Pronotum brown, mesonotum darker, carinae concolorous. Intercarinal regions of mesonotum infuscate. Tegulae concolorous with body. Pleural

regions brown. Forewings clear, faintly and uniformly infuscate, veins brown. Legs yellow, infuscate at articulation of femur and tibiae. Pygofer light brown.

Structure. Body length (n = 12 unless otherwise indicated; 4♂ and 8♀) ♂ macropter: 4.2 (4.02-4.31), ♀: 4.5 (4.13-4.59). Body length without wings ♂ macropter: 2.9 (2.85-2.93; n = 3); ♀: 3.3 (2.46-3.66); body width 1.0. Brachypter: none observed. Head slightly narrower than pronotum. Frons (Fig. 1C) roughly twice as long as wide (l:w 1.93:1). Carinae on frons conspicuous. Median carina of postclypeus conspicuous. Ocelli near ventral anterior margin of compound eye. Antennal segment I about twice as long as wide (l:w 2.23:1)

and $\frac{1}{2}$ length II (I:II 0.57:1), second segment with 5 irregular rows sensory pustules (with 1, 2, 4, 3, and 2 pustules, although irregular organization makes row assignment difficult). Pronotal lateral carinae diverging, curved caudally to just reach posterior margins. Mesonotal length roughly equal to length of pronotum plus head (0.99:1). Mesonotal lateral carinae originating halfway between mesonotal median carina and anterior lateral margin of mesonotum; slightly diverging and posteriorly curved laterad. Mesonotal median carina becoming obsolete on scutellum. Forewings rounded apically; extended for about $\frac{1}{2}$ length (0.30) beyond abdomen. Forewing with R 3-branched (RA, RP₁₊₂, RP₃₊₄; sometimes with RP3+4 apically branched), MP unbranched and CuA appearing 2 or 3 branched (CuA_{1a}, CuA_{1b}, CuA₂ or CuA₁ and CuA₂); inner and outer subapical cells similar in size. Calcar approximately $\frac{2}{3}$ length of basitarsus (0.69:1, n = 11), flattened, tectiform, and narrowing distally to acuminate apex, bearing a continuous row of 18 or more black-tipped teeth on outer lateral margin (range 18-23; n = 11; 20 on holotype).

Genitalia. Male pygofer (Figs. 1E and 5A) rather quadrangular in lateral view, anal angles weakly developed; in caudal view (Fig. 1D) opening wider than tall, margins of opening carinate, ventral margin projecting, concave between. Genital diaphragm roughly twice as wide as tall; armature thickened, weakly carinate along midline, caudally projecting into acute point. Opening between diaphragm and segment 10 in caudal view approximately quadrangular. Parameres (Fig. 5F) narrow, flattened, unbranched, setose; approximate basally, diverging to acutely pointed apices; basal angles expanded into short flattened caudodorsally directed projections; large dorsomedially directed tooth above basal angles and several indistinct subapical teeth on inner and outer margin. Suspensorium distinct, ring-shaped, loosely encircling aedeagus. Aedeagus (Figs. 5C-E) flattened and rather parallel-sided, appearing subapically hooked in right-lateral view; in caudal view bearing 2 processes, an elongate apical process curved left, and a rounded flange in the apical $\frac{3}{4}$ directed right. Aedeagus armed ventrally with row of approximately 5 fine subapical serrulations. Segment 10 (Figs. 5A and 5B) in lateral view broad, longer than tall, rather quadrate, ventrally concave; ventrocaudally bearing a pair of stout, strongly developed, widely separated processes, broadest basally and narrowing to rounded apex; caudally curved in lateral view and laterally curved in caudal view. Segment 11 about $\frac{2}{3}$ length of segment 10 in lateral view.

Remarks

All available specimens are macropterous. All specimens with collection data (9 of 12) were col-

lected at lights. *Meristopsis rhamphis* can most easily be distinguished from *M. melanosteptos* by the shape of the parameres and aedeagus. In *M. rhamphis*, the parameres are widest in basal third with dorsally directed apices, and the basal angles developed into short, flattened processes; as opposed to *M. melanosteptos* where the parameres are widest subapically, with sharp, laterally projecting apices, and the basal angles developed into elongate projections. The aedeagi of the 2 species are quite different with *M. rhamphis* bearing an apical process and subapical flange instead of the prominent dorsal process in the basal third. The large size, features of the aedeagus, and the stout, laterocaudally projecting processes of segment 10 serve to distinguish this taxon from any similar species.

Reported Hosts

None.

Distribution

USA: Florida.

Etymology

The species name *rhamphis* is formed from the Greek word *rhamph* meaning "hook", a reference to the hooklike appearance of the apex of the aedeagus in lateral view. The species name is to be regarded as feminine.

Material Examined

Holotype (here designated; FSCA, macropterous male) "Florida, Palm Beach / Co. Lake Worth / Geneva Lakes Court / 8-IV-2004 / Vince Golia / Black Light". Paratypes. FLORIDA: Palm Beach Co., Lake Worth Geneva Lakes Court, 8-IV-2004, Vince Golia, Black light (3 ♂, VGC), same, 15-V-2003 (1 ♂, 1 ♀, VGC), same, 24-V-2003 (1 ♀, VGC). Miami-Dade Co., Miami Airport, Fumigation site, 22-IV-2008, Light trap, T. Dobbs (2 ♀, UDCC). Paradise Key, 2-III-1919, H. Barber (1 ♀, USNM), same, 4-III-1919, (1 ♀, USNM), same, 3-III-1919, Schwarz & Barber (1 ♀, USNM). Highlands Co., Lake Placid, 8 miles S. Archbold Biological Station, 2 September 1982, M. Deyrup, at UV light (1 ♀, VGC).

MERISTOPSIS MELANOSTEPTOS SP. NOV. (Figs. 2, 6 and 9)

Type Locality

Belize, Toledo District

Diagnosis

Uniformly light brown, less than 4 mm. Parameres widest in apical third with later-

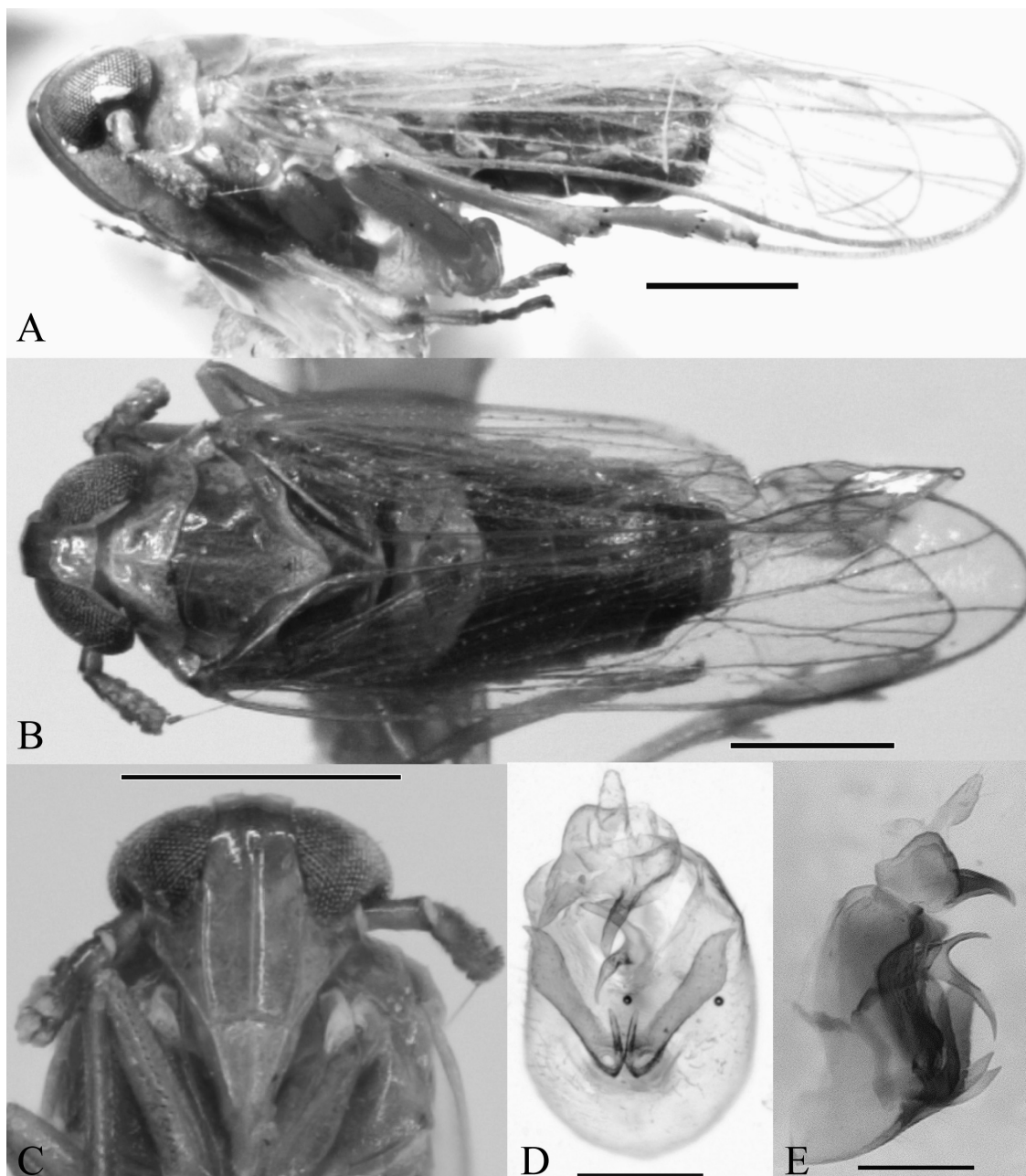


Fig. 2. Features of *Meristopsis melanosteptos* **sp. nov.** (paratype, scale = 0.5 mm for A-C, 0.2 mm for D-E). A. Lateral habitus, B. Dorsal habitus, C. Frons, D. Male pygofer, caudal view, E. Male pygofer, lateral view.

ally hooked apices, basal angles projected into elongate processes. Aedeagus flattened, in lateral view broadening distally to large dorsally projecting curved process; abruptly narrowed to ventrally curved acuminate apex. Genital diaphragm somewhat thickened medially, caudally projected dorsally; opening above genital diaphragm triangular. Processes of segment 10 directed caudad.

Description

Color. General body color uniformly light brown, glossy (Figs. 2A and B). Vertex usually infusate near fastigium; paler posterior to submedian carinae; carinae concolorous. Frons paler ventrad. Antennae light brown, slightly darker at junction of segments I and II and at antennal sulcus. Pronotum brown, mesonotum darker, ca-

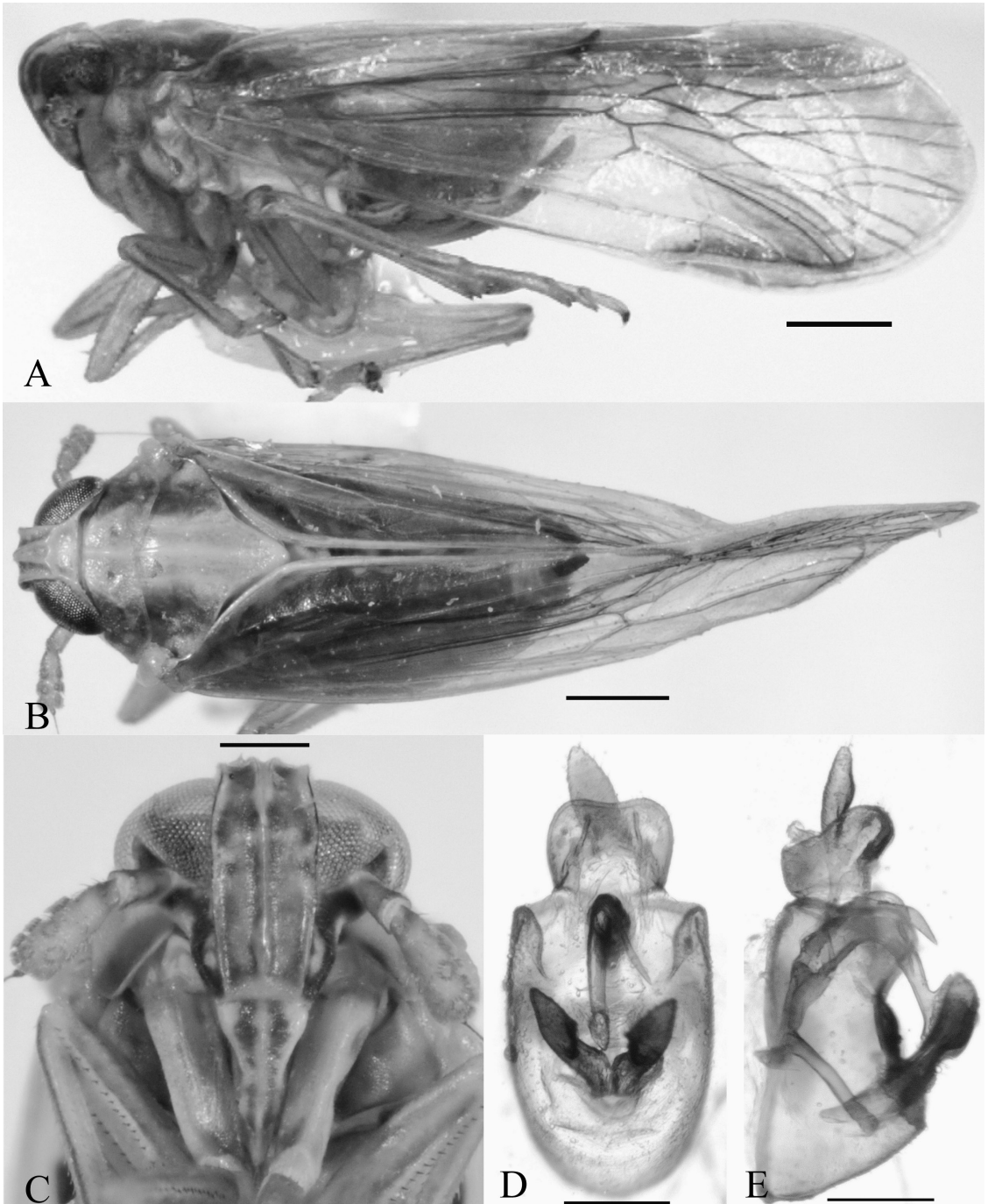


Fig. 3. Features of *Muellerianella meadi* **sp. nov.** (paratype, scale = 0.5 mm for A-C, 0.02 for D-E). A. Lateral habitus, B. Dorsal habitus, C. Frons, D. Male pygofer, caudal view, E. Male pygofer, lateral view.

rinae concolorous. Tegulae concolorous with body. Forewings clear, faintly and uniformly infuscate, veins brown. Legs uniformly light brown, infuscate at pretarsus. Pygofer light brown, parameres darker.

Structure. Body length ($n = 12$ unless otherwise indicated; 8♂ and 4♀) ♂ macropter: 3.22 (2.95-3.38), ♀: 3.79 (3.65-3.92). Body length without wings ♂ macropter: 2.29 (2.00-2.48); ♀: 2.71 (2.62-2.88); body width: 0.86. Brachypter: none ob-

served. Head narrower than pronotum. Frons (Fig. 2C) more than twice as long as wide (l:w 2.16:1). Carinae on frons and median carina of postclypeus conspicuous. Ocelli near ventral anterior margin of compound eye. Antennal segment I about twice as long as wide (l:w 1.83:1) and $\frac{1}{2}$ length II (I:II 0.53:1), second segment with 5 irregular rows sensory pustules (1, 2, 3-4, 3-4, and 2-3 pustules, holotype with 1, 2, 3, 3, 2, although irregular organization makes row assignment difficult). Pronotal lateral carinae diverging, curved caudally to just reach posterior margin. Mesonotal length roughly equal to length of pronotum plus head (1.10:1). Mesonotal lateral carinae originating near midlength between midline and apices of pronotal lateral carinae; slightly diverging and posteriorly curved laterad. Mesonotal median carina becoming obsolete on scutellum. Forewings rounded apically; extended for about $\frac{1}{3}$ length (0.30) beyond abdomen. Forewing (Fig. 9) with R 3-branched (RA, RP₁₊₂, RP₃₊₄), MP unbranched, and CuA appearing 2 or 3 branched (CuA_{1a}, CuA_{1b}, CuA₂ or CuA₁ and CuA₂); inner and outer subapical cells similar in size. Calcar approximately $\frac{2}{3}$ length of basitarsus (0.71:1), flattened, tectiform, and narrowing distally to acuminate apex, bearing a continuous row of more than 15 black-tipped teeth on outer lateral margin (range 16-25; 18 on holotype).

Genitalia. Male pygofer (Figs. 2D-E) elongate-quadrangular in lateral view, longer ventrally than dorsally; anal angle caudally projected into tooth, and slightly projected at level of base of parameres. In caudal view, opening taller than wide, margins of opening rounded (not carinate). Genital diaphragm strongly concave medially; armature thickened along midline, caudally projecting, weakly carinate along midline between parameres. Opening between diaphragm and segment 10 in caudal view approximately triangular (Fig. 2D). Parameres narrow, flattened, unbranched, setose; approximate basally, diverging to sharply pointed laterally projected apices, widest subapically. Suspensorium distinct, ring-shaped, loosely encircling aedeagus. Aedeagus flattened, in lateral view concave ventrally, broadening from base to large, curved dorsal process located at about $\frac{2}{3}$ length; abruptly narrowed in apical $\frac{1}{4}$ to ventrally curved, acuminate apex; distal third with ventral margin weakly serrulate. Segment 10 in lateral view quadrate, roughly as long as tall, ventrocaudally bearing a pair of strongly developed, widely separated processes, broadest basally, caudally curved, and narrowing to sharp apex. Length of segment 11 subequal to segment 10.

Remarks

All available specimens are macropterous. Available specimens from southern Belize or Northern Guatemala were collected in the 1930s, evidently from light traps, and probably with the

specimens collected into alcohol. These specimens were generally not in good condition, but we were unable to find more suitable specimens in more recent collections from a similar geographic area. Specimens labeled "Rio Temas" probably refer to the Temash River in the Toledo District in southern Belize. A single specimen from Florida was observed (also collected at a light), which unfortunately also was poorly preserved.

Features separating the species of *Meristopsis* are provided in the remarks to *M. rhamphis*. This species is generally smaller (3.22 vs. 4.19 mm for males) and less robust than *M. rhamphis*. The form of the aedeagus of *Meristopsis melanosteptos*, with the large dorsal projection, is unique.

Reported Hosts

None.

Distribution

USA: Florida (Palm Beach County); Belize, Guatemala.

Etymology

The species name *melanosteptos* is formed from the Greek combining form "*melano*"- meaning "dark" and *steptos* (Greek, adjective) meaning "crowned", in reference to the infuscation of the vertex near the fastigium, which is more conspicuous in this species than in *M. rhamphis*. The species name is to be regarded as feminine in gender.

Material Examined

Holotype (here designated; macropterous male, NCSU): "Br. Hondora / Rio Temas May 1937 / A. J. White." Paratypes. USA: FLORIDA: Palm Beach Co., 4 mi SE Canal Point, 16.vii.1973, C. W. O'Brien, Blacklight trap (1 ♂, UDCC). BELIZE (as British Honduras): [Toledo District:] Punta Gorda, May 1930, J. J. White (1 ♂, NCSU); Rio Grande, June 1932, J. J. White (1 ♂, NCSU); Rio Temas [Temash River], May 1937, A. J. White (1 ♂, 6 ♀, NCSU), same, July 1937 (5 ♂, 14 ♀, NCSU, UDCC), same, Aug. 1937 (2 ♂, 12 ♀, NCSU), same, Sept. 1937 (3 ♂, 7 ♀, NCSU). GUATEMALA: [Izabal Department] Morales, Oct. 1930, J. J. White (2 ♂, 1 ♀, NCSU).

MUELLERIANELLA, WAGNER 1963

Type Species

Delphax fairmairei Perris, 1857

Diagnosis

Moderately large and robust delphacids (bra-chypters body length mostly 2.3-2.5 mm, macrop-

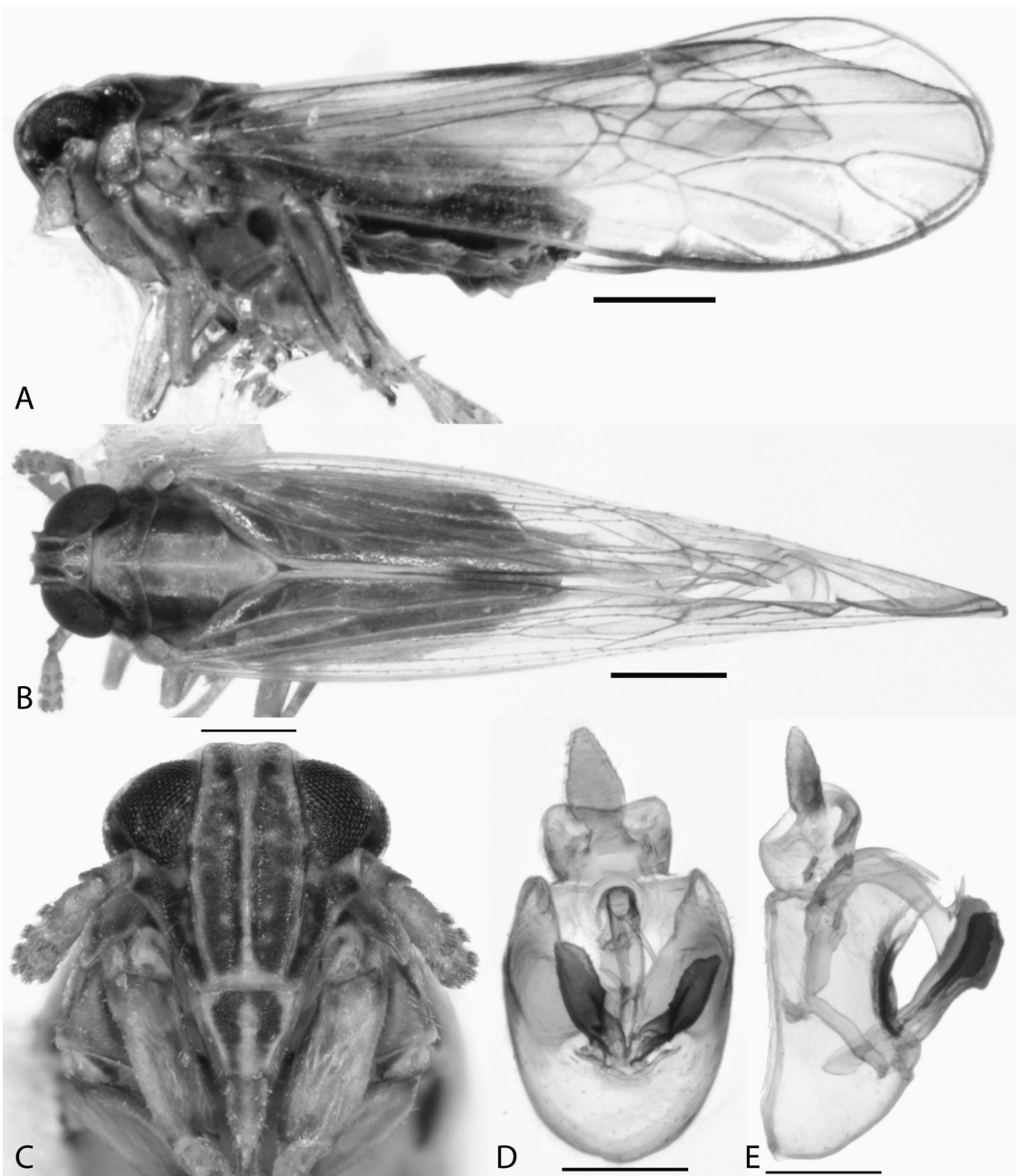


Fig. 4. Features of *Muellerianella laminalis* (Van Duzee). (scale = 0.5 mm for A-B, 0.02 for C-E). A. Lateral habitus, B. Dorsal habitus, C. Frons, D. Male pygofer, caudal view, E. Male pygofer, lateral view.

MUELLERIANELLA MEADI SP. NOV.
(Figs. 3 and 7)

Type Locality

USA; Florida, Alachua Co., Paynes Prairie.

Diagnosis

Apex of aedeagus with large dorsal apical sub-triangular process; aedeagus at midlength with 2 dorsal processes: 1 sinuate anteroventrally-directed spine on left side and 1 caudoventrally-directed spine on right side.

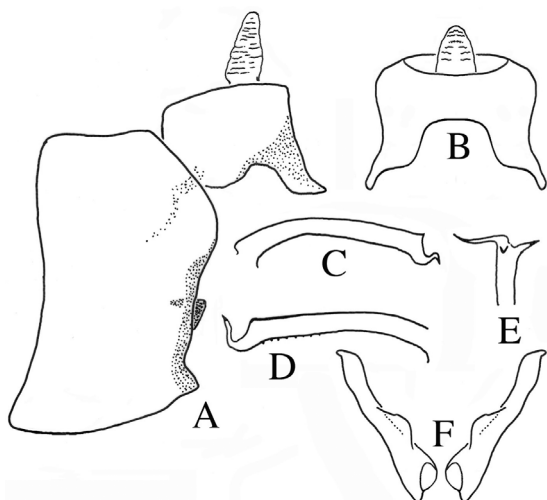


Fig. 5. Genitalic features of *Meristopsis rhamphis* sp. nov. A. Pygofer and anal segments, left lateral view, B. Anal segments, caudal view, C. Aedeagus, left lateral view, D. Aedeagus, right lateral view, E. Apex of aedeagus, F. Parameres, caudal view.

Description

Color. Body (Figs. 3A-B) pale, yellowish to light brown, frons dark brown with mottled pattern. Median and lateral carinae of pronotum and mesonotum pale yellow. Intercarinal regions of pronotum and mesonotum yellow, suggestive of median vitta; outer regions dark brown. Antennae light brown, paler yellow at articulation of antennal segments I and II. Frontal clypeal suture and median carina of frons yellow, lateral margins of frons dark brown. Dark brown mottled coloration on frons, gena. Black spot on mesopleuron. Forewings translucent pale brown, veins slightly infuscate. Slight infuscation at top and bottom edge of wing in lateral view. Legs pale yellow with dark brown coxae and longitudinal dark stripes on tibiae. Pygofer pale.

Structure. Body length ($n = 10$ unless otherwise indicated; 5♂ and 5♀) ♂ macropter: 3.8 (3.63-3.98), ♀: 4.5 (4.28-4.68). Body length without wings ♂ macropter: 2.3 (2.14-2.43); ♀: 2.8 (2.70-3.01). Brachypter: none observed. Body width 1.1. Head slightly narrower than pronotum. Frons (Fig. 3C) narrow, approximately twice as long as wide (l:w 2.15:1); median and lateral carinae conspicuous. Clypeus with pale, weak median longitudinal carina. Pronotum with lateral carinae curving posterolaterally, paralleling curvature of compound eyes; with prominent median longitudinal carina. Mesonotal lateral carinae originating near midlength between midline and apices of pronotal lateral carinae. Median carina of mesonotum becoming obsolete on scutellum. Length of antennal segment I about $1\frac{1}{2}$ × width (l:w 1.55:1) and about $\frac{1}{2}$ length II (I:II 0.48:1). Me-

sonotal length roughly $\frac{1}{4}$ greater than length of pronotum plus head (1.26:1). Forewings rounded apically; extended for about $\frac{1}{3}$ length beyond abdomen. Hind tibiae with spine near tarsal joint and a second, less-developed spine near femoral joint, and 5 apical teeth, grouped 2 + 3. Basitarsus with 7 apical teeth (grouped 2 + 5), and second tarsomere with 4 teeth. Calcar slightly shorter in length than basitarsus (0.9:1), calcar flattened, tectiform, and narrowing distally to acuminate apex, bearing a continuous row of more than 15 very small black-tipped teeth on posterolateral margin (15-18) becoming reduced near apex.

Genitalia. Parameres (Fig. 7D) stout, appearing flattened and unbranched, diverging laterally to pointed apices, closely approximated basally, with large dorsomedially directed tooth above basal angles. Diaphragm armature narrow, not strongly developed. Aedeagus (Figs. 7B and C) tubular, broadest basally, strongly arched dorsally, with dorsal transparent membranous subtriangular apex sometimes appearing bifurcate; midlength with 2 strong, subequal posteriorly directed dorsal processes. Segment 10 appearing quadrate, without processes; segment 11 elongate.

Female Genitalia. Tergite 9 (T9) elongate, with a longitudinal groove on midline. Anal tube subcylindrical, dorsoventrally flattened; caudal aspects of dorsal and ventral margins con-

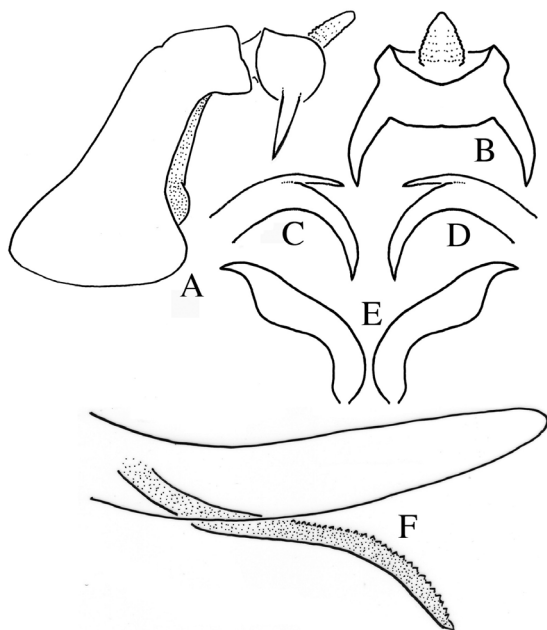


Fig. 6. Genitalic features of *Meristopsis melanostepos* sp. nov. A. Pygofer and anal segments, left lateral view, B. Anal segments, caudal view, C. Aedeagus, left lateral view, D. Aedeagus, right lateral view, E. Parameres, caudal view, F. Ovipositor, left lateral view.

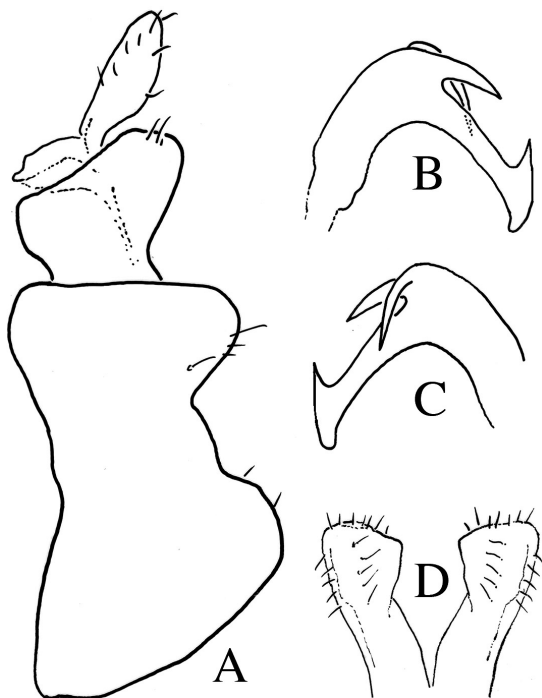


Fig. 7. Genitalic features of *Muellerianella meadi* sp. nov. A. Pygofer and anal segments, left lateral view, B. Aedeagus, left lateral view, C. Aedeagus, right lateral view, D. Parameres, caudal view.

cave; anal style narrowing caudally, subequal in length to anal tube. Gonacoxae of segment 8 subtriangular, ca. $\frac{1}{4}$ length of T9 and covering it anteroventrally. Lateral gonapophyses of segment 9 elongate, ca. $\frac{3}{4}$ length of T9, narrowing and rounded apically. In lateral view, median gonapophyses of segment 9 (MG9) saber-shaped, heavily sclerotized, broad at base, narrowing toward acute apex; row of ca. 25 prominent teeth on dorsal margin in distal $\frac{1}{2}$. Gonapophyses of segment 8 enclosing MG9, slightly shorter and narrower than MG9.

Remarks

Muellerianella meadi differs from *M. laminalis* most conspicuously in having 2 dorsal processes on the aedeagus near midlength and 1 dorsal apical projection, compared with 1 at midlength and 2 apical in *M. laminalis*. *Muellerianella meadi* also tends to have a paler frons than *M. laminalis*. Brachypterous forms are known for *M. laminalis* but have not yet been observed in *M. meadi*, as all available specimens from Florida were collected from light traps. As all other *Muellerianella* species have brachypterous forms, it is probable that there are brachypters of *M. meadi*. *Muellerianella meadi* is most similar in male genitalic features to the European *M. brevipennis*, which

has 2 subequal aedeagal spines but has an additional short anteriorly-directed spine on the right side (see Booij 1981, Holzinger et al. 2003). The specimen of *M. laminalis* reported from Cuba by Rodriguez-León and colleagues (1994) is likely to be *M. meadi* because *M. laminalis* appears to be more northern in distribution.

Reported Hosts

None.

Distribution

USA: Florida and possibly Cuba.

Etymology

The species name is named in honor of Dr. Frank Mead, retired from FSCA, who contributed significantly to our knowledge of planthoppers. Dr. Mead originally collected *Muellerianella meadi* and recognized it as an undescribed species.

Material Examined

Holotype (here designated; FSCA, macrop-terous male). "Florida, Alachua Co. / Edgecliff Subdivision / S. side Paynes Prairie / 23-VII-1991 / D. H. Habeck / at blacklight". Paratypes. FLORIDA: Alachua Co., same (5 ♂, 5 ♀, FSCA). Other material examined. Alachua Co., Edgecliff Subdivision, S. side Paynes Prairie 23-VII-1991, D. H. Habeck at blacklight (41 ♂, 143 ♀, FSCA). Gainesville, Doyle Conner Bldg., 21-23-IX-1979, F. W. Mead, Blacklight trap (1 ♂, FSCA); same, 20-VIII-1979 (1 ♂, 5 ♀, FSCA); same, 7-VII-1978 (1 ♂, FSCA).

MUELLERIANELLA LAMINALIS (VAN DUZEE) (Figs. 4 and 8)

- = *Liburnia laminalis* Van Duzee 1897: 251.
- = *Megamelus laminalis* (Van Duzee), new combination by Crawford 1914: 607.
- = *Liburnia laminalis* Van Duzee, restored combination from *Megamelus laminalis* by Van Duzee 1917: 774
- = *Delphacodes lateralis* (Van Duzee 1897:191) [nec. Fieber, 1879], **new combination** by Muir & Giffard 1924: 38.
- = *Delphacodes laterana* Metcalf 1943, new name for *Delphacodes lateralis* (Van Duzee, 1897) [nec. Fieber, 1879] by Metcalf, 1943: 458; synonymy with *D. laminalis* by Oman, 1947: 212-213.
- = *Muellerianella laminalis* (Van Duzee), **new combination** by Maw et al. 2000: 85.

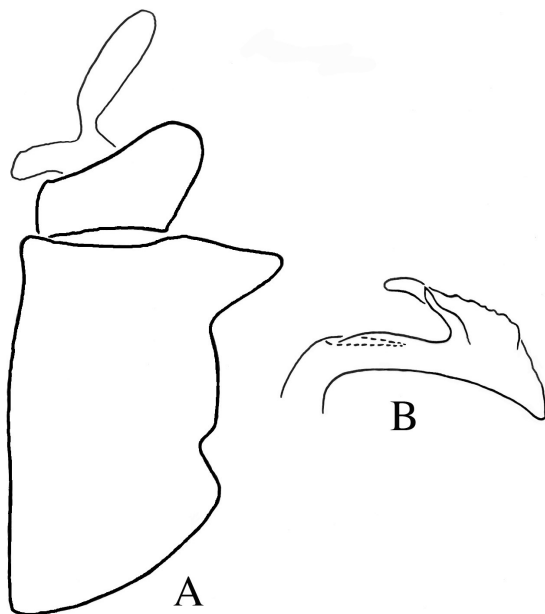


Fig. 8. Genitalic features of *Muellerianella laminalis* (Van Duzee). A. Pygofer and anal segments, left lateral view, B. Aedeagus, left lateral view.

Diagnosis

Body length ♂ brachypter = 2.3 mm, ♂ macropter = 4.0; ♀ brachypter = 2.5, ♀ macropter = 4.3. Male genitalia (Figs. 4D and E) with pygofer yellow, most of lateral aspects fuscous; subquadrate with caudal margin in dorsal $\frac{1}{3}$ extending caudally as a subtriangular extension (Figs. 4E and 8A). Parameres fuscous; in caudal view, spatulate with apices slightly rounded. Aedeagus arched dorsally, with large subtriangular transparent membranous apex; with 1 subapical sinuate anteroventrally-directed spine on left side, and 1 caudoventrally-directed spine originating near middle on dorsal aspect on right side. Female genitalia with tergite 9, in ventral view, elongate, each side broad with length approximately 3x width, apex rounded. Segment 10 subcylindrical. Lateral gonapophyses of segment 9 elongate, spatulate posteriorly. In lateral view, median gonapophyses of segment 9 curved, narrowing toward apex, with about 20 small teeth on dorsal margin in distal one-half.

Distribution

Canada: Ontario, Quebec; USA: California (error?), Connecticut, District of Columbia, Florida, Illinois, Indiana, Kentucky, Louisiana, Maryland, Maine, Massachusetts, Missouri, Mississippi, New Hampshire, New York, North Carolina, Ohio, Pennsylvania, and Tennessee (Metcalf 1943, DuBose 1960, Coley 1970, Wilson & McPherson

1980a, Giri et al. 1985, Maw et al. 2000, Gonzon et al. 2007); also observed Delaware, Nebraska, North Dakota, Texas, Vermont.

Etymology

The species name *laminalis* is evidently derived from the Latin *lamina*, meaning “thin plate” or “blade.”

Remarks

Transfer of this species to *Muellerianella* was made without comment by Maw and colleagues (2000). The similarity of this species to its European congeners was previously noted by Muir & Giffard (1924: 25) who commented that this “. . . species is closely related to *D. fairmairei* (Perr.) of Europe”. Descriptions and illustrations of the male genitalia were provided by Muir & Giffard (1924), DuBose (1960), Coley (1970), and Wilson & McPherson (1980b). A few specimens of this species appeared smaller and paler than average (including those noted as a potential new species by Gonzon et al. 2007), but careful review of these specimens confirm that they were *M. laminalis*.

Material Examined

DELAWARE: Kent Co., Norman G. Wilder WMA, Petersburg Tract, 8-VI-2005 A. Gonzon (13♂, 2♀, UDCC); Route 1 & 113 near Milford I. G. Burton Auto Dealer, 21-VIII-2005 A. Gonzon (1♂, UDCC); New Castle Co., Middletown, Brick Mill Farm, 22-VIII-2003 A. Gonzon (14♂, 22♀, UDCC); same, 6-VII-2003; C & D Canal N., Retriever Training Area, 20-VII-2006 A. Gonzon (1♀, UDCC); Glasgow, Frenchtown Woods NA, 19-VI-1999 A. Short (1♀, UDCC); same, 2-VII-2002 C. Bartlett (1♀, UDCC); near Vandyke, Blackbird State Forest, Vandyke Tract, 9-VI-2004 C. Bartlett (2♀, UDCC); Vandyke, Peter's Tract Blackbird State Forest, 9-VI-2004 N. Nazdrowicz (1♀, UDCC); Brandywine Creek State Park, 18-X-2007 A. Gonzon (7♂, 5♀, UDCC); south of Taylor's Bridge Road near Cedar Swamp WMA, 29-VIII-2003 A. Gonzon (1♀, UDCC); Newark, IX-1988 C. Bartlett (1♂, UDCC); Sussex Co.: Georgetown, 6-X-1999 R. Snyder (2♀, UDCC); circa 2 miles northwest of Georgetown, Wilson Hill Road, 22-VII-2004 A. Gonzon (1♀, UDCC); MAINE: York Co., near Berwick, 15-IX-1999 C. Bartlett (1♂, UDCC); Kittery, 5-IX-1999 C. Bartlett (1♀, UDCC); MARYLAND: Allegeny Co., Little Orleans, 1-VI-2001 C. Bartlett (2♀, UDCC); same, 2-4-VI-2006 (1♀, UDCC); same, 2-VI-2006 R. Rakitov (1♀, UDCC); Cecil Co., Elkton, 6-VIII-2010 L. Barringer (1♀, UDCC); Fair Hill, Fair Hill Natural Resources Area, 17-IX-2010 C. Bartlett (1♂, UDCC); same, 18-IX-2009 (1♀, UDCC); MISSOURI: Johnson Co., Warrensburg, 7-IX-2000, S. Wilson, 23-X-

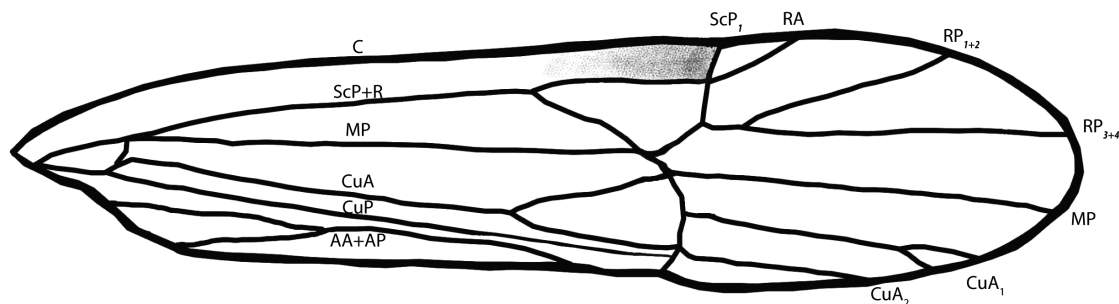


Fig. 9. Right forewing of *Meristopsis melanosteptus* sp. nov. interpreted following Dworakowska (1988); AA = anterior anal, AP = posterior anal, C = costa, CuA = anterior cubitus, CuP = posterior cubitus, MP = posterior media, R = radius, RA = anterior radius, RP = posterior radius, ScP = posterior subcosta.

2001 (3♂, SWWC); Taney Co., Ozark Underground Laboratory, 3 mi. N. Protom, 16-IX-2000 (3♂, 3♀, SWWC); NEBRASKA: Jefferson Co., Fairbury, southwest of town, Flathead WMA, 12-VIII-2010 L. Barringer (1♂, UDCC); NEW YORK: Chautauqua Co., Fredonia, 21-VII-1946 (1♂, 1♀, SWWC); NORTH CAROLINA: Haywood Co., Great Smoky Mountains National Park, the Purchase, weather station, 5-12-IX-2003 GJ Steck & BD Sutton (1♀, UDCC); Great Smoky Mountain National Park, circa 0.8 miles southeast Purchase Knob ATBI House along gravel drive, 22-VI-2006, C. Bartlett and A. Gonzon (1♂, UDCC); Mecklenburg Co., Charlotte 4-6-VIII-1969 J. Cornell (1♂, UDCC); Swain Co., Great Smoky Mountains National Park, Clingman's Dome Road circa 2 miles from US 441, 20-VI-2006 C. Bartlett & A. Gonzon (1♂, 2♀, UDCC); same, 10-VI-2005 L. Donovan (1♀, UDCC); NORTH DAKOTA: Richland Co., 11.5 miles south Wahpeton, 15-VIII-1973 G. Hevel (2♂, 1♀, UDCC); Wake Co., Raleigh, Centennial Campus, 17-VI-1994, C. Bartlett (1♀, UDCC); Raleigh, Schenck Forest, 16-VII-1993 C. Bartlett (1♂, UDCC); OHIO: Wayne Co., Izaak Walton For., c. 10 mi. W. Wooster, 17-VIII-1990 (2♂, 5♀, SWWC); PENNSYLVANIA: Chester Co., Avondale, Stroud Water Research Center, 9-IX-2005 L. Donovan (1♀, UDCC); Oxford, Locust Street, 3-X-1999 R. Synder (1♀, UDCC); TENNESSEE: Blount Co., near Townsend, Great Smoky Mountains National park, Cades Cove, Wet Bottom Trail, 8-VII-2002 C. Bartlett et al. (1♀, UDCC); Sevier Co., Great Smoky Mountains National Park, Twin Creeks ATBI Plot, 27-IX-8-X-2001 I. Stocks (1♀, UDCC); same, 26-IX-12-X-2000 Parker, Stocks, Petersen (1♀, UDCC); TEXAS: Dallas Co., Dallas, 5-XII-1945, coll. R. H. Beamer (1♂, SWWC). Victoria Co., Coletto Creek Park campground lots, 30-VII-2003 A. Short (1♀, UDCC); VERMONT: Chittenden Co., Jehrico, Sunnyview Drive, 22-25-VIII-1997 C. Bartlett (1♂, UDCC); same, 26-27-IV-2001 (1♀, UDCC); same, 26-27-V-2001 (3♀, UDCC).

DISCUSSION

The compiled species list suggests that Florida has the highest diversity of delphacids in the conterminous United States with 128 species recorded so far, including the 3 new species described here. In comparison, compiled state delphacid records from Wilson & McPherson (1980a) and more recent sources provide the highest number of state records from North Carolina (77), Illinois (75), New York (66), Mississippi (59), Connecticut (55), Georgia (53), Texas (52), Kansas (49), Colorado (46) and California (45); but this reveals more about the distribution of entomologists studying Auchenorrhyncha than it does about the distribution of planthoppers. Given that planthoppers (Fulgoroidea) generally are more diverse in lower latitudes, and about 2/3 of the 935 planthopper species north of Mexico are western (unpublished data), Texas and California might be expected to have the highest delphacid totals because of their relative size and their location in the West. The lower numbers reported suggest inadequate survey for delphacids. Four states have fewer than 10 delphacid species records (North Dakota, Rhode Island, Vermont, and West Virginia). States in the southwestern US (especially Arizona and New Mexico) certainly must have a much richer delphacid fauna than is currently reported, although possibly not as diverse as Florida.

Several of the new records are Neotropical species that have been recorded in southern Florida (e.g., *Chionomus balboae*, *C. havanae*, *Delphacodes vaccina*, *Euides guadauae*, *Tagosodes approximatus*, *T. cubanus*, and *T. orizicolus*). It is not clear whether such species are vagrants or established, but members of the genera *Chionomus*, *Euides*, and *Tagosodes* are common in light trap samples from the Neotropics, and these taxa potentially are long-distance migrants that may be expected as a regular feature of the fauna of Florida. More northern records of some taxa,

particularly members of the genera *Tagosodes*, *Sogatella*, and *Nilaparvata* (see Bartlett 2007) probably are migrants rather than established populations.

The new species *Muellerianella meadi* described here doubles the number of known *Muellerianella* species in the New World, and expands known *Muellerianella* habitat to reflect a more widespread tropical distribution.

Meristopsis appears to be a tropical genus based on our current specimen records from southern Florida, Belize, and Guatemala. The observed specimens were nearly all collected at lights, providing no information regarding their host or habitat preferences. The new species appear to be relatively rare in collections. This underrepresentation may be due to small size, cryptic habits, and appearance that may be unremarkable to non-specialists. Additional species are very likely to be found, particularly in Central America, whose delphacid fauna remains poorly investigated.

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REFERENCES CITED

- ARNETT JR., R. H., SAMUELSON, G. A., AND NASHIDA, G. M. 1993. The Insect and Spider Collections of the World, 2nd edition. Sandhill Crane Press, Gainesville, FL. 310 pp.
- ASCHE, M. 1985. Zur Phylogenie der Delphacidae Leach, 1815 (Homoptera: Cicadina: Fulgoromorpha). Marburger Entomol. Publ. 2, vol. 1, pp. 1-398, vol. 2, pp. 399-910.
- ASCHE, M. 1990. Vizcayinae, a new subfamily of Delphacidae with revision of *Vizcaya* Muir (Homoptera: Fulgoroidea) - a significant phylogenetic link. Bishop Mus. Occ. Pap. 30: 154-187.
- ASCHE, M. 1997. A review of the systematics of Hawaiian planthoppers (Hemiptera: Fulgoroidea). Pac. Sci. 51 (4): 366-376.
- ASCHE, M. 2000. New State Records of Immigrant Planthoppers in Hawaii (Homoptera: Fulgoroidea). Proc. Hawaiian Entomol. Soc. 43: 205-207.
- ASCHE, M., AND WILSON, M. R. 1990. The delphacid genus *Sogatella* and related groups: a revision with special reference to rice-associated species (Homoptera: Fulgoroidea). Syst. Entomol. 15: 1-42.
- ASCHE, M., AND REMANE, R. 1983. Zur Problematik von *Delphacodes mulsanti* (Fieber 1866) und zur Kenntnis einiger benachbarter Taxa (Homoptera Auchenorrhyncha Fulgoromorpha Delphacidae) (Vorläufige Mitteilung). Marburger Entomol. Publ. 1(8): 25-56.
- BALL, E. D. 1903. Some new North American Homoptera. Canadian Entomol. 35: 227-232.
- BALL, E. D. 1905. Some new Homoptera from the south and southwest. Proc. Biol. Soc. Washington 18: 117-120.
- BALLOU, J. K., TSAI, J. H. AND WILSON, S. W. 1987. Delphacid planthoppers *Sogatella kolophon* and *Delphacodes idonea* (Homoptera: Delphacidae): Descriptions of immature stages and notes on biology. Ann. Entomol. Soc. Am. 80(2): 312-319.
- BARTLETT, C. R. 2007. A review of the planthopper genus *Nilaparvata* (Hemiptera: Delphacidae) in the New World. Entomol. News 118: 49-66.
- BARTLETT, C. R. 2008. Case 3460. *Liburnia* Stål, 1866 (Insecta, Hemiptera, Delphacidae): proposed designation of *Embolophora monoceros* Stål, 1855 as the type species. Bull. Zool. Nomencl. 65(3): 183-187.
- BARTLETT, C. R. 2010 (dated 2009). Diversity in New World Stenocranine Planthoppers (Hemiptera: Delphacidae). Trans. Am. Entomol. Soc. 135: 443-486.
- BARTLETT, C. R., AND DEITZ, L. L. 2000. Revision of the New World delphacid planthopper genus *Pissonotus* (Hemiptera: Fulgoroidea). Thomas Say Publ. Entomol.: Monogr. 234 pp.
- BARTLETT, C. R., AND HAMILTON, K. G. A. 2011. *Aethodelphax prairianus* gen. et sp. nov. (Hemiptera: Delphacidae) and seven congeneric species from North America *Delphacodes*. Zootaxa 2837: 48-66.
- BARTLETT, C. R., AND WHEELER JR., A. G. 2007. *Kelisia* and *Stenocranus* species (Hemiptera: Fulgoromorpha: Delphacidae): new host-plant associations and distributional records of eight sedge-feeding planthoppers. Proc. Entomol. Soc. Washington 109: 400-415.
- BEAMER, R. H. 1946. A new species of Delphacine Fulgorid with notes on four other species. J. Kansas Entomol. Soc. 19: 82-87.
- BEAMER, R. H. 1948. Some new species of *Delphacodes* (Homoptera: Fulgoridae: Delphacinae), Part IV. J. Kansas Entomol. Soc. 21: 96-110.
- BEAMER, R. H. 1951. A new genus and two new species of Delphacine fulgorids. Ann. Entomol. Soc. Am. 44(2): 198-200.
- BEAMER, R. H. 1952. One old and five new species of delphacine fulgorids (Homoptera: Fulgoridae). J. Kansas Entomol. Soc. 25: 111-115.
- BOOIJ, C. J. H. 1981. Biosystematics of the *Muellerianella* complex (Homoptera, Delphacidae): taxonomy, morphology and distribution. Netherlands J. Zool. 31: 572-595.
- BOOIJ, C. J. H. 1982. Biosystematics of the *Muellerianella* complex (Homoptera, Delphacidae): host-plants, habitats and phenology. Ecol. Entomol. 7: 9-18.
- CALDWELL, J. S., AND MARTORELL, L. F. 1951 [dated 1950]. Review of the Auchenorrhynchos [sic] Homoptera of Puerto Rico. Part II. The Fulgoroidea except Kinnaridae. J. Agri. Univ. Puerto Rico 34: 133-269. [New species described in this work attributed to senior author only.]
- CALVERT, P. D., TSAI, J. H., AND WILSON, S. W. 1987. *Delphacodes nigrifacies* (Homoptera: Delphacidae): Field biology, laboratory rearing and descriptions of immature stages. Florida Entomol. 70(1): 129-134.

- CALVERT, P. D. AND WILSON, S. W. 1986. Life history and descriptions of the immature stages of the planthopper *Stenocranus lautus* (Homoptera: Delphacidae). J. New York Entomol. Soc. 94: 118-125.
- CHERRY, R. H., STANSLY, P., NAGATA, R., AND HALBERT, S. 2006. *Liburnia pseudoseminigra* (Delphacidae: Homoptera), a new and unusual pest of St. Augustine grass. Florida Entomol. 89(4): 459-461.
- COLEY, J. D. 1970. The family Delphacidae (Homoptera) in Mississippi. MS Thesis, Mississippi State Univ., State College, Mississippi, 106 pp.
- CRAWFORD, D. L. 1914. A contribution toward a monograph of the homopterous insects of the family Delphacidae of North and South America. Proc. United States Nat. Mus. 46: 557-640.
- CUMMINS, J. D., WILSON, S. W., CALVERT, P. D., AND TSAI, J. H. 1988. *Neomegamelanus elongatus* (Homoptera: Delphacidae): Descriptions of immatures. J. New York Entomol. Soc. 96: 260-265.
- DENNO, R. F. 1978. The optimum population strategy for planthoppers (Homoptera: Delphacidae) in stable marsh habitats. Canadian Entomol. 110: 135-142.
- DENNO, R. F. 1980. Ecotope differentiation in a guild of sap-feeding insects on the salt marsh grass, *Spartina patens*. Ecology 61: 702-714.
- DING, J.-H. 2006. Fauna Sinica Insecta Vol. 45 Homoptera Delphacidae. Science Press, Beijing, China. xx + 776 pp + xx plates.
- DISTANT, W. L. 1906. Rhynchota. Heteroptera-Homoptera. The Fauna of British India, including Ceylon and Burma. 3: 1-503.
- DOUD, C. W., WILSON, S. W., AND TSAI, J. H. 1997. Descriptions of nymphs of the cat-tail feeding delphacid planthopper *Pygospina spinata* (Homoptera: Fulgoroidea). Florida Entomol. 80: 443-450.
- DOZIER, H. L. 1922. A synopsis of the genus *Stenocranus*, and a new species of *Mysidia* (Homoptera). Ohio J. Sci. 22: 69-82.
- DROSOPoulos, S. 1976. Triploid pseudogamous biotype of the leafhopper *Muellerianella fairmairei*. Nature 263: 499-500.
- DROSOPoulos, S. 1977. Biosystematic studies on the *Muellerianella* complex (Delphacidae, Homoptera Auchenorrhyncha). Mededelingen Landbouwhogeschool Wageningen. (also: H. Veenman & Zonen B.V., Wageningen, Nederland). 77-14(1977): 1-133.
- DROSOPoulos, S. 2006. Acoustic communication, mating behaviour and hybridisation in closely related, pseudogamic and parthenogenetic species of planthoppers, pp. 239-253 *In* S. Drosopoulos and M. F. Claridge [eds.], Insect Sounds and Communication: Physiology, Behaviour, Ecology and Evolution. CRC Press, Taylor & Francis Group, LLC, Boca Raton, FL. XVII + 532 pp.
- DUBOSE, W. P. 1960. The genus *Delphacodes* Fieber in North Carolina (Homoptera: Delphacidae). J. Elisha Mitchell Scientific Soc. 76: 36-63.
- DWORAKOWSKA, I. D. 1988. Main veins of the wings of Auchenorrhyncha (Insecta, Rhynchota: Hemelytrata). Entomol. Abh. 52(3): 63-108.
- EMELJANOV, A. F. 1994. The species of *Perkinsiella* introduced into Florida is the genuine *P. saccharicida* Kirkaldy (Homoptera: Delphacidae). Zoosystematica Rossica 3: 18.
- FABRICIUS, J. C. 1798. Rhyngota. Os Rostro: Vagina articulata. Suppl. Entomol. Systematicae 1798: 511-524.
- FENNAH, R. G. 1963a. New Genera of Delphacidae (Homoptera: Fulgoroidea). Proc. R. Entomol. Soc., London (B) 32: 15-16.
- FENNAH, R. G. 1963b. The Delphacid-species-complex known as *Sogatella furcifera* (Horvath) (Homoptera: Fulgoroidea). Bull. Entomol. Res. 54: 45-79.
- FERRENBERG, S. M., AND DENNO, R. F. 2003. Competition as a factor underlying the abundance of an uncommon phytophagous insect, the salt-marsh planthopper *Delphacodes penedetecta*. Ecol. Entomol. 28: 58-66.
- FIEBER, F. X. 1866. Neue Gattungen und Arten in Homoptern (Cicadina Bur.). Verhandlungen der Kaiserlich-Königlichen Zool.-botan. Gesellschaft in Wien 16: 497-524.
- FIEBER, F. X. 1879. Les Cicadines d'Europe d'après les originaux et les publications les plus récentes. Quatrième partie. Rev. Magasin de Zool. Pure Appl., series 3, 7: 65-160.
- GERMAR, E. F. 1821. Bermerkungen über einige Gattungen der Cicadarien. Magazin der Entomol. 4: 1-106.
- GIRI, H. K., FREYTAG, P. H., AND YEARGAN, K. V. 1985. Field studies of delphacid planthopper populations (Homoptera: Delphacidae), with notes on their dryinid parasites (Hymenoptera: Dryinidae). J. Kansas Entomol. Soc. 58: 69-74.
- GONZON, A. T., AND BARTLETT, C. R. 2008. Systematics of *Hadropygos* n.g., *Metadelphax* Wagner and New World *Toya* Distant (Hemiptera: Delphacidae). Trans. Am. Entomol. Soc. 113: 205-277.
- GONZON, A. T., BARTLETT, C. R., AND BOWMAN, J. L. 2007 [dated 2006]. Planthopper (Hemiptera: Fulgoroidea) diversity in the Great Smoky Mountains National Park. Trans. Am. Entomol. Soc. 132(3/4): 243-260.
- HEDRICK-ZELLER, M., AND WILSON, S. W. 2010. The planthopper genus *Pentagramma* in the United States: Morphology of male and female genitalia (Hemiptera: Delphacidae). J. Kansas Entomol. Soc. 83: 231-239.
- HOLDER, M. D., AND WILSON, S. W. 1992. Life history and descriptions of the immature stages of the planthopper *Prokelisia croceae* (Van Duzee) (Homoptera: Delphacidae). J. New York Entomol. Soc. 100: 491-497.
- HOLZINGER, W., KAMMERLANDER, I., AND NICKEL, H. 2003. The Auchenorrhyncha of Central Europe - Die Zikaden Mitteleuropas Fulgoromorpha, Cicadomorpha exc. Cicadellidae. Brill Publ., Leiden, The Netherlands. 673 pp.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (ICZN). 1961 Opinion 602. Delphax Fabricius, 1798 (Insecta, Hemiptera); Interpretation under the plenary powers. Bull. Zool. Nomencl. 18(4): 246-248.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (ICZN). 2010. Opinion 2260 (Case 3460) *Liburnia* Stål, 1866 (Insecta, Hemiptera, Delphacidae): proposed designation of *Embolophora monoceros* Stål, 1855 as the type species. Bull. Zool. Nomencl. 67(4): 340-341.
- KIRKALDY, G. W. 1907. Leafhoppers supplement (Hemiptera). Bull. Exp. Sta. Hawaiian Sugar Planters' Assoc., Entomol. Series 3:1-186, plus 20 plates.
- KUKALOVA-PECK, J. 1978. Origin and evolution of insect wings and their relation to metamorphosis, as documented by the fossil record. J. Morphol. 156(1): 53-125.
- LOGVINENKO, V. N. 1976. New leafhopper species of the superfamily Fulgoroidea (Auchenorrhyncha) from the Caucasus. Entomol. Rev. 55(3): 69-74.

- MAW, H. E. L., FOOTITT, R. G., AND HAMILTON, K. G. A. 2000. Checklist of the Hemiptera of Canada and Alaska, NRC Research Press, Ottawa, Canada.
- MCDERMOTT, B. T. 1952. A revision of the genus *Megamelanus* and its allies (Homoptera, Fulgoroidea, Delphacinae). *J. Kansas Entomol. Soc.* 25: 41-49.
- MEAGHER JR., R. L., WILSON, S. W., BLOCKER, H. D., ECKEL, R. V. W., AND PFANNENSTIEL, R. S. 1993. Homoptera associated with sugarcane fields in Texas. *Florida Entomol.* 76(3): 508-514.
- METCALF, Z. P. 1923. A key to the Fulgoroidea of eastern North America. *J. Elisha Mitchell Science Soc.* 38: 139-230.
- METCALF, Z. P. 1943. General catalogue of the Hemiptera. Fasc. IV. Fulgoroidea, Part 3. Araeopidae (Delphacidae). Smith College, Northampton, Massachusetts. 556 pp.
- METCALF, Z. P. 1949. The redescription of twenty-one species of Araeopidae described in 1923. *J. Elisha Mitchell Scientific Soc.* 65(1): 48-60 plus, 4 plates.
- MUIR, F. A. G. 1918. Homopterous Notes II. *Proc. Hawaiian Entomol. Soc.* 3: 414-429.
- MUIR, F. A. G. 1926. Contributions to our knowledge of South American Fulgoroidea (Homoptera). Part I. The Family Delphacidae. *Exp. Sta. Hawaiian Sugar Planters' Assoc., Entomol. Series, Bull.* 18: 1-51, plates 1-5.
- MUIR, F. A. G., AND GIFFARD, W. M. 1924. Studies in North American Delphacidae. *Bull. Hawaiian Sugar Planters Assoc. Div. Entomol.* 15: 1-53.
- NAST, J. 1972. Palaeartic Auchenorrhyncha (Homoptera). An annotated check list. *Polish Academy of Sciences, Inst. Zool., Polish Scientific Publ., Warsaw.* 550 pp.
- NGUYEN, R., SOSA JR., O., AND MEAD, F. W. 1984. Sugarcane delphacid, *Perkinsiella saccharicida* Kirkaldy 1903 (Homoptera: Delphacidae). *Florida Dept. Agric. Consumer Serv. Div. Plant Ind. Entomol. Circular* 265: 1-2. Available <http://www.fresh-from-florida.com/pi/enpp/ento/entcirc/ent265.pdf> (accessed 2 Mar 2012).
- NICKEL, H. 2003. The leafhoppers and planthoppers of Germany (Hemiptera, Auchenorrhyncha): patterns and strategies in a highly diverse group of phytophagous insects. *Pensoft Series Faunistica No. 28, Sofia-Moscow, Keltern.* 460 pp.
- OMAN, P. W. 1947. The types of Auchenorrhynchous Homoptera in the Iowa State College Collection. *Iowa State College J. Science* 21: 161-228.
- OSBORN, H. 1905. Descriptions of new North American Fulgoroidea. *Ohio Naturalist* 5: 373-376.
- OSBORN, H. 1935. Insects of Porto Rico and the Virgin Islands. Homoptera (exclusive of Sternorrhynchi). *Scientific Survey of Porto Rico and the Virgin Islands* 14: 111-260.
- OSSIANNILSSON, F. 1978. The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark. Part 1: Introduction, infraorder Fulgoromorpha. *Fauna Entomol. Scandinavica* 7(1): 5-222.
- PENNER, L. R. 1952. A new *Bostaera* from Florida (Homoptera-Delphacidae). *J. Kansas Entomol. Soc.* 25: 1-3.
- RODRIGUEZ-LEÓN, R., NOVOA, N., AND HIDALGO-GATO, M. M. 1994. Nuevos registros de homópteros para Cuba (Fulgoroidea: Cixiidae, Delphacidae, Tropiduchidae). *Cocuyo* 1: 4.
- SOSA JR., O., 1985. The sugarcane delphacid *Perkinsiella saccharicida* (Homoptera: Delphacidae), a sugarcane pest new to North America detected in Florida. *Florida Entomol.* 68(2): 357-360.
- STÅL, C. 1866. Hemiptera Homoptera Latr. Hemiptera Africana 4. *Officina Norstedtiana, Stockholm, Sweden.* 276 pp.
- TALLAMY, D. W., AND DENNO, R. F. 1979. Responses of sap-feeding insects (Homoptera: Hemiptera) to simplification of host plant structure. *Environ. Entomol.* 8(6): 1021-1028.
- TSAI, J. H. 1996. Development and oviposition of *Pergandrius maidis* (Homoptera: Delphacidae) on various host plants. *Florida Entomol.* 79(1): 19-26.
- URBAN, J. M., BARTLETT, C. R., AND CRYAN, J. R. 2010. Evolution of Delphacidae (Hemiptera: Fulgoroidea): Combined-evidence phylogenetics reveals importance of grass host shifts. *Syst. Entomol.* 35: 678-691.
- USDA, NRCS. 2010. The Plants Database (<http://plants.usda.gov>. National Plant Data Center, Baton Rouge, LA 70874-4490 USA (accessed 6-X-2010).
- VAN DUZEE, E. P. 1897. A preliminary review of the North American Delphacidae. *Bull. Buffalo Soc. Natural Sciences* 5: 225-261.
- VAN DUZEE, E. P. 1907. Notes on Jamaican Hemiptera: A report on a collection of Hemiptera made on the island of Jamaica in the spring of 1906. *Bull. Buffalo Soc. Natural Sciences* 8: 3-79.
- VAN DUZEE, E. P. 1909. Observations on some Hemiptera taken in Florida in the spring of 1908. *Bull. Buffalo Soc. Natural Sciences* 9: 149-230.
- VAN DUZEE, E. P. 1917. Catalogue of the Hemiptera of America North of Mexico excepting the Aphididae, Coccidae and Aleurodidae. *Univ. California Publ., Tech. Bull. vol. 2. Univ. California Press, Berkeley,* pp. i-xiv, 1-902.
- WAGNER, W. 1963 [dated 1962]. *Dynamische Taxonomie, angewandt auf die Delphaciden Mitteleuropas. Mitt. Hamburgischen Zool. Mus. Inst.* 60: 111-189.
- WESTWOOD, J. O. 1833. A notice of the ravages of the cane fly, a small winged insect, on the sugar canes of Grenada, including some facts on its habits. *Magazine Nat. Hist.* 6: 407-409.
- WHEELER JR., A. G., AND BARTLETT, C. R. 2006. *Delphacodes campestris* (Van Duzee) and *D. lutulenta* (Van Duzee) (Hemiptera: Fulgoromorpha: Delphacidae): association with common hairgrass, *Deschampsia flexuosa* (Poaceae), and notes on habitats, seasonality, and taxonomy. *Proc. Entomol. Soc. Washington* 118: 395-403.
- WHITE, W. H., REGAN, T. E., AND SOSA JR., O. 1995. The sugarcane delphacid (Homoptera: Delphacidae) extends its North American range into Louisiana. *Florida Entomol.* 78(4): 617-619.
- WILSON, B. H., PHILLIPS, S., AND HARRIS, H. M. 1973. Species and seasonal occurrence of leafhoppers and planthoppers in a 'Coastal' bermudagrass pasture in the Macon Ridge area of Louisiana. *J. Econ. Entomol.* 66(6): 1346-1347.
- WILSON, S. W. 1980. The Planthoppers, or Fulgoroidea, of Illinois, with information on the biology of selected species. *Southern Illinois Univ. Carbondale. Doctoral thesis.*
- WILSON, S. W. 1982. The planthopper genus *Prokelisia* in the United States (Homoptera: Fulgoroidea: Delphacidae). *J. Kansas Entomol. Soc.* 55(3): 532-546.
- WILSON, S. W. 1983. The first record of *Delphacodes havanae* in the United States (Homoptera: Fulgoroidea: Delphacidae). *Great Lakes Entomol.* 16: 188.

- WILSON, S. W. 2005. Keys to the families of Fulgoromorpha with emphasis on planthoppers of potential economic importance in the southeastern United States (Hemiptera: Auchenorrhyncha). *Florida Entomol.* 88(4): 464-481.
- WILSON, S. W., AND MCPHERSON, J. E. 1979. The first record of *Megamelus palaetus* in Illinois (Homoptera: Fulgoroidea: Delphacidae). *Great Lakes Entomol.* 12: 227.
- WILSON, S. W., AND MCPHERSON, J. E. 1980a. The Distribution of the Fulgoroidea of the Eastern United States (Homoptera). *Trans. Illinois State Acad. Sci.* 73(4): 7-20.
- WILSON, S. W. AND MCPHERSON, J. E. 1980b. Keys to the planthoppers, or Fulgoroidea of Illinois (Homoptera). *Trans. Illinois State Acad. Sci.* 73(2): 1-61.
- WILSON, S. W., AND MCPHERSON, J. E. 1981. Life history of *Megamelus davisii* with descriptions of immature stages. *Ann. Entomol. Soc. Am.* 74(4): 345-350.
- WILSON, S. W., AND WHEELER JR., A. G. 2010. Planthopper (Hemiptera: Fulgoroidea) diversity of weeping lovegrass (*Eragrostis curvula*), an introduced host of little known, rarely collected native species. *Entomol. Americana* 116: 98-106.
- WILSON, S. W., DENNO, R. F., MITTER, C., AND WILSON, M. R. 1994. Evolutionary patterns of host plant use by delphacid planthoppers and their relatives, pp. 7-113 *In* R. F. Denno and T. J. Perfect [eds.], *Planthoppers: their Ecology and Management*. Chapman and Hall, Inc., New York. 799 pp.
- WOOTEN, C. M., WILSON, S. W., AND TSAI, J. H. 1993. Descriptions of nymphs of the planthopper *Harmalia anacharsis* Fennah, a species new to the United States (Homoptera: Delphacidae). *J. New York Entomol. Soc.* 101: 567-573.
- YANG, C. T., AND CHANG, T. Y. 2000. *The External Male Genitalia of Hemiptera (Homoptera - Heteroptera)*. Shih Way Publishing, Taichung, China. 746 pp.