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Systematics of *Caenodelphax* Fennah (Hemiptera: Fulgoroidea: Dephacidae) and Description of the New Genus *Flavoclypeus*

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ABSTRACT

Caenodelphax Fennah was reviewed with reference to putatively allied species in the polyphyletic genus *Delphacodes* Fieber. Phylogenetic analyses using maximum parsimony of 34 morphological features for 15 ingroup and 3 outgroup taxa found that *Caenodelphax* sensu stricto did not group with putatively allied *Delphacodes*. *Caenodelphax* is here redefined as monotypic, and *Flavoclypeus* new genus is described to accommodate a clade of 8 species (6 transferred from *Delphacodes* and 2 transferred from *Caenodelphax*). *Caenodelphax philyra* was found to be a junior subjective synonym of *Caenodelphax teapae*.

Among the Delphacidae are many important pests, most notably *Nilaparvata lugens* (Stål), the brown planthopper, *Perkinsiella saccharicida* Kirkaldy, the sugarcane planthopper, *Peregrinus maidis* (Ashmead), the corn planthopper, and *Laodelphax striatellus* (Fallén), the small brown planthopper (Wilson 2005). Delphacids tend to be host-specific, with a majority feeding on phloem sap in monocots, usually grasses and sedges (Wilson et al. 1994, Nickel 2003). In addition to causing mechanical damage by feeding on vascular tissues of plants ("hopperburn", Backus et al. 2005) and cutting slits into plants for oviposition, delphacids are vectors for more than thirty plant viruses and at least one phytoplasma (Wilson & O'Brien 1987, Wilson 2005, Arocha et al. 2005). Among crops they attack are sugarcane, maize, rice, wheat, barley, and oats.

In spite of delphacids' notoriety as pests, their taxonomy is shrouded in uncertainty. Among American delphacids, several genera are known or suspected to be polyphyletic, notably the large genus *Delphacodes* (Delphacinae: Delphacini). *Delphacodes* Fieber, 1866, was originally established as a subgenus of *Delphax* Fabricius. Kirkaldy (1904: 177) raised *Delphacodes* to genus status and designated a lectotype for the type species of the genus, *Delphacodes mulsanti* (Fieber 1866). The lectotype was a female in poor condition (from southern France), which led to uncertainty and varied interpretation of the generic definition (e.g., Muir & Giffard 1924, Haupt 1935, China 1954, Linnavuori 1957, Dlabola 1957, 1961; Nast 1958, Wagner 1963, Le Quesne 1964), consequently leading to the inclusion of many unrelated species under this grouping. At one time, *Delphacodes* included 136 New World species, in addition to numerous Old World species. Asche and Remane (1983; following Wagner 1963) redefined *Delphacodes* more narrowly, limiting it to only 10 western Palearctic species, leaving many species (including all New World *Delphacodes*) in incertae sedis. Phylogenetic analyses by Urban et al. (2010) using 4 genes and morphology revealed *Delphacodes* species occurring in multiple branches, unequivocally demonstrating the polyphyly of the genus.

Hamilton (2002) suggested that some species currently in *Delphacodes* may belong to *Caenodelphax*. *Caenodelphax* Fennah, 1965, was described to include 2 Neotropical species— the type species C. *teapae* (Fowler 1905) and C. *philyra* (Fennah, 1959). Hamilton (2002) and Bouchard and colleagues (2002) transferred two Nearctic species from *Delphacodes* to *Caenodelphax* – C. *nigriscu-*

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tellata (Beamer, 1947) and *C. atridorsum* (Beamer, 1947). Hamilton (2002: 17) observed that:

"This genus [*Caenodelphax*] with a tropical genotype and 10 Nearctic species (currently placed in *Delphacodes* Fieber) have males which combines [sic] a narrow crown and a black dorsum with contrastingly pale antennae. Their calcars are small and knife-shaped.... In some species of Nearctic *Caenodelphax* the face is unusually broad, convex and shining; these species may be sexually dimorphic, with females pale tan without contrasting antennae."

Hamilton (2002: 16) also suggested that "... colour patterns are generally conservative within most genera or subgenera", suggesting that color may have a phylogenetic signal, at least within genera.

Here we test Hamilton's hypothesis regarding the composition of *Caenodelphax*. Sixteen species, including the 4 nominative *Caenodelphax* and 12 *Delphacodes*, were examined on a morphological basis to define the features of *Caenodelphax*. A phylogenetic analysis was performed to test the monophyly of *Caenodelphax* and establish a hypothesis for the evolutionary relationships among taxa. Revised genera were established, with uniform descriptions and photographs of included species.

MATERIALS AND METHODS

Sixteen species of delphacids were included in the phylogenetic analyses and considered for taxonomic revision (Table 1). Specimens were examined from the following collections (abbreviated following Arnett et al. 1993 with the addition of ABSC).

ABSC - Archbold Biological Station, entomology research collection, Venus, FL
AMNH - Department of Entomology Collection, American Museum of Natural History, New York, NY
BMNH - Department of Entomology, The Natural History Museum, London, United Kingdom
BYUC - Monte L. Bean Life Science Museum, Brigham Young University, Provo, UT
CDAE - California State Collection of Arthropods, Analysis and Identification Unit, California Department of Food and Agriculture, Sacramento, CA
CUIC - Cornell University Insect Collection, Department of Entomology, Cornell University, Ithaca, NY
ISNB - Collections Nationales Belges d'Insectes et d'Arachnides, Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium
LBOB - Lois O'Brien Collection, Green Valley, AZ, associated with CASC
LSAM - Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA
OSEC - KC Emerson Entomology Museum, Department of Entomology and Plant Pathology, Oklahoma State University, Stillwater, OK
SEMC - Snow Entomological Museum, University of Kansas, Lawrence, KS
TAMU - Department of Entomology Insect Collection, Department of Entomology, Texas A&M University, College Station, TX
UDCC - Department of Entomology and Wildlife Ecology Collection, University of Delaware, Newark, DE
ULKY - Department of Biology Collection, University of Kentucky, Lexington, KY
USNM - United States National Entomological Collection, Department of Entomology, U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC
WFBM - William F. Barr Entomological Museum, University of Idaho, Moscow, Idaho

Phylogenetic analysis and character coding

Phylogenetic analyses were conducted to test the monophyly of ingroup species. Analyses used the maximum parsimony (MP) optimality criterion as implemented by PAUP* ver. 4.0b10 (Swofford 1998), with tree graphics subsequently developed using TreeView (Version 1.6.6, Page 1996). A total of 34 characters, 14 ordered and 20 unordered, were coded for 15 ingroup (excluding C. *philyra*, see results) and 3 outgroup species (*Chionomus havanae*, *Kosswigianella lutulenta* and *Muirodelphax arvensis*; Tables 2-3). Outgroups were selected to represent nearby subtending clades in the analyses of Urban et al. (2010). Both continuous and discrete morphological characters were coded for analyses. Continuous features were coded following Poe and Wiens (2000). Continuous characters (e.g., body

length) were grouped in 'bins' of roughly equal size (e.g., state 0 = 1.50-1.75 mm, state 1 = 1.76-2.00 mm, state 2 = 2.01-2.25 mm, and state 3 = 2.26-2.50 mm) and treated as ordered. For potentially overlapping traits (e.g., number of teeth on the calcar), the average number was used instead of the full range.

Successive weighting (Farris 1969) was performed on the MP tree until the topology stabilized. A bootstrap analysis (Felsenstein 1985) using importance sampling was performed to test phylogenetic support for tree topology. The consistency index (CI), retention index (RI), homoplasy index (HI), rescaled consistency index (RC), and tree length were obtained for each tree (Kluge & Farris 1969, Archie 1989, Farris 1989a, b).

TAXONOMIC REVISION

Morphologically diagnosable monophyletic clades were defined based on the results of the phylogenetic analyses. Revised genera and each ingroup species were redefined in a consistent style. Illustrations of each included species, with photographs of dorsal and lateral views, frontal, lateral and caudal views of male terminalia are provided. Morphological terminology follows Asche (1985), except "segment 10" is substituted for "anal tube" and "armature" is used in reference to the aedeagal brace on the diaphragm. For descriptive purposes the parameres will be referred to as having a proximal "basal angle", and distal "inner", and "outer angles" (sensu Metcalf 1949).

Male genitalia were dissected for description and identification following standard procedures (e.g., Wilson & McPherson 1980, Bartlett & Deitz 2000), briefly described as follows. The abdomen was removed and cleared in 10% potassium hydroxide (KOH) overnight, rinsed in water, and transferred to glycerol for examination. Dissected parts were retained with glycerin in microvials pinned with the specimens. A variety of male and female specimens from various localities were included in morphological analyses to account for potential geographic variation or sexual dimorphism.

All observations were made using a Wild Heerbrugg dissecting scope with 20x oculars and a 6-50x objective lens. All photographs and measurements were taken using a Nikon SMZ-1500 Digital Imaging Workstation with Nikon DS-U1 digital camera and NIS Elements Imaging software (Version 3.0); photographs were compiled into plates using FastStone Image Viewer (Version 4.6). Reported measurements are averages in millimeters (mm), with the number measured (n) specified; some measurements are expressed in the descriptions as ratios of length to width (l:w). The pronotal and mesonotal lengths are expressed as the ratio pl:ml. Total body length was defined as the length from the tip of the vertex to the wing tip in macropters and from the tip of the vertex to the tip of the abdomen in brachypters; width was defined as the distance across the mesothorax between the tegulae. The length and width of antennal segments I and II were measured at the widest points. Frontal length was measured along the median carina from the vertex to the frontoclypeal suture; frontal width was measured across the lateral margins, between the antennae. Pronotal and mesonotal length were measured along their respective median carinae. Calcar length was defined as the distance from the articulation with the tibia to the apex of the calcar. In the event that a wing morph or sex was not observed, its omission was specified under the "Structure" heading.

Primary types were examined (and photographed) for each ingroup species where practicable; otherwise paratypes were examined. A critical synonymy list including all prior combinations is provided for each species. Host plant data were compiled from literature and label data, with plant names based on the USDA PLANTS database (USDA, NRCS 2012). Host data from specimens are reported along with the institution where the specimen can be found and the general collecting locality of the specimen. The distribution of all taxa was inferred from the available specimens, with additional localities from the literature also reported.

Label data were recorded for all included specimens (with non-type label data provided in Appendix 1). For primary types, labels were quoted verbatim using "/" to indicate a line break and "//" to indicate a new label and with supplemental information given in brackets. For other material examined, label data were rewritten to maintain consistency in pattern, beginning with the country, state or province, and more specific locality, followed by the collection date, collector, and lastly

the number and sex of specimens and the depository where the specimens are located, given in parentheses. Additional information such as elevation, GPS coordinates, host plant, and collection method were included, if given, in the same order as seen on the label data. Some abbreviations in label data were expanded for clarity. Specimens were provided 2D barcode labels and data were captured for online presentation (visualized at www.discoverlife.org) using "Arthropod Easy Data Capture" (Schuh et al. 2010, Schuh 2012, Arthropod Easy Capture 2013).

RESULTS

The unweighted heuristic search performed with PAUP* produced a single maximum parsimony tree (Figure 1). In this tree, the ingroup formed 3 clades: a basal clade of (*aterrima* + *sucinea*) + (*recurvata* + *shermani*) sister to the remaining ingroup; with the remaining ingroup forming two clades of (*nitens* + (*balli* + (*teapae* + *livida*))) sister to the remaining 7 taxa. Successive weighting returned a tree with similar topology except for the movement of *Delphacodes nitens* to the base of the 7 taxon clade (Figure 2, Table 4). The bootstrap analysis yielded a resolved majority consensus tree (Figure 3).

Based on the tree generated through maximum parsimony analysis, 8 of the species considered for inclusion in *Caenodelphax* (including 6 *Delphacodes* and 2 nominative *Caenodelphax*) form a monophyletic grouping (*Flavoclypeus* n. g.) with a bootstrap value of 66% on the basal node (Figure 3). The features coded in the phylogenetic analyses that best support *Flavoclypeus* (node 28, Figure 2; Table 5) are character #33 (teeth present on aedeagus, RC = 0.40), #22 (pygofer quadrate, roughly equally wide as tall, RC= 0.38), #27 (processes present on segment 10, RC = 0.14), and #18 (ratio of pronotum length to mesonotum length = 0.56-0.65, RC = 0.13). *Caenodelphax teapae* (the type species of *Caenodelphax*) did not group with this eight-species clade, but instead grouped with *Delphacodes balli* and *D. livida* as a weakly supported sister-group to the eight species clade. We view this result as a rejection of the monophyly of *Caenodelphax* sensu Hamilton (2002).

Alternatively, *Ceanodelphax* might be more broadly interpreted to include *D. livida* and *D. balli*. *Delphacodes livida* and *D. balli* differ most obviously from *Flavoclypeus* in having caudally expanded lateral margins of the pygofer and elongate diaphragm armature (taller than wide), traits shared at least with *Delphacodes acuministyla* Dozier 1926, *D. mcateei* Muir and Giffard 1924, and *D. turgida* Beamer 1948b, that were not considered in the present analyses (possibly also *D. angulata* Beamer 1947, *D. caerulata* Beamer 1947, and *D. lappae* Beamer 1946), but given these results may plausibly be allied. Since *C. teapae* does not possess caudally expanded lateral margins of the pygofer, it is not clear whether *C. teapae* is allied with these species either. Broader taxon sampling to include these species, and perhaps other *Delphacodes*, is needed to resolve the relationships among these taxa and establish if a much broader interpretation of *Caenodelphax* is tenable. Therefore, *Caenodelphax* is here redefined as a monotypic genus, and the other 8 species forming a monophyletic grouping are here defined as *Flavoclypeus* n. g.

DESCRIPTIVE TAXONOMY

Caenodelphax Fennah, 1965

Type species: *Liburnia teapae* Fowler, 1905.

Color.—Body glossy brown, patterned with orange or yellow; legs and antennae yellow; carinae concolorous or slightly darker. Genae often paler than frons; clypeus concolorous with frons. Anterior compartments of vertex usually darker than posterior compartments. Wings translucent, light to dark brown, often with darker venation. Females often paler.

Structure.—Length 1.92-3.57 mm, with females larger. Carinae of head and thorax evident but concolorous with body. Antennae circular in cross-section, first segment longer than wide, second segment not quite twice as long as first. Head, including eyes, narrower than pronotum, vertex quadrate. Median carina of frons forked below fastigium. Mesonotum more than twice as long as pronotum.

Hind tibiae bearing 5 apical black teeth, grouped 2 + 3. Basitarsus with 7 apical black teeth grouped 2 + 5, and second tarsomere with 4 teeth. Calcar slender, acuminate, bearing continuous row of many fine, black-tipped teeth on outer margin. Wings in brachypters reaching nearly to end of abdomen. Genital diaphragm well-developed, armature projecting dorsocaudally, just broader than tall. Parameres broad, flattened. Segment 10 bearing 1 pair of processes. In caudal view, opening of pygofer with rounded to weakly carinate margins; in lateral view, dorsocaudal margin of opening not expanded.

Remarks.—This genus bears a cursory resemblance to the new *Delphacodes*-segregate genus *Flavoclypeus* due to the pale antennae and contrasting darker frons, but can be distinguished by having the frons and clypeus concolorous instead of contrasting, genae contrasting with the frons instead of concolorous, and a higher frons length-to-width ratio.

Etymology.—The genus name is presumably formed from the Greek adjective *caeno* meaning "sleek" or "shining" and the Greek noun *delphax* meaning "young pig". Fennah (1959) did not specify the etymological origin, but Fowler (1905) described the frons of *Liburnia teapae* as "more or less shining" in his original description. The name is masculine in gender based on ICZN (1961; Opinion 602) that "*Delphax*" is masculine and consequently any name ending in "*–delphax*" is similarly considered masculine.

Caenodelphax teapae (Fowler, 1905)
(Fig. 4)

Liburnia teapae Fowler, 1905: 135 (plate 13, fig. 13).
Megamelus teapae (Fowler, 1905); combination by Crawford, 1914: 618 (plate 49, fig. E).
Delphacodes teapae (Fowler, 1905); combination by Wolcott, 1923: 274.
Delphacodes philyra Fennah, 1959: 262 (fig. 8).
Caenodelphax teapae (Fowler, 1905); combination by Fennah, 1965: 96.
Caenodelphax philyra (Fennah, 1959); combination by Fennah, 1965: 96.
Caenodelphax philyra (Fennah, 1959); new synonymy.

Type locality.—Mexico, Tabasco state, Teapa.

Diagnosis.—Body glossy brown, genae paler, antennae and legs yellow to orange; wings translucent dark brown, except distally along leading margin. Length 1.92-2.10 mm (brachypter), 2.76-3.57 mm (macropter). Parameres broad, constricted most narrowly subapically, truncate to slightly concave apically. Aedeagus tapering from broad base to rounded apex, bearing irregular row of about 5 retrose teeth on apical half. Segment 10 bearing pair of short, blunt, ventrocaudally curved processes.

Color.—General body color glossy brown to dark brown, carinae concolorous with body. Genae paler; antennae and legs yellow, darker near articulation of femur and coxa. Wings translucent dark brown distally along leading margin; veins dark. Pygofer brown. Females may display similar coloration to males but typically appear paler (see remarks).

Structure.—Length male macropter: 2.94 mm (2.73-3.15, n= 10); length female macropter: 3.11 mm (2.90-3.57, n = 5). Length male brachypter: 1.99 mm (1.92-2.05, n = 2); female brachypter: 2.07 mm (2.04-2.10; n = 2).

Head.—Head, including eyes, slightly narrower than prothroax. Frons quadrate, roughly twice as long as wide (l:w 2.04:1); strong median and lateral carinae; lateral carinae subparallel. Vertex approximately as wide as long (l:w 1.11:1), carinae evident. Antennal segment I longer than wide (l:w 1.57:1);

second antennal segment approximately twice as long as first (I:II 0.58:1), bearing sensory fields arranged approximately in rows.

Thorax.—Mesonotum more than twice as long as pronotum (pl:ml 0.38:1); pronotum and mesonotum weakly carinate. Lateral carinae of pronotum curved lateral, not reaching posterior margin. Median carina of mesonotum becoming obsolete in scutellum, lateral carinae slightly diverging posteriorly, reaching hind margin. Wings rounded at apex, veins setose. Calcar flattened, widest in basal third, slightly narrowing distally to acute apex, roughly three-quarters length of basitarsus, bearing a continuous row of 13-18 (n = 6) fine, black-tipped teeth on outer margin.

Abdomen.—Pygofer approximately triangular in lateral view, much wider ventrally than dorsally; in caudal view, opening taller than broad. Diaphragm well-developed, armature caudally projecting, declinate faces with fine serrulations. Parameres wide, approximately parallel, broad basally, basal angles evident, not projected; distally narrowed then becoming broader at truncate to slightly concave apex; inner angles elongate, pointed medially. Suspensorium ring-shaped. Aedeagus flattened, in lateral view broadest proximally, narrowed distally to rounded apex; bearing an irregular row of about 6 small teeth on left side, and a few ventral irregular serrulations near midlength. Segment 10 in lateral view taller than long, bearing pair of broad, short, blunt, curved processes on ventrolateral margin, serrulate apically. Segment 11 elongate, nearly as long as height of segment 10.

Hosts.—*Axonopus compressus* (Sw.) P. Beauv. (broadleaf carpetgrass) (Fennah 1959); *Crotalaria* L. (rattlebox) (Leonard 1933); *Cucurbita maxima* Duchesne (winter squash) (NMNH, Puerto Rico); *Cymbopogon citratus* (D.C. ex Nees) Stapf (lemon grass) (Wolcott 1923); *Cynodon dactylon* (L.) Pers. (Bermudagrass) (NMNH, Puerto Rico); *Daucus* L. (carrot) (Wolcott 1923); *Paspalum notatum* Flueggé (bahiagrass) (NMNH, Florida); *Phaseolus vulgaris* L. (kidney bean) (NMNH, Puerto Rico); *Saccharum* L. (sugarcane) (Wolcott 1923); *Solenostemon scutellarioides* (L.) Codd (common *Coleus*, Lamiaceae; reported as *Coleus blumei*) (Ballou 1936); *Urochloa plantaginea* (Link) R. Webster (plantain signalgrass) (Wilson 2005).

Distribution.—USA (FL); Caribbean (Antigua, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Puerto Rico, St. Lucia, St. Vincent, Trinidad and Tobago); Argentina, Bahamas, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico (Colima, Guerrero, Jalisco, Oaxaca, Puebla, San Luis Potosí, Tabasco, Veracruz), Nicaragua, Panama, Peru, Venezuela; also reported from Barbados (Fennah 1965), Galápagos Islands (Fennah 1967), Montserrat (Fennah 1959), St. Thomas and St. Croix (Caldwell and Martorell 1951).

Remarks.—This is a broadly distributed and very common Neotropical species, often collected while sweeping grasses or at lights. Most individuals are macropterous, although brachypters are not uncommon, particularly among females. There is variation in coloration geographically as well as sexually; females are usually paler, with general body color yellowish to light brown, having a yellow vertex and frons gradually darkening to brown towards the clypeus; carinae yellow, intercarinal regions brown. The wings of females usually have more extensive clear regions. Brachypters are usually paler than macropters. A few adult macropters from Belize (in the UDCC) were found bearing pits on the frons (similar to nymphs), which we viewed as an abnormality.

Crawford (1914) observed that specimens from Cuba were more uniformly brown than black. He designated the variety *Megamelus teapae albinotatus* from specimens collected in Jalapa, Mexico. This variety was subsequently raised to the species level (*Delphacodes albinotata*) by Muir and Giffard (1924), but they had misidentified the species concept. The unavailable name *Delphacodes albinotata* Muir and Giffard (nec. Crawford) was subsequently replaced by *Delphacodes arcuata* Beamer, 1948b. *Megamelus teapae albinotatus* was found to be a junior synonym of *Peregrinus maidis* (Ashmead) by Beamer (1948b).

Wolcott (1950) observed that C. *teapae* is fre-

quently preyed upon by the lizards *Anolis pulchellus* Duméril and Bibron, 1837 and *A. krugi* Peters, 1876 (these species controversially transferred to *Ctenonotus* Fitzinger, 1843 by Nicholson et al. 2012). *Caenodelphax teapae* is a vector of *Urochloa hoya blanca tenuivorus* in plantain signalgrass (*Urochloa plantaginea* (Link) R. Webster) (Lapierra & Signoret 2004, Wilson 2005).

Caenodelphax teapae can be distinguished easily from the closely-allied species in the genus *Flavoclypeus* by the clypeus, which is concolorous with the frons, not paler. The genae are often paler than the frons, in contrast to members of *Flavoclypeus*, which have the genae and frons concolorous. Compared to the sympatric tropical taxa in *Flavoclypeus* (*F. andromedus* and *F. nigrifacies*), *C. teapae* has dark wings (clear in *Flavoclypeus*) and a darker posterior edge of the pronotum.

The lectotype (designated by Fennah 1967: 77) is a macropterous male in good condition, but it is glued on a card that obscures some features.

Fennah's (1959) description of *Delphacodes philyra* outlined structural differences between it and *D. teapae*, but these differences fall within the realm of normal geographic variation within C. *teapae*. Fennah mentioned the calcar of *D. philyra* bearing 18 teeth in contrast to *D. teapae*'s 13; we found the number of calcar teeth in C. *teapae* to be more variable (13-18), and Fennah (1965) reported up to 21 teeth. Fennah (1965) cited differences in coloration of the vertex as a key component of the distinction between the two species, but this feature is relative and too variable to be of diagnostic value. Additional reported differences, involving the processes of segment 10 and the arrangement of spines on the aedeagus, are well within the scope of intraspecific geographic variation.

Etymology.—The specific name is a geographical reference to the type locality (Teapa, Mexico).

Type material examined.—Lectotype (male macropter, BMNH): "Type / H. T. [round label, red border] // Lecto- / type [round label, blue border] // *Liburnia* / *teapae* / Fowler [handwritten, paper folded] // Teapa, / Tabasco. / H. H. S[mith]. // B.C.A. Homopt. I / *Liburnia* / *teapae*, / Fowl." (See Appendix 1 for other material examined.)

Holotype D. philyra (male macropter, BMNH, in alcohol): "Type [round label] // Pres by / Com Inst Ent / B M 1965-3 // Morne Fortunée [handwritten] / St. Lucia W. I. / Feb. 1940 / R. G. Fennah // *Delphacodes* / *philyra* Fenn. / det / RGFennah / TYPE".

***Flavoclypeus*, new genus**

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Type species: *Liburnia andromeda* Van Duzee, 1907.

Color.—General body color glossy dark brown to black, often with white to yellow patterning, carinae concolorous; antennae, clypeus, and legs white to yellow. Genae concolorous with frons. Vertex concolorous except in *F. incurvus*, which has the anterior compartments darker than the posterior compartments. Wings usually clear, light; dark in *F. atridorsum* and *F. nitens*. Females usually paler, often uniformly stramineous.

Structure.—Length 1.41-3.64 mm, with females larger. Carinae evident, concolorous with body. Antennae circular in cross-section, first segment approximately as wide as long, half length of second segment. Head, including eyes, narrower than pronotum. Median carina of frons forked on fastigium. Mesonotum not quite twice as long as pronotum. Hind tibiae bearing 5 apical black teeth, grouped 2 + 3. Basitarsus with 7 apical black teeth grouped 2 + 5, and second tarsomere with 4 teeth. Calcar slender, acuminate, bearing continuous row of fine, black-tipped teeth on outer margin. Wings in brachypters leaving several abdominal tergites exposed (usually truncate at the distal margin of the 5th tergite). Pygofer in lateral view quadrate, roughly as tall as wide. In caudal view, opening of pygofer with rounded margins; in lateral view, dorsocaudal margin of opening not expanded. Diaphragm well-developed, often with median projection, about as tall as wide, dorsally or dorsocaudally projecting. Aedeagus usually bearing teeth. Segment 10 bearing one or two pairs of processes.

Remarks.—This is a broadly distributed New World genus with some common, easily encountered species and some more cryptic species. Several species in this genus appear externally indistinguishable, necessitating examination of the male genitalia for species determination. Although the yellow clypeus and dark frons pattern is a useful identifying feature of this genus, it is not sufficiently diagnostic in itself as other *Delphacodes* species (e.g., *D. aterrima* and *D. balli*) share this feature. Several species have moderate to strong sexual dimorphism, with females of *F. atridorsum*, *F. incurvus*, *F. nigriscutellatus*, and *F. nitens* completely stramineous.

Etymology.—The generic name is formed from the Latin adjective *flavo* meaning "yellow" and the Latin noun clypeus meaning "shield" in reference to the pale clypeus, which is in sharp contrast to the dark frons observed in the included species. The name is treated as masculine in gender.

Key to males of *Flavoclypeus*

1 Posterior edge of pronotum dark, concolorous with mesonotum (e.g., Figs. 7B, 12B); general body color almost black, wings dark **2**
— Posterior edge of pronotum paler than mesonotum (e.g., Fig. 5); wings clear or white **3**

2. Length of male brachypter less than 2 mm; aedeagus bent basally to project dorsally (Figs. 7D, E); found in Pacific Northwest . . . . . ***F. atridorsum***
— Length of male brachypter greater than 2 mm; aedeagus caudally projected (Figs. 12D, E); found in Mexico and eastern United States . . . . . ***F. nitens***

3. Two pairs of processes on segment 10 (e.g., Fig. 5E) **4**
— One pair of processes on segment 10 (e.g., Fig. 9E) **5**

4. First pair of processes on segment 10 short and slender; first antennal segment yellow (Fig. 6C) . . . . . ***F. aduncus***
— First pair of processes on segment 10 elongate, broad, spatulate; first antennal segment brown (Fig. 5C). . . . . ***F. andromedus***

5. Inner angles of parameres more pronounced than outer angles (Fig. 8D, 9D, 11D); pronotum mostly pale (e.g., Fig. 11B); first antennal segment yellow **6**
— Outer angles of parameres slightly longer than inner angles (Fig. 10D); pronotum mostly dark except for posterior edge (Fig. 10B); first antennal segment brown . . . . . .***F. nigrifacies***

6. Inner angles of parameres strongly evident, but not elongate (Figs. 8D, 9D) 7
— Inner angles of parameres elongate (Fig. 11D) . . . . . .***F. nigriscutellatus***

7. Processes of segment 10 truncate apically, ventrocaudally projecting (Fig. 9D); frons pale on frontoclypeal margin (Fig. 9C); vertex concolorous, or with pale posterior edge . . ***F. latidens***
— Processes of segment 10 sharply incurved apically, terminating in pointed apices (Fig. 8D); frons dark in frontoclypeal margin (Fig. 8C); posterior compartments of vertex paler than anterior compartments . . . . . ***F. incurvus***

Flavoclypeus andromedus (Van Duzee, 1907), new comb.
(Figs. 5, 13C, D)

Liburnia andromeda Van Duzee, 1907: 46.
Megamelus andromedus (Van Duzee, 1907); combination by Crawford, 1914: 628.
Delphacodes andromeda (Van Duzee, 1907); combination by Muir and Giffard, 1924: 36 (figs. 49, 107).

Type locality.—Jamaica, Middlesex County: Mandeville.

Diagnosis.— General body color glossy dark brown, with extensive yellow to orange markings, including clypeus, second antennal segment, legs, pleural and ventral regions. Posterior edge of pronotum whitish; wings clear. Length 1.45-2.79 mm, varied by sex and wing morph. Armature of the diaphragm W-shaped. Parameres flattened, broadest apically. Aedeagus tubular, broadest subapically, bearing 6 teeth near gonopore. Segment 10 bear-

ing 2 pairs of processes; first pair broad, spatulate; second pair elongate, sinuous.

Color.—Body glossy dark brown to black with sharply contrasting yellow to orange regions. Vertex, frons, and genae dark brown with sharply contrasting orange clypeus; first antennal segment brown, second antennal segment yellow to orange. Thorax dorsally dark brown to black anterior to wings, carinae darkest; wings clear revealing orangish metanotum beneath. Venter and legs pale yellow to orange-brown, palest distally, darker towards coxae. Posterior edge of pronotum and posterior tip of mesonotum pale white to yellow. Abdomen fading from dark brown anteriorly to pale white or yellow posteriorly; posterior edge of each abdominal segment slightly darker than anterior edge. Wings translucent, veins indistinct. Pygofer dark brown to black, with paler spot on dorsum. Females may be similar in coloration to males or paler, to a uniform yellow.

Structure.—Length male macropter: 2.64 mm (2.47-2.79, n = 3); length female macropter: 2.57 mm (n = 1). Length male brachypter: 1.52 mm (1.45-1.57, n = 8); length female brachypter: 1.83 mm (1.67-1.94, n = 13).

Head.—Head, including eyes, slightly narrower than prothorax.—Frons approximately twice as long as broad (l:w 1.81:1), widest at middle; carinae strongly evident. Vertex longer than wide (l:w 1.56:1). Antennal segment I approximately equal in length and width (l:w 1.13:1); second antennal segment approximately twice as long as first (I:II 0.47:1).

Thorax.—Mesonotum about twice as long as pronotum (pl:ml 0.55:1); mesonotum and pronotum strongly carinate. Median carina of mesonotum becoming obsolete on scutellum. Wings rounded at apex, about twice as long as wide in brachypters, leaving several tergites exposed beyond wings. Macropterous wings extending for one-third length beyond abdomen. Abdominal segments 7-10 visible dorsally in brachypters. Calcar approximately three-quarters length of basitarsus, foliaceous, bearing row of 12-15 (n = 5) fine, black-tipped teeth on outer margin.

Abdomen.—Pygofer roughly triangular in lateral view, much wider ventrally than dorsally; anterior margin longer than posterior margin; in caudal view, aperture approximately oval. Diaphragm well-developed; armature of the diaphragm projecting dorsally, approximately W-shaped with rounded medial projection, taller than wide. Parameres broad basally, narrowing slightly medially, and broadest subapically. Suspensorium ring-like, surrounding base of aedeagus with subtending elongate base attaching to segment 10. Aedeagus tubular, in lateral view broadest subapically, with row of approximately 6 teeth near gonopore at apex. Segment 10 bearing 2 pairs of processes; first pair (on ventrocaudal margin from lateral view) distinctly flattened, spatulate, broadest basally; second pair (on ventroanterior margin) slender, elongate, sinuous, projecting approximately caudally. Segment 11 small, elongate, about ½ as tall as segment 10.

Hosts.—*Aristida beyrichiana* Trin. & Rupr. (Beyrich threeawn; see remarks) (ABSC, Florida); *Eleocharis* R. Br (spikerush; see remarks) (UDCC, Delaware), *Paspalum* L. (crowngrass) (Osborn 1926).

Distribution.—USA (AL, AR, DC, DE, FL, LA, MD, NC, NJ, PA, TN, TX, VA), Jamaica. Also reported from USA (CT, KS, KY, MA, SC) (PBI database; NCSU), USA (GA) (Spooner 1920), USA (OH) (Osborn 1935), USA (OK) (PBI database; OSEC), Belize (Crawford 1914), Cuba (Osborn 1926), Guyana (Van Duzee 1907), Puerto Rico (Osborn 1929).

Etymology.—The specific name is presumably related to the Latin *Andromeda* (Latinized form of the Greek *Andromede*), beautiful Ethiopian princess of Greek mythology. Van Duzee (1909: 203) referred to *L. andromeda* as a "beautiful little species".

Remarks.—Osborn (1935) comments that this species occurs in high numbers in moist locations. According to label data, an additional host for this

species might be *Eleocharis* R. Br (spikerush) but this remains unconfirmed (see Appendix A). *A* record from *Aristida beyrichiana* was based on a female (from Florida) and could have been *F. nigrifacies* instead. We have collected this species in long series sweeping ruderal grasses in Cecil County, Maryland.

Although the type specimen of this species was collected in Jamaica, this species has a limited Neotropical distribution. *Flavoclypeus andromedus* males can often be recognized by the distinctive, spatulate pair of processes on the ventrocaudal margin of segment 10, which are visible without dissection. Presumptive *F. andromedus* specimens collected in the Neotropics should be compared with *F. nigrifacies*, which is more abundant in that region. *Flavoclypeus nigrifacies* has only one pair of processes on segment 10. This species also bears a resemblance to *F. aduncus*, but *F. andromedus* has the first pair of processes on segment 10 longer and spatulate rather than short and sharply pointed.

Females of *F. andromedus* are most often colored similarly to the male, but some are much paler (Fig. 13D), approaching a uniform shiny straminеous. Female *F. andromedus* and *F. nigrifacies* probably cannot be reliably distinguished.

Type material examined.—Lectotype (Male brachypter, dissected, CASC): "Mandev'le / Ja. Apr. 06 // VanDuzee / Collector // Lectotype / *Andromeda* [handwritten] [red paper] // EPVanDuzee / collection // California Academy / of Sciences / Type / No. 3059 [handwritten]".

Flavoclypeus aduncus (Beamer 1948b), new comb.
(Figs. 6, 13A, B)

Delphacodes aduncа Beamer 1948b: 98, 105 (fig. 35).

Type locality.—USA, Florida: Levi County.

Diagnosis.— General body color glossy dark brown with extensive pale markings, including white to yellow antennae, clypeus, venter, legs, and portions of the abdomen. Posterior edge of pronotum white; wings clear. Length 1.41-1.91 mm.

Color.—Body dark brown, extensively marked with orangish. Frons dark brown to black with sharply contrasting yellow antennae and clypeus. Thorax dark brown to black, legs and venter white to yellow. Posterior edge of pronotum and scutellum white to yellow. Abdomen fading from dark brown anteriorly to pale white or yellow posteriorly. Wings translucent, veins indistinct; body pale beneath wings. Pygofer, in dorsal view, white to yellow medially and dark brown to black laterally. Sexually dimorphic coloration with females typically paler, uniform white to yellow.

Structure.—Macropters: none observed. Length male brachypter: 1.61 mm (1.41-1.91, n = 20); female brachypter: 1.85 mm (n = 1).

Head.—Head, including eyes, slightly narrower than prothorax. Frons approximately twice as long as wide (l:w 1.80:1). Vertex longer than wide (l:w 1.38:1), carinae evident. Antennal segment I slightly longer than wide (l:w 1.13:1); second antennal segment approximately twice as long as first (I:II 0.53:1), bearing sensory fields arranged approximately in rows.

Thorax.—Mesonotum longer than pronotum (pl:ml 0.69:1); pronotal and mesonotal carinae evident. Median carina of mesonotum becoming obsolete in scutellum, lateral carinae slightly diverging posteriorly, reaching hind margin. Wings rounded at apex leaving several tergites exposed beyond wings. Calcar flattened, acuminate, widest in basal third, approximately three-quarters length of basitarsus, slightly narrowing distally to acute apex, bearing a continuous row of 10-13 (n = 5) fine, black-tipped teeth on outer margin.

Abdomen.—Pygofer approximately ovular in lateral view, slightly wider ventrally than dorsally; anterior margin longer than posterior margin. Diaphragm strongly developed, in caudal view armature deeply concave, just taller than wide, dorsocaudally projected. Parameres broad, in caudal view boot-shaped, inner angles strongly evident. Suspensorium evident, surrounding base of aedeagus subtended by sinuate, elongate stem attached to segment 10. Aedeagus tubular, bearing numerous

retrose spines; bent dorsad in basal third and caudad in apical third to project caudally; slightly wider at base than at apex, narrowest medially. Segment 10 elongate, bearing two pairs of processes; the first (on ventrocaudal margin in lateral view) short, caudally projected, terminating in sharp apices; the second (on anteroventral margin) more elongate, slender, sinuous, and dorsally projected, terminating in sharp apices. Segment 11 small.

Hosts.—None reported.

Distribution.—USA (FL, GA, NC).

Etymology.—Beamer (1948b) did not specify the etymological origin, but the specific name is presumably formed from the Latin adjective *aduncus* meaning "hooked" or "bent inward", in reference to the aedeagus, which is bent dorsally near the base.

Remarks.—This species is infrequently encountered and very similar to *F. andromedus* in coloration and structure. Both species bear 2 processes on segment 10, but in *F. aduncus*, the first pair is short and sharply pointed, whereas it is elongate and spatulate in *F. andromedus*. The "boot-shaped" parameres also distinguish this species from similar taxa. Female *F. aduncus* (Figs. 13A, B) appear to be considerably paler than males.

Type material examined.—*Paratypes* (2 male brachypters, USNM), USA: FLORIDA: "Hilliard FLA / Oct5 / Oman 1938 // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", paratype (female brachypter, USNM): "Islamoranda / FLA July 20 / Oman 1939 // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", (2 male brachypters, USNM): "LaBelle FLA / July 16 / Oman 1939 // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", (2 male brachypters, USNM): "New Port Ritchey / FLA X-7 / Oman // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", (male brachypter, USNM): "Sanford, Fla. / (handwritten)10-31-25 / E. D. Ball // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", (2 male brachypters, USNM): "ZolfoSpgs / FLA Ju. 15 / Oman 1939 // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer", (1 male, 1 female brachypter, AMNH): "Otter Creek / Fla. 3-9-47 / L. D. Beamer // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer". USA: NORTH CAROLINA: (3 male brachypters, USNM), "Raleigh NC / Oct 16 / Oman 1938 // [blue paper] PARATYPE / *Delphacodes* / *adunca* / R.H. Beamer".

Flavoclypeus atridorsum (Beamer 1947), new comb.
(Figs. 7, 13E, F)

Delphacodes atridorsum Beamer 1947: 63, 71 (fig. 16).
Caenodelphax atridorsum (Beamer 1947), combination by Hamilton, 2002: 17.

Type locality.—USA, Oregon: Deschutes County, La Pine.

Diagnosis.—General body color (males) dark brown to black with yellow clypeus, antennae, and legs; wings dark; females uniformly stramineous. Length 1.66-2.23 mm, with females larger. Parameres broad, with inner angles sharply pointed medially. Aedeagus bent dorsally at base, bearing about 6 teeth near apex and about 8 teeth near base. Segment 10 bearing pair of pointed processes curved slightly ventrally.

Color.—Strongly sexually dimorphic; male general body color dark brown to black, carinae concolorous with body. First and second antennal segments, clypeus, legs, and scutellum yellow; genae fading from dark brown to yellow. Wings dark, translucent brown, veins darker. Pygofer dark brown to black. Females much paler, general body color uniform yellow to light brown, with lateral frontal carinae and apex of ovipositor darker; in some specimens, posterior edge of each abdominal segment darker than anterior edge.

Structure.—Macropters: none observed. Length male brachypter: 1.69 mm (1.66-1.71, n = 2); length female brachypter: 2.04 mm (1.89-2.23, n = 5).

Head.—Frons slightly longer than wide (l:w 1.33:1). Frons widest at middle, between ocelli, and tapering evenly towards the vertex above and clypeus below. Median carina defined most sharply medially, fading at base and apex. Antennal segment I approximately equal in length and width (l:w 0.88:1); second antennal segment approximately twice as long as first (I:II 0.44:1). Vertex as long as wide (l:w 1:1), broadly rounded in frontal view.

Thorax.—Mesonotum approximately twice as long as pronotum (pl:ml 0.53:1); pronotal and mesonotal carinae visible but not strongly evident. Median carina of mesonotum becoming obsolete before scutellum; lateral carinae diverging sharply towards hind margin. Wings rounded, only slightly longer than wide, just reaching second abdominal segment. Calcar foliaceous, approximately three-quarters length of basitarsus, bearing a row of 10-12 (n = 3) very fine, black-tipped teeth on outer margin.

Abdomen.—Pygofer approximately quadrate in lateral view, slightly taller than wide. Diaphragm well-developed, in caudal view dorsum broadly U-shaped, armature subapical, caudally projecting. Parameres broad basally and apically, narrowed medially; inner and outer angles strongly evident, pointed; distal margin concave, basal angles weak. Suspensorium evident, ring-shaped. Aedeagus curved dorsad; broad basally, tapered abruptly in basal 1/3, then slightly tapered to apex, with irregular group of approximately 6 subapical teeth, pair of rows of 8+ ventral teeth beginning in distal 1/3, with few scattered irregular teeth laterally. Segment 10 short and broad, bearing pair of large caudoventrally projecting processes on ventrolateral margin. Segment 11 small, approximately 2/3 as tall as segment 10.

Hosts.—None reported.

Distribution.—USA (OR).

Etymology.—Beamer (1947) did not specify the etymological origin of the specific name, but it was likely formed from the Latin *ater* meaning "black" and the Latin noun dorsum meaning "back" in reference to the dark body color observed in males.

Remarks.—As Beamer (1947) noted, this species is similar to *F. nitens* but smaller and bearing a distinctive bend in the aedeagus. Both species are strongly sexually dimorphic with females (Figs. 13E, F) much paler and more uniform in color than males. In frontal view, *F. atridorsum*'s head is rounder than those of the other species in *Flavoclypeus* due in part to the shorter length of the frons.

This species is only known to have been collected during the month of July. The specimens examined are all from the type locality and date.

Type material examined.—Paratypes (1 male, 1 female brachypter, SEMC), USA: OREGON: "Lapine, Oregon / 7-2-35 // [blue paper] PARATYPE / *Delphacodes* / atridorsum / R.H. Beamer".

Flavoclypeus incurvus (Beamer 1948a), new comb.
(Figs. 8, 13G, H)

Delphacodes incurva Beamer 1948a: 3, 7 (fig. 24).

Type locality.—USA, Connecticut: Tolland County.

Diagnosis.—General body color glossy dark brown; clypeus, antennae, posterior edge of pronotum, and legs white to yellow; wings clear. Length 1.45-1.96 mm, with females larger. Parameres avicephaliform, with sharp inner angles and rounded outer angles. Aedeagus elongate, bearing small teeth near apex and 3 larger processes medially on ventral margin. Segment 10 bearing pair of processes on dorsal margin with apices sharply incurved medially.

Color.—General body color glossy dark brown, carinae concolorous with body. First and second antennal segments, clypeus, posterior edge of vertex, pronotum, scutellum, and legs white to yellow. Wings translucent, veins whitish. Pygofer brown, with paler medial spot in dorsal view. Females paler; general body color uniformly white to yellow.

Structure.—Length male brachypter: 1.57 mm (1.45-1.67 mm, n = 5); female brachypter: 1.83 mm (1.52-1.96 mm, n = 5).

Head.—Width of head, including eyes, subequal to prothorax width. Frons longer than wide (l:w 1.59:1); facial carinae evident. Vertex longer than wide (l:w 1.38:1), broadly rounded in frontal view. Antennal segment I longer than wide (l:w 1.5:1); second antennal segment approximately twice as long as first (I:II 0.53:1).

Thorax.—Mesonotum not quite twice as long as pronotum (pl:ml 0.59:1), carinae evident. Median carina of mesonotum becoming obsolete in scutellum. Wings rounded at apex. Calcar knife-shaped, bearing continuous row of 6-13 (n = 5) very fine, black-tipped teeth.

Abdomen.—Pygofer approximately quadrate in lateral view, width and height roughly equal, anterior margin just taller than posterior margin. Diaphragm well-developed, with medially concave, dorsocaudally directed armature. Parameres avicephaliform, broadest apically, narrowest just before apex, with inner angles strongly produced into sharp apices, outer angles broadly rounded, basal angle weakly indicated. Suspensorium evident, ring-like. Aedeagus tubular, broadest basally, narrowest medially, incurved ventrally at apex, bearing irregular row of teeth apically and 3 larger, ventrally-projected processes at midlength of ventral margin. Segment 10 with pair of elongate, caudally-projected processes on dorsal margin, terminating in pointed apices, incurved medially at right angles. Segment 11 small, elongate, about 1/3 as tall as segment 10.

Hosts.—None reported.

Distribution.—USA (CT, NM, UT). Also reported from USA (KS) (Beamer 1948a), Canada (BC) (Maw et al. 2000).

Etymology.—Beamer (1948a) did not specify the origin of the specific name, but it is likely in reference to the sharply incurved processes of segment 10.

Remarks.—As Beamer (1948a) noted, this species is very similar to *F. nigriscutellatus* but with the posterior compartments of the vertex paler than the anterior compartments; this feature also helps to distinguish it from *F. aduncus*. In contrast to both of those species, *F. incurvus* has the anterior compartments of the vertex longer than the posterior compartments, as well as the dorsal processes on segment 10 sharply incurving medially. Females of *F. incurvus* are uniformly stramineous.

Type material examined.—Paratype (female brachypter, AMNH): USA: CONNECTICUT: "Storrs Conn. / 8-15-1946 / R. H. Beamer // [blue paper] PARATYPE / *Delphacodes* / *incurva* / R. H. Beamer".

Flavoclypeus latidens (Beamer 1948a), new comb.
(Figs. 9, 14A, B)

Delphacodes latidens Beamer 1948a: 4, 7 (fig. 25).

Type locality.—USA, Texas: Kenedy County, Sarita.

Diagnosis.— General body color glossy dark brown, with white to yellow clypeus, antennae, pronotum, and legs; wings clear. Length 1.81-3.64 mm, varied by sex and wing morph. Parameres broad, avicephaliform, with elongate inner angles pointed medially. Aedeagus tapering from broad base to narrow apex, with two rows of retrose teeth. Segment 10 bearing pair of thick, truncate processes.

Color.—General body color glossy dark brown, carinae concolorous with body. First and second antennal segments, clypeus, lower margin of frons, posterior edge of vertex, pronotum, scutellum, and legs white to yellow. Wings translucent, veins light brown. Pygofer brown, with paler medial spot in dorsal view. Females paler; general body color yellow, with pale median vitta and row of dark brown to black patches occurring along the dorsolateral margins of the abdomen and dark patches on genae, directly below the compound eyes.

Structure.—Length male macropter: 2.97 mm (2.86-3.36, n = 5); female macropter: 3.40 mm (3.21-3.64, n = 5). Length male brachypter: 1.89 mm (1.88-1.98, n = 6); length female brachypter: 2.49 mm (2.38-2.61, n = 4).

Head.—Head, including compound eyes, slightly narrower than prothorax.—Frons not quite twice as long as broad (l:w 1.70:1); facial carinae strongly evident, median carina of frons forked below fastigium. Vertex approximately as long as wide in males (l:w 1.11:1); slightly longer in females. Antennal segment I longer than wide (l:w 1.38:1); second antennal segment twice as long as first (I:II 0.50:1).

Thorax.—Mesonotum approximately twice as long as pronotum (pl:ml 0.56:1), carinae evident. Median carina of mesonotum becoming obsolete in scutellum; lateral carinae diverging posteriorly, just reaching hind margins. Wings rounded at apex. Calcar bearing continuous row of 12-19 (n = 5) teeth.

Abdomen.—Pygofer approximately quadrate in lateral view, slightly wider ventrally than dorsally. Diaphragm strongly developed; armature with rounded dorsocaudal projection, just wider than tall. Parameres wide basally and apically, narrowest medially, approximately avicephaliform; inner angles elongate, projected medially, outer angles rounded, projected laterally; basal angles small. Suspensorium evident, ring-like, surrounding base of aedeagus with subtending elongate base attached to segment 10. Aedeagus in lateral view widest basally, slightly serpentine and slightly to narrowest point apically; one row of 2-4 subdorsal retrose teeth; subapical ventral portion expanded, bearing 6-8 ventrolateral teeth on each side. Segment 10 bearing one pair of thick, truncate processes, ventrocaudally projected, apices slightly laterally projected. Segment 11 small, approximately ovular, longer than wide.

Hosts.—*Setaria texana* W.H.P. Emery (Texas bristlegrass) (Wilson et al. 1994).

Distribution.—USA (AZ, KS, NM, TX, UT), Mexico (Puebla, Zacatecas). Also reported from USA (OK) (Wilson and Wheeler 2010).

Etymology.—Beamer (1948a) did not specify the origin of the specific name, but it was presumably formed from the Latin adjective *latus* meaning "broad" and the Latin noun *dens* meaning "tooth" in reference to the aedeagal teeth.

Remarks.—This species bears a superficial resemblance to *F. nigriscutellatus* in coloration, as both species' pronota are pale, but can be distinguished by the genitalia. *Flavoclypeus nigriscutellatus* has more elongate inner angles on the parameres and a curved, slightly pointed aedeagus, compared to avicephaliform parameres and a blunt, caudally-projected aedeagus in *F. latidens*. *Flavoclypeus* latidens has a pale band along the frontoclypeal margin of the frons that is often quite evident. Females of *F. latidens* (Figs. 14A, B) are often distinctive because of strongly contrasting dark markings on the genae and pleuron.

This species is modestly common in collections and has been collected from April through September. The record from Kansas is tentative because it is based on a female specimen only.

Type material examined.—Holotype (male brachypter, SEMC) USA: Texas, Kenedy County "Sarita, Texas / Dec. 25, 1945 / R. H. Beamer // M // HOLOTYPE / *Delphacodes* / latidens [handwritten] / R. H. Beamer [red paper]".

Flavoclypeus nigrifacies (Muir, 1918), new comb.
(Figs. 10, 14C, D)

Delphacodes nigrifacies Muir, 1918: 428 (fig. 5).
Delphacodes xerosa Caldwell, 1951: 186 (plate 22) (in Caldwell & Martorell 1951); synonymy by Kennedy et al., 2012: 405.

Type locality.—Martinique, Fort de France.

Diagnosis.— General body color glossy dark brown, with white to yellow clypeus, second antennal segment, posterior edge of pronotum, and legs; wings clear. Length 1.41-2.67 mm, varied by sex and wing morph. Parameres flattened, broadest apically, with elongate outer angles. Aedeagus tubular, bearing several rows of retrose spines. Segment 10 bearing pair of broad, truncate processes.

Color.—Frons glossy dark brown with contrasting yellow clypeus; carinae concolorous. First antennal segment brown, second segment yellow. Vertex dark yellow to light brown. Prothorax dark brown with paler posterior margin and sometimes with paler lateral margins; mesothorax dark brown with yellow scutellum; tegulae and adjacent lateral edges of mesothorax yellow. Coxae dark brown, legs yellow; wings hyaline, veins indistinct. Abdomen fading from brown anteriorly to yellow posteriorly; posterior edge of each abdominal segment darker than anterior edge. Sexually dimorphic coloration with females typically similar in coloration to males, or with paler variations such as yellow to orange vertex and pronotum.

Structure.—Length male macropter: 2.24 mm (n = 1); female macropter: 2.58 mm (2.49-2.67, n = 2). Length male brachypter: 1.53 mm (1.41-1.65, n = 10); female brachypter: 1.70 mm (1.53-1.80, n = 14).

Head.—Frons approximately twice as long as broad (l:w 1.83:1); carinae strongly evident. Frontal median carina forked just below fastigium. Vertex just wider than long (l:w 0.94:1). Antennal segment I slightly longer than wide (l:w 1.14:1); second antennal segment approximately twice as long as first (I:II 0.50:1).

Thorax.—Mesonotum about twice as long of pronotum (pl:ml 0.55:1). Median carina of mesonotum becoming obsolete on scutellum; lateral carinae of pronotum and mesonotum diverging, curved posteriorly, not reaching hind margin. Wings vary in length, leaving abdominal segments 7-10 exposed in some brachypters and only the pygofer in others; wings rounded at apex. Acuminate calcar bearing row of 15-20 (n = 5) fine, black-tipped teeth on outer margin.

Abdomen.—Pygofer approximately triangular in lateral view, much wider ventrally than dorsally. Diaphragm well-developed, armature concave, wider than tall, with lateral dorsally-directed projections. Parameres broad, reaching broadest point apically, outer angles elongate, pointing laterally; inner angles acute, pointing medially; basal angles strongly evident. Suspensorium with elongate stem, distally ringing aedeagus base. Aedeagus tubular, broadest basally, bearing several irregular rows of retrose spines. Segment 10 with very short, acute pair of approximated caudally-projected processes from ventroanterior margin. Segment 11 about 2/3 as tall as segment 10 in lateral view.

Hosts.—*Chamaecrista fasciculata* (Michx.) Greene (partridge pea) (Kennedy et al. 2012); *Cynodon dactylon* Pers. (Bermudagrass) (Calvert et al. 1987); *Paspalum notatum* Flueggé (bahiagrass) (Kennedy et al. 2012); Poaceae (reported as Gramineae) (Ballou 1936); *Stenotaphrum secundatum* Kuntze (St. Augustine grass) (Calvert et al. 1987).

Distribution.—USA (FL), Belize, Bolivia, Colombia, Costa Rica, Ecuador, Grenada, Guyana, Jamaica, Martinique, Mexico (Federal District, Veracruz), Panama, Puerto Rico, St. Thomas, St. Vincent and the Grenadines, Venezuela. Also reported from Dominica, Montserrat, and St. Lucia (Fennah 1959).

Etymology.—Muir (1918) did not specify the etymological origin, but the specific name is presumably formed from the Latin adjective *niger* meaning "black" and the Latin noun *facies* meaning "face", in reference to the dark frons.

Remarks.—Muir and Giffard (1924) note that the paratype of *L. andromeda* Van Duzee from Demerara, British Guiana (= Guyana, R.J. Crew, April 2, 1901) is actually D. *nigrifacies*. These two species are very similar externally; *F. nigrifacies* has only one pair of processes on segment 10 instead of 2 as observed in *F. andromedus*. Females of *F. nigrifacies* (Figs. 14C, D) may be colored very similarly to males, or may be slightly to considerably paler.

At the outset of this project, *Delphacodes xerosa* was considered a separate taxon, but it was synonymized with *F. nigrifacies* during the duration of this project based on comparison of the type specimens (Kennedy et al. 2012). The type of *D. xerosa* is at the USNM and the type of D. *nigrifa-*

cies is at the AMNH.

Calvert and colleagues (1987) provide descriptions of immatures and some details of life history of *F. nigrifacies*. In Florida, this species is polyvoltine. Eggs are deposited singly along the midrib of leaves of *Paspalum notatum* and require 20.8±2.44 days to complete nymphal development at 26.7°C and 12L:12D.

Type material examined.—Holotype (male brachypter, AMNH) MARTINIQUE: "Fort de France / Martinique, W.I. / June 27, 1911 // [red paper] TYPE OF / *D nigrifacies* / Muir // Am. Mus. Nat. Hist. / Dept. Invert. Zool. / No. 24254 // [red paper] HOLOTYPE / *Delphacodes* / *Nigrifacies* / MUIR".

Flavoclypeus nigriscutellatus (Beamer 1947), new comb.
(Figs. 11, 14E, F)

Delphacodes nigriscutellata Beamer 1947: 62, 69 (fig. 15).
Caenodelphax nigriscutellata (Beamer 1947), combination by Bouchard et al. 2002: 49.

Type locality.—USA, Kansas: Douglas Co.

Diagnosis.— General body color glossy dark brown, with white to yellow clypeus, antennae, pronotum, and legs; wings clear. Length 1.70-3.26 mm. Parameres broad, inner angles elongate. Aedeagus tapering from broad base to narrow apex, incurved ventrally in apical third, bearing about 4 retrose teeth dorsally and 2 retrose teeth on both lateral margins. Segment 10 bearing pair of elongate, pointed, caudally projected processes.

Color.—General body color dark brown to black, carinae concolorous with body. Posterior edge of pronotum white to yellow; in some specimens, entire pronotum white to yellow, in contrast with dark brown mesonotum, or white to yellow with darker brown patches on lateral margins. Vertex typically dark brown but appearing paler yellow in some specimens. First and second antennal segments, clypeus, tegulae, scutellum, and legs yellow. Wings translucent, veins darker. Pygofer brown. Sexually dimorphic coloration with females typically paler, uniform white to yellow.

Structure.—Length male macropter: 3.26 mm (n = 1); female macropter: 3.88 (n = 1). Length male brachypter: 1.70 mm (n = 1); female brachypter: 2.60 (n = 1).

Head.—Head, including eyes, approximately equal in width to pronotum. Frons longer than wide (l:w 1.39:1). Frons widest at middle, between ocelli; slightly narrower at base than at apex. Median carina of frons forked below fastigium. Vertex length approximately equal to width (l:w 1.04:1). Antennal segment I equal in length and width (l:w 1:1); second antennal segment approximately twice as long as first (I:II 0.43:1).

Thorax.—Mesonotum not quite twice as long as pronotum (pl:ml 0.60:1); pronotal carinae evident, lateral mesonotal carinae evident, median mesonotal carina becoming obsolete before scutellum. Wings (brachypter) longer than wide. Wings (macropter) extend beyond base of abdomen by one-third. Wings rounded at apex in both forms. Calcar bearing continuous row of 14-16 (n = 2) black-tipped teeth.

Abdomen.—Pygofer approximately ovular in lateral view, slightly wider ventrally than dorsally; anterior margin longer than posterior margin. Diaphragm well-developed; armature dorsally and caudally projecting; bearing fine serrulations ventral margins. Parameres with elongate, medially-projected inner angles, much shorter laterally-projected outer angles, and short caudally-projecting basal angles. Suspensorium ring-shaped. Aedeagus broadest basally, thinnest apically, incurved ventrally towards apex, bearing row of about 4 large retrose teeth along dorsal margin and a pair of retrose teeth on both lateral margins at the base. Processes of segment 10 long, slightly sinuate, caudally projected, tapering to pointed apex. Segment 11 elongate, roughly as long as height of segment 10.

Hosts.—*Andropogon gerardii* Vitman (big bluestem; reported as *A. furcatus* Muhl; see remarks) (Beamer 1947); *Eleocharis compressa* Sull. (flat-stem spikerush) (Bouchard et al. 2002); *Eleocharis elliptica* Kunth (elliptic spikerush) (Bouchard et al. 2002); *Spartina pectinata* Bosc ex Link (prairie cordgrass, UDCC, Wisconsin); *Sporobolus heterolepis* (A. Gray) A. Gray (prairie dropseed; see remarks) (Bouchard 1997).

Distribution.— USA (CO, IA, KS, WI). Also reported from USA (MN, SD) (Bouchard 1998) and Canada (AB, MB, ON) (Bouchard 1997, Maw et al. 2000).

Etymology.—Beamer (1947) did not specify the origin of this name, but it was presumably formed from the Latin adjective niger meaning "black" and the Latin noun *scutellum*, diminutive of *scutum*, meaning "shield", in reference to the dark scutellum.

Remarks.—In his original diagnosis, Beamer (1947) described this species (as *Delphacodes nigriscutellata*) as being similar to *Delphacodes shermani* but with differences in coloration. In addition to the color differences described by Beamer, there are distinctions in structure between these species, such as *D. shermani*'s avicephaliform parameres, wide, rectangular aedeagus, greater body length to width ratio, and longer frons. For these reasons, *D. shermani* was excluded from the ingroup. Females of *F. nigriscutellatus* (Figs. 14 E, F) are uniformly pale.

Beamer (1947) reports that "this species was collected in Douglas Co., Kans., by sweeping around the edge of a marsh which had a fair stand of *Andropogon furcatus* Muhl. It was not taken in any other stand of this grass although several other locations were swept." *Sporobolus heterolepis* (A. Gray) A. Gray (prairie dropseed) was additionally listed as a potential host by Bouchard (1997).

Bouchard (1998) remarks that F. *nigriscutellatus* is very rare and occurs in low abundance, necessitating intensive collecting efforts. It has been collected from April through September. Wallner (2010) established that this species is a prairie habitat specialist and intolerant of prairie degradation.

Type material examined.—Paratypes USA: KANSAS: Plesiotype/holomorphotype (male macropter, SEMC): "Meade Co. Kans / 9-13 1944 / R. H. Beamer // [handwritten, orange paper] Holomorphotype / *Delphacodes* / *nigriscutellata* / R.H. Beamer". Allomorphotype (female macropter, SEMC): "Douglas Co. Kans / Apr. 18 1946 (4) / R.H. Beamer // [handwritten, orange paper] Allomorphotype / *Delphacodes* / *nigriscutellata* / R. H. Beamer". Paratype (male brachypter, SEMC), "Douglas Co. Kans / 4-12-1946 (4) / R. H. Beamer // [blue paper] PARATYPE / *Delphacodes* / *nigriscutellata* / R.H. Beamer", paratype (male brachypter, AMNH): "Douglas Co. Ks / Apr. 18 1946 (4) / R. H. Beamer // [blue paper] PARATYPE / *Delphacodes* / *nigriscutellata* / R.H. Beamer", paratype (female brachypter, AMNH): "Douglas Co. Ks / Apr. 18 1946 (4) / R.H. Beamer // [blue paper] PARATYPE / *Delphacodes* / *nigriscutellata* / R.H. Beamer".

Flavoclypeus nitens (Muir and Giffard, 1924), new comb.
(Figs. 12, 14G, H)

Delphacodes nitens Muir and Giffard, 1924: 27, 45 (figs. 20, 21), 49 (fig. 76).

Pissonotus nigridorsum Metcalf, 1923: 206 (figs. 449, 679); syn. by Bartlett et al. in press (*Delphacodes nitens* used by Bartlett et al. (in press) to avoid homonymy with *Delphacodes nigridorsum* (Crawford, 1914).

Type locality.—USA, Ohio: Columbus.

Diagnosis.— General body color glossy dark brown to black with yellow to orange clypeus, antennae, and legs; wings dark. Length 2.13-3.03 mm, with females larger. Parameres broad, constricted most narrowly subapically, with outer angles longer than inner angles. Aedeagus thick, bearing row of about 6 teeth on both lateral margins, third row of about 4 teeth on dorsal margin. Segment 10 bearing pair of pointed, slender processes, curved ventrally.

Color.—General body color dark brown to black; glossy. Carinae concolorous with body. Clypeus, first and second antennal segments, legs,

and scutellum pale yellow to orange. Posterior compartments of vertex lighter brown than areolet, anterior compartments of vertex, and pronotum. Wings dark brown, veins concolorous. Sexually dimorphic coloration with females typically paler, uniform white to yellow.

Structure.—Macropters: none observed. Length male brachypter: 2.35 mm (2.13-2.46, n = 10); length female brachypter: 2.84 mm (2.62-3.03, n = 7).

Head.—Head slightly narrower than pronotum. Frons twice as long as broad (l:w 1.94:1), widest at middle between ocelli; carinae strongly evident. Median carina of frons forked below fastigium. Vertex longer than wide (l:w 1.17:1); carinae evident. Antennal segment I slightly longer than wide (l:w 1.22:1); second antennal segment approximately twice as long as first (I:II 0.46:1); second segment bearing sensory fields approximately arranged in rows.

Thorax.—Mesonotum not quite twice as long as pronotum (pl:ml 0.62:1). Median carina of mesonotum becoming obsolete on scutellum; lateral carinae diverging posteriorly to reach hind margin. Wings rounded apically. Calcar bearing continuous row of 14-17 (n = 5) very fine black-tipped teeth.

Abdomen.—Pygofer approximately quadrate in lateral view, just wider ventrally than dorsally; in caudal view, opening roughly quadrate, slightly wider than tall; margin of opening carinate laterally, rounded ventrally. Diaphragm well-developed; armature strongly projecting caudally, bearing irregular fine serrulations on lateral and ventral margins. Parameres broad basally and distally with distinct inner and outer angles, median and lateral margins sinuate; basal angles barely evident, inner angles subacute, outer angles rounded, longer than inner angles; apex concave. Suspensorium evident, ring-shaped. Aedeagus thick, flattened, tubular, slightly decurved, broadest basally, distinctly convex ventrally, orifice at apex. Two rows of approximately 6 or 7 teeth on opposite lateral margins of aedeagus, spanning from mid-length to apex; third row of approximately 4 teeth located dorsally sometimes present. Segment 10 with a pair of pointed, robust processes, slightly broader basally, bent at right angle to project ventrally. Segment 11 elongate, roughly equal in length to height of segment 10, slightly pointed at apex.

Hosts.—None reported.

Distribution.—USA (DC, DE, IL, KY, MD, NC, TN, TX), Mexico (Coahuila). Also reported from USA (OH) (Muir & Giffard 1924).

Etymology.—The specific name is presumably formed from the Latin *niteo* meaning "shine" in reference to the glossy quality of the habitus. Muir and Giffard (1924) did not specify the origin but refer to this species as "shiny black".

Remarks.—As noted above, *F. nitens* is superficially similar to *F. atridorsum* due to their very dark coloration, including an entirely dark pronotum and dark wings; however, *F. nitens* is larger, with the male brachypter more than half a millimeter longer on average, and distributed in the eastern half of the United States whereas *F. atridorsum* is only reported from Oregon. Both species display strong sexual dimorphism with females uniformly straminеous (Figs. G, H).

This species has been collected from April through September.

Type material examined.—USA: MARYLAND: Paratype (male brachypter, USNM): "Plummers I / May-9-13 Md / WLMcAtee / Collector // [orange paper] Paratype", paratype (male brachypter, USNM): "Plummers I / May-18-13 Md / WLMcAtee / Collector // [orange paper] Paratype".

Taxa Excluded from *Caenodelphax* and *Flavoclypeus*

The following taxa were excluded from both *Caenodelphax* and *Flavoclypeus* based on results of the phylogenetic analyses (e.g., Figure 3): *Delphacodes aterrima* Muir, 1926, *D. balli* Muir and Giffard, 1924, *D. livida* Beamer, 1948a, *D. recurvata* Beamer 1948a, *D. shermani* (Metcalf 1923), and *D. sucinea* Beamer 1948c. As noted, these spe-

cies do not belong in *Delphacodes* but their proper placement remains undetermined at this time. None of these species appears to belong in currently established genera and further investigation is needed in order to fully delineate generic concepts and place all species.

Delphacodes aterrima groups with *D. sucinea*; these species lack processes on segment 10 (or they are greatly reduced) and the pygofer in lateral view is quadrate (tall and narrow); also, both have a weak diaphragm armature. All these features are in contrast to *Flavoclypeus* and *Caenodelphax*, but are shared with *D. trimaculata* Beamer 1948a, *D. truncata* Beamer 1948b, and *D. waldeni* (Metcalf 1923), and when all these species are considered, the shape of the parameres (flattened and dorsally pointed) of these species is similar; however, *D. aterrima* bears some superficial differences (e.g., much larger than the other 4 taxa), and is Neotropical (vs. temperate), suggesting, at minimum, that this species may be less closely affiliated to the other species.

As noted above, *D. balli* and *D. livida* have expanded lateral margins of the pygofer and projecting armature of the diaphragm, unlike *Flavoclypeus* and *Caenodelphax*. These features are shared to some degree with *Delphacodes acuministyla*, *D. angulata, D. caerulata, D. lappae, D. mcateei, and D. turgida*. *Delphacodes livida* has the clypeus similar in color to the frons (dark); this feature varied in *D. balli*, but very few specimens were available. Further investigation of the relationships among these species plus *Caenodelphax* and *Flavoclypeus* is needed to place these species.

Delphacodes recurvata and *D. shermani* are both stramineous species, lacking the characteristic dark coloration of both *Caenodelphax* and *Flavoclypeus*. The terminalia of both species bear unique features and similarities to *Flavoclypeus* and *Caenodelphax*, making species diagnoses relatively simple, but phylogenetically harder to place. Both species have processes on abdominal segment 10 (like *Flavoclypeus* and *Caenodelphax*), although they are caudal in *D. shermani* and anterior in *D. recurvata* (which are similar to *F. andromedus* in the latter species).

Delphacodes recurvata is uniformly pale. The paramere shape of *D. recurvata* is unique among *Delphacodes* (flattened, with the apex rotated and bilobed), the aedeagus bears more elongate processes than any in *Flavoclypeus* and *Caenodelphax*, and the genitalic armature is caudally projecting and strongly decurved. These structures are unlike *Flavoclypeus* and *Caenodelphax*, but not obviously similar to any other *Delphacodes* with which we are familiar.

Delphacodes shermani is problematic in that the species bears superficial similarities to *Flavoclypeus*, and in coloration is comparable to female *F. latidens* (although markings vary in degree among specimens), but also bears a series of differences. The phylogenetic analyses placed *D. shermani* outside of *Flavoclypeus* based on 5 ratios of body measurements (characters 2, 7, 14, 18, 20), and the frons and clypeus concolorous (although we found 1 specimen with the frons darkened). *Delphacodes shermani* has unusual broad, sinuate parameres and a broadly flattened aedeagus, but the genital armature is comparable to *Flavoclypeus* (just taller than wide, apically truncate, dorsocaudally projecting); also the brachypterous forewings are more elongate than most *Flavoclypeus* (exceeding the 7th tergite). Molecular tools would provide valuable insight with respect to the placement of this species.

The species excluded from *Caenodelphax* and *Flavoclypeus* generally support Hamilton's (2002) perception that coloration may be a conserved feature at least within genera.

DISCUSSION

This revision restricted *Caenodelphax* to a monotypic genus consisting of the type species, C. *teapae* (with C. *philyra* a new junior synonym), returning it to the original definition established by Fennah (1965). *Caenodelphax teapae* is an abundant and widespread species in the tropics. Eight species regarded as similar to *Caenodelphax* by Hamilton (2002) are here placed in the new genus *Flavoclypeus*. *Flavoclypeus* is widespread in the Nearctic and Neotropical regions (although most species are Nearctic). Most host records suggest they are grass feeders (Table 6). These are both derived genera, found near the apex of the Delphacini among a series of genera with unresolved relationships (see fig. 3 of Urban et al. 2010).

Molecular data may be helpful in resolving relationships among *Caenodelphax*, *Flavoclypeus*, and potentially related *Delphacodes*. We attempted to obtain the fragment of CO1 used by Urban et al. (2010) for available ingroup (Table 1) species (viz. *Caenodelphax teapae*, *Flavoclypeus andromedus*, *F. latidens, F. nigrifacies*, *F. nitens*, *Delphacodes aterrima*, and *D. recurvata*). The oligonucleotide primers Ron, Calvin, Pat and COI-RLR (Simon et al., 1994, Lin & Wood, 2002) were used to enable amplification, but failed to produce adequate amplification, resulting in an insufficient number of ingroup species to satisfactorily investigate phylogenetic relationships. New primers are needed to improve amplification, but new primer design was beyond the scope of our project. An alternate approach might be to sequence the DNA barcoding region of COI (e.g., DeWaard et al. 2008, Park et al. 2011), which can be amplified from dry specimens from recent collections, but this approach yields a different portion of CO1 than used by Urban et al. (2010), and obtaining data from a satisfactory number of ingroup taxa remains a problem. Also, our impression is that these taxa are relatively recently evolved (near the apex of the phylogeny of Urban et al. 2010) and longer gene fragments (or additional genes) may be needed to provide sufficient phylogenetic data for a resolved phylogeny.

The removal of 6 species from *Delphacodes* to *Flavoclypeus* leaves 96 New World species currently improperly placed in *Delphacodes*. Here we also suggest 2 possible segregates of *Delphacodes* that should be investigated (viz. *D. sucinea* + *D. trimaculata* + *D. truncata* + *D. waldeni* + D. *aterrima*; and *D. acuministyla* + *D. angulata* + *D. balli* + *D. caerulata* + *D. lappae* + *D. livida* + *D. mcateei* + *D. turgida*). Unfortunately, most of these species are essentially unknown ecologically (except that they are presumptively grass feeders), and published distributions are based on few collection records.

Future work on *Flavoclypeus* (and other derived Delphacini) should include efforts to associate host plants, better understand species-specific life-history, and field collections to better elucidate species distribution and to obtain specimens for needed molecular research. Several species of *Flavoclypeus* are seldom encountered (possibly an artifact of collecting effort), and essentially unknown ecologically; and even common species (*Flavoclypeus andromedus*, *Caenodelphax teapae*) have not been carefully investigated. Finally, additional systematics work is needed to investigate the phylogeny of the advanced Delphacini and establish valid genera for the remaining *Delphacodes* species.

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APPENDIX 1. MATERIAL EXAMINED

Caenodelphax teapae

USA: **FLORIDA**: Broward Co., Fort Lauderdale, Lauderhill, Invarray, 24 July 1999, C.R. Bartlett (7M, UDCC), 5 July 2000, C.R. Bartlett, sweep, lawn/sedge in shallow ditch (3M, UDCC). **ANTIGUA AND BARBUDA:** Antigua, St. John's Par., June 1962, J. Maldonado G. (1M, USNM). ARGENTINA: Tucuman, Jan.-Mar. 1941, K.J. Hayward (1M, USNM). **BAHAMAS:** New Providence Island, 5 mi. W Nassau, 6 Apr. 1953, E.B. Hayden & G.B. Rabb (2M, AMNH). BELIZE: Cayo District, nr. Teakettle Bank, Pook's Hill, 4-7 Jan. 2003, C.R. Bartlett, sweeping (8M, 4F, UDCC), 2 July 2003, C.R. Bartlett (1M, UDCC). **BOLIVIA:** Santa Cruz Dept., 3.7 km. SSE Buena Vista, Hotel Flora y Fauna, 430 m., 17°29'S 63°33'W, M.C. Thomas, 14-28 Oct. 2000 (1M, UDCC). **BRAZIL:** Rio de Janeiro, Petropolis, 22.50463°S 43.18233°W, Dec 1970, J. Maldonado C. (1M, 1M, USNM), Rondonia, 8 km. N. Porto Velho, 7 Oct. 1984, J.F. Cornell collection (2M, UDCC), São Paulo, 9 Dec. 1964, C. A. & W.E. Triplehorn, blacklight trap (1M, UDCC). **COLOMBIA:** Putumayo, PNN La Paya Cabana La Paya, 0°2'S 75°12'W, 330 m, 24-25 Sep. 2001, Pan trap, D. Campos (2M, UDCC). **COSTA RICA**: Alajuela Prov., Cano Negro, at dock path, A. E.Z. Short, 14 Jan. 2004, Cartago Prov., Tapanti National Park, Arboles Caidos Trail, 16 July 2011, sweep, A. Kennedy (1M, UDCC), Tapanti National Park, rd. by visitor center, 18 July 2011, sweep, A. Kennedy (1M, UDCC), Turrialba, 600-700 m., 12 Aug. 1975, N.L.H. Krauss (1M, USNM), Guanacaste Prov., E.J.N., M. Ag. 21 km. S Canas, at light, 27 July 1990, W.F. Chamberlain (1M, 1F, TAMU), Heredia Prov., nr. Puerto Viejo, La Selva Biological Station, station grounds, 23 Feb.-2 Mar. 2004, C.R. Bartlett, J. Cryan, & J. Urban (9M, UDCC), 10°26'N, 84°00'W, 21 Mar. 2005, S.M. Clark (1M, 1F, BYUC), Limón Prov., 24 km. SE Limón, at light, 4 Aug. 1990, W.F. Chamberlain (2M, TAMU), Pandora, 150', 22 Aug. 1963, S.L.W. (2M, BYUC), Puntarenas Prov., Rincon, Osa Peninsula, 100', 11 Aug. 1966, S.L.W. (1M, BYUC), San Jose Prov., 10 km. N San Jose, 9 Aug. 1972, J. Maldonado C. (1M, USNM), Cerro Muerte, 26 km. N San Isidro, 2100 m., Oct. 1991-Jan. 1992, Hanson & Godoy (1M, LBOB), Zurqui de Moravia, 1600 m., Nov. 1992-Dec. 1992, Godoy & Hanson (5M, LBOB), Mar. 1994, Hanson & Godoy (1M, 1F, LBOB), June 1995, Hanson & Godoy (7M, 3F, LBOB). CUBA: Havana Prov., Hoya Colorado, 23 Aug. 1917, H. Morrison (1M, USNM), Caimito, 23 Aug. 1917, H. Morrison (1M, USNM). **DOMINICA:** Saint George Par., Roseau, Nov. 1967, N.L.H. Krauss (1M, 1F, USNM), Saint John Par., Portsmouth, 100 m., July 1976, N.L.H. Krauss (1M, USNM), Saint Joseph Par., July 1963, J. Maldonado C. (1M, USNM), Springfield Estate, malaise in humid forest, 15-20 Mar. 2003, M.E. Irwin, M.B. Shephard, E. Benson, & G. Carner (1M, UDCC), Sylvania, Nov. 1967, N.L.H. Krauss (2M, USNM), St. Paul Par., Pont Casse, J. Maldonado C. (2F, USNM). **DOMINICAN REPUBLIC:** La Vega Prov., 6 mi. NW or Route 1 on rd. to Constanza, 27 June 1998, blacklight, R.E. Woodruff & R.M. Baranowski (1F, UDCC), Constanza, 1 Aug. 1978, R.O. Schuster & R.S. Rominger (2M, CDAE), María Trinidad Sánchez Prov., Cabrera, 1 Aug. 1978, R.O. Schuster & R.S. Rominger (1M, CDAE), Samaná Prov., Playa Rincon, 31 July 1978, R.O. Schuster (1M, CDAE). **ECUADOR**: Provincia de Francisco de Orellana, Yasuni National Park, 29 Apr. 2005, C.R. Bartlett, N. Nazdrowicz, & D. Chang (1M, UDCC), Santo Domingo de los Colorados, 6 Mar. 1973, M.A. Deyrup (1M, UDCC). **EL SALVADOR:** La Libertad, Quezaltepeque, 21 June 1961, M.E. Irwin (1M, CDAE), 4 Aug. 1963, D. Cavagnaro & M.E. Irwin (2M, CDAE), San Salvador, Oct. 1965, N.L.H. Krauss (1M, 1F, USNM). FRENCH GUIANA: 8 km. W of Risquetout, 45 m., 10-11 June 2005, J.E. Eger, N04 55.097, W052 33.121 (2M, UDCC). **GRENADA**: Aug Busck (2M, USNM), Mount Gay Est. (Leeward side), H.H. Smith (1F, USNM), St. Andrew, Mirabeau Est. (Windward side), H.H. Smith (1M, USNM), St. George's (Leeward side), Botanic gardens, 10 Sep., H.H. Smith (1M, USNM). **GUADELOUPE**: Grande Terre, July 1963, J.

Maldonado C. (1M, 1F, USNM). **GUATEMALA**: Chimaltenango Dept., Yepocapa, 1948-1949, H.T. Dalmat, (3M, 2F, USNM); Dec. 1948, H. T. Dalmat (4M, 1F, USNM). Petén Dept., Petén, Sep. 1959, N. L.H. Krauss (2M, USNM), Tikal, Sep. 1959, N.L.H. Krauss (2M, USNM), Quetzaltenango Dept., San Felipe, La Jardin Restaurant and guesthouses, 755 m., 15 Feb. 2007, A.T. Gonzon (4M, UDCC). **GUYANA**: Demerara-Mahaica Region, Demerara River Bank, 1 mi. from Georgetown, 22 Sep. 1918, H. Morrison (1M, USNM), nr. Peter's Hall, 2 mi. from Georgetown, 22 Sep. 1918, H. Morrison (1M, USNM). **HAITI**: Ouest Dept., Port-au-Prince, Dec. (2M, USNM), Feb. (6M, USNM). **HONDURAS**: Alta Verapaz nr. Yiquiche, 16 July 2001, R.L. Snyder (1M, UDCC). **JAMAICA**: Gordon Th., 1 Feb. 1937, Chapin & Blackwelder (1F, USNM), Trinity Ville, 28 Feb. 1937, Chapin & Blackwelder (2M, USNM), Clarendon Par., Cockpit City, 28 Dec. 1960, J. Maldonado C. (1M, USNM), 28 Dec. 1961 (1M, USNM), Kingston Par., Blue Mountains, Whitfield Hall, July 1984, N.L.H. Krauss (1M, USNM), Kingston, 9-14 Sep. 1917, H. Morrison (2M, USNM), St. Ann Par., Fern Gully, 14 Sep. 1917, H. Morrison (5M, 3F, USNM), Hardwar Gap, 21 July 1968, J. Maldonado C. (1M, USNM), 6-8 Dec. 1975, Gary F. Hevel (2M, USNM), 4 mi. N Moneague, 2 Feb. 1937, Chapin & Blackwelder (4M, USNM), St. Catherine Par., Spanish Town, 12 Dec. 1967, N.L.H. Krauss (1M, USNM), St. Thomas Par., Morant Point, Dec. 1961, J. Maldonado C. (1M, USNM), Trelawney Par., Clarks Town, 16 Feb. 1937, Chapin & Blackwelder (1M, USNM). **MARTINIQUE**: Lamantin, June 1962, J. Maldonado C. (4M, USNM), St. Pierre, Nov. 1950, N.L.H. Krauss (2M, USNM). **MEXICO**: Colima, Minatitlan Rd., 2 km. NE Punta de Agua, 3 Nov. 1988, W.F. Barr (1M, WFBM), Guerrero, Tierra Colorada, 17.16666°N 99.58333°W, 610 m., 5 Oct. 1945, D. M. DeLong (2M, ULKY), Jalisco, Puerto Vallarta, 5 Oct. 1984, G.E. Bohart (1M, 1F, 1 broken, BYUC), Rio Ayuquilla circa Zenzontla, 800 m, 13 Oct. 2001, C.H. Dietrich, sweeping (2M, 1F, UDCC), Oaxaca, 3.9 mi. NE San Gabriel Mixtepec, 16 July 1985, J. Woolley & G. Zolnerowich 85/067 (1M, TAMU), Puebla, Necaxa, 26 Oct. 1945, D. M. DeLong (1M, ULKY), San Luis Potosí: 10 km. of Tamazunchale, 20 Sep. 1945, D. M. DeLong (3F, ULKY), Veracruz, 3 mi. NE Huatusco, 22 July 1995, J.B. Woolley & G. Zolnerowich (1M, 1F, TAMU), Cordoba, 22 Nov. 1963, N.L.H. Krauss (1F, USNM). **NICARAGUA**: Managua Dept., outskirts W. Bolona, July 1971, J. Maldonado C. (1M, USNM), Rio San Juan Dept., Refugio Bartolo, 51 m., 10.97254°N, 0.8433906°W, 5-15 Aug. 2002, R.M. Caesar (1M, TAMU), Región Autónoma del Atlántico Norte, Blue Field, July 1971, J. Maldonado C. (2M, USNM), Musawas, Waspuc River, 23 Oct. 1955, B. Malkin (2M, UDCC). **PANAMA**: 10 Nov. 1952, F.S. Blanton (2M, USNM), Barro Colorado Island, N.L.H. Krauss, Jan. 1947 (1M, USNM), Chepo, 25 Sep. 1952, F.S. Blanton (3M, 3F, USNM), Indio-hydrographic station, Canal Zone, N.L.H. Krauss, Oct. 1946 (1M, USNM), Rio las Lajas nr. Coronado Beach, 17 Sep. 1952, F.S. Blanton (1M, USNM), Chiriquí Prov., 3 km. W Fortuna Highway, Oleoducto Rd. 2001/017, 8°47'07"N, 82°12'05"W, 6-9 Jan. 2001, 1170 m., M. Yoder & J.B. Woolley (1M, TAMU), Cocle Prov., Aguadulce, 25 Sep 1951, F. S. Blanton, (1M, USNM); 21 Nov. 1952, F. S. Blanton (1M, USNM), Colón Prov., Flat rock above Juan Mina, 5 mi. up Chagres River, Canal Zone, 24 Aug. 1918, H. Morrison (M, USNM), Mindi Dairy, Canal Zone, 3 Dec. 1951, F.S. Blanton (9M, 2F, USNM), Mojinga Swamp, Canal Zone, 8 Nov. 1951, F.S. Blanton (1M, USNM), Darién Prov., El Real, 8 Aug. 1952, F.S. Blanton (1M, USNM), Panamá Prov., Las Cumbres, 26-28 July 1971, M. Daykin (1M, 1F, CDAE), light trap, 8 Jan. 1973, H. Wolda (2M, USNM), Paja, 13 Oct. 1952, F.S. Blanton (1M, USNM). **PERU**: Madre de Dios Region, Rio Tambopata, Posada Amazonas, S12°48 08.4, W69°17 59.4, Sep. 2004, J.R. Cryan & J.M. Urban (M, North Carolina Museum of Natural Sciences, New York State Museum Genbank #04-04-02-06). **PUERTO RICO**: Bayamon, Jan. 1899, A. Busck (1M, 1F, USNM), 13 Nov. 1947 (1M, USNM), El Yunque, 20-22 Mar. 1954, J. Maldonado Capriles (1F, USNM), El Yunque, 10 Apr. 2013, A.C. Kennedy, sweep (3M, UDCC), Guajataca Forest, Isabela, 22 July 1955, collected at light, Ramos & Maldonado (1M, USNM), Gurabo, 4 Nov. 1944 (1M, USNM), Luquillo Forest, 30 Dec. 1962, P. & P. Spangler (1M, USNM), Maricao, 2 July 1917, H. Morrison (2M, USNM), Mayaguez, 4 July 1917, H.

Morrison (1 broken, USNM), Mayaguez, 9 Oct. 1935, collected at light (1M, USNM), Mayaguez, Mar. 1959, H. Mendoza (1M, USNM), Mayaguez, Sep.-Nov. 1960, M.M. Beauchamp (1M, USNM), Mayaguez, Fed. Exp. Sta. 10 Oct. 1975, E. Freytag (8M, UDCC), Punta Cangrejos, 22 Mar. 1920, G.N. Wolcott (1M, USNM), Yauco-Lares rd., Kilometer 22, 18 July 1953, J.A. Ramos & J. Maldonado, at light (1M, USNM), Kilometer 29, 20 Jan. 1954 (2M, USNM). **SAINT LUCIA:** Castries, 10-22 Sep. 1919, J. C. Bradley (14M, CUIC). **SAINT VINCENT AND THE GRENADINES**: St. Vincent, no date provided, H.H. Smith (1M, USNM). **TRINIDAD AND TOBAGO**: Aripo savanna, 26 Oct. 1918, H. Morrison (1M, USNM), Caroni River, 12 Oct. 1918, H. Morrison (13M, USNM), Single Research Station, sweeping yard, 28 June 1987, T. Myers (2M, UDCC), Port of Spain City Corporation, Botanical Garden, 13 Oct. 1918, H. Morrison (1M, 1F, 1 broken, USNM), D'Abadie, 15 Oct. 1918, H. Morrison (6M, USNM), Dept. of Agriculture grounds, 24 Oct. 1918, H. Morrison (7M, USNM), Savanna, St. Clair, 24 Oct. 1918, H. Morrison (5M, 1F, USNM), San Fernando City Corporation, Golconda estate, 19 Oct. 1918, H. Morrison (1M, USNM), Tobago, Archibald Estate, Roxborough, 6 Nov. 1918, H. Morrison (1M, USNM), St. George County, Arima, Blanchesuisse rd. 8th mi., 29 Oct. 1918, H. Morrison (1F, USNM). **VENEZUELA**: Amazonas, Aqua Linda, 18-20 June 2000, P. Freytag et al., sweep (1F, UDCC), T. F.A. Rio Negro, San Carlos de Rio Negro, 5-12 Mar. 1984, O. Flint & J. Louton (1F, USNM), Lara, Jiménez, Quíbor, 8 July 1979, R.W. Brooks, A.A. Grigarick, J. McLaughlin, & R.O. Schuster (1F, CDAE), Miranda, Venezuelan Institute for Scientific Research, Altos de Pipe, 2 July 1968, J. Maldonado C. (1M, USNM), Zulia, Puerto Tarra, Encontrada, Jan. 1970, J. Maldonado C. (1F, USNM), Maracaibo, Caño Colorado, 27 June 1979, R.W. Brooks, A.A. Grigarick, J. McLaughlin, & R.O. Schuster (1M, CDAE).

Flavoclypeus andromedus

USA: **ALABAMA**: Houston Co., Dothan, Landmark Park, 10 Sep. 2005, L.R. Donovall, sweeping, mowed grasses/sedges (4M, 4F, UDCC). **ARKANSAS**: Logan Co., Paris, 9 Nov. 1977 ("9-11-77", 1F, LSAM). **DELAWARE**: New Castle Co., Blackbird State Forest, Peters Tract nr. Saw Mill Rd., N39 20 35 W75 44 37, 12 Sep. 2005, A. Gonzon, sweep understory/grass (1F, UDCC), Newark, Iron Hill Park, 15 July 2004, C.R. Bartlett, sweeping grass & sedges (2M, UDCC), Iron Hill Park, 4 Aug. 2004, A. Gonzon, sweeping sedges and grass including *Eleocharis* (1M, UDCC). **DISTRICT OF COLUMBIA**: Washington, 14 Aug. 1937, P.W. Oman (2M, USNM). **FLORIDA**: Alachua Co., nr. Gainesville, Paynes Prairie Preserve State Park, nr. Lake Wauberg, 29.53208, -82.29863, 23 Jan. 2009, sweep grassy vegetation, C.R. Bartlett (11M, 6F, UDCC); Broward Co., Fort Lauderdale, Hugh T. Birch Recreation Area, sweep, 26 Dec. 1999, C.R. Bartlett (1M, 3F, UDCC), Fort Lauderdale, Lauderhill, Invarray, 24 July 1999, C.R. Bartlett (2F, UDCC); Fort Lauderdale, Sunrise, NW 20th CT, 26 Dec. 1999, C.R. Bartlett, sweeping grass and weeds nr. canal (2M, 4F, UDCC); Fort Lauderdale, H.T. Birch Recreation Area, 26 July 1999, C.R. Bartlett, sweep lawn/weeds (8F, UDCC); Highlands Co., nr. Lake Placid, Archbold Biological Station, 21 Jan. 2002, C.R. Bartlett (1M, 2F, UDCC) ; Archbold Biological Station, E of Learning center, 26 Aug 2011, M.A. Deyrup, *Aristida beyrichiana* (1F, ABSC); Jefferson Co., Wacissa, at Jct SR259 & 60, 27 July 2000, C.R. Bartlett, sweeping roadside (1M, UDCC); Miami-Dade Co., Airport Fumigation Site, 25 47 58 N 80 18 26 W, 17 Oct. 2008, T. Dobbs, light trap (1M, UDCC), Miami, 17 Oct. 2003, C. Beal, sweep grass (1F, UDCC); Palm Beach Co., nr. Boca Raton, Loxahatchee Rd., 22 Jan. 2002, C.R. Bartlett, sweeping roadside (1M, 6□, UDCC); nr. West Palm Beach, Loxahatchee Rd., roadside, 22 Jan. 2002, C.R. Bartlett (2M, 4F, UDCC); nr. West Palm Beach, Seminole Palms Park, 23 Jan. 2002, C.R. Bartlett (1F, UDCC), Sarasota Co., Myakka River State Park, 3 Sep. 1954, H.V. Weems (1M, USNM). **LOUISIANA**: East Baton Rouge Par., Baker, Maw Maws house, 14 Sep. 2002, M. Pierson, caught by net (1F, UDCC), Evangeline Par., St. Landry, Chicot State Park, Lake Chicot Trail, 20 July 2003, C.R. Bartlett & S.T. Dash, levy/mercury light, Beech Magnolia Tupelo (5M, UDCC). **MARYLAND**: Allegany Co., Little Orleans at Little Orleans campground, N39

37.844 W 078 23.348, 5 June 2004, C. Bartlett & A. Gonzon (1M, UDCC); Cecil Co., Fair Hill, Fair Hill Natural Resources Area, 26 Sep. 2003, C.R. Bartlett, sweeping field (18M, 21F, UDCC); same, 24 Sep. 2004, A. Gonzon, sweeping (1M, UDCC); same, 18 Sep. 2009, sweeping, C.R. Bartlett (4M, 1F, UDCC); same, 30 Sep. 2011, sweep, A. Kennedy (6M, 10F, UDCC), Harford Co., circa 2 mi. NW of Havre de Grace, I-95 Park & Ride, N 39 35 804 W 76 08 001, 10 Sep. 2004, A. Gonzon, sweeping grasses (1M, UDCC). **NEW JERSEY**: Salem Co., nr. Salem, 166 Maskell Mill Rd., 16 Sep. 2000, C.R. Bartlett, sweeping lawn (6M, 4F, UDCC); 21 July 2001, C.R. Bartlett, sweeping (2M, FM, UDCC); 23 Aug. 2003, C.R. Bartlett (1M, 2F, UDCC). **NORTH CAROLINA**: Brunswick Co., Bald Head Island, 2-4 July 2007, N.H. Nazdrowicz, sweeping (4M, UDCC), Haywood Co., Great Smoky Mountains National Park, Purchase Knob ATBI house at Appalachian Highlands Science Learning Center, N35 35.222 W83 04.460, 22 June 2006, 1517 m., C. Bartlett & A. Gonzon, light & night sweep (2F, UDCC), Swain Co., Great Smoky Mountains National Park, Andrew's Bald circa 1.8 mi. from Clingman's Dome parking lot, 1707 m., N35 32.508 W83 29.591, 20 June 2006, C.R. Bartlett & A.T. Gonzon, sweeping grassy bald (1M, UDCC), Clingman's Dome Rd. circa 2.25 mi. from US 441, 1706 m., N35 35.741 W83 27.519, 20 June 2006, C.R. Bartlett & A.T. Gonzon, sweeping roadside grasses (1F, UDCC), Wake Co., Raleigh, 16 Oct. 1938, Oman (4M, USNM). **PENNSYLVANIA**: Chester Co., nr. Toughkenamon, Stroud Water Research Center, 17 Sep. 2004, A. Gonzon, sweeping (1F, UDCC). **TENNESSEE**: Blount Co., nr. Townsend, Great Smoky Mountains National Park, Cades Cove at campground, 8 July 2002, C.R. Bartlett et al. (3F, UDCC); same, Cades Cove, Forge Creek Rd., wet meadow, 10 July 2002, C.R. Bartlett et al. (1F, UDCC); Great Smoky Mountains National Park, Middle Prong, Little River roadside, 10 July 2002, C.R. Bartlett et al. (1M, UDCC); Great Smoky Mountains National Park, Gregory Bald, 11 July 2002, C.R. Bartlett et al. (2F, UDCC). **TEXAS**: Brazos Co., 3 mi. NE Edge, 21 June 1984, T. Harrison (1M, TAMU), Hidalgo Co., Bentsen-Rio Grande Valley State Park, 15 July 1983, Woolley & Browning (1M, TAMU), Nacogdoches Co., Nacogdoches, 22 Sep. 1979, M. Klass (1F, LSAM). **VIRGINIA**: Accomack Co., Wallops Island, 25 May 1913, W.L. McAtee (1M, UDCC); Fairfax Co., Vienna, 2 Sep. 1946, P.W. Oman (2M, ISNB), Vienna, 2 Sep. 1946, P.W. Oman (3M, USNM).

Flavoclypeus aduncus

USA: **GEORGIA**: Rabun Co., Pinnacle Mt., 2500-3000', 20 Aug. 1913 (1 broken, USNM), Thomas Co., Thomasville, 21 Apr. 1914 (1F, USNM), 9 Apr. 1915, C.S. Spooner (4M, USNM), 10 Apr. 1915 (1M, USNM), 11 Apr. 1915, C.S. Spooner (2M, USNM), 15 Apr. 1915 (1M, USNM), 22 Apr. 1915 (1M, USNM), 4 May 1915 (1M, USNM). NORTH CAROLINA: Wake Co., Raleigh, 19 June 1993, C.R. Bartlett (1M, UDCC).

Flavoclypeus atridorsum

USA: **OREGON**: Deschutes Co., Lapine, 2 July 1935, Oman (2M, 5F, USNM).

Flavoclypeus incurvus

USA: **NEW MEXICO:** Marshall, 26 July 1950, D.D. Beamer (1F, SEMC), Colfax Co., Maxwell, 26 July 1950, R.H. Beamer (3M, 7F SEMC). **UTAH:** Uintah Co., Vernal, 2 Aug. 1947, R.H. Beamer (7F, 1M, SEMC).

Flavoclypeus latidens

USA: **ARIZONA**: Cochise Co., Chiricahua Mountains, 5 July 1930, E.D. Ball (1M, USNM), Chiricahua Mountains, Rucker Camp, T. 29S. R. 29E. Sec. 27, 4-7 Sep. 1987, pan trap, T.D. Miller (1M, WFBM), Huachuca Mountains, Garden Canyon Upper Picnic Area, 7 May 2009, swept seep area, C.W. & L.B. O'Brien (1 broken, UDCC), Pima Co., Baboquivari Mountains, 11 Apr. 1932, E.D. Ball (6M, 4F, USNM), Green Valley, 3107', N31.80, W111.03, UV light, 25 Aug. 2007, J. Brambila (1M, UDCC), Santa Cruz Co., Nogales, Peña Blanca Lake, 12 Sep. 2008, C.W. O'Brien (6M, 31F, UDCC), Nogales, Peña Blanca Lake, Boat Ramp Area, 5 June 2005, L.B. & C.W. O'Brien (1M, UDCC), Nogales, Peña Blanca Lake, Upper White

Rock Campground, 12 Sep. 2008, C.W. O'Brien (3M, 9F, UDCC), Patagonia, 20 July 1930, E.D. Ball (1M, USNM). KANSAS: Meade Co., junction Cimeron River on highway 23, 25 June 1992, E.G. Riley (1F, TAMU). **NEW MEXICO**: Eddy Co., 26 mi. E Carlsbad, 2 June 1977 (1M, TAMU), same, 3 June 1977, malaise trap (West) (1F, TAMU), same, 9 June 1977, grasses, plot W 20, 21, 26, 27, plant #80 (1M, TAMU). **TEXAS**: Brewster Co., Alpine, 8 Aug. 1930, E.D. Ball (1M, 3F, USNM), same, 2 Sep. 1936 (4M, USNM), Big Bend National Park, July 1973 (7M, 3F, LSAM), Big Bend National Park, North Rosillos Mountains, Buttrill Spring, malaise trap, 10-14 July 1991 R. Vogtsberger (1F, TAMU), Hidalgo Co., Lower Rio Grande Valley National Wildlife Refuge, McManus unit, 26.05380°N, 98.04987°W, 3 Sep. 2008, UV light, J. King & E. Riley, 22 primary forest (1F, TAMU), Llano Co., Tow, 21 Mar. 1982, W.F. Chamberlain (1M, TAMU), Presidio Co., Presidio, 5 June 1968, J.E. Hafernik (2F, TAMU), Uvalde Co., Garner State Park, 1400 ft., 21 July 1986, 86/017, J.B. Woolley & G. Zolnerowich (11F, TAMU). **UTAH**: Washington Co., 29 Apr. 1938, Christenson, No. 12424 (1M, USNM). **MEXICO**: Puebla, 4.7 mi. SW La Cumbre, 23 July 1987, 5100', J.B. Woolley & G. Zolnerwich, 87/055 (1M, TAMU), Zacatecas, 4 mi. NE Concepcion del Oro, 4 July 1984, J.B. Woolley 84/014 (2M, 1F, TAMU).

Flavoclypeus nigrifacies

USA: **FLORIDA**: Broward Co., Fort Lauderdale, Hugh T. Birch Recreation Area, 26 Dec. 1999 (3M, 2M, UDCC), Fort Lauderdale, Lauderhill, Invarray, 24 Dec. 1999, C.R. Bartlett, sweeping lawn/sedge in shallow ditch (3M, UDCC), same, 5 July 2000 (3M, UDCC), same, 19 Jan. 2001 (1M, UDCC), Highlands Co., nr. Lake Placid, Archbold Biological Station, 21 Jan. 2002, C.R. Bartlett, sweep (17M, 6F, UDCC), Jefferson Co., 2 mi. S Wacissa, 27 June 2000, C.R. Bartlett (1F, UDCC). **BELIZE**: Cayo District, nr. Teakettle Bank, Pook's Hill, 5-6 Jan. 2003, C.R. Bartlett, sweep (5M, 3F, UDCC), same, 17 09.257N 88 51.091W, 279', 6 July 2003, C.R. Bartlett (1M, UDCC), Stann Creek District, just S of Hopkins, 7 Jan. 2003, C.R. Bartlett, shore vegetation (1M, UDCC). **BOLIVIA**: Santa Cruz Dept., 10 mi. W Portachuelo, 27 Mar. 1978, UV trap, G.B. Marshall (1M, LBOB), Est. Exp. Saavedra 250 m, 9 Aug. 1980, D. Foster (1M, 1F, UDCC). **COLOMBIA**: Meta Dept., Puerto Lopez, 9 Mar. 1971, S.S. Roback (1F, USNM). **COSTA RICA**: Cartago Prov., Pejibaye, 24-25 Mar. 1987, W.E. Steiner, yellow pan trap in old field and agricultural area (1F, USNM), Guanacaste Prov., Estación Experimental Enrique, Jiménez Munez, Jan. 1993, F. Parker (1M, LBOB), Heredia Prov., 10 Aug. 1975, N.L.H. Krauss (1M, USNM), nr. Puerto Viejo La Selva Biological Station 179 ft N10°25 W84°00, C.R. Bartlett, J. Cryan, & J. Urban, 15-17 Aug. 2003 (12M, 20F, UDCC), C.R. Bartlett et al., 24 Feb. 2004 (12M, 13F, UDCC), Limón Prov., 24 km. SE Limón, at light, 4 Aug. 1990, W.F. Chamberlain (3F, TAMU), Puntarenas Prov., Brujo, 7 Aug. 1990, G.M. Chamberlain (1M, TAMU). **ECUADOR**: Orellana Prov., Yasuni National Park, S00°40.478 W76°23.866, 26-29 May 2005, C.R. Bartlett, N. Nazdrowicz, & D. Chang, sweeping/day (13M, 11F, UDCC). **GRENADA**: St. George Par., Halifax Harbour, 10 Sep. 1991, C.W. & L.B. O'Brien (1M, LBOB). **GUYANA**: Demerara-Mahaica, nr. Peter's Hall 2 mi. from Georgetown, 22 Sep. 1918, H. Morrison (1M, USNM). **JAMAICA**: Kensworth, 18 Feb. 1937, Chapin & Blackwelder (1F, USNM), Trelawney Par., Clarks Town, 16 Feb. 1937, Chapin & Blackwelder (2M, 1F, USNM). **MARTINIQUE**: Fort-de-France, Nov. 1950, N.L.H. Krauss (1M, USNM), Saint-Pierre, Nov. 1950, N.L.H. Krauss (1F, USNM). **MEXICO**: Federal District, Mexico City area, 1940's, D.M. DeLong (6M, 3F, ULKY), Veracruz, 3 mi. E Huatusco, 22 July 1995, J.B. Woolley & G. Zolnerowich (5M, 2F, TAMU), 3 mi. NE Huatusco, 22 July 1995, J.B. Woolley & G. Zolnerowich (15M, 8F, TAMU). **PANAMA**: Chiriquí Prov., Chorcha Abajo, landing, N8°20.564', W82°16.752', 5 m., sweeping grass, 17 Jan. 2001, A. Gillogly (1F, TAMU), David, N.L.H. Krauss, Dec. 1946 (1F, USNM), Gualaca, 14 Dec. 1952, F.S. Blanton (1F, USNM), Panama Prov., Tocumen, 4 Feb. 1953, F.S. Blanton (1M, USNM), Veraguas, Cerro Tute, 4 km. W Santa Fe, 680 m., 2 Aug. 1995, C.W. & L. O'Brien (1F, LBOB). **PUERTO RICO**: Isabela, Guajataca Forest, 22 July 1955, collected at light, Ramos & Maldonado (1M, USNM), Mayaguez, Federal Experiment Station, 10 Oct. 1975, P.F.

Freytag (23M, 18F, ULKY). ST. THOMAS: 27-30 Mar. 1961, J. Maldonado C. (1M, USNM). ST. VINCENT: H.H. Smith, 18, P.R. Uhler collection (1M, 1F, USNM). **VENEZUELA**: Amazonas, Agua Linda River, 5°49'5"N 67°27'29"W, 18-20 June 2000, sweep, P. Freytag, M.A. Gaiani, & Q. Arias (2M, 3F UDCC), Apure, nr. San Fernando de Apure, 7 50'44"N 67 29' 10"W, 20 June 2000, blacklight, P.M. Freytag, M.A. Gaiani, & Q. Arias (1F, ULKY), same (10M, 16F, UDCC), Aragua, Rancho Grande, Henry Pittier National Park, 1100 m., 24 Dec. 1985, P. Kovarik &R. Jones (3F, TAMU), Barinas, 5 km. E Altamira de Caceras, 700 m., 30 Dec. 1985, P. Kovarik & R. Jones (1F, TAMU), Guarico, 5 km. N Santa Rita, 400'. 28 July 1989, C. & L. O'Brien and G.J. Wibmer (1M, LBOB), 7 km. ESE Calabozo, Est. Biol. Llanos, 380', 21 July 1988, C.W. & L. O'Brien & G.J. Wibmer (1M, LBOB), N Calabozo Dam, 350', 22 July 1988, C. & L. O'Brien & G. Wibmer (1M, LBOB).

Flavoclypeus nigriscutellatus

USA: COLORADO: Weld Co., Greeley, 5 Aug. 1901 (1M, USNM). IOWA: Story Co., Ames, 29 July 1935, P.W. Oman (1M, USNM), Ames exp. sta., 6 Aug. 1897 (1M, USNM). WISCONSIN: Jefferson Co., Faville Prairie State Natural Area, N43.14646 W88.87928, 22 Aug. 2005, A.M. Wallner, vacuum from prairie cordgrass (3M, UDCC).

Flavoclypeus nitens

USA: **DELAWARE**: New Castle Co., Ashland nr. Ashland Nature Center along Red Clay Creek, 1 Sep. 2005, A.T. Gonzon at mercury lamp (2M, UDCC), same, C.R. Bartlett at mercury lamp (1M, 2F, UDCC), Newark, White Clay Creek Preserve, Aug. 2005, at light (1M, 2F, UDCC). **DISTRICT OF COLUMBIA**, Washington, 15 May 1931, P.W. Oman (1M, USNM), 15 Apr. 1934, P.W. Oman (1 broken, USNM). **ILLINOIS**: Coles Co., Charleston, 3 May 1943 (1M, USNM), Piatt Co., Sangamon River, 7 mi. NE Monticello, 16 May 1936 (2M, USNM). **KENTUCKY**: Whitley Co., Williamsburg, welcome center near milemarker 1 on I-75, 4 July 2013, A.C. Kennedy, sweep (1M, UDCC). **MARYLAND**: Allegany Co., Little Orleans, Little Orleans campground, N39 37.83 W78 23.36, 6-7 June 2008, C.R. Bartlett (1M, UDCC), same, sweep/aspirator, damaged (1M, UDCC), Anne Arundel Co., nr. Edgewater, Smithsonian Environmental Research Center, 38°53'N, 76°33'W, 10 July 1993, G.F. Hevel (2M, USNM), Montgomery Co., nr. Chevy Chase Lake, 6 July 1913, W.L. McAtee (1M, USNM), Plummers Island, 18 May 1913, R.C. Shannon (1F, USNM), 13 July 1913, R.C. Shannon (1F, USNM), 28 Apr. 1914, R.C. Shannon (1M, USNM). **NORTH CAROLINA**: Haywood Co., Great Smoky Mountains National Park, circa 0.8 mi. SSE of Purchase Knob ATBI house, along gravel drive, 1417 m., N35 34.889 W83 04.214, 22 June 2006, C.R. Bartlett & A.T. Gonzon, sweeping grassy meadow & bank (1M, UDCC), Great Smoky Mountains National Park, circa 1 mi. SSE of Purchase Knob, ATBI house along gravel drive, 1381 m., N35 34.736 W83 04.132, 22 June 2006, C.R. Bartlett & A.T. Gonzon, sweep grassy meadow and roadside (5M 1F, UDCC). **TENNESSEE**: Blount Co., Great Smoky Mountains National Park, Cades Cove nr. Abrams Creek, 526 m., circa 0.3 mi. from CC Loop Rd., N35 35.367 W83 50.274, 21 June 2006, C.R. Bartlett & A.T. Gonzon, sweeping grass sedge in wet meadow (3M, 3F, UDCC), nr. Townsend, Great Smoky Mountains National Park, Cades Cove, Forge Creek Rd., Wet Meadow, 8 July 2002, C.R. Bartlett et al. (2M, UDCC), nr. Townsend, Great Smoky Mountains National Park, Cades Cove, Laurel Creek Rd., 10 July 2002, C.R. Bartlett (1F, UDCC). **TEXAS**: Gonzalez Co., Palmetto State Park, 1 June 1984, J.B. Woolley (5M, 2F, TAMU), San Patricio Co., 15 km. NE Sinton, Welder Refuge, 28°06.9'N, 97°23.9'W, 5 m., 1-8 Apr. 2004, S. & J. Peck, riparian woodland, lot 17 (1M, TAMU). MEXICO: Coahuila, 7 mi. SSW Saltillo, 4 July 1984, J.B. Woolley (2M, TAMU).

Table 1. *Caenodelphax* and putatively allied *Delphacodes* (with authors and locations of type specimens) considered as ingroup species in phylogenetic analyses.

Species	Author, Year	Type Location
Caenodelphax atridorsum	(Beamer, 1947)	SEMC
Caenodelphax nigriscutellata	(Beamer, 1947)	SEMC
Caenodelphax philyra	(Fennah, 1959)	BMNH
Caenodelphax teapae	(Fowler, 1905)	BMNH
Delphacodes adunca	Beamer, 1948b	SEMC
Delphacodes andromeda	(Van Duzee, 1907)	CASC
Delphacodes aterrima	Muir, 1926	BPBM
Delphacodes balli	Muir and Giffard, 1924	CASC
Delphacodes incurva	Beamer, 1948a	SEMC
Delphacodes latidens	Beamer, 1948a	SEMC
Delphacodes livida	Beamer, 1948a	SEMC
Delphacodes nigrifacies	Muir, 1918	AMNH
Delphacodes nitens	Muir and Giffard, 1924	BPBM
Delphacodes recurvata	Beamer, 1948a	SEMC
Delphacodes shermani	(Metcalf, 1923)	NCSU
Delphacodes sucinea	Beamer, 1948c	SEMC

Table 2. Morphological data set (* outgroups).

Species	Character states						
Caenodelphax atridorsum	10011	10101	00101	31100	01011	01110	0010
Caenodelphax nigriscutellatus	100?3	10111	00001	10210	11111	11110	0010
Caenodelphax teapae	03110	12210	12112	01003	12110	01000	0110
Delphacodes adunca	12001	11211	01021	10310	02211	01011	1010
Delphacodes andromeda	03001	01111	02030	30111	02211	01101	1010
Delphacodes aterrima	13120	13211	02223	11200	?001?	10--0	0000
Delphacodes balli	033?2	12311	12211	11200	??010	01110	0010
Delphacodes incurva	22000	12211	01122	20210	?120?	11110	0011
Delphacodes latidens	11122	12111	01010	10212	01101	11100	0010
Delphacodes livida	03110	12111	13011	11001	?110?	00--1	0010
Delphacodes nigrifacies	02001	01111	02001	00112	12001	00--1	0010
Delphacodes nitens	12321	11111	02013	11201	11211	01110	0110
Delphacodes recurvata	32331	11111	13023	11310	00100	00--1	0001
Delphacodes shermani	32322	12210	03030	11312	?201?	11010	0110
Delphacodes sucinea	13121	13101	02021	21110	?0000	00--0	0001
Chionomus havanae *	011?0	10001	13201	00103	30110	00--0	0001
Kosswigianella lutulenta *	003?2	10001	11001	01201	0020?	-0--0	0000
Muirodelphax arvensis *	20223	11211	12001	11112	?0010	00--0	0000

Table 3. Morphological characters and states for phylogenetic analysis.

Body

1. Ratio of body length to width: 0) 2.40-2.65, 1) 2.66-2.90, 2) 2.91-3.15, 3) 3.16-3.40
2. Ratio of body width to head width: 0) 2.60-3.00, 1) 3.01-3.40, 2) 3.41-3.80, 3) 3.81-4.25
3. Length male brachypter: 0) 1.50-1.75mm, 1) 1.76-2.00 mm, 2) 2.01-2.25 mm, 3) 2.26-2.50 mm
4. Length female brachypter: 0) 1.70-2.00 mm, 1) 2.01-2.30 mm, 2) 2.31-2.60 mm, 3) 2.61-2.90 mm

Head

5. Ratio of compound eye length to compound eye width: 0) 1.55-2.05, 1) 2.06-2.55, 2) 2.56-3.05, 3) 3.06-3.55
6. First and second antennal segments concolorous: 0) no, 1) yes
7. Ratio of length of antennal segment I to width of antennal segment I: 0) 0.85-1.10, 1) 1.11-1.35, 2) 1.36-1.60, 3) 1.61-1.90
8. Ratio of length antennal segment I to length antennal segment II: 0) 0.30-0.40, 1) 0.41-0.50, 2) 0.51-0.60, 3) 0.61-0.70
9. Carinae on frons concolorous: 0) no, 1) yes
10. Frons concolorous: 0) no, paler towards vertex, 1) yes
11. Clypeus concolorous with frons: 0) no, 1) yes
12. Ratio of frons length to width: 0) 1.30-1.55, 1) 1.56-1.80, 2) 1.81-2.05, 3) 2.06-2.35
13. Vertex: 0) concolorous, 1) anterior compartments darker, posterior compartments lighter, 2) carinae paler
14. Ratio of vertex length to width: 0) 0.85-1.05, 1) 1.06-1.25, 2) 1.26-1.45, 3) 1.46-1.65
15. Ratio of length of anterior compartments of vertex to posterior compartments of vertex: 0) 0.60-0.80, 1) 0.81-1.00, 2) 1.01-1.20, 3) 1.21-1.45
16. Ratio of vertex length to pronotum length: 0) 1.05-1.20, 1) 1.21-1.35, 2) 1.36-1.50, 3) 1.51-1.65

Thorax

17. Posterior edge of pronotum concolorous with mesonotum: 0) no, 1) yes
18. Ratio of pronotum length to mesonotum length: 0) 0.35-0.45, 1) 0.46-0.55, 2) 0.56-0.65, 3) 0.66-0.75
19. Wing color: 0) dark, 1) light
20. Ratio of brachypter wing length to body length: 0) 0.35-0.45, 1) 0.46-0.55, 2) 0.56-0.65, 3) 0.66-0.75
21. Average number of teeth on calcar: 0) 11.00-14.50, 1) 14.51-18.00, 2) 18.01-21.50, 3) 21.51-25.00

Abdomen

22. Pygofer shape: 0) rectangular, taller than wide, 1) quadrate, roughly equally wide as tall, 2) triangular, taller than wide
23. Dorsal emargination of the diaphragm shape: 0) concave, U-shape, 1) convex, inverted u-shape, 2) W- or V-shape
24. Median projection of the armature of the diaphragm: 0) absent, 1) present
25. Armature of the diaphragm: 0) caudally projected, 1) dorsally projected
26. Inner angles of parameres longer than outer angles: 0) no, 1) yes
27. Processes on dorsal margin of segment 10: 0) absent, 1) present
28. Processes on dorsal margin of segment 10: 0) short, 1) elongate
29. Processes on dorsal margin of segment 10: 0) blunt or truncate, 1) sharp, pointed
30. Processes on ventral margin of segment 10: 0) absent, 1) present
31. Aedeagus: 0) projected caudally, 1) projected dorsally
32. Aedeagus: 0) elongate, 1) stout
33. Teeth on aedeagus: 0) absent, 1) present
34. Processes on aedeagus: 0) absent, 1) present

Table 4. Character weights assigned by successive weighting using the rescaled consistency index in PAUP*.

Character	Type	Weight	Character	Type	Weight
1	Ordered	0.257143	18	Ordered	0.133333
2	Ordered	0.179487	19	Unordered	0.085714
3	Ordered	0.190476	20	Ordered	0.053254
4	Ordered	0.666667	21	Ordered	0.000000
5	Ordered	0.025000	22	Unordered	0.388889
6	Unordered	1.000000	23	Unordered	0.049383
7	Ordered	0.204545	24	Unordered	0.000000
8	Ordered	0.047619	25	Unordered	1.000000
9	Unordered	0.111111	26	Unordered	0.000000
10	Unordered	0.000000	27	Unordered	0.142857
11	Unordered	0.222222	28	Unordered	0.000000
12	Ordered	0.238095	29	Unordered	0.000000
13	Unordered	0.000000	30	Unordered	0.166667
14	Ordered	0.218750	31	Unordered	0.000000
15	Ordered	0.000000	32	Unordered	0.000000
16	Ordered	0.047619	33	Unordered	0.400000
17	Unordered	0.222222	34	Unordered	0.000000

Table 5. List of apomorphies for Figure 2. The double arrow ">>" represents unambiguous changes and the single arrow ">" represents ambiguous changes.

Node	Character (state change)
node 22>node 26	19 (0>1)
node 26>node 27	2 (0>2), 6 (1>2), 8 (1>2), 14 (0>1)
node 27>node 28	18 (1>2), 19 (1>0), 21 (0>1), 22 (0>1), 27 (0>1), 33 (0>1)
node 28>node 29	8 (2>1), 11 (1>0), 25 (0>1), 28 (0>1)
node 29>node 33	3 (2>>1), 12 (2>1), 17 (1>0), 19, (0>1), 21 (1>0), 23 (0>2)
node 33>node 34	3 (1>>0), 20 (1>0), 26 (0>1)
node 34>*atridorsum*	2 (2>0), 4 (2>1), 7 (2>0), 9 (1>>0), 12 (1>0), 13 (0>>1), 14 (1>0), 16 (1>>3), 17 (0>>1), 18 (2>>1), 19 (1>>0), 23 (2>0), 26 (1>0)
node 34>*nigriscutellata*	2 (2>0), 5 (1>>3), 7 (2>0), 12 (1>0), 14 (1>0), 21 (0>>1), 23 (2>1)
node 33>node 32	3 (1>0), 4 (2>>0), 8 (1>2), 14 (1>>2), 20 (1>0)
node 32>node 31	7 (2>1), 22 (1>>2), 30 (0>>1), 31 (0>1)
node 31>*adunca*	18 (2>>3), 28 ((1>>0)
node 31>node 30	1 (1>>0), 6 (1>>0), 8 (2>1), 12 (>>2), 18 (2>>1), 20 (0>>1), 29 (1>0)
node 30>*andromeda*	2 (2>>3), 14 (2>>3), 15 (1>>0), 16 (1>>3)
node 30>*nigrifacies*	14 (2>>0), 16 (1>>0), 20 (1>>2), 21 ((0>>1), 23 (2>>0), 24 (1>>0), 27 (1>>0), 31 (1>0)
node 32>*incurva*	1 (1>>2), 5 (1>>0), 13 (0>>1), 15 (1>>2), 16 (1>>2), 24 (1>>0), 26 (0>1), 34 (0>>1)
node 29>*latidens*	2 (2>1), 3 (2>1), 5 (1>>2), 12 (2>1), 15 (1>>0), 17 (1>0), 19 (0>1), 20 (1>>2), 21 (1>0), 23(0>1), 24((1>>0), 26 (0>1), 29 (1>>0)
node 28>*nitens*	3 (2>>3), 7 (2>1), 8 (2>1), 11 (1>0), 15 (1>>3), 23 (0>2), 25 (0>1), 28 (0>1), 32 (0>>1)
node 27>node 20	1 (1>>0), 2 (2>>3), 4 (2>1), 19 (1>0), 21 (0>1), 22 (0>1), 27 (0>1), 33 (0>1)
node 20>node 19	3 (2>>1), 5 (1>>0), 18 (1>>0), 23 (0>1), 29 (1>0)
node 19>*teapae*	10 (1>>0), 13 (0>>1), 15 (1>>2), 16 (1>>0), 20 (1>>3), 22 (1>>2), 32 (0>>1)
node 19>*livida*	8 (2>1), 12 (2>>3), 24 (1>>0), 27 (1>>0), 30 (0>>1)
node 20>*balli*	3 (2>>3), 5 (1>>2), 8 (2>>3), 13 (0>>2), 18 (1>2), 20 (1>>0), 28 (0>1)
node 26>node 25	2 (0>2), 7 (1>2), 11 (1>0), 14 (0>>2), 18 (1>2), 20 (1>0)
node 25>node 23	2 (2>>3), 3 (2>>1), 7 (2>>3)
node 23>*aterrima*	5 (1>>0), 8 (1>2), 13 (0>>2), 15 (1>>3), 19 (1>0), 26 (0>>1)
node 23>*sucinea*	9 (1>>0), 16 (1>>2), 18 (2>>1), 24 (1>>0), 34 (0>1)
node 25>node 24	1 (1>>3), 3 (2>>3), 12 (2>>3), 18 (2>>3)
node 24>*recurvata*	4 (2>>3), 7 (2>1), 11 (0>1), 15 (1>>3), 23 (0>1), 24 (1>>0), 30 (0>>1), 34 (0>>1)
node 24>*shermani*	5 (1>>2), 8 (1>2), 10 (1>>0), 14 (2>>3), 15 (1>>0), 20 (0>>2), 22 (0>>2), 26 (0>>1), 27 (0>>1), 32 (0>>1), 33 (0>>1)
node 22>node 21	1 (1>>0), 7 (1>>0), 8 (1>>0), 9 (1>>0), 16 (1>>0), 23 (0>1)
node 21>*ch. havanae*	2 (0>1), 3 (2>>1), 5 (1>>0), 12 (2>>3), 13 (0>>2), 17 (1>>0), 20 (1>>3), 21 (0>>3), 34 (0>>1)
node 21>*k. lutulenta*	3 (2>>>3), 5 (1>2), 12 (2>>1), 18 (1>2), 23 (1>2), 24 (1>>0)
node 22>*m. arvensis*	1 (1>>2), 5 (1>>3), 8 (1>2), 19 (0>1), 20 (1>2)

Table 6. Summary of recorded host plants for species of *Caenodelphax* and *Flavoclypeus* (Plant names from USDA PLANTS database (USDA, NRCS 2012).

Species	Hosts	Common name	Source
Caenodelphax teapae	*Axonopus compressus* (Sw.) P. Beauv.	broadleaf carpetgrass	Fennah 1959
	Crotalaria L.	rattlebox	Leonard 1933
	Cucurbita maxima Duchesne	winter squash	Label data
	Cymbopogon citratus (D.C. ex Nees) Stapf	lemon grass	Wolcott 1923
	Cynodon dactylon (L.) Pers.	Bermudagrass	Label data
	Daucus L.	carrot	Wolcott 1923
	Paspalum notatum Flueggé	bahiagrass	Label data
	Phaseolus vulgaris L.	kidney bean	Label data
	Saccharum L.	sugarcane	Wolcott 1923
	Solenostemon scutellarioides (L.) Codd	common *Coleus*	Ballou 1936
	Urochloa plantaginea (Link) R. Webster	plantain signalgrass	Wilson 2005
Flavoclypeus andromedus	*Aristida beyrichiana* Trin. & Rupr.	Beyrich threeawn	Label data
	Eleocharis R. Br	spikerush	Label data
	Paspalum L.	crowngrass	Osborn 1926
Flavoclypeus latidens	*Setaria texana* W.H.P. Emery	Texas bristlegrass	Wilson et al. 1994
Flavoclypeus nigrifacies	*Chamaecrista fasciculata* (Michx.) Greene	partridge pea	Kennedy et al. 2012
	Cynodon dactylon Pers.	Bermudagrass	Calvert et al. 1987
	Paspalum notatum Flueggé	bahiagrass	Kennedy et al. 2012
	Poaceae (reported as Gramineae grass)		Ballou 1936
	Stenotaphrum secundatum Kuntze	St. Augustine grass	Calvert et al. 1987
Flavoclypeus nigriscutellatus	*Andropogon gerardii* Vitman	big bluestem	Beamer 1947
	Eleocharis compressa Sull.	flatstem spikerush	Bouchard et al. 2002
	Eleocharis elliptica Kunth	elliptic spikerush	Bouchard et al. 2002
	Spartina pectinata Bosc ex Link	prairie cordgrass	Label data
	Sporobolus heterolepis (A. Gray) A. Gray	prairie dropseed	Bouchard 1997

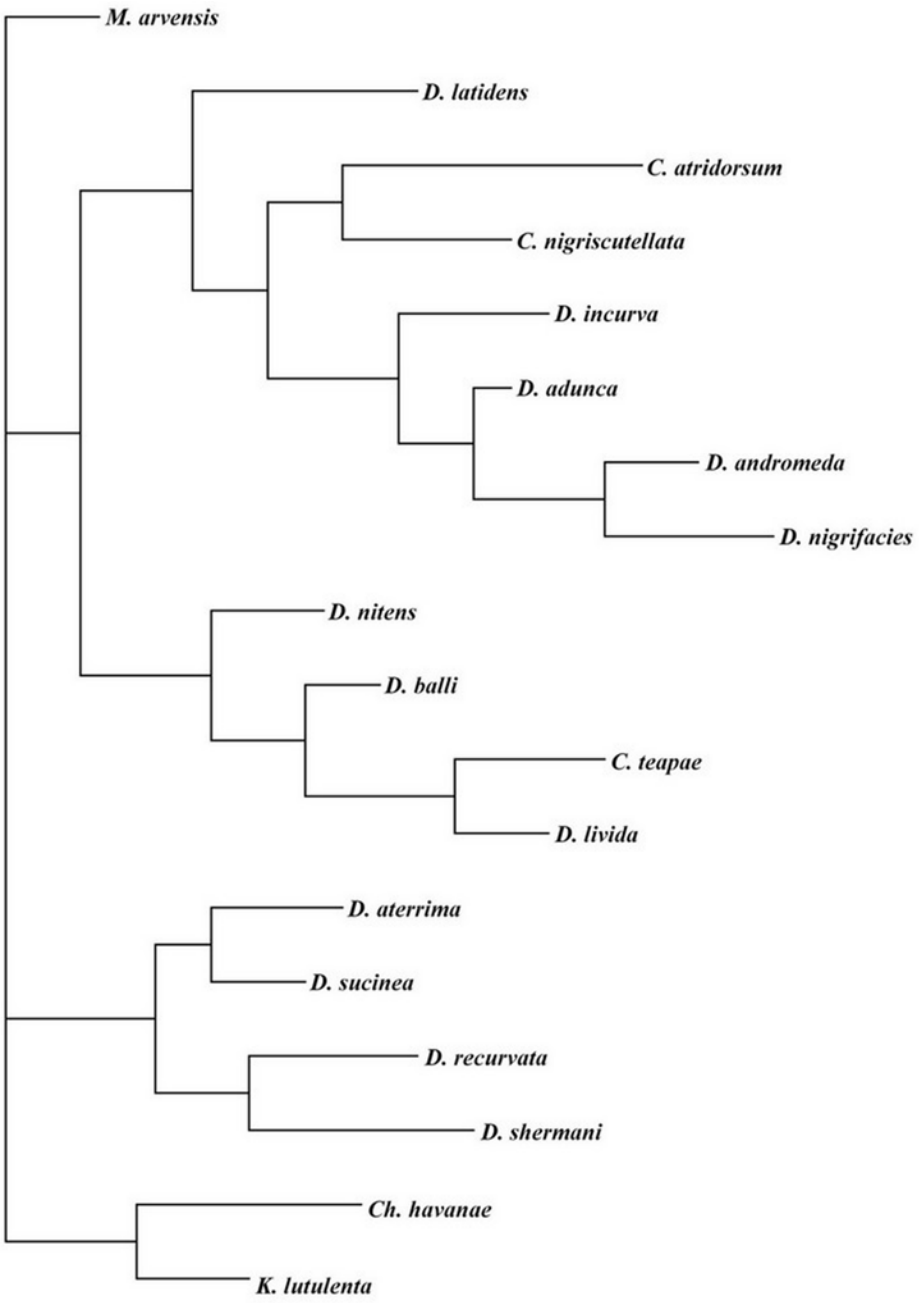

Figure 1. Unweighted maximum parsimony tree for *Caenodelphax* and putatively allied *Delphacodes* and 3 outgroup species (*Chionomus havanae*, *Kosswigianella lutulenta*, and *Muirodelphax arvensis*). Tree length = 194, consistency index (CI) = 0.335, homoplasy index (HI) = 0.6649, retention index (RI) = 0.4241, rescaled consistency index (RC) = 0.1421.

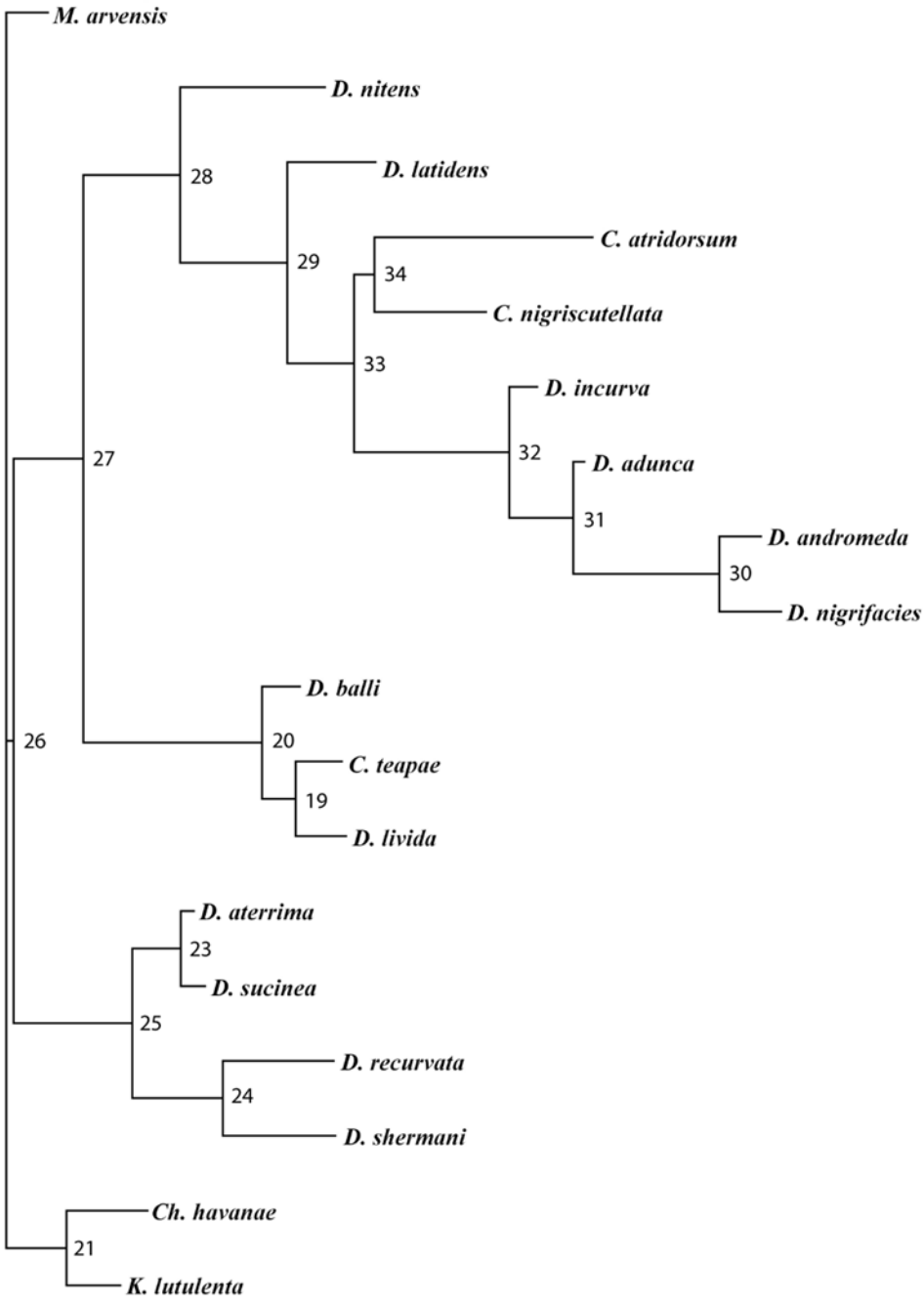

Figure 2. Weighted maximum parsimony tree of the *Caenodelphax* and *Delphacodes*-segregate ingroup and 3 outgroup species (*Chionomus havanae*, *Kosswigianella lutulenta*, and *Muirodelphax arvensis*) with nodes numbered (see Table 5). Tree length = 23.86549, consistency index (CI) = 0.4615, homoplasy index (HI) = 0.5385, retention index (RI) = 0.6846, rescaled consistency index (RC) = 0.3159.

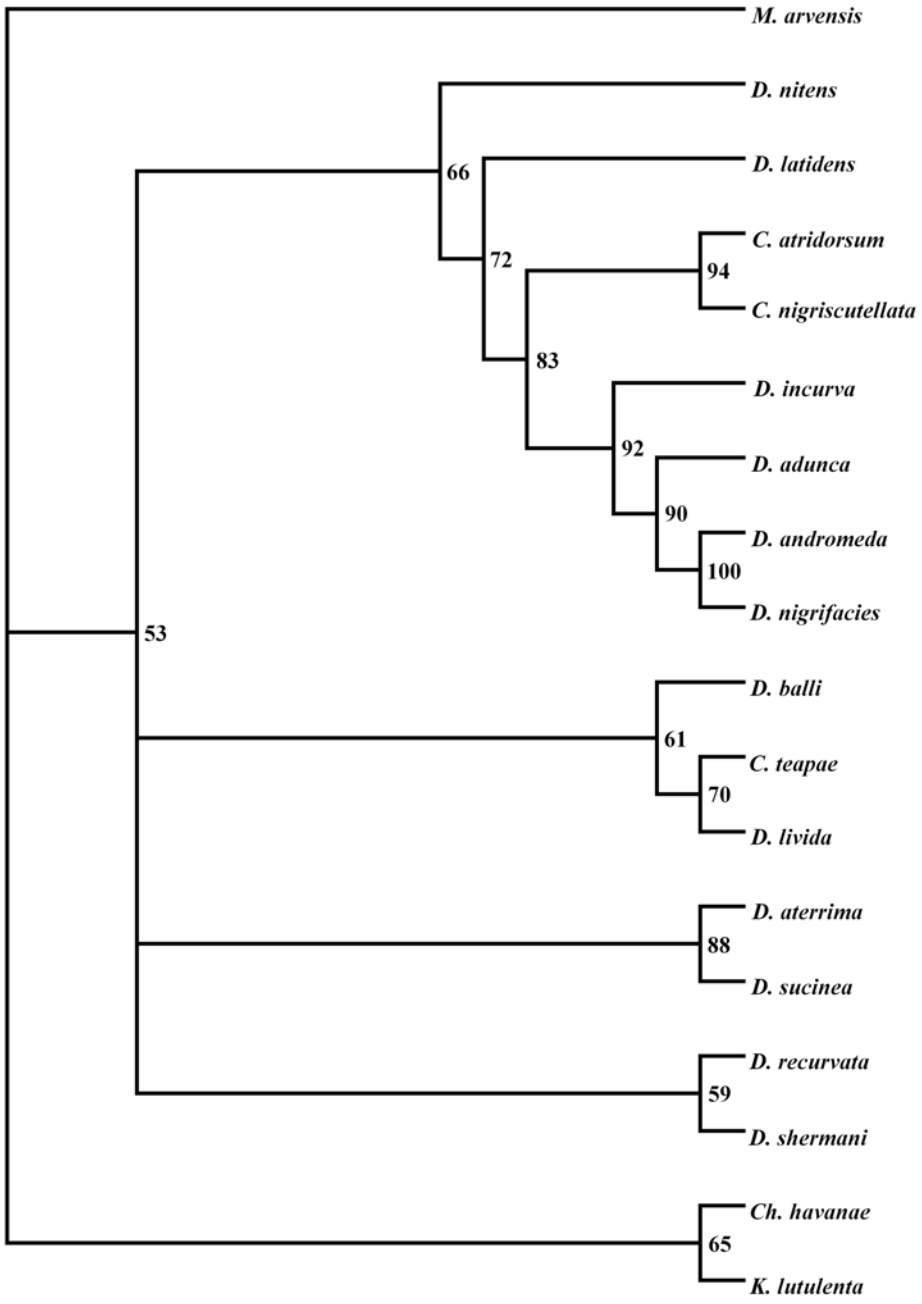

Figure 3. Best-scoring maximum parsimony tree of the *Caenodelphax* and putatively allied *Delphacodes* and 3 outgroup species (*Chionomus havanae*, *Kosswigianella lutulenta*, and *Muirodelphax arvensis*). Bootstrap values provided beside branches. Tree length = 25.01598, consistency index (CI) = 0.4403, homoplasy index (HI) = 0.5597, retention index (RI) = 0.6563, rescaled consistency index (RC) = 0.2889.

Figure 4. Features of *Caenodelphax teapae*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

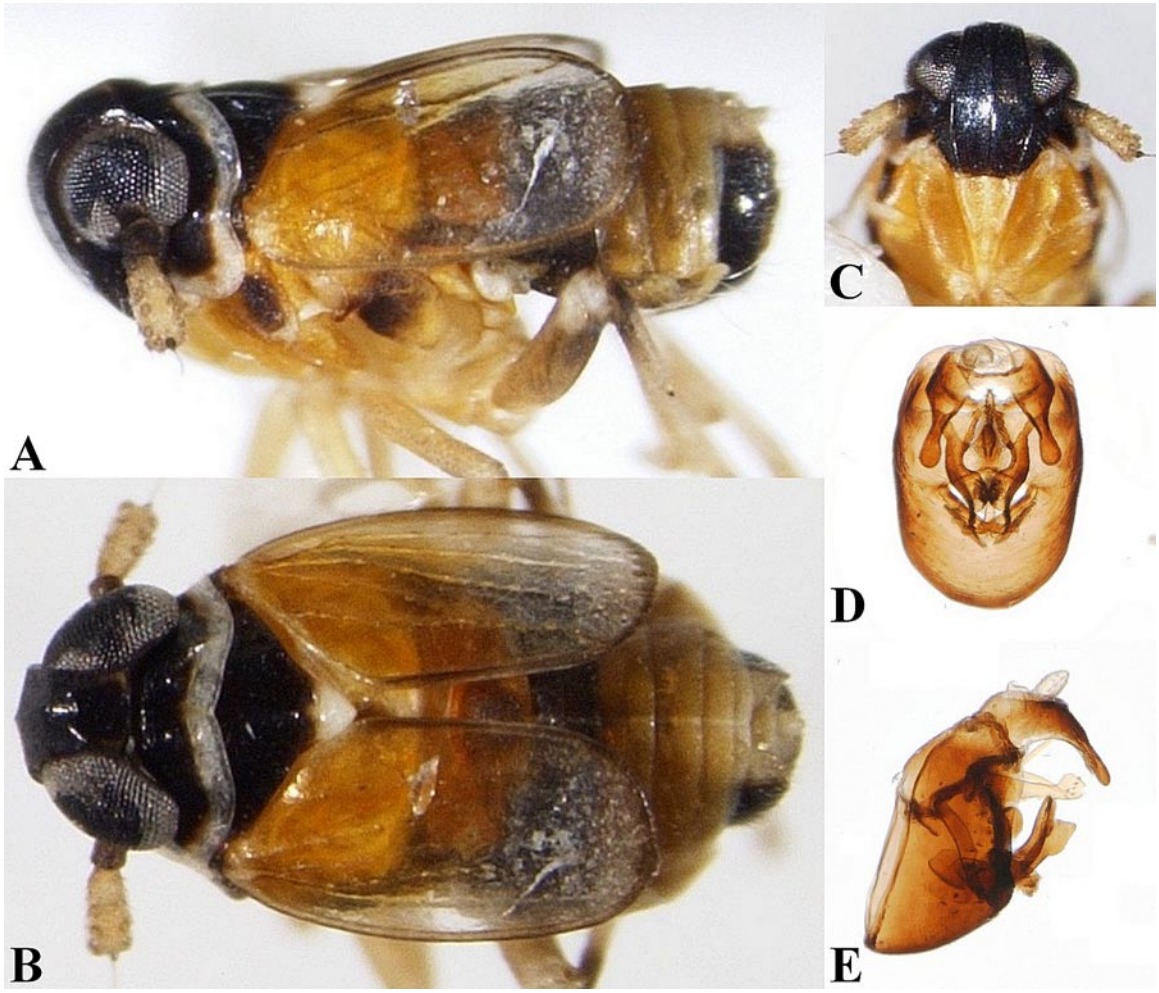

Figure 5. Features of *Flavoclypeus andromedus*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

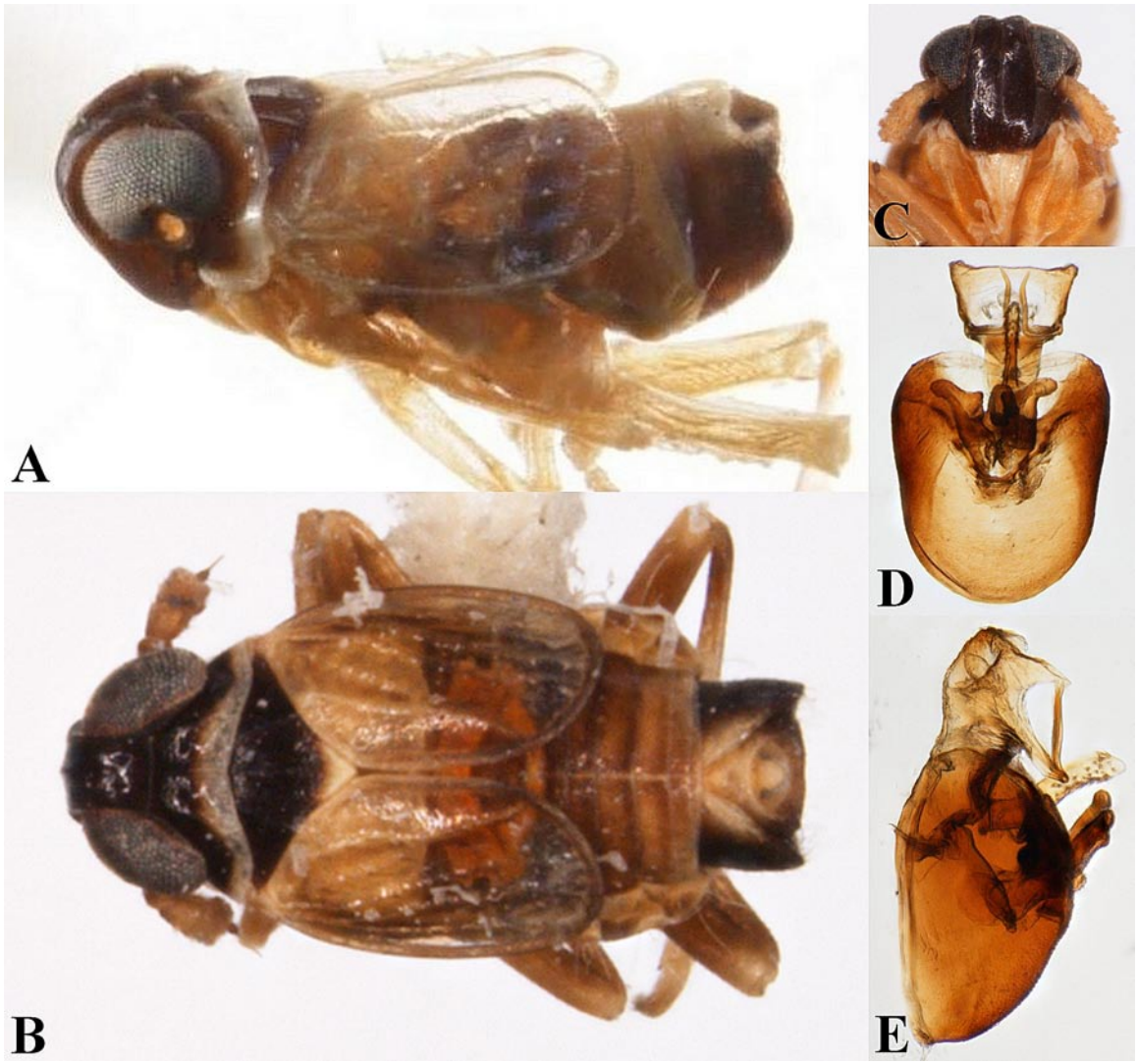

Figure 6. Features of *Flavoclypeus* aduncus; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

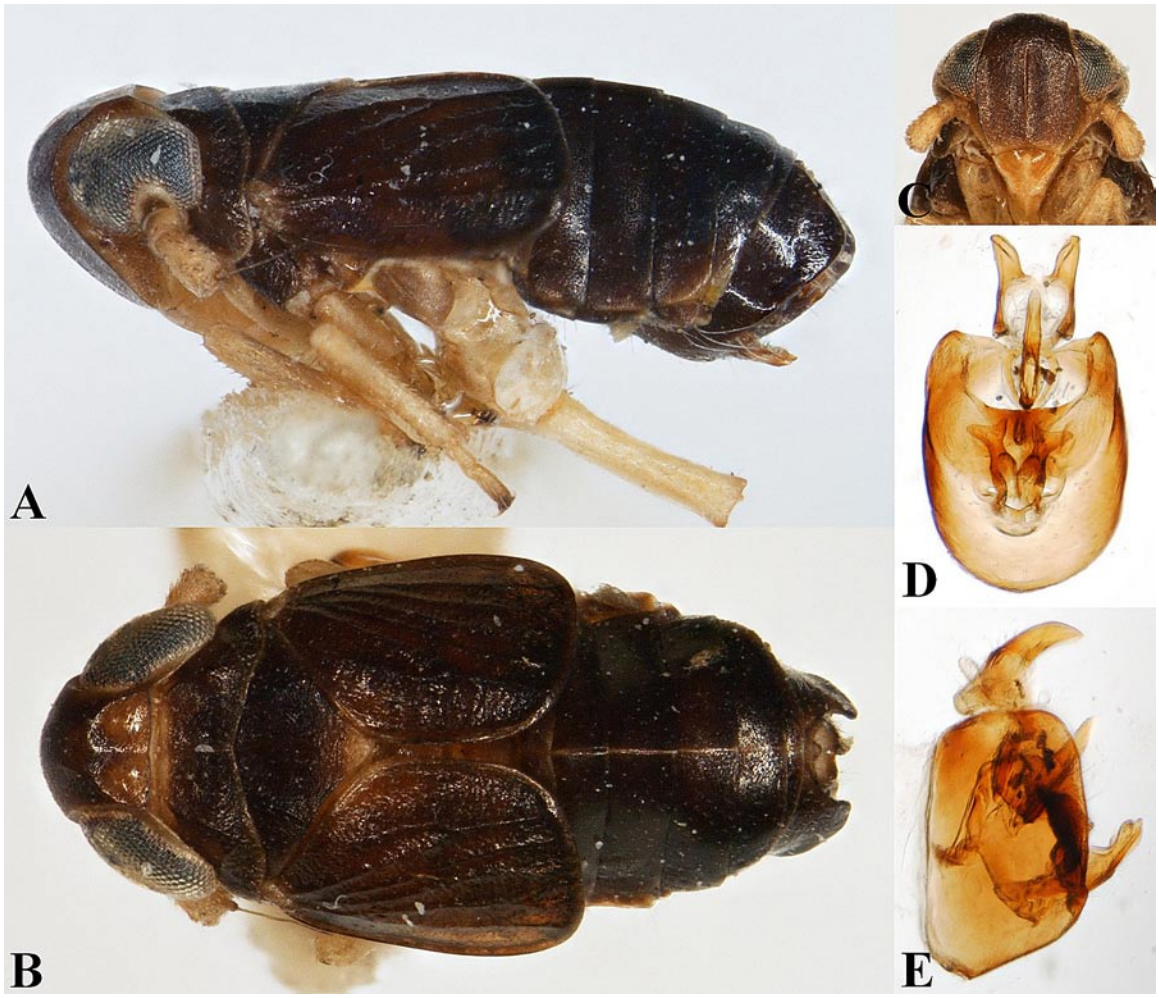

Figure 7. Features of *Flavoclypeus atridorsum*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

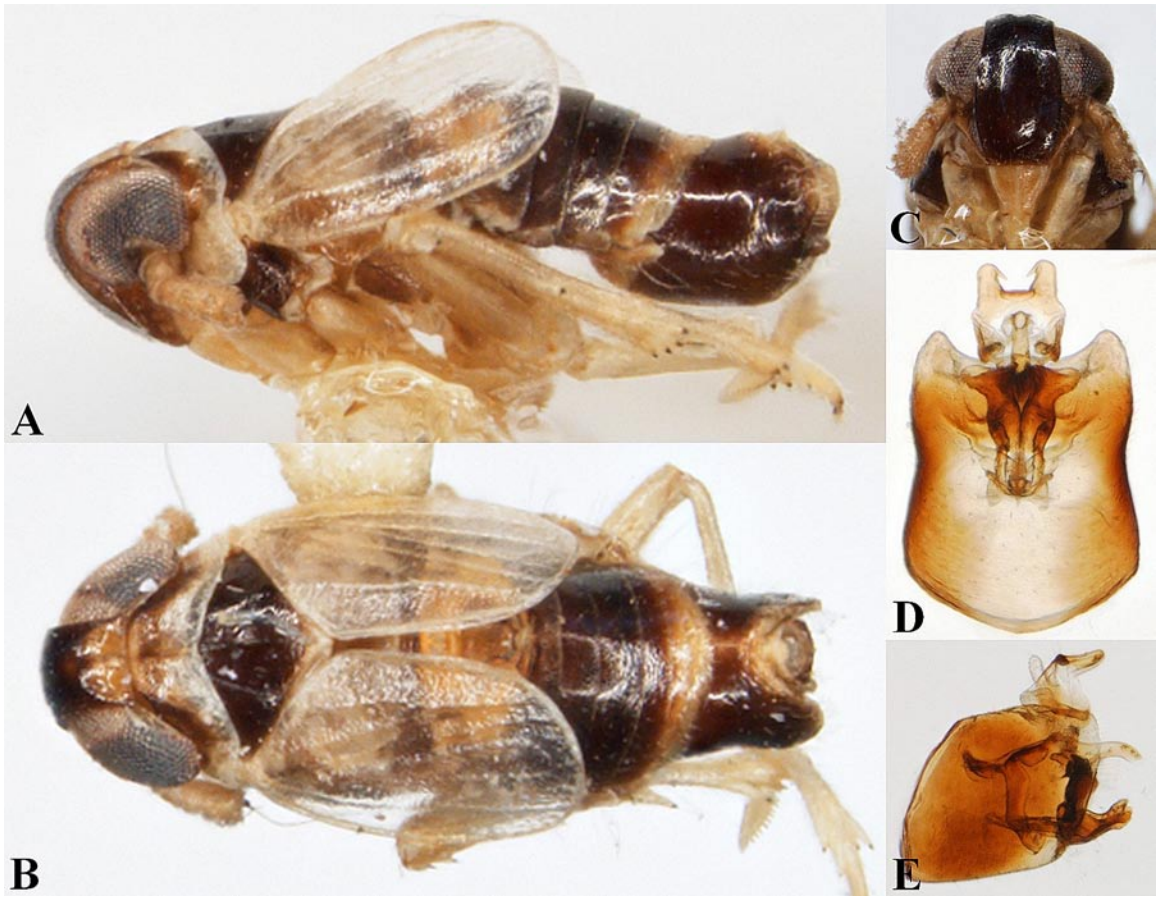

Figure 8. Features of *Flavoclypeus incurvus*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

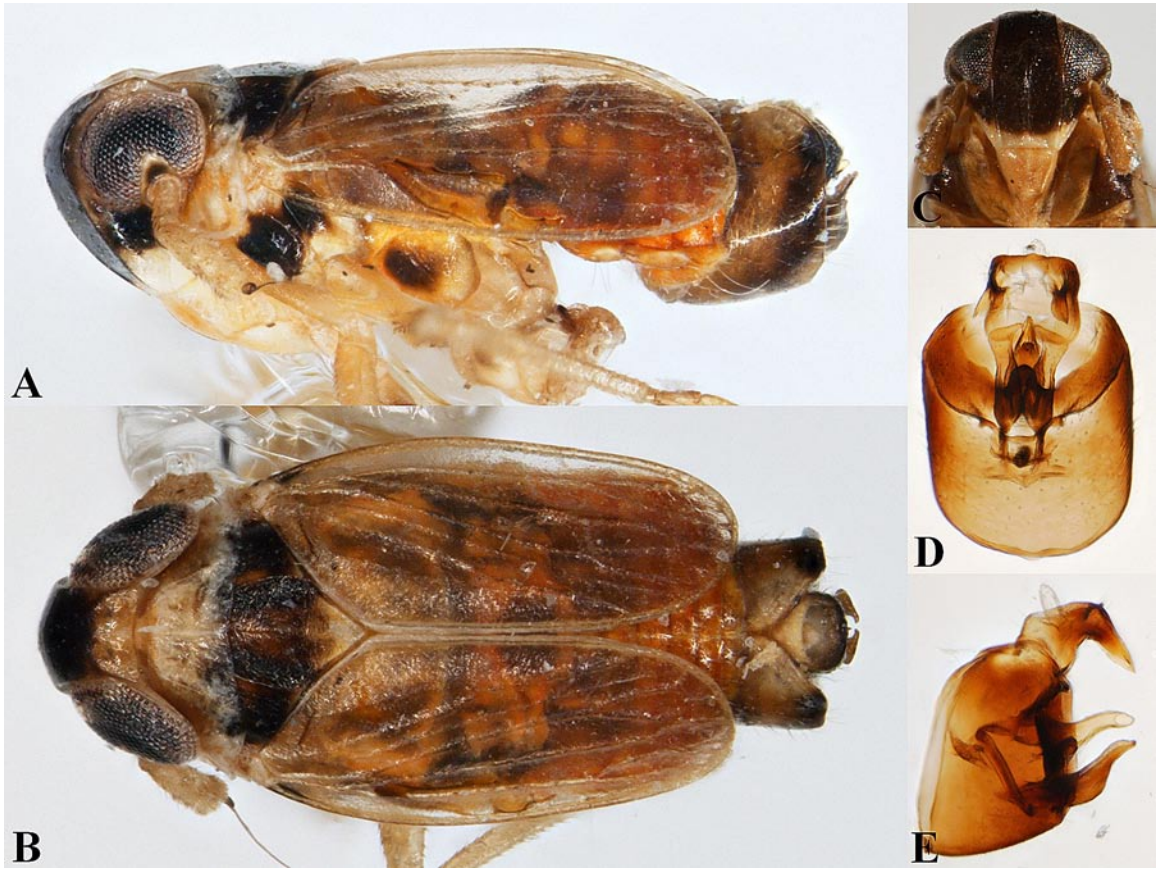

Figure 9. Features of *Flavoclypeus latidens*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

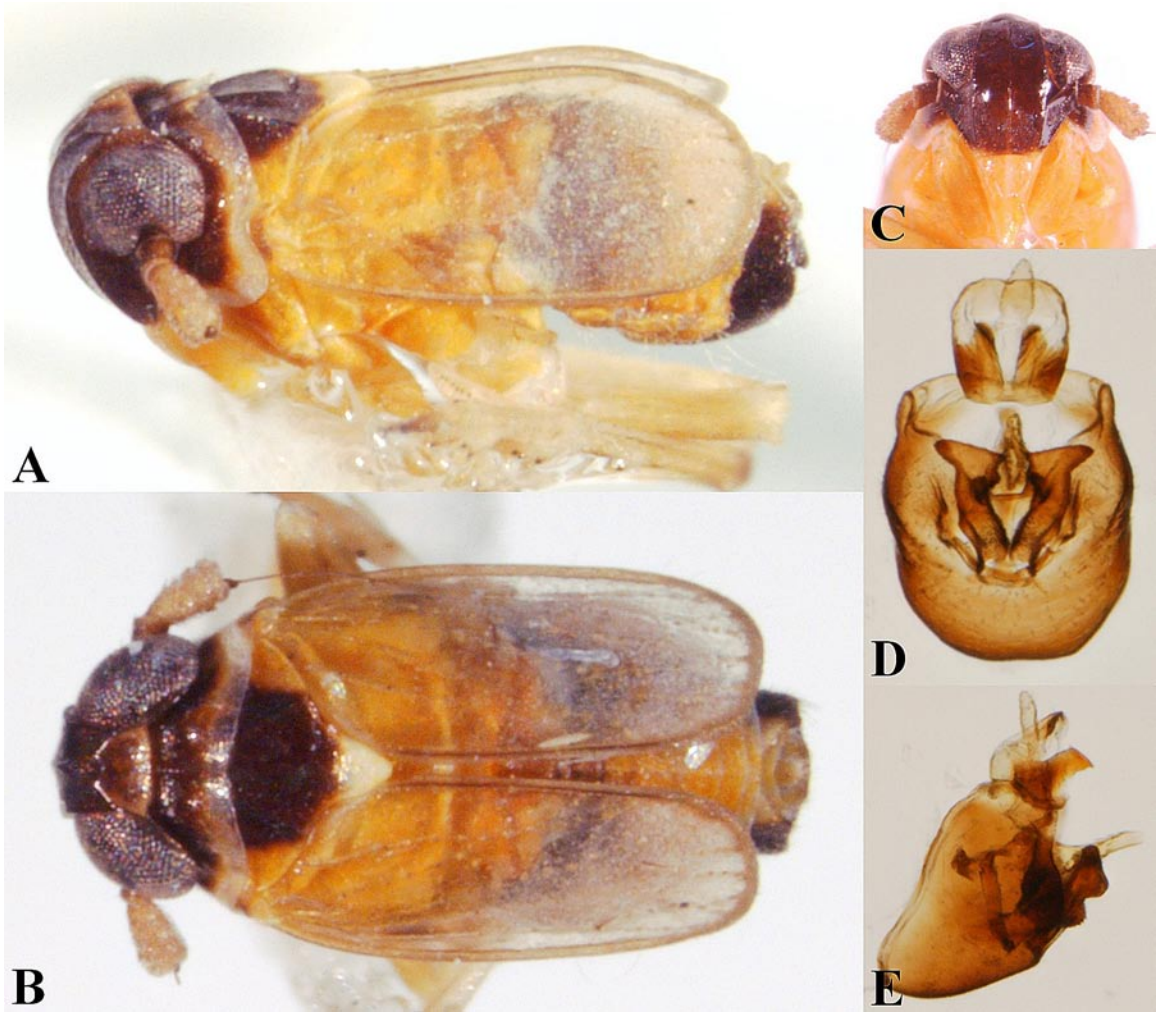

Figure 10. Features of *Flavoclypeus nigrifacies*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

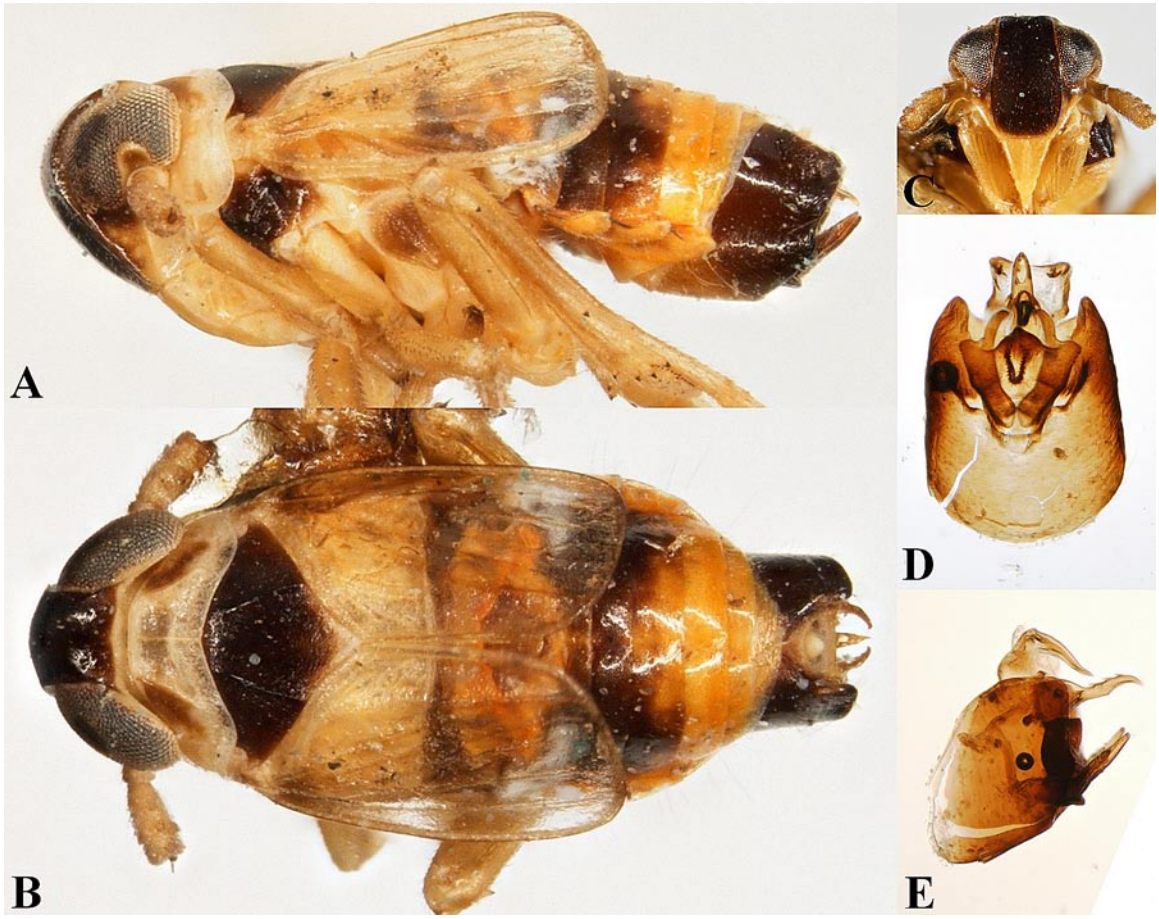

Figure 11. Features of *Flavoclypeus nigriscutellatus*; A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

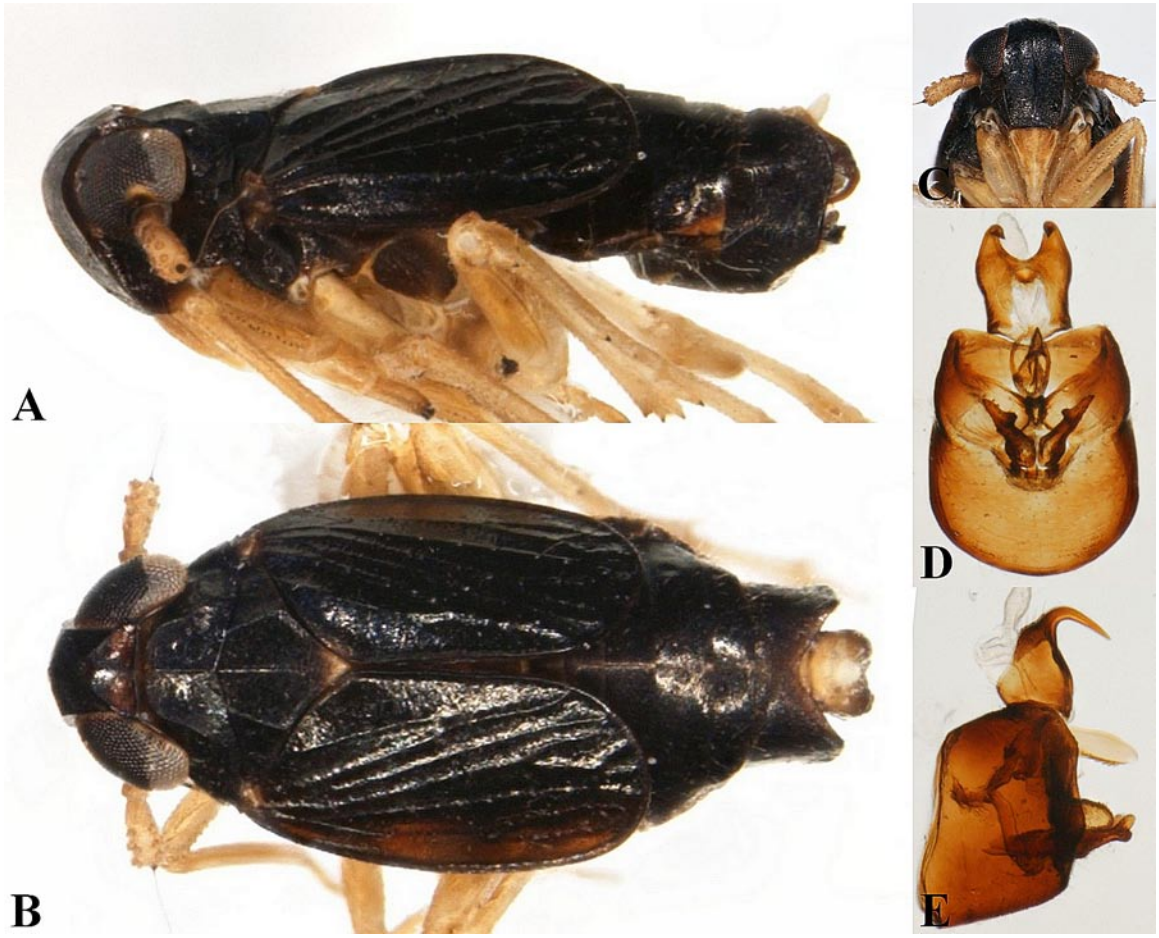

Figure 12. Features of *Flavoclypeus nitens*. A. lateral habitus, B. dorsal habitus, C. frons, D. pygofer, caudal view, E. pygofer, lateral view.

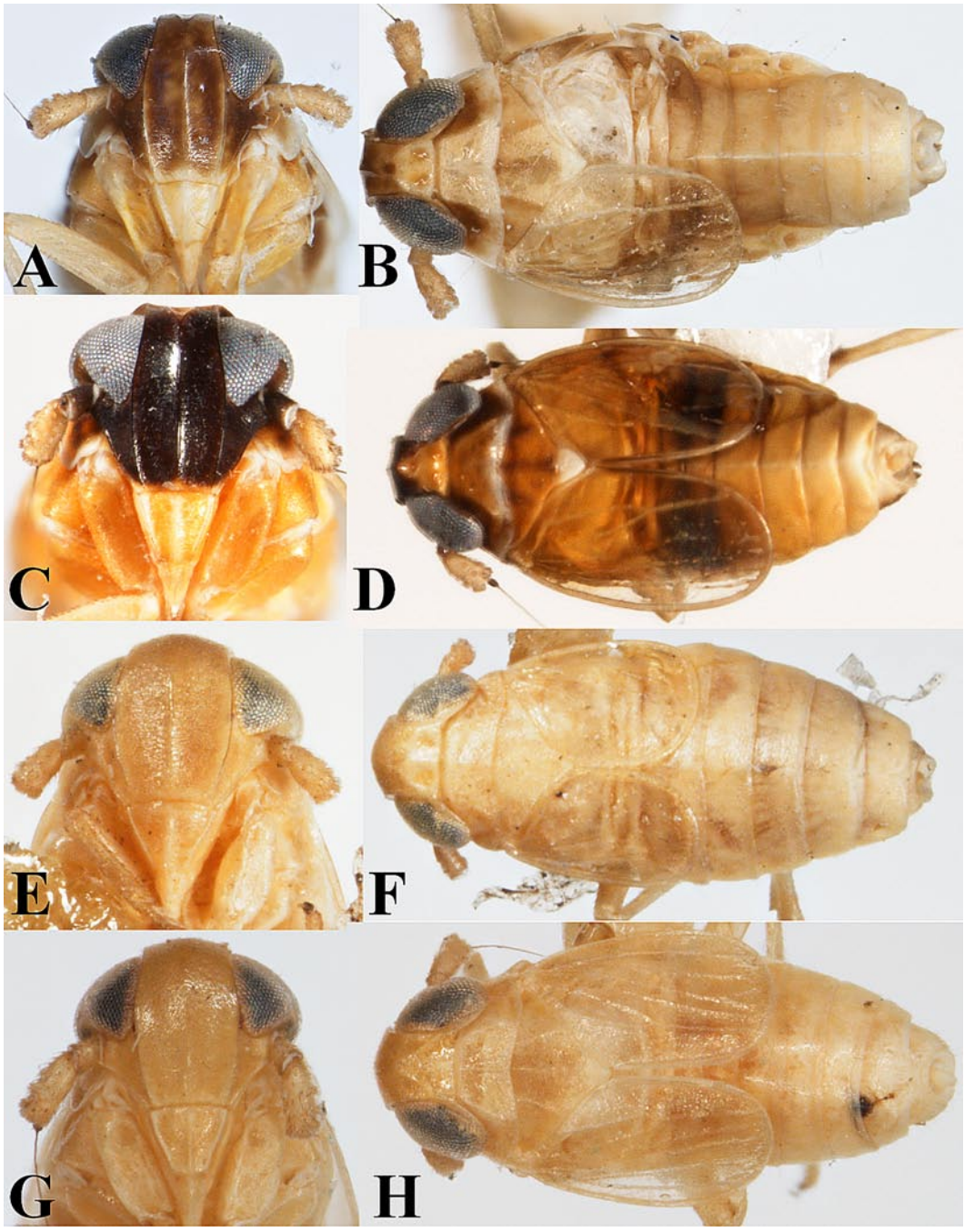

Figure 13. Front and dorsal habitus of female *Flavoclypeus* (front A, C, G, E; dorsal view B, D, F, H); A, B. *Flavoclypeus aduncus* (paratype), C. D. *F. andromedus*, E, F. *F. atridorsum* (topotype), G, H. *F. incurvus*.

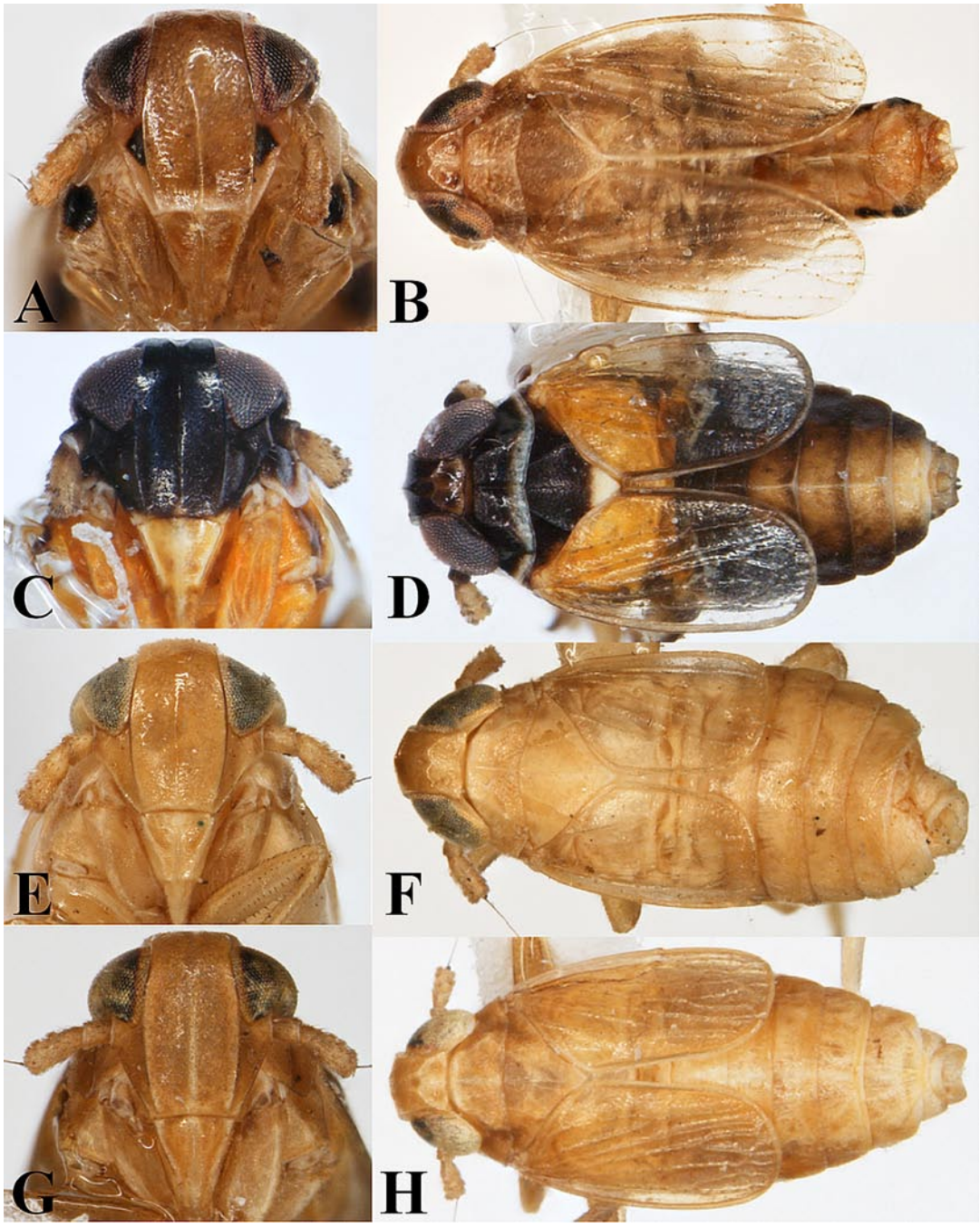

Figure 14. Front and dorsal habitus of female *Flavoclypeus* (front A, C, G, E; dorsal view B, D, F, H); A, B. *Flavoclypeus latidens*, C. D. *F. nigrifacies*, E, F. *F. nigriscutellatus* (paratype), G, H. *F. nitens*.