

Systematics of *Hadropygos* n.g., *Metadelphax* Wagner and New World *Toya* Distant (Hemiptera: Delphacidae)

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ABSTRACT:

New World members of the genera *Toya* Distant and *Metadelphax* Wagner are here revised and the genus *Hadropygos* n. g. described from South America. Generic limits are discussed, with particular comparison to *Syndelphax* Fennah. A key to treated genera and species is provided. The type species of *Toya*, *T. attenuata* Distant from Sri Lanka, is illustrated and discussed. Among the New World *Toya*, *T. boxi* (Muir) and *T. venilia* (Fennah) are retained in the genus; two species are transferred to *Toya* from *Delphacodes* Fieber, *Toya idonea* (Beamer) new comb. and *T. nigra* (Crawford) new comb., with *Delphacodes axonopi* Fennah placed as a new junior synonym of *T. nigra*. Three new species of New World *Toya* are described (*T. goliai* n. sp., *T. dietrichi* n. sp., and *T. recurva* n. sp.). *Toya iaxartes* (Fennah), described from a single specimen from St. Lucia, is here considered *nomen dubium* as it appears to have been described from a malformed or parasitized specimen. *Metadelphax*, restored as a genus by Ding (2006), consists of five species: *M. propinqua* (Fieber) (type species), *M. argentinensis* new comb., here transferred from *Toya*, *M. pero*, here transferred from *Syndelphax*, *M. wetmorei* (Muir and Giffard) new comb., here transferred from *Delphacodes*, plus *M. dentata* n. sp. *Metadelphax bridwelli* (Muir), transferred from *Toya* by Ding (2006), is returned to *Toya*. *Hadropygos* n. g., with the single species, *H. rhombos* n. sp., from the Neotropics bears comparable features to *Toya* and *Metadelphax*. Lectotype designations are made for *Toya attenuata* Distant and *Delphax propinqua* Fieber. Collectively, 3 genera are treated: *Hadropygos* n. g., with a single new species, *Metadelphax* with 5 species (1 new), and *Toya* with 7 New World species (3 new), excluding *T. iaxartes* as a *nomen dubium*.

Key Words: Delphacidae, Delphacini, Hemiptera, Auchenorrhyncha, Fulgoroidea, Fulgoromorpha, planthopper, new genus, new species, *Metadelphax*, *Toya*.

The genus *Toya* Distant 1906 (Delphacinae: Delphacini) contains 38 valid species (Table 1) with most found in the tropical and subtropical habitats in the Old World. The type species, *T. attenuata* Distant, 1906, was described from Sri Lanka. In the New World, the genus *Toya* is presently represented by 4 species: *Toya argentinensis* (Muir 1929a) (Argentina), *T. boxi* (Muir 1926) (British Guiana), *T. iaxartes* (Fennah 1959) (St. Lucia), and *T. venilia* (Fennah 1959) (Montserrat, British Virgin Islands). *Toya propinqua* (Fieber 1866) (widespread, tropical and temperate regions) was recently restored to the genus *Metadelphax* Wagner, 1963, by Ding (2006).

This revision was motivated in part by research associated with the Great Smoky Mountains National Park All Taxon Biotic Inventory (GSMNP ATBI) (Sharkey 2001, Bartlett & Bowman 2004, Gonzon et al. 2007). Certain specimens collected in the Park appeared to be either new species of *Toya* or species incorrectly placed at the generic level. In addition to *Toya*, we examined type material from several species currently in the polyphyletic genus *Delphacodes*

that exhibited general similarities to *Toya*, namely *Delphacodes axonopi* Fennah 1945, *D. banosensis* Muir 1926, *D. dolosa* Muir 1926, *D. fallax* Muir 1926, *D. gluciophila* Muir 1926, *D. idonea* Beamer 1947, *D. nigra* (Crawford 1914), and *D. wetmorei* Muir and Giffard 1924. The purpose of this study was to revise and summarize the taxonomy of the New World members of the genus *Toya* and closely allied taxa.

MATERIALS AND METHODS

All available New World specimens of *Toya*, *Metadelphax*, and *Delphacodes* species similar to *Toya* were examined. "Similarity" to *Toya* was defined as being New World Delphacini bearing an expanded dorsocaudal margin of the pygofer, particularly with inflected dorsocaudal apices and not bearing features associated with other New World genera. All available Old World *Toya* species were also examined, including the type species, *Toya attenuata* Distant 1906, from Sri Lanka. In addition, we examined all available primary type specimens for New World taxa, including junior synonyms. A total of 2,694 individuals, excluding type material and tentatively identified females, were studied (Table 2, Appendix). Because definitive species features are only present on males, females are tentatively identified through associated males. Females not clearly associated with males were excluded.

For each species, the distribution is summarized from the observed specimens with additional records from the literature indicated as "Also reported from". Type specimens examined are annotated with the species description. The label data for primary type specimens are quoted, top to bottom label, with "/" indicating a new line, and "//" indicating new label. Additional materials examined are annotated in the appendix, recorded geographically by country (all caps) approximately north to south, east to west, with states, provinces, departments, and counties within countries presented alphabetically and underlined as headers for subsequent information, except for states of the USA in all caps. Specimen data are recorded as on specimen labels, except that clarifying spacing or punctuation may be added, with notes and emendations in square brackets. Sample or accession codes and the terms "collector" or "coll." were omitted from label information of non-type specimens. Locality data for *Metadelphax propinqua*, the only species occurring in both the Old and New World, are segregated by biogeographic regions.

Host information is given as provided on specimen labels or in the literature. When host common names are provided, plant scientific names are interpreted parenthetically according to the nomenclature within the "PLANTS" database (USDA: NRCS 2006) and the "GRIN" database (USDA: ARS 2007).

We examined specimens from the following collections (acronyms following Arnett et al., 1993, except for VGC and UKYL):

- AMNH — American Museum of Natural History, New York, NY.
- ANSP — Academy of Natural Sciences, Entomology Department, Philadelphia, PA.
- BMNH — British Museum Natural History, London, UK.
- BPBM — Bernice P. Bishop Museum, Department of Entomology, Honolulu, HI.
- CASC — California Academy of Sciences, Department of Entomology, Golden Gate Park, San Francisco, CA.

- CDAE —California Department of Food and Agriculture, California State Collection of Arthropods, Sacramento, CA.
- EMEC —Essig Museum of Entomology, Department of Entomological Sciences, University of California, Berkeley, CA.
- FMNH —Field Museum of Natural History, Chicago, IL.
- FSCA —Florida State Collection of Arthropods, Division of Plant Industry, Gainesville, FL.
- INHS —Illinois Natural History Survey Insect Collection, University of Illinois, Champaign, IL.
- LBOB —Lois O'Brien Collection (associated with California Academy of Natural Sciences, CASC), Green Valley, AZ.
- LSUC —The Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA.
- NCSU —North Carolina State University, Department of Entomology, Insect Collection, Raleigh, NC.
- NHMW —International Research Institute of Entomology, Natural History Museum Vienna, Austria.
- SEMC —University of Kansas, Snow Entomological Museum, Lawrence, KS.
- UCDC —The Bohart Museum of Entomology, University of California Davis, CA.
- UDCC —University of Delaware, Department of Entomology and Wildlife Ecology, Insect Reference Collection, Newark, DE.
- UKYL —University of Kentucky, Department of Entomology, Lexington, KY.
- USNM —National Museum of Natural History, The Smithsonian Institution, Washington, DC.
- VGC —Vince Golia Collection, associated with Archbold Biological Station Collection (ABSC), Lake Placid, FL.

Diagnoses for genera and species are given along with a key to New World taxa and distribution summary. New World Taxa similar to, but lacking features defined here as definitive, are discussed in comparison with *Toya*. A critical synonymy is listed for each species (includes all generic placements and subjective synonyms, plus misspellings) since Metcalf's catalogue (1943). Diagnoses are based primarily on males and begin with descriptions of macropters, followed by brachypters, except when a wing form was unavailable for study.

Morphological terminology follows Asche (1985), except that "armature" (sensu Muir & Giffard 1924) is used to describe the aedeagal brace on the genital diaphragm, "segment X" is used instead of "anal tube", and features of the parameres (viz. basal angle, inner angle, outer angle) follow Metcalf (1949). Male specimens were cleared and dissected as needed following standard procedures described by Wilson and McPherson (1980) and Wilson (2005). In the descriptions, the header "genitalia" should be understood to refer to males and include the terminal abdominal segments.

Measurements and photographs were made using a Nikon SMZ-1500 Digital Imaging Workstation with Nikon DS-U1 digital camera and Eclipse Net Imaging software (version 1.16.6). All photos included a scale bar measuring between 0.1 and 0.5 mm as indicated in the figure captions. Further photo editing was performed using Adobe Photoshop CS Version 8.0 [trial edition] or Corel Photo-Paint ver. 8.232. Total body length (in mm, n=5 unless otherwise specified) was measured on macropterous and brachypterous males and on females. Total body length was defined as the apex of the vertex to the tip of abdomen (excluding epiproct) for brachypters, and to the tip of the wing for macropters.

Wing venation for each genus is illustrated based on the type species for each genus [and interpreted following Dworakowska, 1988]. Line drawings of the wing venation for the left wing are presented dorsum up, head right. Line drawings of the widest view of the left paramere and the left lateral and ventral view of the aedeagus for each species were created from outlines of captured digital images and first-hand observations. For all species, except *Toya dietrichi* n. sp., *T. goliai* n. sp., and *T. recurva* n. sp., observations and photographs were made from disarticulated genitalia. For the remaining three species, multiple images from various angles were used for illustrations.

RESULTS

Based on observations from 2,694 target specimens among taxa that bear an expanded dorsocaudal pygofer, we recognize 13 species in three genera in the New World. New World *Toya* can be principally diagnosed from other Delphacini by having the dorsocaudal margin of the pygofer expanded, with apices medially inflected, and the armature of the genital diaphragm wider than long. *Metadelphax* is very similar to *Toya*, but has the armature of the genital diaphragm taller than wide. *Metadelphax* might best be considered a subgenus of *Toya*; however, the remaining *Toya* are not clearly a subgeneric clade and can not be definitively partitioned into subgenera until the Old World fauna has been considered, an endeavor beyond the scope of our current project. *Hadropygos* n. g. differs from *Toya* and *Metadelphax* in having a foliaceous expanded pygofer and a rhomboid diaphragm armature. The more distantly related genus, *Syndelphax*, has the dorsocaudal margin of the pygofer expanded, but the apices of the expansions are not inflected; the armature of the genital diaphragm is much taller than wide, and usually rounded apically (narrowly spoon-shaped).

SYSTEMATIC TREATMENT

Key to species of New World *Toya* species and allies

- 1 Genital diaphragm much wider than long, in caudal view concave or slightly convex (Figs. 2 A-J); aedeagus of most species slightly curved dorsad, bearing a lateral row of teeth near midlength on both sides plus several subapical dorsal teeth (Figs. 4 A-D) ***Toya* 2**
- 1' Genital diaphragm strongly projecting, much taller than wide (Figs. 3 A-J); aedeagus not as above **8**
- 2 Inner angle of parameres well-developed, outer angle obscure, represented by broadly rounded projection (Figs. 9 E, 10 E) **3**
- 2' Parameres with inner and outer angles well developed (Figs. 6 E, 18 E, 21 E) **4**
- 3 Armature of genital diaphragm with distinct lateral and median hump; parameres with outer angle strongly bulged (Figs. 10 D, F) ***Toya goliai* n. sp.**
- 3' Armature of genital diaphragm with low lateral projections and obscure median hump; parameres with outer angles broadly curved (Figs. 9 D, F) ***Toya dietrichi* n. sp.**
- 4 Processes on segment X strongly upcurved (Fig. 13 H) ***Toya recurva* n. sp.**
- 4' Processes on segment X not, or very slightly, upcurved (Figs. 4 A-D) **5**
- 5 Parameres with bump approximately at midlength on median margin, outer angle of apex broader and 2x as long as inner angle, inner angle directed rather medially (Fig. 12 E); processes on 10 closely approximated basally (Fig. 12 D) ***Toya nigra***

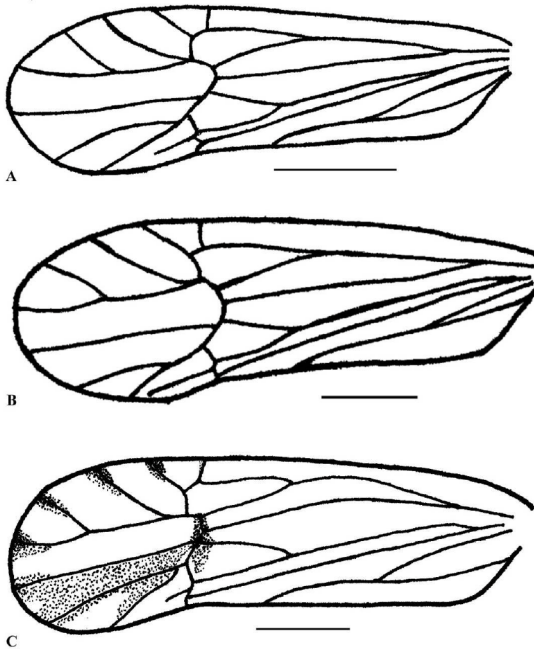


Fig. 1. Left forewing of *Toya*, *Metadelphax*, and *Hadropygos* (scale = 0.5 mm). A. *Toya attenuata* (holotype), B. *Metadelphax propinqua*, C. *Hadropygos rhombos* (holotype).

- 5' Parameres without median bump at midlength of ental surface, outer angle of apex less than 2x as long as inner angle, inner angle directed more dorsad (Fig. 10 E); processes on 10 approximated or separated **6**
- 6 Parameres without expanded basal angle, inner and outer angles developed approximately equally (Fig. 10 E); processes of segment X longer, basally approximated, and frequently arising ventrad of dorsocaudal angle, tightly approximated to 10 (Fig. 10 D); aedeagus strongly curved dorsad, bearing 10 or more teeth on each side in subparallel rows (Figs. 10 F, G) *Toya idonea*
- 6' Parameres with expanded basal angle bearing well developed process, outer angles stouter than inner angles (Figs. 8 E, 14 E); processes of segment X relatively short, basally separated and in lateral view arising from dorsocaudal angles of 10 (Figs. 8 D, 14 D); aedeagus slightly curved dorsad, bearing 6 or fewer teeth on each side in parallel rows (Figs. 8 F-G, 14 F-G) **7**
- 7 Parameres in widest view with outer angle broader and longer than inner angle (Fig. 8 E), aedeagus in ventral view with left and right rows of teeth forming lateral flanges (Figs. 8 F-G); northern South America, Central America, Caribbean, Florida *Toya boxi*
- 7' Parameres in widest view with inner angles subequal to or longer than outer angles (Fig. 14 F), aedeagus with lateral rows of teeth not produced into a flange (Figs. 14 F-G); Caribbean, on *Sporobolus* grasses *Toya venilia*
- 8 Dorsocaudal margin of pygofer greatly expanded and foliaceous, apex bent broadly and strongly medially, genital diaphragm strongly arrowhead-shaped (Figs. 3 I-J); parameres apically acute, without distinct outer or basal angles (Fig. 21 E); aedeagus flattened, bearing few subapical teeth (Fig. 21 F) *Hadropygos* n.g., *H. rhombos* n. sp.

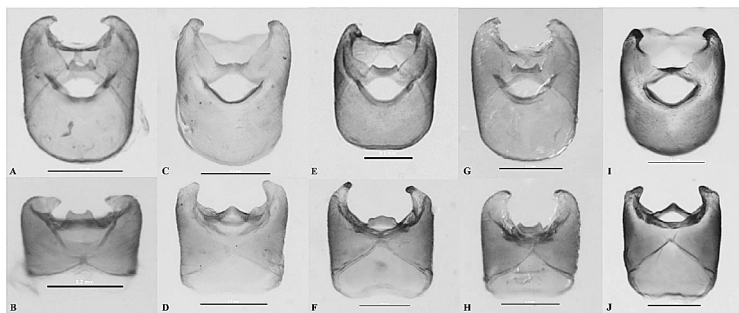


Fig. 2. Male pygofer of *Toya* species, caudal and dorsal view (scale = 0.2 mm); A, C, E, G, I. Caudal view; B, D, F, H, J. Dorsal view. A-B. *Toya attenuata* (type specimen, Sri Lanka), C-D. *Toya boxi* (paratype, Guyana), E-F. *Toya idonea* (Florida), G-H. *Toya nigra* (Dominica), I-J. *Toya venilia* (Guana Is., BVI).

- 8' Dorsocaudal margin of pygofer expanded to varying degrees, but not foliaceous, apex bent ventrad to mediad, or not at all, genital diaphragm bifid or rounded apically (Figs. 3 A-H); parameres usually with distinct outer, inner and basal lobes (Figs. 15 E, 20 E); aedeagus tubular, bearing few to many teeth, variously arranged (Figs. 15 F, 16 F, 17 E, 18 F, 19 F) **9**
- 9 Pygofer with dorsocaudal region slightly to broadly expanded in lateral view, expanded dorsal portion of pygofer in caudal view directed caudad, apices not inflected; genital diaphragm elongate, apically rounded, often narrowly spoon-shaped; brachypterous males often yellowish with strongly contrasting tegmina *Syndelphax*
- 9' Expanded dorsal portion of pygofer in caudal view with apices inflected (usually medially or ventromedially directed); genital diaphragm elongate, apically bilobed or trilobed (except *M. pero*) (Figs. 3 A-H); brachypterous males without strongly contrasting tegmina *Metadelphax* **10**
- 10 Armature of genital diaphragm apically convex, appearing rounded to trilobed (Figs. 3 A-B) **11**
- 10' Armature of genital diaphragm apically concave, appearing bifid (Figs. 3 C-H) **12**
- 11 Parameres with outer apical angle reduced, appearing curved medially (Figs. 17 F, G) (Cayman Islands) *M. pero*
- 11' Parameres with outer angle well-developed, triangular in shape (Fig. 15 E) (South America) *M. argentinensis*
- 12 Aedeagus simple, straight, bearing few teeth near apex and in lateral row (teeth variable in development, usually weak) (Fig. 18 F); frons infuscated along carinae, intercarinal regions pale (rarely more broadly infuscated in macropters, or pale in brachypters) (Fig. 18 B); parameres weakly concave apically, with moderately developed basal angle (Fig. 18 E); expansion of pygofer with ventromedially directed apex (Figs. 3 E-F); common and widespread species *M. propinqua*
- 12' Aedeagus slightly bent ventrad near apex (Figs. 16 F, 20 F); frons with intercarinal region infuscated (Figs. 16 B, 20 B); parameres with basal angles obscure, apically concave or with dorsomedially directed with subapical medially directed tooth (Figs. 16 E, 20 E); expansion of pygofer bilobed apically, with medially and caudally directed apices (Figs. 3 C, G) **11**
- 13 Paramere apices concave, lacking medially directed subapical tooth (Fig. 20 E) *M. wetmorei*
- 13' Parameres dorsomedially pointed with medially directed subapical tooth (Fig. 16 E) *M. dentata* n. sp.

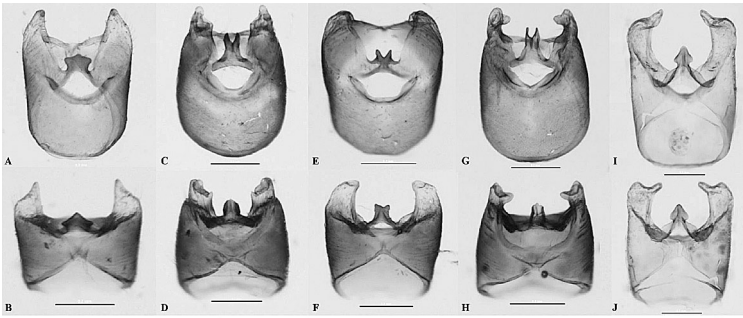


Fig. 3. Male pygofer of *Metadelphax* and *Hadropygos*, caudal and dorsal views (scale = 0.2 mm): A, C, E, G, I. Caudal view; B, D, F, H, J. Dorsal view. A-B. *Metadelphax argentinensis* (Argentina), C-D. *M. denata* (paratype, Ecuador), E-F. *M. propinqua* (North Carolina), G-H. *M. wetmorei* (Florida), I-J. *Hadropygos rhombos* (paratype, Bolivia).

TOYA Distant, 1906

Toya Distant, 1906: 472.

Himeunka Matsumura and Ishihara 1945: Synonymy by Anufriev 1977: 865. Removed from synonymy by Kuoh et al. 1981: 190.

Metadelphax Wagner, 1963: Synonymy by Fennah 1964: 142 (by implication; type species moved to *Toya*); Nast 1972: 65, Linnavuori 1973: 107 (generic synonymy listed). Removed from synonymy by Ding 2006: 511.

Type species.—*Toya attenuata* Distant 1906 (by original designation).

Diagnosis.—*Color*. General body color usually yellowish tan; females usually paler than males, and brachypters paler than macropters (macropters of *nigra*, and apparently *attenuata*, darker). Carinae of head paler than body. Intercarinal regions of head, except region posterior to arms of Y-shaped carinae of vertex, narrowly to broadly infuscate. Thoracic pleura irregularly darkened. Wings clear, veins concolorous or slightly darkened. Abdomen irregularly darkened; pygofer dark brown (most) to pale (*venilia*).

Structure. Eyes projecting posteriorly beyond vertex approximately half their length. Stem of Y-shaped carina of vertex obscure, arms evident, submedian joining at fastigium. Front parallel-sided to slightly bowed, widest ventrad of eyes; frontal carinae conspicuous. Antennal length slightly exceeding 1/2 width of head, segment II slightly longer than I. Carinae of pronotum obsolete prior to posterior margin. Macropter forewing venation illustrated (Fig. 1A). Wings of macropters rounded at apex; extending nearly 1/2 their length beyond abdomen, small setae-bearing projections on veins; forewings of brachypters apically rounded exposing pygofer or subequal to abdominal length. Hind tibiae with tooth on outer surface near femoral joint, at midlength, and 5 apical teeth grouped 2 + 3. Basitarsus with 7 apical teeth, grouped 2 + 5, and tarsomere II with 4 teeth. *Genitalia*. Male pygofer with dorsocaudal margin strongly expanded into projections bent medially or ventrally at apex (Fig. 6 D). Parameres dorsocaudally directed in lateral view, diverging in caudal view; appearing flattened; basal angle weakly to strongly developed; usually concave apically with development of inner and outer angles varying (Figs. 6 E, 9 E). Diaphragm bridge relatively narrow medially, armature

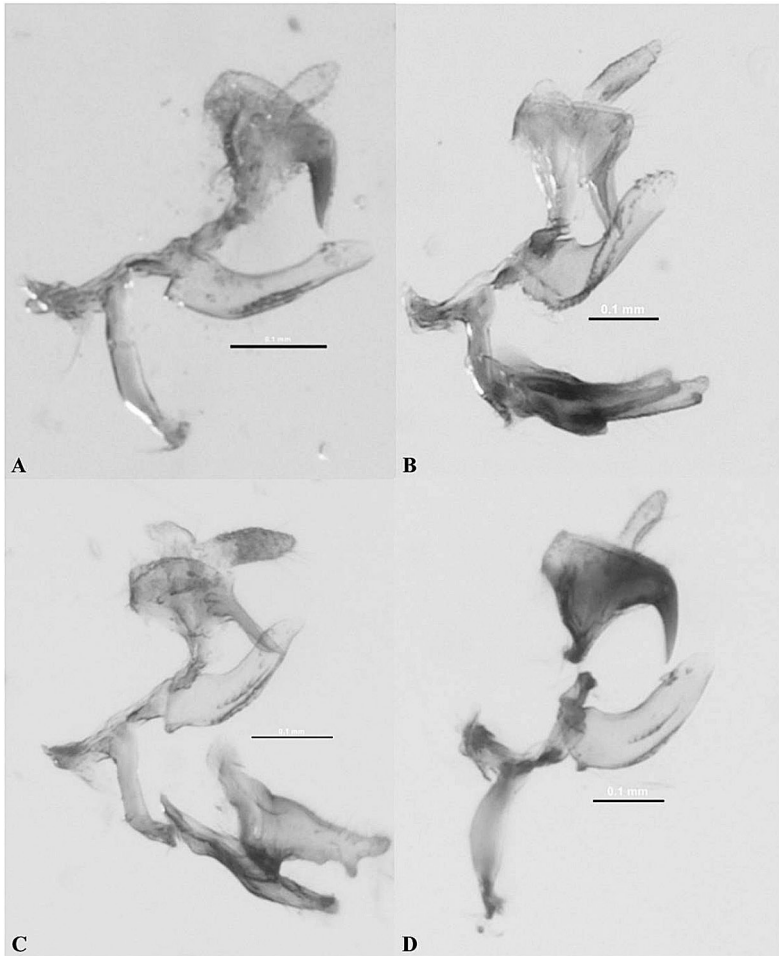


Fig. 4. Lateral views of the aedeagal complexes of *Toya* (scale = 0.1 mm). A. *T. boxi* (Florida), B. *T. idonea* (Florida), C. *T. nigra* (Costa Rica), D. *Toya venilia* (Guana Is., BVI).

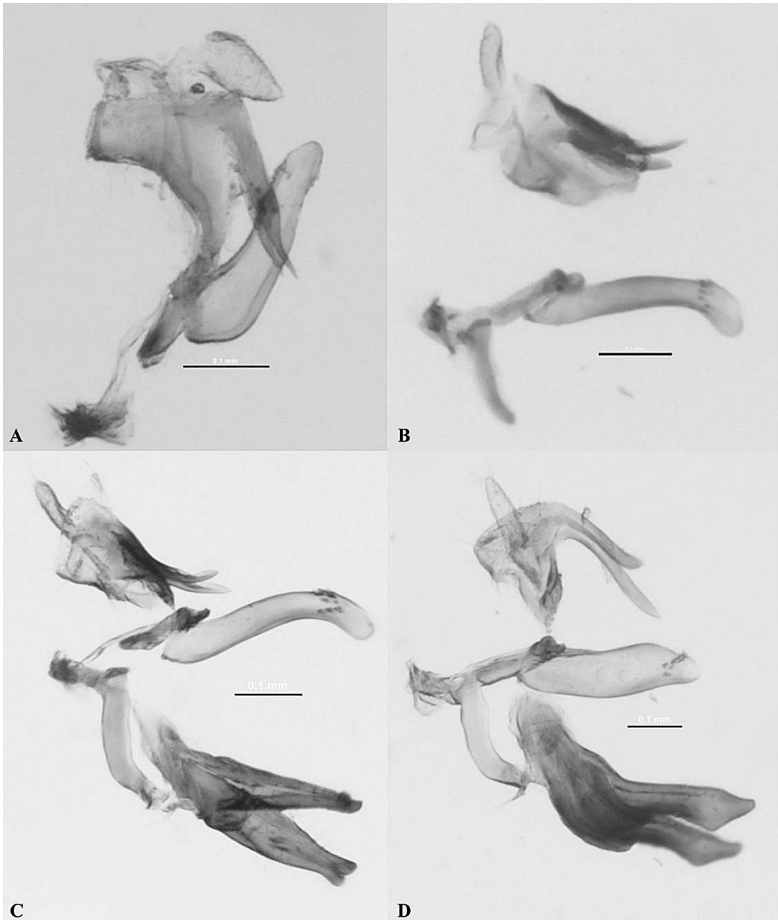


Fig. 5. Lateral views of the aedeagal complexes of *Metadelphax* and *Hadropygos* (scale = 0.1 mm). A. *Metadelphax argentinensis* (Argentina), B. *M. dentata* (paratype, Ecuador), C. *M. wetmorei* (Florida), D. *Hadropygos rhombos* (paratype, Bolivia).

much broader than tall, in caudal view concave to slightly convex, often with blunt dorsally directed lateral teeth (Figs. 2 A-J). Segment X with pair of basally approximated ventrally directed processes, somewhat diverging apically (Fig. 6 D), often arising subdorsally in lateral view and rather oppressed to segment X (Figs. 4 A-D). Aedeagus terete to subterete, appearing laterally flattened in cross-section, often upcurved, armed with subapical teeth and often with lateral rows of teeth near midlength (Figs 4 A-D).

Remarks. — The definitive features for this genus appear to be the dorsocaudal margin of the pygofer expanded, subapically inflected into medially to ventrally directed apices, the genital diaphragm much wider than high, and the processes on segment X basally approximated, usually arising below the dorsal margin in lateral view. Also, the aedeagus is generally semi-tubular, slightly upcurved, bear-

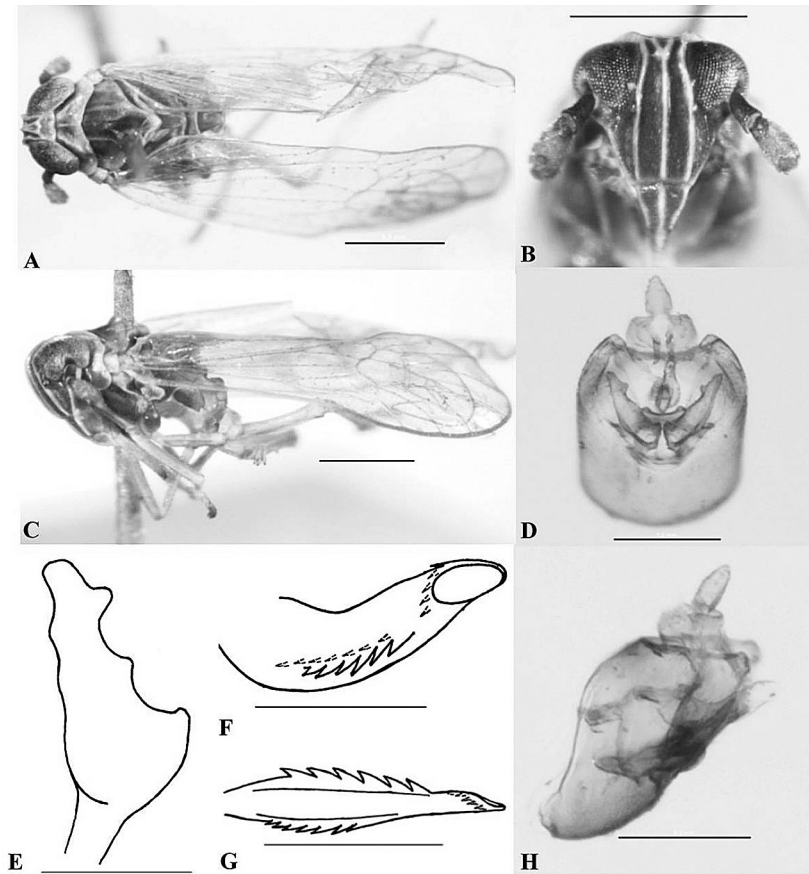


Fig. 6. Features of *Toya attenuata*, A-C, E-G. Type specimen; D, H. Sri Lanka. A. Dorsal habitus (scale = 0.5 mm), B Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2mm), E. Left paramere, widest view (scale = 0.1 mm), F. Lateral view of aedeagus (scale = 0.1mm), G. Ventral view of aedeagus (scale = 0.1 mm) H. Lateral view of pygofer (scale = 0.2 mm).

ing nearly parallel rows of lateral teeth near midlength. Most New World species are pale colored with a variably infuscate frons, except *Toya nigra* which tends to be much more darkly colored. *Toya nigra* appears to be much more closely allied to the type species *Toya attenuata* than the other New World species both because of a similarity of color and by features of the male genitalia discussed under Remarks of *Toya nigra*.

The generic description is based partially on examination of a syntype specimen of *Toya attenuata* from the BMNH (male macropter, dissected, double-mounted with minutin and cardstock labeled: "Peradeniya, / Ceylon, 4-[19]05 [date handwritten]// Distant Coll. / 1[0?]11-383. // Syn-/type [round label, blue circumference] // *Toya / attenuata / type* Dist. [handwritten]"). There is nothing

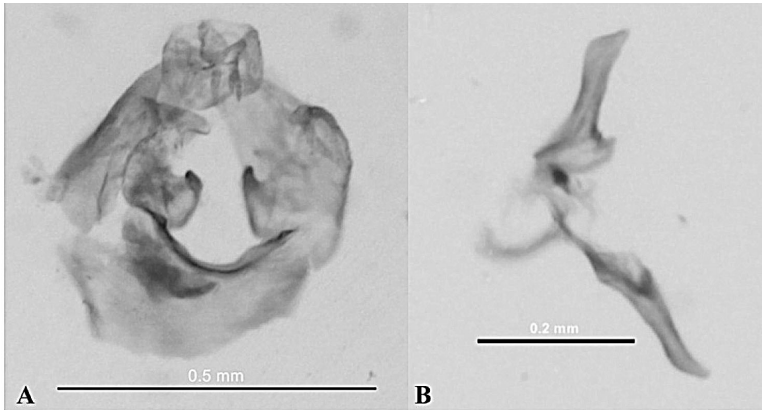


Fig. 7. *Toya iaxartes* (holotype). A. Caudal view of pygofer (scale = 0.5 mm), B. Parameres (scale = 0.2 mm).

in the original description, nor subsequent works, that indicate whether Distant had only one specimen (type specimen by monotypy) or more than one specimen (hence this specimen is part of a syntype series). To ensure stability of nomenclature in the event that additional specimens are discovered, we here designate this specimen as the lectotype of *Toya attenuata*.

Metadelphax is quite similar to *Toya* except for three diagnostic differences. First is the form of the genital diaphragm, which is elongate and much taller than wide in *Metadelphax* and much broader than tall in *Toya*. Second, *Metadelphax* also tends to have a much more expanded pygofer than the members of *Toya* examined. Third, the aedeagus tends to be straight to slightly downcurved in *Metadelphax*, unlike the dorsocaudally bent aedeagus in most *Toya*. We have discovered no reliable morphological features to separate females of *Toya* from *Metadelphax* (see Remarks under *Metadelphax*).

Syndelphax Fennah, 1963 (Type = *Delphax matanitu* Kirkaldy, 1907, a junior synonym of *Delphax disonymus* Kirkaldy, 1907; Muir 1920: 139), differs in having an elongate, narrowly spoon shaped genital diaphragm armature and lacks the apical median inflections of the caudal expansion of the pygofer. The aedeagus of *Syndelphax* varies in form. *Syndelphax* appears to be quite closely related to *Toya* and *Metadelphax* based on morphological features. Male brachypters of *Syndelphax* tend to be uniformly pale, often yellowish, with strongly contrasting dark tegmina, while females are uniformly pale. All brachypterous forms of *Toya* and *Metadelphax* observed here have clear tegmina. All the New World species of *Syndelphax* were reported by Fennah (1971a) from the Cayman Islands. He reported *S. disonymus* (Kirkaldy, 1907) (as *S. matanitu* (Kirkaldy, 1907)), described *S. pero* Fennah, 1971a, and transferred *Delphacodes argentinensis* Muir, 1929a (later transfer to *Toya*; Teson & Remes Lenicov 1989), into *Syndelphax*. *Syndelphax disonymus* has also been reported from Hawaii (Asche 2000). Here we transfer *S. pero* and *T. argentinensis* to *Metadelphax*, primarily because of the shape of the genital diaphragm (much taller than wide) and both have the apices of the expanded dorsocaudal margins of the pygofer bent over unlike *Syndelphax*.

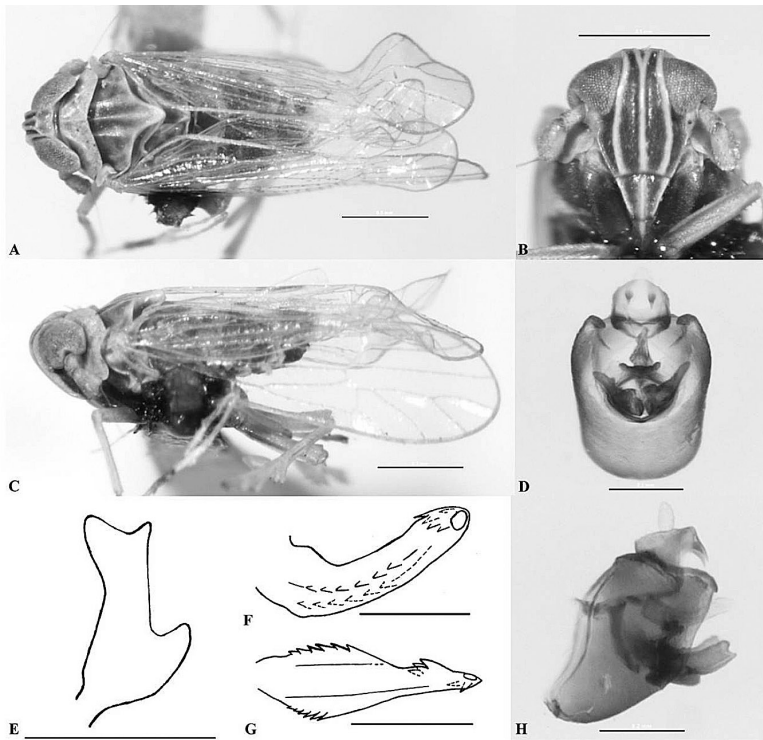


Fig. 8. Features of *Toya boxi*. A. Dorsal habitus (holotype; scale = 0.5 mm), B. Frons (holotype, scale = 0.5 mm), C. Lateral view (holotype, scale = 0.5 mm), D. Caudal view of pygofer (Paraguay, scale = 0.2 mm), E. Left paramere, widest view (paratype, Guyana, scale = 0.2 mm), F. Lateral view of aedeagus (paratype, Guyana, scale = 0.1 mm), G. Ventral view of aedeagus (paratype, Guyana, scale = 0.1 mm), H. Lateral view of pygofer (Paraguay, scale = 0.2 mm).

Syndelphax is currently under revision (S. Wilson, Central Missouri State University, *pers. comm.*), and it appears that no fewer than ten New World taxa properly belong in *Syndelphax*, but a definitive statement regarding the composition of *Syndelphax* must await the completion of that revision.

The members of the genus *Toya* in the New World appear to be as follows: *Toya boxi* (Muir, 1926), *T. idonea* (Beamer, 1947), new comb., *T. nigra* (Crawford, 1914), new comb., *T. venilia* (Fennah, 1959) plus three new species (*T. goliai* n. sp., *T. dietrichi* n. sp., and *T. recurva* n. sp.). *Delphacodes axonopi* Fennah, 1945, is here designated as a junior synonym of *Toya nigra*.

Toya iaxartes (Fennah, 1959) was described into *Delphacodes* based on a single specimen (BPBM, Union Station, St. Lucia), and moved to *Toya* by Fennah (1965a: 96). The terminalia of this specimen (Fig. 7 A-B) are dissected and preserved in balsam between two cover slips held within cardstock. The pygofer is expanded on its dorsocaudal angle, and segment X bears a pair of approximated processes, suggesting *Toya*. However, the genital diaphragm is medially incom-

plete, the separated parts asymmetrically dorsomedially directed. Fennah (1959) stated that the aedeagus was missing; however, it appears that there may be an incompletely formed aedeagal complex ventrad to segment X. Our impression is that this specimen is deformed, and perhaps was parasitized. For this reason, we consider *Toya iaxartes* to be a *nomen dubium*.

Available specimens suggest that macroptery is more common than brachyptery in most species of *Toya*, except *T. venilia* and possibly *Toya goliai* n. sp.

The etymology for the generic name *Toya* was stated neither by Distant nor evidently subsequent authors. It may be derived from the Dutch word “*tuig*” (= tool, toy), Latinized with the female suffix “-a”; or it may have been coined as an arbitrary combination of letters understood to be female by subsequent authors.

Toya boxi (Muir, 1926)

Figs. 2 C-D, 4 A, 8 A-H

Delphacodes boxi Muir, 1926; pp. 32-33, figs. 120-122.

Toya boxi (Muir, 1926); new combination by Fennah, 1965a: 96.

Type Locality.— Blairmont, British Guiana.

Diagnosis.— Length male macropter, 2.73 (2.61-2.92); brachypter, ~1.5 (n=1). *Color*. *Macropter*. General body color light brown; pronotum paler. Carinae of head conspicuously paler than body; intercarinal regions dark, except pale behind M-shaped carina of vertex. Antennae pale, darker at junction of antennal segments I and II. Pronotum pale except anterior to lateral carinae. Mesonotum castaneus, paler laterally and between lateral carinae of mesonotum, suggesting median vitta; carinae concolorous with adjoining region. Coxae and pleural regions dark brown. Wings clear, veins concolorous except distal veins darkened; small, trailing margin with dark mark near apex of clavus. Legs pale, pygofer brown. *Brachypter*. General body color yellowish, slightly paler than macropter. Head infusate along carinae of frons and throughout genae. Coxae and pleural regions brownish, pygofer darker.

Structure. *Macropter*. Head slightly narrower than pronotum, eyes extending for about 1/2 length beyond posterior margin of vertex. Vertex just longer than wide at midlength. Stem of Y-shaped carina of vertex obsolete, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons slightly laterally bowed, widest ventrad of eyes. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (ocelli whitish in type). Antennal length just under 0.5x width of head (including eyes); segment I approximately 2/3 length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts on type are 1, 3, 3, 1). Pronotum at midlength equal to length of vertex, lateral carinae curved laterad, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum longer than length of pronotum plus head, lateral carinae subparallel, slightly diverging posteriorly. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing many small, black-tipped teeth (16 on holotype) on outer margin (these be-

coming reduced near apex) plus small apical tooth present, outer margin slightly convex, inner margin nearly straight. *Brachypter*. Similar to macropter except head subequal to pronotum in width, mesonotum just shorter than length of pronotum plus head. Tegmina just exceeding 1 mm length, apex broadly rounded, veins with setae-bearing projections.

Genitalia. Pygofer opening about as wide as long, margins of opening rounded with obscure lateral angles. In caudal view, with caudal expansions on dorsolateral margins blunt, medially directed. Diaphragm developed, slightly convex in ventrocaudal view laterally bordered with 2 obscure projections; caudally projecting in dorsal view. Parameres stout, appearing flattened, diverging; in broadest view widest at basal angle, basal angle strongly produced, stout, apically rounded at apex; subparallel distal to basal angle to shallowly concave apex; inner angle small, acute at apex; outer angle wider, apex rounded. Aedeagus subterete in cross section, widest near base, curving dorsally in basal third; apical 2/3 parallel sided, armed with parallel rows of lateral teeth along midlength forming lateral flanges in ventral view; and several dorsal subapical teeth; opening subapical on left side. Segment X with 2 relatively short, ventrally directed processes (2x as long as basal width in lateral view) arising from dorsal margin; in caudal view separated basally, each arising halfway between midpoint and lateral margin of segment.

Remarks.— *Toya boxi* most strongly resembles *T. venilia* in having the processes on segment X relatively short and basally separated, and by the parameres having an enlarged basal angle. These features collectively separate *T. boxi* and *T. venilia* from all other New World *Toya*. *Toya boxi* differs most strongly from *T. venilia* in that the lateral teeth on the aedeagus are more strongly developed (appearing as lateral flanges from ventral view) and in that the inner angle of the parameres are less well developed. Macropters of *T. venilia* have a pale face, infuscated only along the carinae, as opposed to a dark face in *T. boxi*.

A single brachypterous specimen of *T. boxi* was observed from Collier Co., FL, which was dissected for identification prior to measuring its body length.

Reported hosts.— None.

Distribution.— Paraguay, Puerto Rico, St. Lucia, Trinidad and Tobago, USA (FL).

Type material observed.— Holotype (BPBM, macropterous male): “Blairmont / B. G. Oct. 1923 // F. X. Williams / Collector // off shrimp / grass A-1 [handwritten, A-1 circled] // male // Delphacodes / boxi Muir / male / Type no 1149 [handwritten] / Holotype [red paper, pasted reading top to bottom from left] // 856 [handwritten]”.

Toya dietrichi, new species

Figs. 9 A-H

Type Locality.— Mexico, Colima, ca. Manzanillo.

Diagnosis.— *Length* male macropter, 2.75 (2.60-2.90, n=2); brachypter, none observed. *Color*. *Macropter*. General body color light brown. Carinae of head paler than body, intercarinal regions of the head deeply infuscate except pale posterior to arms of Y-shaped carina of vertex. Antennae pale, darkened at junction of antennal segments I and II. Pronotum tan except darkened areas laterad. Mesonotum tan, faintly paler within lateral carinae suggesting vitta; carinae

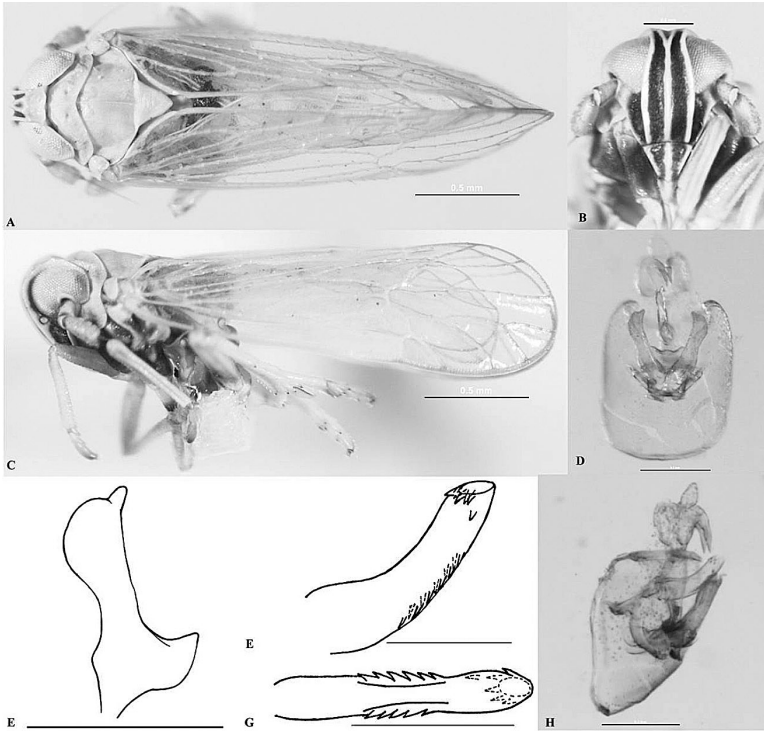


Fig. 9. Features of *Toya dietrichi* (holotype). A. Dorsal habitus (scale = 0.5mm), B. Frons (scale = 0.2 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of the aedeagus (scale = 0.1 mm), G. Ventral view of the aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

concolorous. Coxae and pleural regions brown. Tegmina clear, veins concolorous. Legs tan except proximal half of hind femora. Pygofer brown, posterior margins and adjacent ental regions paler.

Structure. *Macropter.* Head slightly narrower than pronotum, eyes extending for $1/2$ length beyond posterior margin of vertex. Vertex just longer than wide at midlength. Stem of Y-shaped carina of vertex obsolete, other carinae of head pronounced. Arms of submedian carina meeting acuminately at fastigium. Frons slightly laterally bowed, widest just ventrad of eyes. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye. Antennal length just over $0.5x$ width of head (including eyes); segment I approximately $2/3$ length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, with row on trailing margin difficult to evaluate, from leading to trailing edge, row counts are 1, 3, 3-4, 0-1). Pronotum at midlength just shorter than vertex, lateral carinae curved laterad, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum longer than length of pronotum plus head,

lateral carinae subparallel, slightly diverging with lateral curve near caudal end. Transverse concavity separates mesoscutum from mesoscutellum. Median carinae of mesonotum weakly indicated on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally, bearing multiple small, black-tipped teeth (17 on holotype) on outer margin (these becoming reduced near apex) plus small apical tooth; inner margin slightly convex.

Genitalia. Pygofer opening about as long as wide, margins of opening rounded, lateral angles obscure. In lateral view, pygofer produced on dorsocaudal margin, with caudal expansions in caudal view tapering to blunt, medially directed apices. Diaphragm with weak lateral projections, medially concave in caudal view, with slight caudally produced median projection evident in ventrocaudal view. Parameres appearing flattened, diverging; widest near base, basal angle truncate and without projection; median surface of parameres slightly concave, lateral margins more strongly concave; enlarged apically to curved outer angle abruptly tapered to blunt, dorsomedially directed inner angle. Aedeagus subterete in cross section, widest near base, tapering slightly throughout length, curved dorsally in basal third; encircled subapically with ring of small teeth; laterally with 2 parallel rows of rows of lateral teeth along median third, left row beginning and ending distal to right; opening subapical, slightly left of dorsum. Segment X with 2 stout processes, arising along dorsal margin; closely approximated in caudal view.

Remarks.— This species is most closely similar to *T. goliai*, as noted under the remarks of that species. These species can be separated by differences in the parameres, genital diaphragms and the closely approximated processes of segment X as noted under the remarks of *T. goliai* and in the key. *Toya goliai* and *T. dietrichi* may ultimately be found to be conspecific if geographically intermediate forms were found to be morphologically transitional. *Toya dietrichi* is also similar to *T. venilia* and *T. boxi*, from which it can be most readily distinguished by the shape of the parameres, including the absence of a projection at the basal angle, and the close approximation of the processes of segment X.

Reported hosts.— None.

Etymology.— This species is named in honor of Chris Dietrich.

Distribution.— Mexico (Colima State).

Type material observed.— Holotype (INHS, macropterous male) “Mexico: Colima / rt.54 km#78, ca. Manzanillo / 0m [elevation], 19°3'N104°15'E / 17 Oct 2001, C.H.Dietrich / vacuum, 01-015-01” (male macropter, INHS). Paratypes, same data as above, 2 male macropters; 2 female macropters and 1 female brachypter (INHS, pair retained UDCC).

Toya goliai, new species

Figs. 10 A-H

Type Locality.— USA: Florida, Manatee Co., Terra Ceia Island.

Diagnosis.— Length male macropter, none observed; brachypter, 1.67 mm.

Color. *Brachypter*. General body color tan. Carinae of head concolorous with body, intercarinal regions of the head infuscate adjacent to carinae except pale posterior to subantennal suture and M-shaped carina of vertex. Antennae pale, darker at junction of antennal segments I and II. Pronotum and mesonotum tan; carinae concolorous. Coxae and pleural regions brown. Tegmina clear, veins concolorous. Legs tan. Pygofer brown, posterior margin paler.

Structure. *Brachypter*. Head subequal to pronotum, eyes extending about 1/2 length beyond posterior margin of vertex. Vertex about as long as wide at midlength. Stem of Y-shaped carina of vertex weak, other carinae of head pronounced. Arms of submedian carina meeting acuminate just above fastigium. Frons narrowed between eyes, widest just ventrad of eyes, lateral margins slightly converging, to frontoclypeal suture. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (dark reddish). Antennal length slightly less than 0.5x width of head (including eyes); segment I approximately 2/3 length of antennal segment II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts 1-2, 3, 3, 1, with the first row bearing 2 clear pits on left side, but only 1 on right). Pronotum at midlength subequal to midlength of vertex, lateral carinae curved laterad, not reaching hind margin; median carina reaching hind margin. Mesonotum about as long as length of pronotum plus head; lateral carinae distinctly diverging, straight, reaching hind margin. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Tegmina very faintly infuscate, venation concolorous with seta bearing tubercles. Calcar about 2/3 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acute apex, bearing ca. 14 small, black-tipped teeth on outer margin plus small apical tooth; outer and inner margin slightly convex.

Genitalia. Pygofer opening slightly wider than long, margins of opening rounded, lateral angles obscure. In lateral view, pygofer produced on dorsocaudal margin, with caudal expansions in caudal view tapering to acute, medially directed apices. Diaphragm developed distinctly, medially concave with lateral teeth in caudal view; with rounded, caudally directed, median projection apparent from ventrocaudal view. Parameres appearing flattened, diverging; widest near base, basal angle with weak projection; lateral margins slightly concave; outer angle rounded, inner angle tapering to acutely rounded, dorsomedially directed apex. Aedeagus terete in cross section, widest near base, curved dorsally in basal fourth; encircled subapically with nearly complete ring of small teeth, plus 2 parallel rows of rows of distinct lateral teeth along median third, in ventral view forming weak lateral flanges; opening at apex on right. Segment X with 2 stout processes, arising along dorsal margin; approximated in caudal view; slightly outcurved at apices.

Remarks.— The form of the parameres most readily separates this species for all other New World *Toya*. This species is most similar to *T. dietrichi* n. sp., with which it shares a similar form of parameres, but they differ in that *T. goliai*

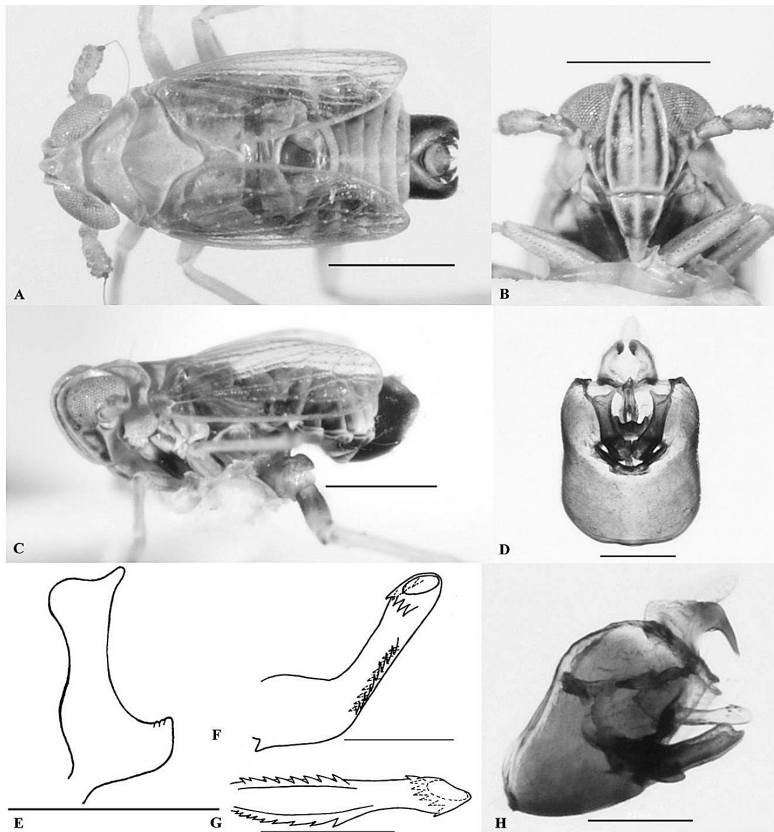


Fig. 10. Features of *Toya goliai* (holotype). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.5 mm), E. Left paramere (scale = 0.2 mm), F. Lateral view of the aedeagus (scale = 0.1 mm), G. Ventral view of the aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

possesses more developed basal angles with small projections, a more broadly convex outer angle and a more distinctly tapering inner angle. The diaphragm of *T. goliai* also possesses distinct lateral projections, absent in *T. dietrichi*, and the specimens on hand have the processes on segment X very closely approximated in *T. dietrichi*, but slightly separated in *T. goliai*. The structure of the aedeagus for both species is similar except the flanges appear to be more ventral on *T. goliai* with fewer teeth and originating more distally than was observed in *T. dietrichi*. This species is also similar to *T. venilia* and *T. boxi*, from which it differs, in addition to the parameres, in having the basal angle of the parameres less developed, the processes on segment X more closely approximated, and the genital diaphragm more distinctly concave in caudal view.

Reported hosts.— None.

Etymology.— This species is named after the collector, Vince Golia.

Distribution.— USA (FL).

Type material observed.— Holotype (FSCA, brachypterous male) “Florida, Manatee / County, Terra / Ceia Island / July 21, 2003 / Vince Golia / ‘coastal sweeping’ // male”.

Toya idonea (Beamer, 1947) new combination

Figs. 2 E-F, 4 B, 11 A-H

Delphacodes idonea Beamer, 1947; p. 66, figs. 10a-10c.

Type Locality.— Homestead, Florida.

Diagnosis.— Length male macropter, 3.16 (2.94-3.29); brachypter, 1.99 (1.92-2.05). *Color.* *Macropter.* General body color yellowish tan; pronotum paler. Carinae on frons, vertex much paler than body; carinae on pronotum, mesonotum concolorous with body. Intercarinal regions of frons and vertex completely darkened to pale in center, except area behind M-shaped carina of vertex concolorous with body. Tegmina slightly fuscous; veins darkened near apex. *Brachypter.* General body color similar to macropter; body yellowish brown, deeply infusate in intercarinal regions of head; lateral regions of thorax brown. Tegmina faintly infusate. Abdomen brown except margins of sclerites and posterior margin of pygofer.

Structure.— *Macropter.* Head slightly narrower than pronotum, eyes extending for 1/2 length beyond posterior margin of vertex. Vertex about as long than wide at midlength. Stem of Y-shaped carina of vertex obsolete, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons narrowed between eyes, parallel sided or slightly converging ventrad of eyes. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (may be pale or dark). Antennal length just over 0.5x width of head (including eyes); segment I just over 1/2 length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts are 1-2, 2-3, 2-3, 1-2). Pronotum at midlength equal to length of vertex, lateral carinae curved laterad, becoming obsolete just prior to reaching hind margin; median carina reaching hind margin. Mesonotum 1.3x longer than length of pronotum plus head, lateral carinae curved slightly laterad posteriorly. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing many (17-21) small, black-tipped teeth on outer margin (these becoming reduced near apex) plus small apical tooth; outer and inner margins slightly convex. *Brachypter.* Similar to macropter except mesonotum subequal to head plus pronotum length. Tegmina approximately 1.4 mm long, nearly reaching end of abdomen, apex broadly rounded, veins with setae-bearing projections.

Genitalia. Pygofer opening about as wide as long, margins of opening distinct, rounded with low, rounded lateral angles. Pygofer with well-developed expansions on dorsolateral caudal margins, apices strongly bent medioventrally. Diaphragm narrow, concave with minute lateral projections; caudally projecting in dorsal view. Parameres diverging, widest at base, subparallel from basal third to widened apices; apices distinctly concave, inner and outer angles subequal

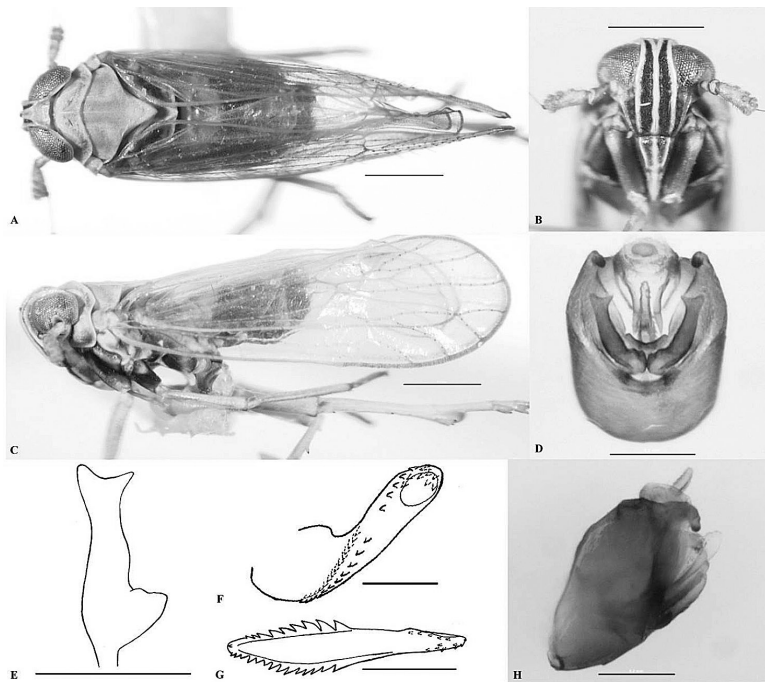


Fig. 11. Features of *Toya idonea* (Florida). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.2 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere (scale = 0.2 mm), F. Lateral view of the aedeagus (scale = 0.1 mm), G. Ventral view of the aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

with inner slightly longer and thinner. Aedeagus widest at base, strongly curved in basal third, subparallel to rounded apex; armed with subapical teeth on dorsal surface and 2 rows of teeth laterally, diagonally directed from ventral to dorsal surface; genital opening on ventroapical margin. Segment X with 2 proximal processes, arising just below dorsocaudal margin, slightly; separated at base, directed ventrally and converging near apices.

Remarks. — *Toya idonea* differs from other New World congeners by having the aedeagus more sharply upcurved, bearing many lateral and subapical teeth. The lateral rows of aedeagal teeth lateral are not parallel, but rather the row of teeth on the left side of the aedeagus turns dorsad and attains the dorsal aedeagal surface much sooner than those on the right side. The aedeagal form and arrangement of teeth is similar to that found in *T. recurva*, but *T. recurva* has strongly upcurved processes on segment X that are unique in the genus. The parameres of *T. idonea* lack the media protuberance on the ental margin found in *T. nigra*, and the basal angle is much smaller than *T. boxi* and *T. venilia*. The processes of segment X are closely approximated and relatively long compared to *T. boxi* and *T. venilia*.

This species appears to have a rather New World distribution, occupying

areas within the rim of the Gulf of Mexico and Paraguay. Here a specimen is reported collected in the Gulf of Mexico, approximately 48 km (30 miles) from the Louisiana coast, leading to the suspicion that it may be migratory or disperse widely.

Reported hosts.— None.

Distribution.— Bahamas, Belize, Brazil, Bolivia, Cayman Islands, Colombia, Guatemala, Gulf of Mexico, Honduras, Panama, Paraguay, Suriname, Uruguay, USA (FL, LA, NC), Venezuela.

Type material observed.— Holotype (SEMC, macropterous male, dissected): “Homestead Fla. / 8-9-20 / L. D. Tuthill // male [yellow paper] // PLESIOTYPE / 23 [handwritten] / R. H. Beamer // HOLOTYPE / Delphacodes / idonea / R. H. Beamer”. Parameres: same data as holotype (1m male, 1m female, SEMC).

Toya nigra (Crawford, 1914) new combination

Figs. 2 G-H, 4 C, 12 A-H

Megamelus erectus niger Crawford, 1914: 608, 624.

Delphacodes nigra (Crawford, 1914), new combination and emendation by Muir and Giffard, 1924: 32.

Delphacodes axonopi Fennah, 1945: 434-435, fig. 107-110, New Synonymy.

Type Locality.— Acapulco, Mexico (as reported by Crawford, 1914).

Diagnosis.— Length male macropter, 2.59 (2.42-2.83); brachypter, none observed. *Color. Macropter.* General body color variable, type specimen dark brown. Carinae of head paler than body; intercarinal regions dark. Antennal segment I dark, II paler apically. Pronotum dark brown, carinae, posterior and posterolateral margins paler. Tegulae pale. Mesonotum dark brown, paler on posterior margin; carinae concolorous. Coxae and pleural regions dark brown. Wings clear, veins concolorous except distal veins darkened. Legs brown, irregularly and diffusely paler. Pygofer brown.

Structure. Macropter. Head narrower than pronotum, eyes extending slightly over 1/2 length beyond posterior margin of vertex. Vertex as long as wide at midlength. Stem of Y-shaped carina of vertex obsolete, other carinae of head pronounced. Arms of submedian carina meeting acuminate just above fastigium. Frons slightly laterally bowed, widest ventrad of eyes. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (ocelli reddish in type). Antennal length about 0.5x width of head (including eyes); segment I approximately 0.5x length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts on type are 1, 3, 3, 1). Pronotum at midlength subequal to length of vertex, lateral carinae curved laterad, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum about 1.75x longer than length of pronotum plus head; lateral carinae subparallel, slightly diverging posteriorly. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing many small, black-tipped teeth (19 on holotype) on outer margin (these becoming reduced near apex) plus small apical tooth; outer margin

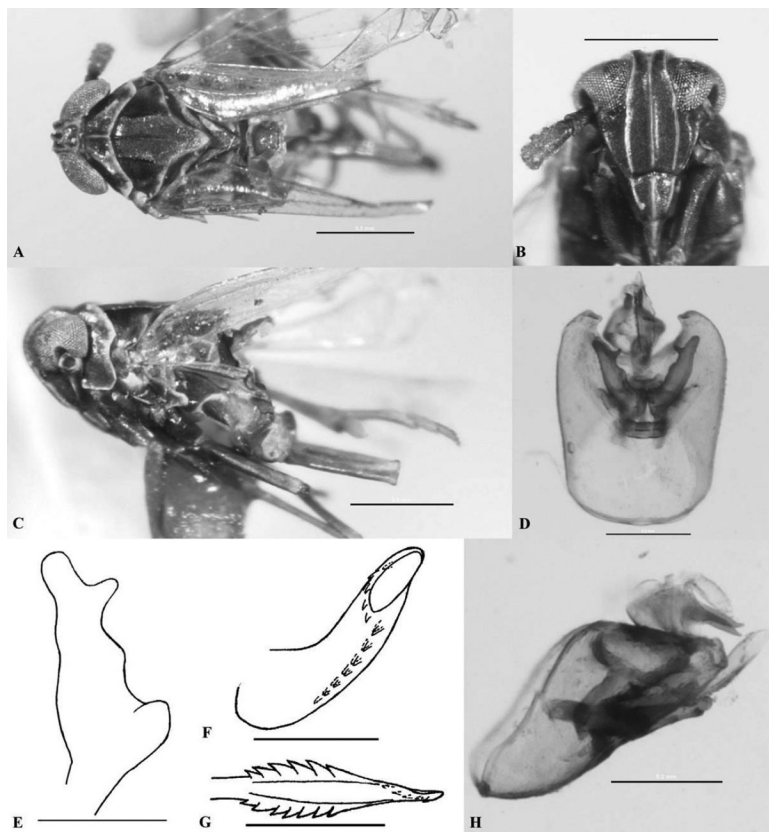


Fig. 12. Features of *Toya nigra* (A-D, H, holotype, E-G, Dominica). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.1 mm), F. Lateral view of aedeagus (scale = 0.1 mm), G. Ventral view of aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

slightly convex, inner margin nearly straight.

Genitalia. Pygofer opening about as wide as long, margins of opening rounded, lateral angles obscure. In caudal view, with caudal expansions on dorso-lateral margins blunt, ventromedially directed. In lateral view, pygofer strongly produced on dorsocaudal margin, posterior margin caudodorsally oriented. Diaphragm developed, convex in ventrocaudal view laterally bordered with 2 projections; diaphragm dorsocaudally projecting in dorsal view. Parameres appearing flattened, diverging; widest at basal angle in broadest view; basal angle weak, without projection; lateral margins gradually converging apically, median margin with rounded projection at midlength; apex concave, inner angle subapical, small, rounded; outer angle wider, apex rounded. Aedeagus subterete in cross-section, widest near base, gradually narrowing to apex; curving dorsad in basal third, then slightly caudad subapically; apical 2/3 armed with parallel rows of sublateral

teeth forming lateral flanges in ventral view, rows continuing with smaller teeth diagonally to dorsum of aedeagus in apical third; opening subapical on right side. Segment X with 2 relatively short, ventrally directed processes, apices bent laterad (much longer than basal width in lateral view) arising just below dorsal margin; closely approximated basally in caudal view.

Remarks.— The general coloration of specimens on hand varies widely, with above description based on the holotype. Dark specimens, similar to the holotype, were predominate among the specimens observed; however, one of the Mexican specimens is entirely pale on the mesonotum, pronotum and vertex posterior to the M-shaped carina, and other specimens are variably patterned. This species appears to be the only New World *Toya* with the basal antennal segment dark brown.

Toya nigra most closely resembles *T. boxi*, *T. venilia*, and *T. idonea*. All three species lack the expanded portion of the midlateral median portion of the parameres, and have the first antennal segment pale, versus dark in *T. nigra*. *Toya boxi* and *T. venilia* also have an expanded basal angle of the parameres and the processes on segment X are basally separated, while *T. nigra* lacks the projections on the paramere basal angles and the processes on 10 are normally basally closely approximated. The Dominican specimen of *T. nigra*, however, had the processes on 10 less closely approximated than the other specimens observed. *Toya idonea* also differs in having small scattered subapical teeth of the aedeagus, and by having inner and outer angles of the parameres subequal.

Toya nigra bears a remarkable similarity to the type species *Toya attenuata*, particularly in that they are both relatively dark colored, unlike other New World congeners, and bear similar genitalia, with the parameres of both bearing a median hump on the ental surface. Aside from range, this species differs from by *T. attenuata* in having a more pronounced inner angle of the parameres and having a more greatly expanded dorsocaudal pygofer angle (evident from lateral view). *Toya nigra* (Crawford, 1914) was originally described as a subspecies of *Megamelus erectus* Crawford, 1914, now considered a junior synonym of *Delphacodes humilis* (Van Duzee 1907). Crawford's original specimens consisted of "two males and one female from Acapulco, Mexico (Baker), one male from Jalapa, Mexico (Crawford), and one pair from Habana, Cuba (Baker)" (Crawford 1914: 625). One of the males from Acapulco was designated as the type specimen. Muir and Giffard (1924: 32-33) transferred this species to *Delphacodes* as a full species and emended the specific name to the feminine "*nigra*". Muir and Giffard (1924) assert (based on a drawing of the male genitalia of the type at the USNM provided by a Dr. Howard) that the type specimen selected by Crawford did not agree with the original description, and they redescribed the species and designated Crawford's second male specimen from Acapulco (now at the BPBM) as a new type specimen [Mex 2499 // Collection / CFBaker // Holotype (red paper) // *Delphacodes / nigra / (Crawf) / Lectotype // (small blue square) // 1077 // Liburnia / erecta male / var. nigra. Crawf (folded)*]. However, we examined the specimen designated by Muir and Giffard and it agrees with Crawford's original designation. The type designation by Muir and Giffard (1924) is not valid (cf. Article 75, ICZN 1999).

The specimens illustrated by Caldwell and Martorell (1951) as *Toya nigra* are not this species but *Toya venilia*, as suggested by Fennah (1959) and noted by Bartlett (2000). The illustrations of "*Delphacodes nigra*" in Caldwell and Martorell

(1951) lack the median expansion of the parameres and have the processes on 10 more widely separated than normally occurs in *Toya nigra*. Specimens at the USNM identified by Caldwell as *Delphacodes nigra* are macropterous specimens of *Toya venilia*.

The macropterous male holotype of *Delphacodes axonopi* Fennah, 1945, is not dissected, making it difficult to understand how Fennah made his original drawings. Fennah (1945: 435) noted that *D. axonopi* was similar to *T. nigra* "but differs in the aedeagus, having the orifice on the left side and a distinctly greater number of spines, as well as in the shape of the diaphragm and in the color of the antennae". We examined the holotype of *D. axonopi* in comparison to its description by Fennah (1945) and the type of *T. nigra*. The holotype is a macropterous male of similar general appearance to that of the *T. nigra* type, except paler. The coloration of the antennae of both types is the same. The *D. axonopi* type specimen's genitalia have the left paramere misaligned from its natural position (the abdomen shows an abnormality that may indicate parasitism), but are identical in form to that of *T. nigra*. The aedeagus of the type of *D. axonopi* possesses an opening on the right side near the apex, and a comparable number of teeth to those of *T. nigra*. The diaphragm of the type of *D. axonopi*, however, appears enlarged and more deeply concave than that of the type of *T. nigra*. Overall, there are no compelling differences between the holotypes of *D. axonopi* and *T. nigra*, therefore these species are here placed in synonymy.

Reported hosts.— *Axonopus compressus* (Poaceae: Panacoideae: Paniceae; Fennah 1945, as *D. axonopi*); *Solanum tuberosum* L. subsp. *andigenum* (Juz. & Bukasov) Hawkes (reported as *Solanum andigenum* Juz. & Bukasov.) (Solanales: Solanoideae: Solanaceae).

Distribution.— Argentina, Belize, Brazil, Bolivia, Cayman Islands, Colombia, Costa Rica, Dominica, Guadeloupe, Jamaica, Mexico, Panama, Puerto Rico, Trinidad and Tobago, USA (FL), Venezuela. Also reported: Cuba (Crawford 1914, Muir and Giffard 1924).

Type material observed.— *Megamelus erectus niger* Crawford, 1914: Holotype (USNM, macropterous male): "Mex / 2499 // Collection / CDBaker // Type / No. 15993 / U.S.N.M. [red paper, number handwritten] // *Megamelus / erectus / niger*. / D.L.C. Craf. [handwritten]".

Delphacodes axonopi Fennah, 1945: Holotype (USNM, macropter male): "Trinidad / Northern Range / VII-18-42 // Coll #3004 / Fennah". Allotype with same information and additional labels "Type No/ 56604 / USNM [red paper] // Coll.No. 3004 Coll. R.G.Fennah / Holotype male DELPHACODES ALLOTYPE female / AXONOPI Fennah July 18, 1942 / Northern Range Trinidad BWI. [handwritten]".

Toya recurva, new species

Figs. 13 A-H

Type Locality.— Cotaxtla, Veracruz state, Mexico.

Diagnosis.— Length male macropter, 3.31 (3.26-3.39, n=3); brachypter, none observed. *Color*. *Macropter*. General body color light brown. Carinae of head pale; intercarinal regions dark brown, postclypeus paler. Antennae pale, except darker at junction of antennal segments I & II. Pronotum light brown, darker laterally, carinae concolorous. Mesonotum light brown; carinae concolorous. Coxae

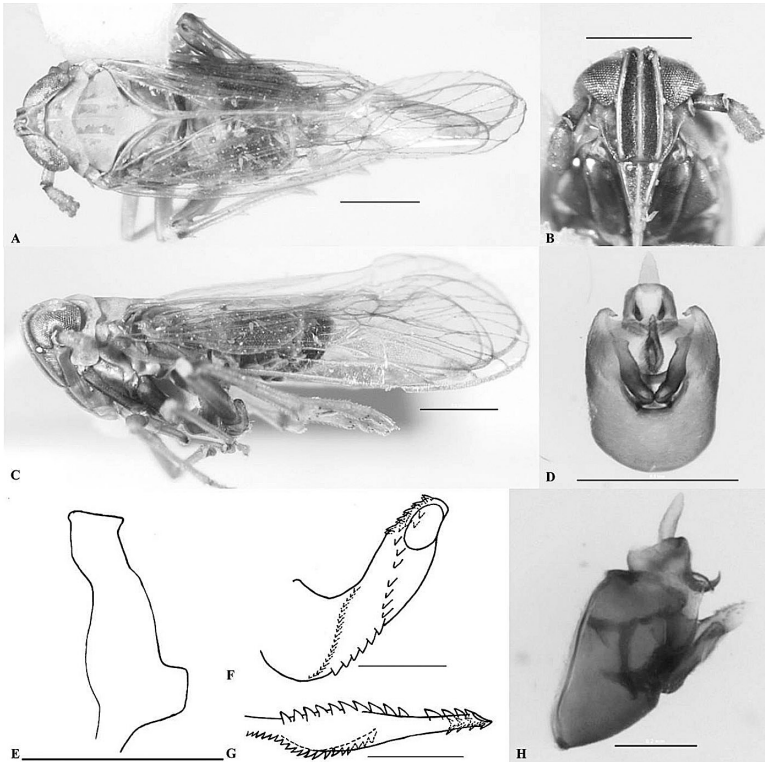


Fig. 13. Features of *Toya recurva* (holotype). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.5mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of aedeagus (scale = 0.1 mm), G. Ventral view of aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

and pleural regions brown. Wings clear, veins mostly concolorous, irregularly darker distally. Legs light brown. Pygofer brown, margin of opening paler. .

Structure. Macropter. Head just narrower than pronotum, eyes extending about 1/2 length beyond posterior margin of vertex. Vertex as long as wide at midlength. Stem of Y-shaped carina of vertex weak, other carinae of head pronounced. Arms of submedian carina meeting acuminate just above fastigium. Frons narrowed between eyes, widest just ventrad of eyes, lateral margins subparallel, slightly converging, to frontoclypeal suture. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (pale in type, reddish on Veracruz specimen). Antennal length slightly more than 0.5x width of head (including eyes); segment I approximately 2/3 length of antennal segment II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts 1, 3, 3, 1). Pronotum at midlength nearly equal to midlength of vertex, lateral carinae curved laterad, not reaching hind margin;

median carina reaching hind margin. Mesonotum about 1.4x longer than length of pronotum plus head; lateral carinae diverging, slightly arched laterad posteriorly. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar about 4/5 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing many small, black-tipped teeth on outer margin (18-19) plus apical tooth; outer and inner margin slightly convex.

Gentalia. Pygofer opening slightly wider than long, margins of opening distinct, lateral angles produced into small weak tooth. In lateral view, pygofer strongly produced on dorsocaudal margin. In caudal view, with caudal expansions on dorsolateral margins acute, directed ventromedially and somewhat caudally. Diaphragm developed, weakly concave in caudal view; diaphragm weakly dorsocaudally projecting in dorsal view. Parameres appearing flattened, diverging; basal angle weak, in broadest view widest just below midlength, lacking projection; lateral margins sinuate to convex, inner angle small, rounded; outer angle obscure. Aedeagus subterete in cross section, widest near base, bent dorsally in basal forth; armed with scattering of small teeth near apex plus 2 rows of distinct lateral teeth originating ventrally near base, right side crossing gradually diagonally to reach dorsal surface in apical forth; left side crossing abruptly, reaching dorsal surface near midlength; opening subapical ventrally, slightly to right. Segment X with 2 stout processes, arising below dorsal margin; in caudal view separated basally; in lateral view ventrally near base, strongly recurved to dorsally directed apices.

Remarks.— The strongly recurved processes of segment X separates this species from all other *Toya*, as does the form of the parameres. The aedeagus of this species suggests an affinity with *Toya idonea*. All three of the observed specimens were taken at lights.

Reported hosts.— None.

Etymology.— The species name is formed from “*curvus*” (Latin; adjective), with the female termination –a, meaning bent; and the Latin prefix “*re-*” meaning “back”, referring to the strongly curved processes on segment X.

Distribution.— Mexico (Veracruz State).

Type material observed.— Holotype (here designated; LBOB, macropterous male): “CotaxtiaExp. / Sta. Cotaxla, / VI-23-1962 at / light Ver.Mex // D. H. Janzen / Collector”. Paratypes: Mexico: Same data as holotype (1m male, UDCC); Veracruz, 3 mi W Coatzacoaclos, VI-26-1971, light trap, Ward male rothers (1m male, LBOB).

Toya venilia (Fennah, 1959)

Figs. 2 I-J, 4 D, 14 A-H

Delphacodes venilia Fennah, 1959: 261-262, figs. 7a-7c.*Toya venilia* (Fennah, 1959); new combination by Fennah, 1965a: 96.*Type Locality.*— Montserrat.*Diagnosis.*— Length male macropter, 2.78 (2.53-2.91); brachypter, 1.65 (1.58-1.71); female macropter 2.95 (2.93-2.96, n=2); brachypter 2.03 (1.92-2.12).*Color. Macropter.* General body color tan. Carinae of head slightly paler than body; intercarinal regions narrowly infusate along carinae, postclypeus more broadly infusate. Antennae pale, pronotum and tegulae pale. Mesonotum light brown, paler between lateral carinae suggesting vitta, carinae concolorous with adjacent region. Coxae and pleural regions with diffuse darker regions. Wings clear, veins concolorous except darker in apical 1/3. Legs pale. Abdomen brown, except lateral and posterior margins of sclerites; pygofer brown, paler on caudal margin. *Brachypter.* General body color straw to pale yellow. Carinae on frons, vertex, prothorax, mesonotum concolorous with body. Intercarinal regions of frons and genae infusate along carinae; postclypeus more broadly infusate. Tegmina lightly fuscous. Abdomen light brown with darker markings medially on each tergite and sternite; pygofer brown, caudal and adjacent ental regions paler.*Structure. Macropter.* Head just narrower than pronotum, eyes extending about 0.5x length beyond posterior margin of vertex. Vertex slightly longer than wide at midlength. Stem of Y-shaped carina of vertex weak, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons narrowed between eyes, widest just ventrad of eyes, lateral margins subparallel, slightly converging, to frontoclypeal suture. Postclypeus with distinct median carina. Lateral ocelli conspicuous at ventral anterior margin of compound eye (reddish in specimens on hand). Antennal length slightly less than 0.5x width of head (including eyes); segment I approximately 3/4 length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts appear 1, 3, 3, 1 in macropter, reduced in some brachypters). Pronotum at midlength slightly shorter than midlength of vertex, lateral carinae curved laterad, nearly reaching hind margin; median carina reaching hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel, slightly diverging posteriorly. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing many small, black-tipped teeth (14-16) on outer margin (these becoming reduced near apex) plus small apical tooth; outer and inner margin slightly convex. *Brachypter.* Similar to macropter except mesonotum subequal to length of head plus pronotum; tegmina nearly reaching tip of abdomen exposing pygofer, broadly rounded apically.*Genitalia.* Pygofer opening slightly wider than long, margins of opening rounded, lateral angles obscure. In lateral view, pygofer strongly produced on dorsocaudal margin; apex bent medially in caudal view. Diaphragm armature slightly convex in caudal view, projecting caudad in ventrocaudal view. Parameres appearing flattened, diverging from median; subparallel in structure, narrowing slightly along distal margins of basal half; in broadest view widest at basal angle,

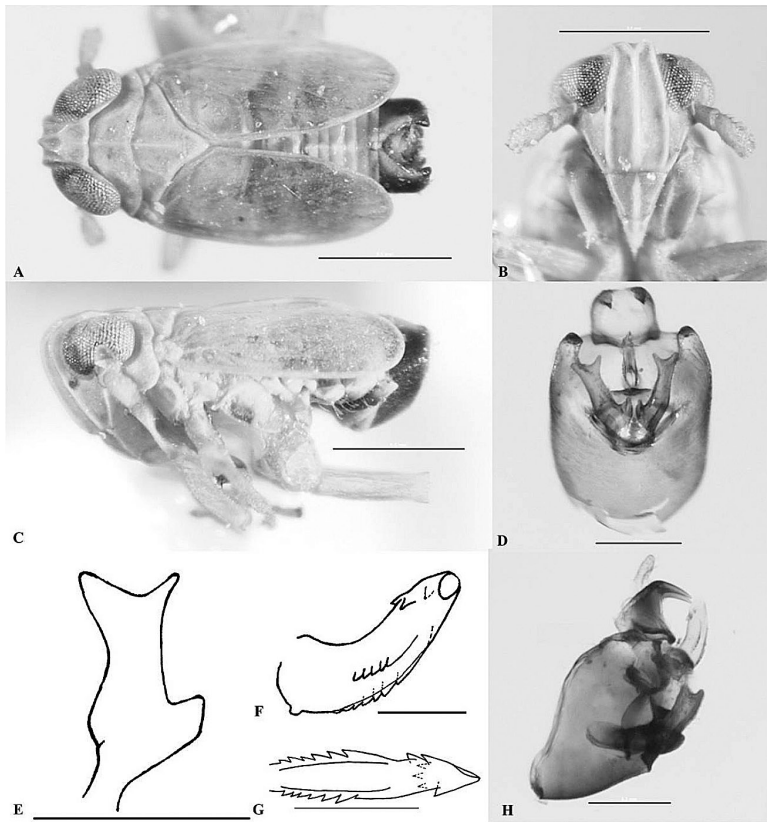


Fig. 14. Features of *Toya venilia* (A-C, E-H. Guana Is., BVI; D. Puerto Rico). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of aedeagus (scale = 0.1 mm), G. Ventral view of aedeagus (scale = 0.1 mm), H. Lateral view of pygofer (scale = 0.2 mm).

basal angle with strong projection; parameres beyond basal angle gradually tapering to abruptly wider apex; apex strongly concave, inner and outer angle well-developed, outer broader and slightly longer than inner. Aedeagus subterete in cross section, widest near base, gradually narrowing to apex; curving dorsally in basal third; middle third armed with parallel lateral rows of teeth, several subapical teeth on dorsal surface; opening subapical on right. Segment X with 2 stout, relatively short, ventrally directed processes, arising on dorsal margin; in caudal view separated basally.

Remarks.— *Toya venilia* is most similar to *T. boxi*, however, the parameres of *T. venilia* are more strongly concave apically, with the inner angle better developed and subequal to the outer angle. *Toya venilia* also differs from *T. boxi* in that the lateral teeth on the aedeagus are not as strongly developed (not appearing as lateral flanges from ventral view). The genital diaphragm of *T. boxi* also pos-

sesses lateral processes that are absent in *T. venilia*. *Toya boxi* also has very dark intercarinal regions, while *T. venilia* has very limited coloration on the frons.

Most specimens of *Toya venilia* on hand are brachypters, unlike all the other New World *Toya* species. Denno et al. (2001) investigated rates of wing polymorphism with respect to habitat of this species in the British Virgin Islands. We were able to examine specimens collected by Denno and colleagues as part of this revision.

Reported hosts.— *Sporobolus virginicus* (L.) Kunth (Poaceae: Chloridoideae: Eragrostidae) (Bartlett 2000, Denno et al. 2001).

Distribution.— British Virgin Islands (Guana, Necker); Puerto Rico (incl. Muertos Is), Turks And Caicos Islands, US Virgin Islands (St. John). Also reported: Virgin Islands: Anegada, Beef, Great Camanoe, Great Dog, Great Thatch, Jost van Dyke, Tortola, Virgin Gorda (Denno et al. 2001); Vieques Island (Caldwell & Martorell 1951 as *Delphacodes nigra*).

Type material.— Holotype (BMNH, brachypterous male): Montserrat, T.W.I., near Plymouth, May 1940, R. G. Fennah (in alcohol; specimen requested, not provided).

METADELPHAX Wagner, 1963

Metadelphax Wagner, 1963. Synonymy with *Toya* by Fennah 1964: 142 (by implication; type species moved to *Toya*); Nast 1972:65, Linnavuori 1973: 107 (generic synonymy listed). Name restored by Ding 2006: 511.

Meadelphax Wagner: Missp. by Kuoh et al. 1983: 155.

Type species.— *Delphax propinqua* Fieber, 1866 by original designation.

Diagnosis.— *Color.* General body color yellowish tan; females often paler than males; brachypters slightly paler than macropters (only macropters of *propinqua* observed). Carinae of head and frons considerably paler than body. Intercarinal regions of head anterior to M-shaped carina narrowly to broadly infusate; area posterior to M-shaped carina slightly paler to slightly darker than body. Thoracic pleura and abdomen irregularly darkened. Wings hyaline to weakly fuscous; veins typically darker in apical 1/3 of forewing. Male pygofer medium to dark brown.

Structure. Eyes extending posteriorly beyond the vertex slightly more than 0.5x their length. Stem of Y-shaped carina weak to obscure, arms evident; submedian carinae joining at fastigium. Frons slightly bowed laterally; frontal carinae conspicuous. Antennal length slightly longer than 0.5x width of head plus eyes, segment II longer than segment I. Pronotal carinae developed, lateral carinae diverging from median and not reaching hind margin, median carina reaching hind margin. Tegulae conspicuous. Hind tibiae with tooth on outer surface near femoral joint, at midlength, and 5 apical teeth grouped 2 + 3. Basitarsus with 7 apical teeth grouped 2 + 5, and tarsomere II with 4 teeth. Macropter forewing venation illustrated (Fig. 1 B). Forewings of macropters apically rounded, extending 0.5x length beyond abdomen; forewings of brachypters broadly rounded apically, exposing pygofer; both with small setae-bearing projections on veins. *Genitalia.* Male pygofer strongly expanded into projections along dorsocaudal margin and apically directed medially to ventromedially (Figs. 15 D, 16 D, 18 D). Parameres directed dorsocaudally in lateral view and subparallel to diverging in caudal view;

appearing flattened; basal angle developed; apices with outer angle weakly to strongly developed, inner angle evident, often concave medially (Figs. 18 E, 20 E). Diaphragm bridge narrow with well-developed median armature; armature much taller than broad in dorsal view, appearing bi- or trifurcate in caudal view (Figs. 3 A-H). Segment X with 2 well-developed ventrally directed processes, typically arising on subdorsal margin, approximated closely basally, subparallel, diverging slightly in apical 1/3 (Fig. 18 D). Aedeagus terete, directed caudally, straight or slightly decurved in apical 1/4, with subapical dorsal to dorsolateral teeth; teeth weak to distinct.

Remarks. The definitive features for this genus appear to be the dorsocaudal margin of the pygofer expanded, subapically inflected into medially to ventrally directed apices, the genital diaphragm much higher than wide, and the processes on segment X basally approximated, usually arising below the dorsal margin in lateral view. Also, the aedeagus is tubular, straight or slightly downcurved, bearing subapical dorsal teeth. *Metadelphax* is superficially quite similar to *Toya*, except that the genital diaphragm is much taller than wide, and the aedeagus tends to be straight to slightly downcurved.

Metadelphax was described by Wagner, 1963, for the species *M. propinqua* (type species by original designation) and *M. minuscula* (Horv-th, 1897) (= *Delphax minuscula* Horv-th, 1897; *Calligypona minuscula* (Horv-th) (Linnavuori 1964: 432); *Toya minuscula* (Horv-th) (Nast 1972:65)), the latter of which currently resides in *Falcotoya* Fennah, 1969a (Emeljanov 1972:79, Asche and Remane 1982, Holzinger et al. 2003). *Calligypona simulans* Dlabola 1958 (Caucasus) was treated as *Metadelphax* by Mitjaev 1971: 66, but placed in *Toya* by Nast (1972: 65) and subsequent authors. *Metadelphax* was treated as a subgenus of *Calligypona* by Linnavuori (1964), perhaps because of confusion at the time concerning the nomenclatural status of *Calligypona* and *Delphacodes* (e.g., Ossiannilsson 1942, China 1954, Dlabola 1957, 1961).

Wagner's (1963: 170) original description of *Metadelphax* based on the 2 species translates from German approximately as follows (comments in square brackets):

"Upper hind-corners of the genital segment [pygofer] drawn out into a lobe form and bent in. Front lower edge strongly drawn back. Stylus [parameres] lying against the genitalphragma [diaphragm]. Stylus [parameres] with sharp [*propinqua*] or rounded [*minuscula*] outer-corners. Penis straight [*propinqua*] or curved [*minuscula*]."

Wagner (1963) did not compare *Metadelphax* with *Toya*, perhaps because only *propinqua* was within his geographic area of treatment.

Metadelphax was de facto synonymized with *Toya* when Fennah (1964), moved *propinqua* to *Toya*, although this was done without mention of Wagner's (1963) work. Nast (1972: 65) was the first author to list *Metadelphax* in synonymy with *Toya*. Although some authors have used the combination "*Metadelphax propinqua*" in the interim (e.g., Dlabola 1965, Mitjaev 1971, Raatikainen and Vasarainen 1990), it does not appear that any of those authors had intended to restore *Metadelphax* to generic status until Ding (2006). Ding (2006: 686-687) keys *Toya* as having an "aedeagus compressed laterally, twisted, with 2 rows of teeth, 1 obliquely on left side" and *Metadelphax* as "not as above". Ding (2006) also transferred *Toya bridwelli* (Muir, 1920) to *Metadelphax*, evidently based on the aedeagus, although this species does not possess the genital

diaphragm that we are specifying as a component of the generic definition of *Metadelphax*. While we would concede that the aedeagus of *bridwelli* is dissimilar to the remaining Chinese *Toya* species, we do not feel that differences in the aedeagus alone are sufficient to warrant generic transfer; further it is not clear that other Chinese taxa remaining in *Toya* (viz. *T. larymna* Fennah, 1975 and *T. terryi* Muir, 1917; the latter a junior synonym of *T. tuberculosa* (Distant, 1916) according to Fennah 1975 and Asche 1988) belong in *Toya* in the strict sense. Clarification of this situation will need to await revision of the Old World *Toya*.

Metadelphax would probably best be treated as a subgenus of *Toya*; however, we felt that subgenera of *Toya*, with only those forms closest to *T. attenuata* placed in a nominotypical subgenus, could not be appropriately defined until the world *Toya* fauna was considered as a whole, which is beyond the scope of our current work.

Available specimens suggest that macroptery is more common than brachyptery in *Metadelphax*.

The etymology for the generic name *Metadelphax* was not stated by Wagner (1963), but is evidently derived from the Greek word “*delphax*” (f., a young pig), a reference to the type genus of the Delphacidae, with the Greek prefix “*meta*” (between, among, near; implying change).

***Metadelphax argentinensis* (Muir, 1929a) new combination**

Figs. 3 A-B, 5 A, 15 A-G

Delphacodes argentinensis Muir 1929a: 82-83, figs. 14, 15, 16.

Syndelphax argentinensis (Muir, 1929a): new combination by Fennah, 1971a: 323.

Delphacodes variabilis Remes Lenicov & Teson, 1978: synonymy by Teson & Remes Lenicov, 1983: 322.

Toya argentinensis (Muir, 1929a): new combination by Teson & Remes Lenicov, 1989: 101-102, figs. 4, 10.

Type locality.— F.C.S.F., Santa Ana, Argentine Republic.

Diagnosis.— Length male macropter, 3.34 (3.05-3.51); brachypter, none observed. *Color. Macropter*. General body color yellow to yellowish tan [in holotype] to light brown. Carinae on frons pale yellow with dark margins within pale intercarinal regions proximal to stems of intermedial carina. Intercarinal region between stems of intermedial carina and M-shaped carina darker at point of divergence of arms; intercarinal region posterior to M-shaped carina pale. Antennal segments I and II pale with dark margins apically on segment I and basally on segment II. Pronotum pale, carinae and margins paler. Tegulae pale. Mesonotum nearly as pale as pronotum, carinae and posterior margin paler. Coxae slightly darker than general color, pleural regions concolorous. Wings hyaline, veins in apical 1/3 darker. Legs pale. Pygofer brown [not observed on holotype].

Structure. Macropter. Head narrower than pronotum, eyes extending slightly less than 2/3 length beyond posterior margin of vertex. Vertex 1.25x longer than wide at midlength. Stem of Y-shaped carina of vertex indistinct, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons slightly laterally bowed, narrowest just below fastigium, widest 0.5x length from postclypeus at base of eyes. Frons slightly wider at frontoclypeal suture than at fastigium. Postclypeus with distinct median carina. Lateral ocelli con-

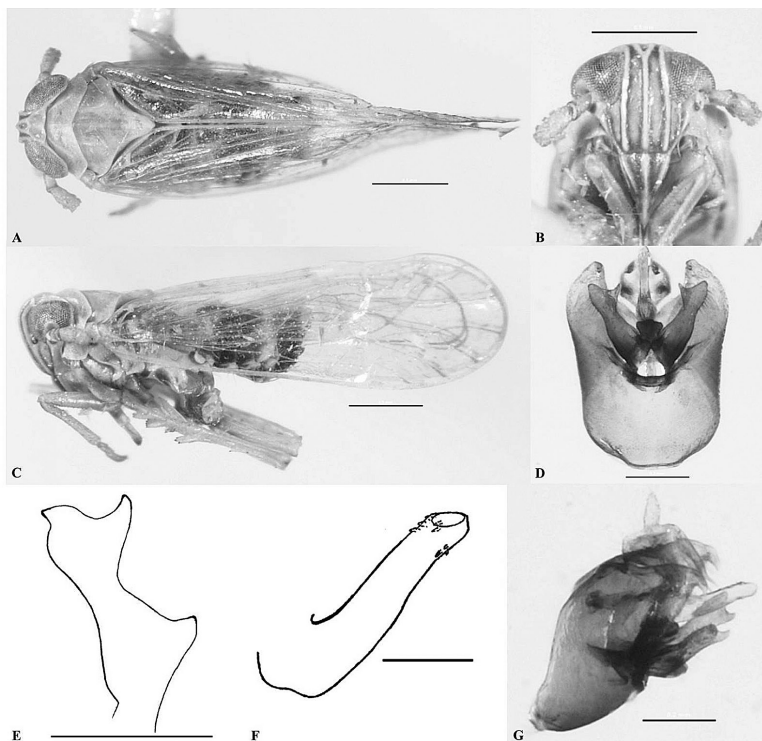


Fig. 15. Features of *Metadelphax argentinensis* (A-G, Argentina). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of aedeagus (scale = 0.1 mm), G. Lateral view of pygofer (scale = 0.2 mm).

spicuous just anterior to ventral anterior margin of compound eye. Antennal length slightly greater than 0.5x width of head (including eyes); segment I nearly 2/3 length of II; II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts are 2, 3, 3, 1). Apex of segment II bearing a circular row of 5 smaller sensory pits. Pronotum at midlength slightly more than 3/4 length of vertex, lateral carinae directed postero-laterad from anterior margin, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel to hind margin. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing ca. 17-21 small, black-tipped teeth on outer margin (becoming reduced near apex) plus small apical tooth; outer margin slightly convex, inner margin nearly straight.

Genitalia. Pygofer opening slightly longer than wide, margins rounded, lateral angles obscure. In caudal view, with caudal expansions on dorsolateral margins, narrowly rounded apically, directed ventromedially. In lateral view,

dorsocaudal margins strongly produced, posterior margin angled dorsocaudally. Diaphragm well developed, produced dorsocaudally in dorsal view, appearing spadelike; in ventrocaudal view appearing convex, trilobed with outer lobes broadly rounded, medial lobe more acute. Parameres appearing flattened, subparallel, widest basally in broadest view; basal angle produced; lateral margins narrowest at just above midpoint; apex with acute inner and outer apical angles, appearing concave medially; outer apical angle appearing slightly decurved and direct distally; inner apical angle produced dorsally, curved medially. Aedeagus terete, directed dorsocaudally, opening apically on the left dorsolateral margin; aedeagal teeth subapical, in 2 groups; row of ca. 4-5 subapical teeth originating on left dorsolateral to right dorsolateral margin; median teeth distal to first and last teeth, row appearing U shaped in dorsal view; row of ca. 2 subapical teeth originating proximal to aedeagal opening on left ventrolateral margin of left side. Segment X with 2 ventrally directed processes, slightly diverging apically and directed caudally, closely approximated basally.

Remarks.— This species exhibits a strong resemblance to *Metadelphax propinqua* and exhibits an armature of the genital diaphragm taller than wide, therefore is here transferred from *Toya*. Muir (1929a) indicates in the original description that it is allied to *M. propinqua*. General body color and structure is nearly identical to *M. propinqua*, and diagnostic features to separate the species relies on the male genitalia. The shape of the armature of the genital diaphragm in the ventrocaudal view appears much broader and trilobed in *M. argentinensis* as compared to the narrower and apically bifurcate armature in *M. propinqua*. The parameres for both species are quite similar, with *M. argentinensis* having acute inner and outer apical angles with a hooklike appearance. The inner and outer angles on *M. propinqua* are often acutely rounded and typically do not exhibit a hooklike appearance, but this feature is not completely reliable. The structure of the aedeagus is also similar in both species, except the aedeagal opening on *M. argentinensis* originates on the left dorsolateral margin, whereas *M. propinqua* is on the dorso-apical margin. The placement of aedeagal teeth in *M. argentinensis* is also slightly different from *M. propinqua*, and appear more strongly developed, but again, this feature is variable in *M. propinqua* and cannot be relied upon for separation of the species.

Reported hosts.— Oats (*Avena sativa* L. (Poaceae: Pooideae: Aveneae)), barley (*Hordeum vulgare* L. (Poaceae: Pooideae: Triticeae)), sorghum (*Sorghum bicolor* (L.) Moench (Poaceae: Panicoideae: Andropogoneae)), rye (*Secale cereale* L. (Poaceae: Pooideae: Triticeae)), beet (*Beta vulgaris* var. *cycla* (L.) Koch (Chenopodiaceae: Chenopodioideae: Beteae)), tomato (*Solanum lycopersicum* L. (Solanaceae: Solanoideae: Solaneae)), pepper (*Capiscum* L. (Solanaceae: Solanoideae: Solaneae)), and weeds (Remes Lenicov & Teson 1978; Remes Lenicov & Virila 1999); maize (*Zea mays* L. (Poaceae: Panicoideae: Andropogoneae)) (Teson & Remes Lenicov 1989).

Distribution.— Argentina, Bolivia, Brazil, Colombia, Paraguay, Peru, Venezuela.

Type material observed.— *Delphacodes argentinensis* Muir, 1929a: Holotype (BMNH macropterous male), genitalia embedded in balsam between cover slips held within card stock): "Type [round label with red border] // Argentine Republic / Villa Ana, F. C. S. Fe. / Dec.1925. / K. J. Hayward. // Brit. Mus. / 192[?]-109 // At night. // *Delphacodes* / *argentinensis* / Muir [handwritten on

genitalia mount] // *Delphacodes / argentinensis / Muir* [handwritten] / Holotype [red paper, pasted perpendicular, reading top to bottom from left].”

Metadelphax dentata, new species

Figs. 16 A-G

Type Locality.— Ecuador, Provincia de Francisco de Orellana, Yasuni National Park.

Diagnosis.— Length male macropter, 2.90 (2.71-2.99, n=4); brachypter, none observed. *Color*. *Macropter*. General body color yellow to yellowish-tan. Carinae of frons, postclypeus, vertex very pale, with dark intercarinal regions. Intercarinal regions anterior and posterior of M-shaped carinae yellow. Antennal segment I with small dark spot at base and darkened apically; segment II entirely pale or with small dark basal region. Pronotum paler than body; pronotal carinae concolorous. Mesonotum distinctly yellow; mesonotal carinae paler. Coxae with large brown region on outer surface. Pleural region concolorous or with light brown markings. Legs paler to light brown between lateral margins. Abdomen with dorsal region brown, ventral region concolorous with light brown regions. Pygofer dark brown.

Structure. *Macropter*. Head narrower than pronotum. Eyes extending nearly 0.5x length beyond posterior margin of vertex. Vertex 1.25x as long as wide at midlength. Stem of Y-shaped carina of vertex obsolete, other carinae of head well-developed. Arms of submedian carina meeting acuminate just below fastigium on frons. Frons expanding slightly, narrowest just below fastigium, widest at base of eyes, subparallel to frontoclypeal suture. Carinae of postclypeus well-developed, distinct. Lateral ocelli conspicuous, arising just above ventral anterior margin of eye. Antennal length nearly 0.5x the width of the head, including eyes; segment I slightly longer than 0.5x length II; segment I bearing 4 longitudinal rows of sensory pits, absent on ventral surface (from leading to trailing edge, row counts are ca. 2, 3, 4, 2). Apex of segment II bearing ca. 3-4 smaller sensory pits arranged in a semicircle around the antennal flagellum. Width of pronotum at midlength subequal to length of vertex; lateral carinae diverging posteriorly, than laterally, not reaching posterior margin of pronotum; median carina terminating at hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel, diverging slightly near posterior margin of mesonotum; median carina distinct, becoming obsolete on scutellum. Tegulae conspicuous. Outer surface near femoral joint and midlength of hind tibia each with a small black-tipped tooth. Calcar subequal to length of basitarsus, tectiform, medially thickened, distally narrowed to an acuminate apex, bearing ca. 23-27 black-tipped teeth, becoming slightly reduced near apex, plus a single small tooth at apex; outer margin slightly convex, inner margin nearly straight.

Genitalia. Pygofer opening longer than wide, margins rounded, lateral angles obscure. Dorsolateral margins with well-developed caudal expansions directed medially, broad and notched at apex, appearing bilobed; well-developed in lateral view, directed dorsocaudally. Diaphragm well-developed, median projection 2x high as wide, posterior margin angled dorsocaudally; in ventrocaudal view, appearing convex with 2 apicolateral projections nearly surrounding aedeagus. Parameres appear flattened, apex turned ca. 45° from base; directed dorsally from base, subparallel, widest basally in broadest view; basal angle produced;

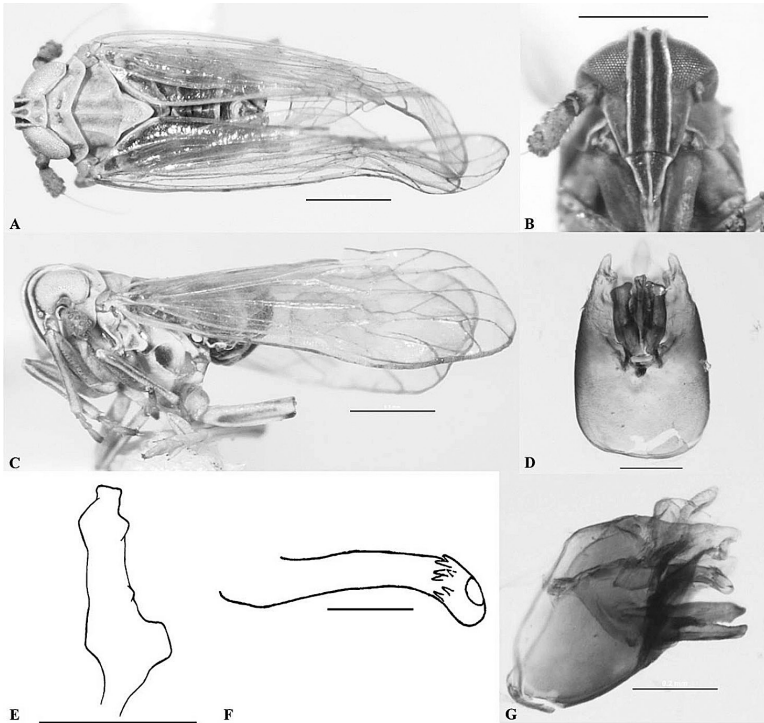


Fig. 16. Features of *Metadelphax dentata* (A, C holotype; B, D, G, paratype, Ecuador; E, F, paratype, Costa Rica). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere (scale = 0.2 mm), F. Lateral view of the aedeagus (scale = 0.1 mm), G. Lateral view of pygofer (scale = 0.2 mm).

inner lateral margin with small median projection, margins narrowest at 2/3 entire length from base; apex without distinct outer angle, broadly rounded; inner angle developed, truncate with small projection below. Aedeagus terete, directed dorsocaudally, bent caudoventrally in apical 1/3, sub-apical opening dorsal, apex wider than basal 3/4; apical teeth well developed, just proximal to opening, in 2 distinct groups; row of ca. 5-6 teeth originating on left lateral margin, extending dorsally, terminating at right dorsolateral margin; 2 teeth present below row on left ventrolateral margin appearing just distal to first row. Segment X with 2 slender, ventral processes closely approximated at base, subparallel, diverging slightly in apical third.

Remarks.— This species most closely resembles *Metadelphax wetmorei* based on the shape of the dorsocaudal projections of the pygofer, the parameres, and the aedeagus. In *M. dentata*, the projections of the pygofer appear more lobelike and longer than on *M. wetmorei*. The parameres for this species lacks a distinct median projection on the outer lateral margin and has a less distinct outer apical angle along with a narrower, truncate inner apical angle in comparison to *M. wetmorei*. The aedeagus on both species is very similar, but the aedeagal teeth for

M. denata appear more strongly developed and originate closer to the orifice than seen in *M. wetmorei*. Externally, these species appear difficult to separate and determinations of females are unlikely, as with most other species of *Toya*, *Metadelphax*, *Syndelphax*, and others. However, examining the shape of the frons in comparison with Muir & Giffard (1924), in the description *M. wetmorei* (holotype from Ft. Lauderdale, FL), list the species as occurring in Nicaragua based on specimens examined from the Baker collection and treated by Crawford (1914) as *Megamelus terminalis* (Van Duzee) (a synonym of *M. propinqua*). We have examined a paratype from Nicaragua and have determined that it is not *M. wetmorei*, but instead the new species here described as *M. dentata*. While it may be possible for *M. wetmorei* to follow the trend to range widely similar to some other species among the treated taxa (e.g., *M. propinqua*, *T. idonea*), we have only confirmed its range within the southeastern United States; however, *Metadelphax dentata* was observed from throughout the Neotropics, including the West Indies.

Reported hosts.— None.

Distribution.— Costa Rica, Ecuador, Nicaragua, Panama, Venezuela.

Type material.— Holotype (USNM, macropterous male): "ECUADOR; Provincia / de Francisco de Orellana / Yasuni National Park / S00°40.478 W076°23.866// 29-IV-2005; CRBartlett/ N. Nazdrowicz, D. Chang/ ex: sweeping / day". Paratypes: Ecuador: same as holotype (1m male, UDCC). Nicaragua: San Marcos, Baker (2m male , USNM [one specimen labeled "*Megamelus terminalis*", V.Duv, D.L.C.]). Panama: CANAL ZONE, Fort Clayton, Sept. 8-15, 1978, N.J. light trap, H.J. Harlan (1m male , LBOB); 10 xi 52, FSBlanton (1m male , USNM). Venezuela: Bolivari, 38kmEast of Ciudad, Bolivar, 19 March 1982, G.F. & J.F. Hevel (2m male , 1 USNM, 1 UDCC).

***Metadelphax pero* (Fennah, 1971a) new combination**

Figs. 17 A-H

Syndelphax pero Fennah, 1971a: 321-323.

Type locality.— Cayman Islands, Grand Cayman.

Diagnosis.— Length male macropter, 3.70 mm; brachypter, not known.

Color. Macropter. General body color yellowish-tan. Carinae on frons pale yellow; intercarinal regions dark brown; genae brown. Carinae of head posterior to vertex pale; intercarinal regions of head posterior to stems of intermedial carina concolorous with general body color. Antennal segments I and II concolorous with body with weakly darkened margins apically on segment I and basally on segment II. Pronotum pale yellow, carinae and margins paler. Tegulae concolorous with body. Mesonotum slightly darker than pronotum, carinae and posterior margin paler. Coxae brown, pleural regions concolorous with general body color. Wings weakly fuscous, veins in apical 1/3 slightly darker. Legs pale. Pygofer appearing brown.

Structure. Macropter. Head narrower than pronotum, eyes extending slightly more than 1/2 length beyond posterior margin of vertex. Vertex greater than 1.25x longer than wide at midlength. Stem of Y-shaped carina of vertex indistinct, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons slightly laterally bowed, narrowest at fastigium, widest 1/3 length

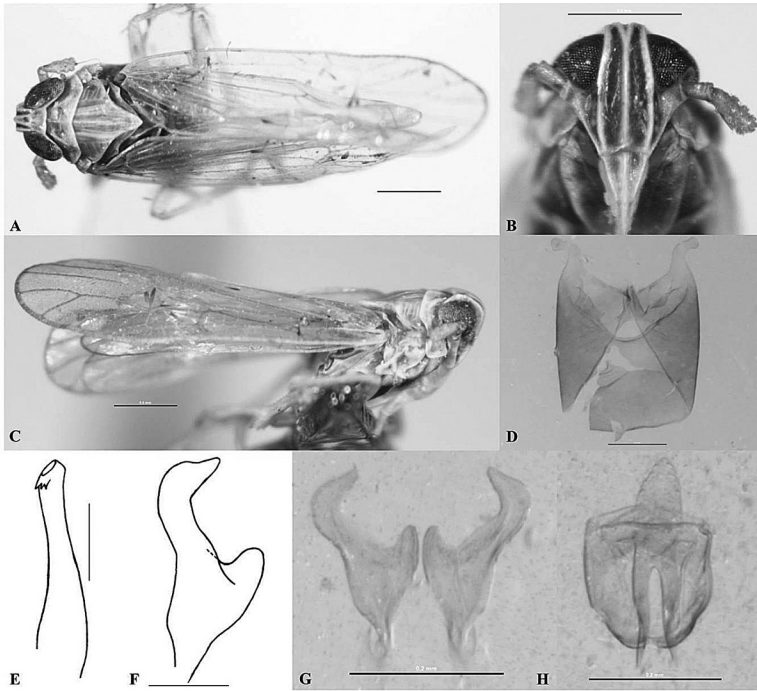


Fig. 17. Features of *Metadelphax pero* (holotype). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (specimen reversed on point; scale = 0.5 mm), D. Pygofer (scale = 0.2 mm), E. Lateral view of the aedeagus (scale = 0.1 mm), F. Left paramere (scale = 0.1 mm), G. Parameres (scale = 0.2 mm), H. Segment X, caudal view (scale = 0.2mm).

from postclypeus, ventrad of eyes. Frons slightly wider at frontoclypeal suture than at fastigium. Postclypeus with distinct median carina. Lateral ocelli conspicuous just anterior to ventral anterior margin of compound eye. Antennal length nearly $2/3$ width of head (including eyes); segment I slightly longer than $2/3$ length of II; II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts are 2, 3, 3, 1). Apex of segment II with circular row of 5 smaller sensory pits. Pronotum at midlength subequal to length of vertex, lateral carinae directed posterior-laterad from anterior margin, becoming obsolete $3/4$ distance from hind margin; median carina reaching hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel, reaching hind margin. Median carinae of mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Hind tibiae with tooth on outer surface near femoral joint, at midlength, and 5 apical teeth grouped 2 + 3. Basitarsus with 7 apical teeth grouped 2 + 5, and tarsomere II with 4 teeth. Calcar approximately $3/4$ length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing ca. 15 small, black-tipped teeth on outer margin (these becoming reduced near

apex) plus small apical tooth; outer margin slightly convex, inner margin nearly straight.

Genitalia. Pygofer (Fig. 17 D) opening longer than wide, margins rounded, lateral angles obscure. In caudal view, with caudal expansions on dorsolateral margins, narrowly rounded and slightly expanded apically (they are dorsolaterally directed in the holotype, but that may be an artifact of the mounting process). Dorsocaudal margins strongly produced, posterior margin appearing angled dorsocaudally. Diaphragm appearing well developed, taller than wide, produced dorsocaudally in dorsal view, appearing compressed (may be an artifact of preservation); in ventrocaudal view appearing spearlike with outer angles obliques, median projection appearing more acute. Parameres appearing flattened, diverging, widest basally in broadest view; basal angle well produced, rounded apically; lateral margins narrowest at just above midpoint; apex with acutely rounded inner angle; outer apical obscure or lacking, outer apical margin broadly rounded; inner apical angle directed dorsomedially. Aedeagus terete, broadest basally, direction indeterminant, opening apically on the dorsal margin; aedeagal teeth sub-apical, produced on dorsal surface, posterior to orifice; one row of ca. 5 subapical teeth originating on left dorso-lateral to right dorsolateral margin. Segment X with 2 ventrally directed processes diverging from single expansion on the basocaudal margin; processes widest in basal 2/3 narrowing, subparallel, slightly diverging away from median in apical 1/3.

Remarks.— This species is known from the holotype and evidently a specimen from Cuba (Rodriguez-León et al. 1994b). External morphology and color is similar to other taxa in *Toya* and *Metadelphax*. Here, we transfer this species to *Metadelphax* based on the development and shape of the armature of the genital diaphragm and the general structure of the aedeagus. This species can be separated from all other *Metadelphax* species based on the development of the processes originating on segment X of the pygofer. Fennah (1971a: 321-323), in his description of the species, describes the armature of the diaphragm as “mitre-shaped” which would indicate the presence of 3 distinct angles. In the original description, Fennah did not describe the direction of the expansions produced along the dorsolateral margins of the pygofer, but instead provided 2 illustrations of the pygofer which conflict regarding their direction.

Reported hosts.— None.

Distribution.— Cayman Islands (Grand Cayman); also reported: Cuba (Rodriguez-León et al. 1994b).

Type material observed.— Holotype data (BMNH, macropterous male); pointed with clear plastic): “Holo-/Type [round label with red margins] // 17.iv-26.viii./ 1938. Oxf.Un. /CAYMAN IS./ Biol. Exped. /Coll.by.C.B./ Lewis, G.H. / Thompson. // 3.viii.1938./ Grand / Cayman, /West end of, /Georgetown. /Light trap. //Pres. Hope / Dept., Oxford/ B.M. 1967-147// Syndelphax / det [crossed out] pero [hand written]/ R.G. Fennah”.

Metadelphax propinqua (Fieber, 1866)

Figs. 1 B, 3 E-F, 18 A-G, 19 A-C

- Delphax propinqua* Fieber, 1866: 525.
Delphax hamulata Kirschbaum, 1868: 38: synonymy by Fieber, 1872: 5.
Liburnia propinqua (Fieber): new combination by Fieber, 1872: 5.
Liburnia marshalli Scott, 1873: 104: synonymy by Webb and Wilson, 1986: 286.
Liburnia terminalis Van Duzee, 1907: 49: synonymy by Muir and Giffard, 1924: 31.
Delphax cataniae Matsumura, 1910: 35: synonymy by Nast, 1975: 4.
Delphax graminicola Matsumura, 1910: 17: synonymy by Yang, 1989: 4.
Liburnia tuckeri Van Duzee, 1912: 506: synonymy by Muir and Giffard, 1924: 31.
Delphacodes propinqua (Fieber): new combination by Muir, 1917: 335.
Delphacodes neopropinqua Muir, 1917: 335: synonymy by Muir and Giffard, 1924: 31.
Delphacodes subfusca Muir, 1919: 38: synonymy by Muir and Giffard, 1924: 31.
Liburnia albicollis Haupt, 1935 [nec. Motschulsky 1863]: 144; synonymy by Metcalf, 1943: 498; see also Wagner 1954: 217-8 (synonymy with *Liburnia albicollis* Motschulsky 1863, e.g., Lindberg, 1936: 18; China 1938: 54, Linnavuori 1952: 191, is in error).
Delphacodes shirozui Ishihara, 1949: 53-54: synonymy by Fennah, 1956: 122.
Calligypona propinqua (Fieber): new combination by Dlabola, 1954: 14, 64 (combination by implication in China 1954: 165).
Toya propinqua (Fieber): new combination by Fennah, 1964: 142 (from *Delphacodes propinqua*); see also Fennah 1965b: 56.
Metadelphax propinqua (Fieber): new combination by Wagner 1963: 170; synonymy by implication Fennah 1964: 142 (as *Toya propinqua*); restored combination by Ding 2006: 511, 513-514.
Calligypona (Metadelphax) propinqua (Fieber): new combination by Linnavuori, 1964: 341-342.
M[etadelphax] propinqua (Fieber): misspelling by Mitjaev, 1971: 66.
Toya (Calligypona) propinqua (Fieber): combination by Linnavuori, 1973: 107.
Toya propinqua neopropinqua (Muir): new status by Kuoh et al 1983: 155.
Toya porpinqua (Fieber): misspelling by Yang, 1989: 219.
Toya propinqua (Fieber): misspelling by Rodriguez-León et al. 1994a: 19.

Type Locality.— Austria.

Diagnosis.— Length: male macropter: 3.29 (3.03-3.58); brachypter: 1.97 (1.83-2.09); female macropter: 3.37 (3.14-3.53); brachypter: 2.35 (2.26-2.59).
Color. Macropter. General body color yellowish tan. Carinae on frons very pale; intercarinal regions typically yellowish-tan, occasionally darkened; borders of intercarinal regions darkened. Intercarinal regions proximal to arms of Y-shaped carina of vertex pale. Antennal segments I and II pale with dark margins apically on segment I and basally on segment II. Pronotum pale yellow, carinae and margins paler. Tegulae and mesonotum nearly as pale as pronotum; carinae and posterior margin of mesonotum paler. Coxae slightly darker than general color, pleural regions medium to dark brown. Wings weakly fuscous, veins concolorous, except darker in apical 1/3. Legs pale, occasionally darker between lateral margins. Abdominal terga and sterna pale to brown with broad pale margins; pygofer brown, often with pale margins. *Brachypter*. Same as macropter except general body color slightly paler. Carinae of pronotum and mesonotum concolorous with general body; tegmina fuscous; pygofer with pale margins to completely darkened.

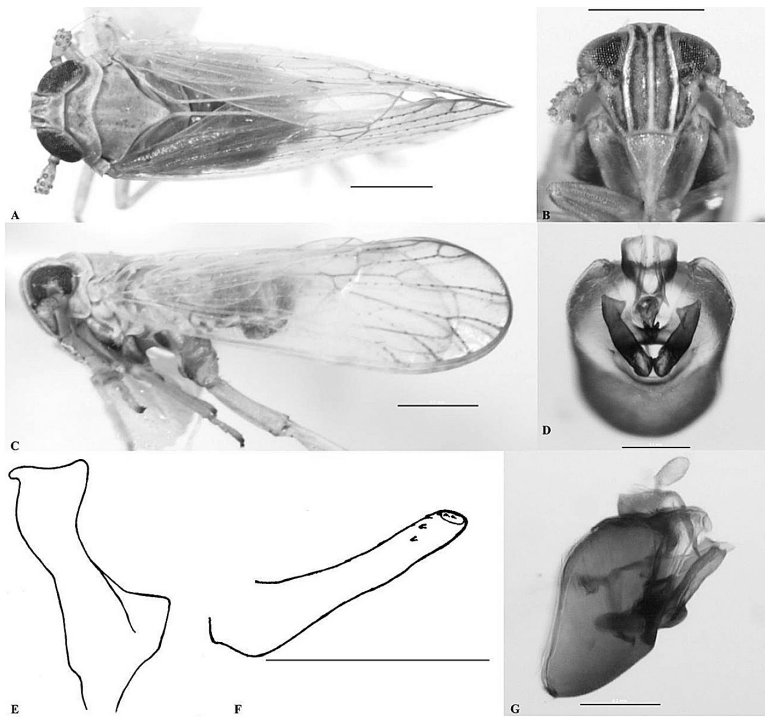


Fig. 18. Features of *Metadelphax propinqua* (A-C. Florida, D. Maryland, E-F. Costa Rica, G. Tennessee). A. Dorsal habitus (scale = 0.5 mm), B. Lateral view (scale = 0.5 mm), C. Frons (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of aedeagus (scale = 0.2 mm), G. Lateral view of pygofer (scale = 0.2 mm).

Structure. Macropter. Head narrower than pronotum, eyes extending slightly over 0.5x length beyond posterior margin of vertex. Vertex slightly longer than wide at midlength. Stem of Y-shaped carina of vertex developed but indistinct, other carinae of head pronounced. Arms of submedian carina meeting acuminate just anterior to fastigium. Frons weakly laterally bowed, narrowest just below fastigium, widest at medlength. Frons slightly wider at frontoclypeal suture than at fastigium. Postclypeus with distinct median carina. Lateral ocelli conspicuous just above ventral anterior margin of compound eye. Antennal length about 0.5x width of head (including eyes); segment I slightly longer than 0.5x length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts are 2, 3, 3, 2). Apex of segment II bearing a circular row of 5 smaller sensory pits. Pronotum at midlength subequal to length of vertex, lateral carinae curved laterad, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel. Median carinae of mesonotum becoming obsolete prior to scutellum. Tegulae conspicuous. Calcar approximately 3/4 length of basitarsus,

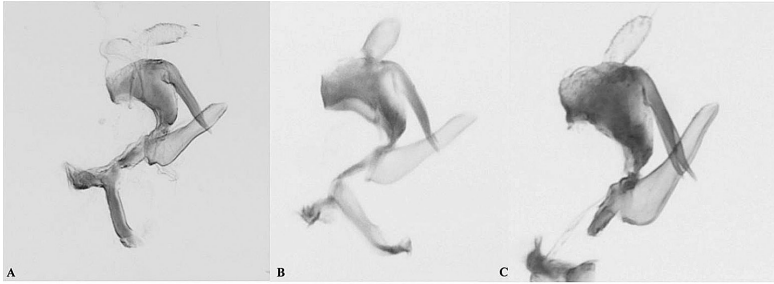


Fig. 19. Variation in the aedeagal complex, lateral view, of *Metadelphax propinqua* within the southeastern United States. A. North Carolina, B. Tennessee, C. Florida.

tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing ca. 15 small, black-tipped teeth on outer margin (these becoming reduced near apex) plus smaller apical tooth; outer margin slightly convex, inner margin nearly straight. *Brachypter*. Similar to macropter except mesonotum subequal to head plus pronotum length. Length of tegmina slightly variable from nearly reaching end of abdomen to extending just beyond; tegmina apices broadly rounded, veins with setae-bearing projections.

Genitalia. Pygofer opening subequal in length and width, margins rounded, lateral angles obscure. In caudal view, with caudal expansions on dorsolateral margins, notched apically, directed medially. In lateral view, dorsocaudal margins strongly produced, posterior margin angled dorsocaudally. Diaphragm developed, produced dorsocaudally in dorsal view, appearing convex with apicolateral projections in ventrocaudal view. Parameres appearing flattened, diverging, widest basally in broadest view; basal angle weak; lateral margins lacking projections; margins narrowest subapically; apex with acutely rounded inner and outer apical angles, appearing straight to slightly concave. Aedeagus terete, directed dorsocaudally, opening sub-dorsoapically; margins nearly straight for entire length; aedeagal teeth subapical, in row of ca. 5-6 weakly to well-developed teeth; teeth originating near margin of orifice on right dorsolateral margin, directed over the dorsal margin and terminating behind the orifice on the left dorsolateral margin. Segment X with 2 ventrally directed processes, diverging in basal 1/3 and directed caudally, closely approximated basally.

Remarks.— Fieber (1866: 525) described this species based on specimens from Triest (Italy), Malaga (Spain) and Austria. Fieber did not indicate the number of specimens examined from these localities. A lectotype has evidently not been designated. Specimens at the Natural History Museum Vienna that appear to be identified by Fieber consist of four specimens that do not bear locality labels, but only "Ullr." for the collector (Ullrich), and these are likely to be from Austria (Herbert Zettel, Natural History Museum Vienna, *pers. comm.*). The remaining specimens appear to be in the National Museum of France among the Lethierry/Nouahlier collections, which contain syntypes of Fieber material (Thierry Bourgoin, Muséum National d'Histoire Naturelle, Paris, France, *pers. com.*). At the MNHN, there are three specimens from Malaga (bearing a green small quadrate label that usually indicates syntypes from Fieber), and 2 with illegible labels

“Stau...ms” (one macropter, one brachypter), which may be the specimens from Trieste (T. Bourgoin, *pers. com.*).

Metadelphax propinqua exhibits variation in the shape of the parameres, the number of aedeagal spines and their placement, and details of the shape of the genital diaphragm (e.g., Teson and Remes Lenicov 1989). The wide distribution of this species along with variation in some of the morphological details has apparently led to this species being described multiple times (i.e., Muir, 1917, 1919; Muir & Giffard 1924, Haupt 1935, Ishihara 1949). In particular, we have observed a very strongly developed diaphragm armature on specimens from Florida, Louisiana and Texas. *Metadelphax propinqua* also utilizes a variety of hosts, many of which occur widely over its pantropical distribution (Table 3).

Metadelphax propinqua is commonly encountered and broadly distributed throughout the tropical and temperate zones of the Old and New World, although it evidently occurs more sparsely in the higher latitudes. This species has been suggested to support its distribution through migratory flights (Giustina and Remane 1992). Holzinger et al (2003) noted that macropters disperse long distances. It is possible that *M. propinqua* was introduced into the New World concurrently or after the invasive weed *Cynodon dactylon* (Bermudagrass) was introduced and the current broad distribution of this species may result from accidental introduction of *M. propinqua* with its preferred hosts, along with high dispersal abilities and broad host amplitude. Distribution records of *Metadelphax propinqua* are abundantly reported in the literature, and we have not attempted to concatenate all records from the Old World, but report broader geographic regions plus localities of the specimens we examined.

A detailed life history of *M. propinqua* was given by Raatikainen and Vasarainen (1990). Remes Lenicov and colleagues (1997) described the preimaginal stages and added behavioral notes as observed under a laboratory setting. The effects of *M. propinqua* feeding were reported by Raatikainen and colleagues (1994). Wilson and colleagues (1973) and Buntin (1988) described the seasonal occurrence of *M. propinqua* on *Cynodon dactylon* (L) Pers. from Louisiana (USA) and Georgia (USA) respectively, including data on abundance and density. Raatikainen and Vasarainen (1990) suggested that *M. propinqua* is polyphagous on grasses and may use a variety of species for oviposition.

While there is no substantive evidence that *M. propinqua* is a major agricultural threat, it does vector at least 2 plant diseases. Brcak (1979) reported it as a vector of maize rough dwarf disease (MRDV) in Israel. MRDV is also reported from Argentina and transmitted by *Delphacodes kuscheli* Fennah (March et al. 1995), in co-occurrence with *Metadelphax argentinensis* and *Metadelphax propinqua* (Grilli & Gorla 1999). *Metadelphax propinqua* is also a vector of *Cynodon* chlorotic streak virus in *Cynodon dactylon* (Lockhart et al. 1985), potentially resulting in substantial yield reductions (Hawkins et al. 1979).

We examined the type specimens of *Liburnia terminalis* Van Duzee, 1907, *Liburnia tuckeri* Van Duzee, 1912, and *Delphacodes subfusca* Muir, 1919, and concur with Muir and Giffard (1924: 31) that these are all junior synonyms of *Metadelphax propinqua*.

Reported hosts.— See Table 3.

Distribution.— NEW WORLD: Antigua, Argentina, Bahamas, Barbados, Belize, Bernuda, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana,

Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Puerto Rico, Peru, St. Croix, St. Thomas, St. Vincent, Suriname, Trinidad and Tobago, USA (AZ, AR, CA, DE, FL, GA, KS, KY, LA, MD, MS, NC, SC, TN, TX, UT, WA), Venezuela. OLD WORLD: Australia, Cyprus, Egypt, Ethiopia, India, Israel, Ivory Coast, Japan, Kenya, Kyrgyzstan, Libya, Madagascar, Morocco, Niger, Northern Mariana Islands, Palau, Rhodesia, Thailand, Turkey, United Arab Emirates, Uzbekistan, Zambia, Zimbabwe. Also Reported: CANADA: British Columbia (Hamilton 1998). Widespread in Palearctic (e.g. Nast 1972, 1987; Holzinger et al. 2003); Afrotropics (e.g. Fennah 1969a, Asche 1988), Australia (Fennah 1965b), and Indomalayan (e.g., Ishihara 1949, Lee 1979, Yang 1989, Ding 2006) regions.

Type material observed.— *Delphax propinqua* Fieber, 1866. Lectotype (here designated) (NHMW, macropterous male); specimen glued to small paper square: “U1021lr. [typed, italics] // propinqua [handwritten] / det. Fieber [typed] // LECTOTYPE / Delphax / propinqua”.

Liburnia terminalis Van Duzee, 1907. Lectotype (CASC, macropterous male). “Kingston / Ja.Apr.06// Van Duzee / Collector // Lectotype / terminalis [red paper] // Figd [handwritten] // male // California Academy / of Sciences / type / no. / 3061”.

Delphacodes subfusca Muir, 1919. [Holo]type (BPBM, macropter, abdomen missing). “Type [round label, red margin] // Demerara R./ Brit. Guiana / 20 III 1913 / F. Muir Coll./ B.M.1932-279.// Delphacodes / subfusca / muir [handwritten] / Holotype [red paper, pasted on right of label, reading top to bottom from left]// Delphacodes / subfusca, / muir [handwritten]/ det.R.J.Izzard 1936”.

Liburnia tuckeri Van Duzee, 1912. Lectotype (CASC, macropterous male). “StPetersbg/ Fla. 4.28.08 / Van Duzee// Lectotype / tuckeri [red paper]// EPVanDuzee / Collection // Pygophor of This / specimen figured / W.M.G. [handwritten, = Giffard] // male gen. Slide No 4 / series III/ *Liburnia tuckeri* VD. / det Van Duzee / Holotype / St Petersburg, Florida / 28.IV.08. VDColl. / W.M.G. [handwritten]// California Academy / of Sciences / Type / No. / 3081”.

Metadelphax wetmorei (Muir and Giffard, 1924) new combination

Figs. 3 G-H, 5 C, 20 A-G

Megamelus terminalis Crawford, 1914: 623 [nec. Van Duzee 1907] [Unavailable, preoccupied].

Delphacodes wetmorei Muir and Giffard, 1924: 30, fig. 33, 104 (Replacement name for unavailable *Megamelus terminalis* Crawford, 1914).

Type locality.— Ft. Lauderdale, FL.

Diagnosis.— Length male macropter, 2.93 (2.83-3.02); brachypter, none observed. *Color.* *Macropter.* General body color yellowish tan. Carinae on frons very pale with solid darkened intercarinal regions. Intercarinal region proximal to arms of Y-shaped carina of vertex and anterior to M-shaped carina pale. Antennal segments I and II pale with dark margins apically on segment I and basally on segment II. Pronotum pale, carinae and margins concolorous. Tegulae pale. Mesonotum nearly as pale as pronotum, carinae and posterior margin paler. Coxae slightly darker than general color, pleural regions medium to dark brown. Wings weakly fuscous, veins darker. Legs pale, occasionally darker between lateral margins, pygofer brown.

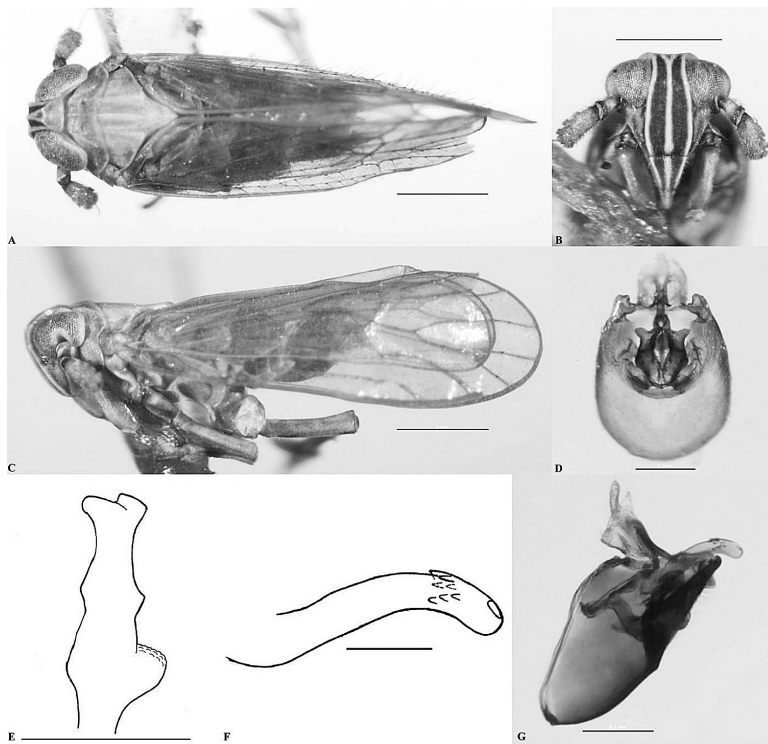


Fig. 20. Features of *Metadelphax wetmorei* (A-C. Georgia, D. North Carolina, E-G Florida). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere, widest view (scale = 0.2 mm), F. Lateral view of aedeagus (scale = 0.1 mm), G. Lateral view of pygofer (scale = 0.2 mm).

Structure. Macropter. Head narrower than pronotum, eyes extending slightly over 1/2 length beyond posterior margin of vertex. Vertex slightly longer than wide at midlength. Stem of Y-shaped carina of vertex developed but indistinct, other carinae of head pronounced. Arms of submedian carina meeting acuminate at fastigium. Frons slightly laterally bowed, narrowest just below fastigium, widest 0.25x length from postclypeus. Frons wider at frontoclypeal suture than at fastigium. Postclypeus with distinct median carina. Lateral ocelli conspicuous just above ventral anterior margin of compound eye. Antennal length about 0.5x width of head (including eyes); segment I slightly longer than 0.5x length II, II bearing longitudinal rows of sensory pits extending distally to proximally, absent on ventral surface (pits in 4 rows, from leading to trailing edge, row counts are 2, 3, 3, 2). Apex of segment II bearing a circular row of 5 smaller sensory pits. Pronotum at midlength subequal to length of vertex, lateral carinae curved laterad, becoming obsolete prior to reaching hind margin; median carina reaching hind margin. Mesonotum about 1.25x longer than length of pronotum plus head; lateral carinae subparallel, slightly diverging posteriorly. Median carinae of

mesonotum becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately $3/4$ length of basitarsus, tectiform, slightly thickened medially, narrowing distally to acuminate apex, bearing ca. 25-28 small, black-tipped teeth on outer margin (these becoming reduced near apex) plus small apical tooth; outer margin slightly convex, inner margin nearly straight.

Genitalia. Pygofer opening slightly longer than wide, margins rounded, lateral angles obscure. In caudal view, with caudal expansions on dorsolateral margins, notched apically, directed medially. In lateral view, dorsocaudal margin strongly produced, posterior margin angled dorsocaudally. Diaphragm developed, produced dorsocaudally in dorsal view, appearing convex with apicolateral projections in ventrocaudal view. Parameres flattened, subparallel, widest basally in broadest view; basal angle produced; lateral margins with a small basal and median projection on outer margin, small median projection on inner margin; margins narrowest subapically; apex with rounded inner and outer apical angles, appearing notched medially. Aedeagus terete, directed dorsocaudally, opening dorsoapically; apical $1/3$ bent, directed caudoventrally, appearing wider than basal $2/3$; aedeagal teeth subapical, in rows; row of ca. 3 subapical teeth on lateral margin of left side directed diagonally from proximal super-basal origination apically; row of ca. 4 subapical teeth originating anterior to aedeagal opening on dorsolateral margin of left side, in semicircular pattern directed proximally, terminating on dorsolateral margin of right side. Segment X with 2 ventrally directed processes, diverging near midlength and directed caudally, closely approximated basally.

Remarks.— *Metadelphax wetmorei* is placed in *Metadelphax* based upon the expansion of the pygofer and the presence of the bifurcated armature of the diaphragm. Within the specimens examined, we observed little variation in the origin of the ca. 7 aedeagal teeth, although the teeth ranged from small and weakly developed to more evident. *Metadelphax wetmorei* most closely resembles *M. dentata* n. sp. These species differ most in the apical angles of the parameres, with the outer angle of *M. wetmorei* evident, but strongly reduced in *M. dentata*. Muir and Giffard (1924) report *M. wetmorei* from Nicaragua based on Crawford (1914). We have examined 2 specimens from the paratype series used by Crawford and have determined that it is not *M. wetmorei*, but instead, *M. dentata* n. sp. Therefore, it appears that the ranges of *M. wetmorei* and *M. dentata* may not overlap.

Metadelphax wetmorei consistently exhibits entirely dark intercarinal regions in comparison to *M. propinqua* that often has pale intercarinal regions with dark borders on the frons. Variation of this feature has been observed in both species; however, this should not be used as a definitive species recognition feature. No females of *M. wetmorei* are cited in this study as their separation from *M. propinqua*, *T. idonea*, and other species is unreliable. Brachyptery, while expected from nearly all delphacid species, was not observed in *M. wetmorei*.

Reported hosts.— None.

Distribution.— USA (FL, GA, LA, NC).

Type material observed.— Holotype (USNM, macropterous male ;Genitalia embedded in balsam between cover slips held within card stock): “*Delphacodes / wetmorei / male* M. G. [hand written]// Fort Lauderdale / Feb. 19. 1919, Fla. // A Wetmore / Collector // *Delphacodes /wetmorei / Muir & Giffard / Holotype* [red paper, pasted perpendicular, reading top to bottom from left].”

HADROPYGOS, new genus

Type species.— *Hadropygos rhombos*, n. sp.

Etymology.— The generic name is formed from “*hadros*” (Greek; adjective) meaning well-developed, stout, combined with “*pygos*” (Greek; noun; masculine) meaning rump.

Diagnosis.— *Color*. General body color light brown, carinae paler than body, median carinae of mesonotum, pronotum and stem of Y-shaped carinae forming narrow vitta. Intercarinal regions of frons deeply infusate. Wings diffusely infusate, particularly along trailing margin.

Structure. Head narrower than pronotum, eyes projecting posteriorly beyond vertex 0.5x their length. Carinae of head conspicuous, except stem of Y-shaped carina of vertex; submedian carinae joining acuminate just above fastigium. Front parallel-sided. Antennal length slightly over 0.5x width of head, segment I about 1/2 length II. Pronotum lateral carinae approximately reaching posterior margin. Wings rounded at apex; extending over 0.5x their length beyond abdomen. Male pygofer with dorsal margins greatly expanded caudally and medially, folded into broad dorsomedially directed projections. Calcar tectiform, narrowed apically, inner margin rather straight, outer margin slightly convex bearing many small black-tipped teeth.

Genitalia. Parameres broad, flattened, slightly twisted such that cephalad surfaces are exposed medially near apex; basal, inner and outer angles all obscure. Diaphragm of pygofer narrow, armature greatly produced, arrowhead-shaped, caudal margin with longitudinal carina. Aedeagus laterally flattened in cross-section, armed with subapical teeth. Segment X with pair of long ventrally directed processes, arising along dorsal margin in lateral view; slightly approximated at base, diverging apically.

Remarks.— The definitive features for this genus are the striking expansion of the dorsocaudal margin of the pygofer, and the rhomboid (arrowhead- or diamond-shaped) genital diaphragm. The form of the parameres and the aedeagus is also different from that seen in *Toya* and *Metadelphax*, as is the diffuse patterning of the wings. The expansion of the pygofer and the general nature of the body coloration, however, suggest that this genus may be phylogenetically close to *Toya* and allies.

In addition to the described species, a second species was located based on a single specimen from light trap material from Panama (10 xi 52 FS Blanton, 1m male, USNM). The specimen was deemed to be of inadequate quality to describe at this time. This specimen has the apices of the parameres with a hooked appearance, and differences in details of the aedeagus.

Hadropygos rhombos, new species

Figs. 1 C, 3 I-J, 5 D, 21 A-G

Type Locality.— Bolivia, Santa Cruz Dept., 3.7 km SSE Buena Vista.

Diagnosis.— *Length* male macropter, 3.85 (3.61-3.86, n=2); brachypter, none observed. *Color*: *Macropter*. General body color light brown. Carinae of head paler than body, intercarinal regions of frons and postclypeus deeply infuscate, lightly infuscate anterior to subantennal suture, but paler posterior. Antennae pale, darkened at junction of segments I and II. Pronotum and mesonotum light brown, paler along carinae, mesoscutellum entirely pale; pale median carinae of mesonotum, pronotum and stem or Y-shaped carinae of vertex forming vitta. Pleural regions brown. Tegmina diffusely infuscate along trailing half, more broadly near wing apex including veins anterior to Sc on leading margin of wings; veins brown, except clear near proximal leading edge. Legs including coxae tan, pale. Pygofer brown, variably paler on posterior and adjacent ental regions.

Structure. *Macropter*. Head narrower than pronotum, eyes extending for 1/2 length beyond posterior margin of vertex. Stem of median Y-shaped carina of vertex weak, other carinae of head pronounced. Vertex slightly longer than wide at midlength. Arms of Y-shaped carina meeting acutely just above fastigium. Frons parallel-sided, very slightly wider near ventral margin of eyes. Postclypeus with distinct median carina. Pale lateral ocelli conspicuous at ventral anterior margin of compound eye. Antennal segment I approximately 0.5x length II, II bearing sensory pits in irregular longitudinal rows, extending distally to proximally, absent on ventral surface (pits in 4 rough rows, from leading to trailing edge, row counts are 2, 3-4, 3-4, 2). Pronotum at midlength approximately equal to vertex, lateral carinae diverging, nearly reaching hind margin; median carina reaching hind margin. Mesonotum 1.4x longer than length of pronotum plus head, lateral carinae subparallel, slightly diverging posteriorly; median carinae becoming obsolete on scutellum. Tegulae conspicuous. Calcar approximately 2/3 length of basitarsus, tectiform, slightly thickened medially, narrowing distally, bearing many black-tipped teeth on outer margin (25 on holotype) plus apical tooth; inner and outer margins slightly convex.

Genitalia. Pygofer opening about as long as wide, margins of opening with rounded carinae, lateral angles obsolete. In lateral view, pygofer greatly produced on dorsocaudal margin, with apices of caudal expansions broadly bent medially, than dorsomedially, acutely tapered to blunt dorsomedially directed apices. Diaphragm of pygofer narrow, armature greatly produced, arrowhead-shaped, caudal margin with longitudinal carina. Parameres broad, flattened, slightly twisted such that cephalad surfaces are exposed medially near apex; basal, inner and outer angles all obscure. Aedeagus laterally flattened in cross-section, in caudal view slightly flattened in basal third, strongly flattened in apical 2/3; in lateral view very slightly curved dorsad near midlength, dorsal and ventral margin slightly sinuate, approximately equal in width in basal 3/4, then tapered to rounded apex, armed with few scattered subapical teeth plus row of subapical teeth, crossing dorsum in diagonally oriented inverse horseshoe-shape; genital orifice apical. Segment X with pair of long ventrally directed processes, arising along dorsal margin in lateral view; slightly approximated at base, widely diverging apically. *Brachypter*. None observed.

Remarks.— The greatly enlarged dorsocaudal margin of the pygofer and the

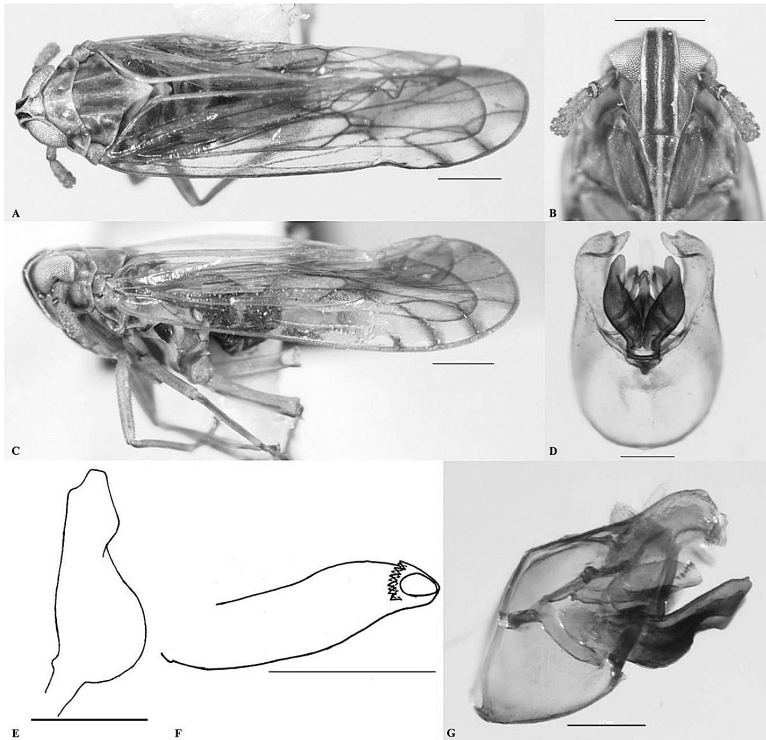


Fig. 21. Features of *Hadropygos rhombos* (A-C, E-F, paratype, D, G, holotype). A. Dorsal habitus (scale = 0.5 mm), B. Frons (scale = 0.5 mm), C. Lateral view (scale = 0.5 mm), D. Caudal view of pygofer (scale = 0.2 mm), E. Left paramere (scale = 0.2 mm), F. Lateral view of the aedeagus (scale = 0.2 mm), G. Lateral view of pygofer (scale = 0.2 mm).

prominent diamond-shaped armature of the genital diaphragm distinguish this genus from all other New World Delphacini. *Hadropygos* is clearly less closely related to *Toya* and *Metadelphax* than these genera are to each other, although substantiation of the relationship among genera of the Delphacini awaits detailed examination.

Reported hosts.— None.

Etymology.— The specific name “*rhombos*”, from Greek (noun; masculine) meaning an equilateral parallelogram with unequal pairs of angles, refers to the diamond-shaped form of the armature of the genital diaphragm.

Distribution.— Bolivia.

Type material observed.— Holotype (Here designated, USNM, macropterous male): “Bolivia, Santa Cruz / Dept. 3.7kmSSE Buena / Vista, Hotel Flora y Fauna / 430km 17°29’S 63°33’W / MC Thomas 14-28.x.2000 (male macropter, deposited USNM)”. Paratypes: Same data (5m males, 1 USNM, 2 UKYL, 2 UDCC).

Species excluded from *Toya*

Primary types of *Delphacodes fallax* Muir, 1926; *D. dolosa* Muir, 1926; *D. banosensis* Muir, 1926; and *D. gluciophila* Muir 1926, were examined because of superficial similarities to *Toya*, but did not fit within the genera revised here. Primary types of all four species are at BPBM. *Delphacodes fallax* and *Delphacodes dolosa* lack the inflection of the dorsocaudal expansion of the pygofer and have elongate, spoonlike genital diaphragm armature, and are here referred to *Syndelphax* (Table 4). The primary types of *Delphacodes banosensis* and *Delphacodes gluciophila* were also examined, but these taxa were found to be allied with *Delphacodes puella* (Van Duzee 1897), and similar to the genera *Isodelphax* Fennah, 1963, and *Chionomus* Fennah, 1971a, but can not be placed until these genera and allied *Delphacodes* are revised.

SUMMARY AND DISCUSSION

The New World genus *Toya* consists of 7 species, with 5 species in *Metadelphax* and a single species of *Hadropygos*. A single specimen of second species of *Hadropygos* was observed from Panama, but was not considered adequate to describe at this time. It is likely that additional species of *Metadelphax* and *Toya* remain to be discovered in the New World. The phylogenetic relationships among these genera and *Syndelphax* are unclear and requires investigation, preferably in the context of a world revision of *Toya*. It is our hope that this revision will facilitate such a project.

The original motivation for this study was to place specimens collected during the Great Smoky Mountains National Park All Taxa Biotic Inventory. During the course of this investigation, one of those specimens was discovered to be *Toya idonea*, which was not anticipated from the Park, and the others were in fact *Metadelphax propinqua*.

The zoogeography of *Metadelphax propinqua* is enigmatic. It is pandemic throughout the tropical and south temperate regions, with fewer specimens observed from the higher latitudes. Its primary host, *Cynodon dactylon*, is not native to the New World (introduced to America in 1751 or earlier; Weintraub 1953: 22), and it is a possibility that *Metadelphax propinqua* was introduced to the New World. The invasive nature of *Cynodon dactylon* probably facilitated adventive dispersal in *M. propinqua*, ultimately resulting in the range we see today. Records from 1918 (CA), 1913 (GA), and 1910 (FL) suggest that if this species were introduced, it would have been at least a century ago. The paucity of more northern records might suggest that this species does not persist well in the north, as suggested by Holzinger and colleagues (2003) for central Europe.

While the hosts of *Hadropygos* are unknown at this time, it appears that the primary hosts of *Toya* and *Metadelphax* are grasses. Most commonly noted are grasses in the Paniceae (Poaceae: Panicoideae), Andropogoneae (Poaceae: Panicoideae), and Cynodonteae (Poaceae: Chloridoideae). Reported hosts not within the Poaceae are likely to be spurious, probably the result of the true host's proximity to the plant from which specimens were collected.

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Table 1. Summary of world *Toya* species. Names used as valid since Metcalf 1953; species epithets in **bold** currently placed in *Toya*. Biogeographic regions: AFR=Afrotropical, AUST=Australia, NEA=Nearctic, NEO=Neotropical, IND=Indomalayan, PAL=Palearctic.

Specific epithet and author (original genus when not <i>Toya</i>)	Synoptic Distribution	Comments
<i>actaeon</i> (Fennah, 1958) (<i>Delphacodes</i>)		Moved to <i>Toya</i> by Linnavouri 1973: 107.
<i>albicollis</i> (Motschulsky, 1863) (<i>Delphax</i>)		See Vilbaste (1968: 37). Possibly error for <i>albicollis</i> Haupt, 1935 (junior syn of <i>M. propinqua</i>); Current combination <i>Opiconsiva albicollis</i> (Motschulsky) by Fennah 1975: 112
<i>argentinensis</i> (Muir, 1929a) (<i>Delphacodes</i>)	NEO: Argentina (Teson et al. 1989)	Here moved to <i>Metadelphax</i>
<i>attenuata</i> Distant, 1906	ORI: Sri Lanka, Taiwan (Metcalf 1943, Fennah 1975), China (Ding 2006)	Type of genus
beninu Fennah, 1975	ORI: Sri Lanka (Fennah 1975)	
<i>boxi</i> (Muir and Giffard, 1924) (<i>Delphacodes</i>)	NEO: British Guiana (Fennah 1965a)	Placed in <i>Toya</i> by Fennah, 1965a: 96
<i>bridwelli</i> (Muir, 1920) (<i>Delphacodes</i>)	AFR: Nigeria, Senegal, Sudan, Ivory Coast; ORI: Taiwan, China (Metcalf 1943, Fennah 1958, Linnavouri 1973, Medler 1980, Asche 1988, Yang 1989, Ding 2006)	Here reinstated into <i>Toya</i> from <i>Metadelphax</i>
<i>camena</i> Fennah, 1969a		Placed in <i>Partoia</i> Asche by Asche (1988: 200)
<i>canidia</i> Fennah, 1969a	AFR: Sudan (Fennah 1969a, Linnavouri 1973, Nast 1975)	
<i>ceresensis</i> (Muir, 1929b) (<i>Delphacodes</i>)	AFR: South Africa, Cape Verde Is., Sudan, Nigeria, Ivory Coast (Muir 1929b, Lindberg 1958, Linnavouri 1973, Medler 1980, Asche 1988)	Placed in <i>Toya</i> from <i>Delphacodes</i> by Linnavouri 1973: 107
<i>complexa</i> (Muir, 1929b) (<i>Delphacodes</i>)	AFR: South Africa, Natal (Metcalf 1943, Uganda, Ethiopia (as Abyssinia) (Fennah 1969a)	Placed in <i>Toya</i> by Fennah (1969a: 46)
<i>cularo</i> Fennah, 1975	IND: Sri Lanka (Fennah 1975)	
<i>demphoon</i> Fennah, 1963	IND: Cameroon, Ethiopia (as Abyssinia), Nigeria (Fennah 1963, 1969a; Linnavouri 1973, Medler 1980)	
<i>dryope</i> (Kirkaldy, 1907) (<i>Delphax</i>)	AUST: Australia, New Zealand, Samoa New Caledonia, Loyalty Is. (Metcalf 1943, Fennah 1965b, 1969a)	Placed in <i>Toya</i> by Fennah (1965b: 56)

<i>epimelas</i> (Fennah 1958) (<i>Delphacodes</i>)		Placed in <i>Toya</i> by Linnavouri (1973: 107), moved to <i>Rhombotoya</i> by Asche 1988: 204.
<i>euonymus</i> Fennah, 1965b		Listed in <i>Syndelphax</i> by Fennah, 1975: 109-110.
<i>fulva</i> (Yang, 1989) (<i>Sogatella</i>)	IND: Taiwan (Yang 1989; Asche and Wilson 1990)	Moved from <i>Sogatella</i> to <i>Toya</i> by Asche and Wilson (1990: 7)
<i>fusca</i> Melichar, 1914	IND: Java (Metcalf 1943)	
<i>hargreavesi</i> (Muir 1929b) (<i>Delphacodes</i>)		Placed in <i>Toya</i> by Linnavouri 1973: 107; current combination, <i>Spinidelphacella hargreavesi</i> (Muir) by Asche 1988: 212-213
<i>hedai</i> (Kuoh, 1977) (<i>Sogatella</i>)		Moved from <i>Sogatella</i> to <i>Toya</i> by Asche and Wilson (1990: 7); Junior synonym of <i>T. attenuata</i> Distant (Ding 2006: 504)
<i>hessei</i> (Muir, 1929b) (<i>Delphacodes</i>)	AFR: South Africa, French Guiana (Metcalf 1943, Fennah 1958, Asche 1988)	Placed in <i>Toya</i> by Fennah (1964: 142)
<i>hispidula</i> (Lindberg, 1954) (<i>Calligypona</i>)	PAL: Canary Is., Egypt, Madeira Archipelago, Morocco, Sudan (Nast 1972, Linnavouri 1973, Nast 1975, Asche 1980)	Placed in <i>Toya</i> by Nast (1975: 6)
<i>hispijimana</i> Asche, 1980		Junior synonym of <i>Toya tuberculosa</i> (Distant) by Asche (1988: 224-226)
<i>iaxartes</i> (Fennah, 1959) (<i>Delphacodes</i>)	NEO: St Lucia (Fennah 1959 1965a)	Placed in <i>Toya</i> by Fennah, 1965a: 96; , Here moved to <i>nomen dubium</i>
<i>ibiturca</i> Asche, 1980	PAL: W. Turkey (Asche 1980), France (Giustina and Remane 1999, 2001)	
<i>larymna</i> Fennah, 1975	IND: Sri Lanka (Fennah 1975), China (Ding 2006)	
<i>lazulis</i> (Kirkaldy, 1907) (<i>Delphax</i>)	AUST: Queensland (Metcalf 1943, Fennah 1965b)	Placed in <i>Toya</i> by Fennah (1965b: 58)
<i>lima</i> (Yang, 1989) (<i>Sogatella</i>)	IND: Taiwan (Yang 1989)	Moved from <i>Sogatella</i> to <i>Toya</i> by Asche and Wilson (1990: 7)
<i>limbata</i> Emeljanov, 1972		Placed in <i>Herbalima</i> Emeljanov, 1972 by Emeljanov 1977: 117 [see also Emeljanov 1988]
<i>lyraeformis</i> (Matsumura, 1900) (<i>Liburnia</i>)	IND: Korea (Lee 1979); China (Kuoh et al. 1983)	Placed in <i>Toya</i> by Fennah 1971b. Placed in <i>Falcotoya</i> by Fennah, 1969b: 21.
<i>mahensis</i> (Distant, 1917) (<i>Nilaparvata</i>)	AFR: Seychelles (Indian Ocean) (Metcalf 1943), Mauritius, Ghana (Fennah 1964)	Placed in <i>Toya</i> by Fennah (1964: 141)
<i>mamura</i> Fennah, 1969a	AFR: Ethiopia (as Abyssinia) (Fennah 1969a)	
<i>mandonius</i> Fennah, 1969a	AFR: Sudan (Fennah 1969a, Linnavouri 1973)	
<i>mastanabal</i> Fennah, 1969a	AFR: Ethiopia (as Abyssinia) (Fennah 1969a)	

<i>menedemus</i> Fennah, 1969a	AFR: Sudan (Fennah 1969a, Linnavouri 1973)	
<i>minutula</i> (Melichar, 1903) (<i>Liburnia</i>)	IND: Sri Lanka (Metcalf 1943, Fennah 1975)	Placed in <i>Toya</i> by Fennah (1975: 117)
<i>minuscula</i> (Horváth, 1897) (<i>Delphax</i>) 1972: 79		Placed in <i>Falcotoya</i> by Emeljanov
<i>narcissus</i> Fennah, 1969a	AFR: Sudan (Fennah 1969a, Linnavouri 1973)	
<i>nigeriensis</i> (Muir 1920) (<i>Megamelus</i> as <i>M. furcifer</i> (sic) <i>nigeriensis</i>)		Placed in <i>Toya</i> by Linnavouri 1973: 107; current combination, <i>Sogatella nigeriensis</i> (Muir) by Asche and Wilson (1990: 7, 13)
<i>obtusangula</i> (Linnavouri, 1957) (<i>Calligypona</i>)	PAL: Cyprus, Israel, Italy, Egypt (Nast 1972, Dlabola 1974, Nast 1975, Asche 1980)	Placed in <i>Toya</i> by Dlabola 1974: 290
<i>peruda</i> Fennah, 1975	IND: Sri Lanka (Fennah 1975)	
<i>propinqua</i> (Fieber, 1866) (<i>Delphax</i>)	Widespread in Neotropical, Nearctic, Palearctic, Afrotropical, and Indomalayan regions (e.g., Metcalf 1947, Caldwell and Martorell 1951, Schiemenz 1970.: Nast 1972, Lodos and Kalkandelen 1980, Yang 1989, Holzinger et al. 2003, Ding, 2006)	Reinstated to <i>Metadelphax</i> by Ding (2006: 511, 513)
<i>salambo</i> Fennah, 1964	AFR: Madagascar (Fennah 1964)	
<i>sapporonis</i> Matsumura 1935		Current combination <i>Kakuna velitchkovskiyi</i> (Melichar, 1913) by Anufriev, 1977: 861
<i>siaka</i> Fennah, 1975	IND: Sri Lanka (Fennah 1975)	
<i>simulans</i> (Dlabola, 1958) (<i>Calligypona</i>)	PAL: USSR (Georgia, Kazakhstan, Tadzhikistan, Ukraine) (Nast 1972)	
sp. Jayanthi and Baskaran		Described, but not named, by Jayanthi and Baskaran 1989, 1990 on <i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen (as <i>Brachiaria mutica</i>). (Poaceae) Not clearly attributable to a named species.
<i>sporoboli</i> (Lindberg, 1958) (<i>Delphacodes</i>)		Placed in <i>Toya</i> by Linnavouri (1973: 107), moved to <i>Falcotoya</i> by Asche 1988: 174
<i>suezensis</i> (Matsumura, 1910) (<i>Delphax</i>)	PAL: Azores, Canary Is., Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Lebanon, Madeira Archipelago, Morocco, Ukraine, Yugoslavia (Nast 1972), Turkey (Lodos and Kalkandelen 1980)	Placed in <i>Toya</i> by Nast (1975: 5-6)
<i>superba</i> (Emeljanov, 1964) (<i>Chloriona</i>)	PAL: Kazakhstan (Nast 1972)	Placed in <i>Toya</i> by Emeljanov 1977: 117
<i>tangira</i> (Matsumura, 1910) (<i>Delphax</i>)	AFR: Morocco (Tangier) (Nast, 1975)	Placed in <i>Toya</i> by Nast (1975: 6-8); moved to <i>Corbulo</i> Fennah, 1965b, by Kwon 1982:7

<i>tateyamaella</i> (Matsumura 1935) (<i>Unkana</i>)	PAL: Japan (Honshu, Kyushu) (Nast 1972)	Placed in <i>Toya</i> by Anufriev 1975: 864; current combination <i>Himeunka tateyamaella</i> by Kuoh et al. 1981: 191
<i>terryi</i> (Muir, 1917) (<i>Liburnia</i>)	IND: China, Taiwan (Ding 2006)	<i>Toya terryi</i> (Muir) was synonymized with <i>T. tuberculosa</i> (Distant) by Fennah 1975: 117, however; Ding (2006: 506) reinstates <i>T. terryi</i> as a senior syn of <i>Sogatella fulva</i> Yang 1989, <i>S. lima</i> Yang 1989, and " <i>Toya tuberculosa</i> Fennah (nec Distant 1916)"
<i>thomasseti</i> (Muir, 1925) (<i>Delphacodes</i>)	AFR: Rodrigues Islands, (Mascarene Islands, Indian Ocean), Seychelles Is., Ghana, Sudan, Nigeria, Ivory Coast; St. Helena (Atlantic Ocean) (Metcalf 1943, Fennah 1964, 1969a, 1976; Linnavouri 1973, Medler 1980, Asche 1988)	Placed in <i>Toya</i> by Fennah (1964: 141)
<i>tricolorata</i> (Dlabola, 1961) (<i>Calligypona</i>)	PAL: USSR (Kazakhstan, Tadzhikistan) (Nast 1972)	Placed in <i>Toya</i> by Nast 1972: 65
<i>tuberculosa</i> (Distant, 1916) (<i>Liburnia</i>)	Widely distributed Indomalayan, Aftrotropical, southern Mediterranean regions, plus St. Helena (Metcalf 1943, Fennah 1975, Medler 1980, Asche 1980, 1988; Yang 1989)	Placed in <i>Toya</i> by Fennah (1975: 117), see also Fennah (1976: 269); Fennah (1975: 117) placed <i>Delphacodes terryi</i> Muir 1917 as junior synonym of <i>Toya tuberculosa</i> (Distant), but see Ding (2006)
<i>varia</i> (Hesse, 1925) (<i>Liburnia</i>)		Placed in <i>Toya</i> by Fennah (1964: 142); Jr. syn of <i>Toya tuberculosa</i> (Distant) by Fennah (1976: 269)
<i>venilia</i> (Fennah, 1959) (<i>Delphacodes</i>)	NEO: Montserrat, ?Puerto Rico (Fennah 1959), Guana Is., (Bartlett 2000), British Virgin Islands (Denno et al. 2001)	Placed in <i>Toya</i> by Fennah, 1965a: 96
<i>yanoi</i> (Ishihara, 1952) (<i>Sogata</i>)	PAL: Japan (Shikoku) (Nast 1972)	Placed in <i>Toya</i> by Nast 1972: 65

Table 2. Material examined, including primary types (females without associated males excluded).

	Macropters		Brachypters	
	male	female	male	female
<i>Hadropygus rhombos</i>	6	0	0	0
<i>Metadelphax argentinensis</i>	47	0	0	0
<i>Metadelphax dentata</i>	8	0	0	0
<i>Metadelphax pero</i>	1	0	0	0
<i>Metadelphax propinqua</i>	1299	491	68	65
<i>Metadelphax wetmorei</i>	21	0	0	0
<i>Toya attenuata</i>	1	0	2	0
<i>Toya boxi</i>	5	0	1	0
<i>Toya dietrichi</i>	3	2	0	1
<i>Toya goliai</i>	0	0	1	0
<i>Toya idonea</i>	122	0	15	0
<i>Toya nigra</i>	34	0	0	0
<i>Toya recurva</i>	3	0	0	0
<i>Toya venilia</i>	25	4	264	209
Totals	1575	497	351	275

Table 3. Summary of published host data for *Metadelphax propinqua* and synonyms with localities of host data.

Species name as published	Host(s)	Family: Subfamily: Tribe	Locality	Reference
<i>Delphacodes propinqua</i>	•"papaya foliage" (<i>Carica papaya</i> L.) grasses	Caricaceae Poaceae	Puerto Rico	Caldwell and Martorell, 1951
<i>Delphacodes propinqua</i>	• <i>Axonopus compressus</i> (Sw.) Beauv.	Poaceae: Panicoideae: Paniceae	Trinidad	Fennah, 1959
<i>Delphacodes graminicola</i>	• <i>Oryza sativa</i> L. • <i>Saccharum officinarum</i> L.	Poaceae: Ehrhartoideae: Oryzaceae Poaceae: Panicoideae: Andropogoneae	Taiwan (as Formosa) Japan	Ishihara, 1949
<i>Delphacodes propinqua</i>	• <i>Setaria italica</i> (L.) Beauv. • <i>Echinochloa crus-galli</i> (L.) Beauv. (as <i>Panicum crusgalli</i>)	Poaceae: Panicoideae: Paniceae Poaceae: Panicoideae: Paniceae		
<i>Delphacodes propinqua</i>	• <i>Cynodon dactylon</i> (L.) Pers. (as <i>Capriola dactylon</i>) • <i>Galinsoga parviflora</i> Cav. (as <i>Galinsoga hispida</i>)	Poaceae: Chloridoideae: Cynodoneae Asteraceae: Asteroideae: Heliantheae	Costa Rica	Ballou, 1936
<i>Metadelphax propinqua</i>	• <i>Cynodon dactylon</i> (L.) Pers. • <i>Digitaria violascens</i> Link • <i>Echinochloa crus-galli</i> (L.) Beauv. • <i>Miscanthus sinensis</i> Anders. • <i>Oryza sativa</i> L. • <i>Poa annua</i> L. • <i>Saccharum officinarum</i> L. • <i>Setaria italica</i> (L.) Beauv. • <i>Zoysia japonica</i> Steud.	Poaceae: Cynodoneae Poaceae: Panicoideae: Paniceae Poaceae: Panicoideae: Paniceae Poaceae: Panicoideae: Andropogoneae Poaceae: Ehrhartoideae: Oryzaceae Poaceae: Pooideae: Poaeae Poaceae: Panicoideae: Andropogoneae Poaceae: Panicoideae: Paniceae Poaceae: Chloridoideae: Cynodonteae	Japan	Mochida and Okada, 1971
<i>Toya propinqua</i>	• <i>Cynodon dactylon</i> (L.) Pers.	Poaceae: Chloridoideae: Cynodoneae	US	Wilson et al. 1973
<i>Toya propinqua</i>	• <i>Chloris gayana</i> Kunth	Poaceae: Chloridoideae: Cynodonteae	US	Meagher et al. 1993

Table 4. Nomenclatural acts proposed in this revision.

Previous name	New name or placement
<i>Delphacodes axonopi</i> Fennah 1945	<i>Toya nigra</i> (Crawford), new syn.
<i>Delphacodes dolosa</i> Muir 1926	<i>Syndelphax dolosa</i> (Muir)
<i>Delphacodes fallax</i> Muir 1926	<i>Syndelphax fallax</i> (Muir)
<i>Delphacodes idonea</i> Beamer 1947	<i>Toya idonea</i> (Beamer)
<i>Delphacodes nigra</i> (Crawford 1914)	<i>Toya nigra</i> (Crawford)
<i>Delphacodes wetmorei</i> Muir and Giffard 1924	<i>Metadelphax wetmorei</i> (Muir and Giffard)
<i>Metadelphax bridwelli</i> (Muir 1920)	<i>Toya bridwelli</i> (Muir) (reinstated combination)
<i>Syndelphax pero</i> Fennah 1971a	<i>Metadelphax pero</i> (Fennah)
<i>Toya argentinensis</i> (Muir 1929a)	<i>Metadelphax argentinensis</i> (Muir)
<i>Toya iaxartes</i> (Fennah 1959)	<i>Nomen dubium</i>

New Taxa

- Hadropygos* n. g.
Hadropygos rhombos n. sp.
Metadelphax dentata n. sp.
Toya dietrichi n. sp.
Toya goliai n. sp.
Toya recurva n. sp.

APPENDIX

SPECIMENS EXAMINED

Metadelphax argentinensis

COLOMBIA: Palmira, Valle, 31 May, 1971, 1006M, 244, G. P. Walbauer (2m male, INHS); same, 23 June, 1971, 1006M, 295, (1m male, INHS). **VENEZUELA:** Apure, near San Fernando de Apure, 7°50'44"N 67°29'10"W, 20-VII-2000, blacklight trap, P.M. Freytag, M.A. Gaiani, Q. Arias, (1m male, UKYL). **BRAZIL:** RO Fazenda, Rancho Grande, 62km S. Ariquemes, 26.XI.1991, S.L. Heydon, mercury vapor (1m male, UCDC); Nova Teutonia Sta. Catharina, April 1958, FPlaumann (1m male, NCSU). **PERU:** Junin, San Ramon, 800m, 11°7'15"S 75°21'13"W, 17 Oct 2002, C. Dietrich & R. Rakitov, merc. vapor light, 02-17-1 (2m males, INHS); Tingo Maria, VII-10-1968, C.W. & L.B. O'Brien (1m male, LBOB). **BOLIVIA:** Santa Cruz Dept., 3.7kmSSE Buena Vista, Hotel Flora y Fauna, 430m, 17°29'S 63°33'W, MC Thomas, 14-28.x.2000 (1m male, UKYL); S. Cruz, Saavedra Res. Sta. 3April, 1978 UV Trap, H. Serrate (6m males, LBOB); S. Cruz, Saavedra Res. Sta., 22 Mar. 1978UVtrap, CR Ward & CW O'Brien (8m males, LBOB); same, 27Mar. 1978 (1m male, LBOB); S.C. 10 mi W. Pto. Banegas, 25 March 1978, UV Trap, G.B. Marshall (3m males, LBOB); S.C., 10mi.W.Portachuelo, 26March 1978, UV trap, G.B. Marshall (1m male, LBOB); 9 mi. N. Santa Cruz, 28March 1978, UV trap, G.B. Marshall (1m male, LBOB); Cbb., Pto. S. Francisco, 19mi. NW. Villa Tunari, April 1, 1978, C.W. & L.B. O'Brien & G.B. Marshall (1m male, LBOB). **PARAGUAY:** Asuncion, at night, VII-5-1968, C.W. & L. O'Brien (1m male, LBOB). **ARGENTINA:** Tucuman, Jan-Mar 1941, K J Hayward, Lot41-16985 (10m males, USNM); same, I-III-1941 (5m males, USNM); P. Salta, Salta, X-23-1968, L&C.W. O'Brien (1m male, LBOB).

Metadelphax propinqua

New World:

USA: ARIZONA: Maricopa Co., Chandler, 3 Dec. 1977, V. M. Ford (1m male, USNM); Wickenburg, VII-5-1950, R. H. Beamer (4m males, SEMC); Tempe, Nov.16, 1910, VLWilderdmuth (4m males, USNM); [Pima Co.], Baboquivari Mts, VII-24-[19]41, R. H. Beamer (1m male, SEMC); Santa Cruz Co., Madera Cyn., 4880', VII-23-1963, Y. I. Vesterby (1m male, CDAE); Yuma Co., 30-x-31, EDBall (1m male, USNM). ARKANSAS: Johnson Co., Lake Dardanelle, 9-9-2003, CW.&LB.O'Brien (1m male, LBOB); Searcy Co., Aug. 29, 1950, RISailer (1m male, USNM). CALIFORNIA: [Contra Costa Co.] Antioch, 7-20-[19]35, R. H. Beamer (1m male, SEMC); Imperial Co., Mt Signal, 4-12-49, R. A. Flock (3m males, 1m female, CDAE); Calexico, 12-5-67, R. A. Flock, (2 specimens with "Bermuda" [grass] handwritten) (4m males, 8b males, 1m female, 1b females, CDAE); Calexico., 9-29-72, R. A. Flock (2m males, CDAE); Calexico, 10-2-47, R. A. Flock, *Aster spinosus* (1m male, CDAE); Calexico., 12-5-67, R. A. Flock (1m male, CDAE); Calexico., 11-3-59, K C Dickson (1m male, CDAE); Brawley, 10-23-67, R. A. Flock, ragweed (1m male, CDAE); Brawley, 11-30-67, R. A. Flock (2m males, 3b males, 1b females, CDAE); Brawley, 6-25-64, R. A. Flock (6m males, CDAE); Seeley, 5-2-67, R. A. Flock, *Hilaria* (1m male, CDAE); Seeley, 10-16-1986, R. Flock, ex grass in alfalfa (4m males, 1m female, CDAE) same, sorghum (2m males, CDAE); Seeley, Mt. signal, 1-18-68, R. A. Flock, *Hilaria rigida* (1m male, CDAE); Calipatria, 11-30-67, R. A. Flock, Bermuda [grass] (1m male, CDAE); Calipatria, 4-26-58, R. A. Flock (1m male, CDAE); same, 5-21-65, cotton (3m males, CDAE); same 11-30-67, Bermuda [grass] (1m male, CDAE); El Centro, 2-21-68, R. A. Flock, Alfalfa (1b males, CDAE); El Centro, 7-30-68, R. A. Flock, Bermuda grass (4m males, 1b males, CDAE); El Centro, 7-12-63, R. A. Flock (1m male, CDAE); El Centro, 11-16-54, R. A. Flock (1m male, CDAE); El Centro, 10-22-66, R. A. Flock, grass (2m males, CDAE); El Centro, 28 iv 1980, R. A. Flock (1m male, CDAE); Westmoreland, 3-7-67, R. A. Flock (1m male, CDAE); Winterhaven, 10-17-1986, R. Flock, J. Troutwine, ex. Bermuda grass/weeds/citrus (8m males, 1m female, CDAE); Bard, 3-15-66, R. A. Flock (1m male, CDAE); Inyo Co., Deep Spr., VII-16-1953, E. I. Schlinger (1m male, CDAE); Kern Co., Lebec, 8-26-49, R. A. Flock, Grass (1m male, CDAE); Los Angeles Co., Southgate, VIII-19-41, EX. Bentgrass, R. M. Bohart (1m male, UCDC); Marin Co., N.end of Drake's Estero, sweeping *Salicornia*, *Distichlis*, May 23, 1970, J.A.Powell (5m males, 4b females, EMEC); Modoc Co., Lake City, X-II-1952, E.I. Schlinger (1b male, UCDC); Mono Co., Mono Lake, VII-31-40, L. C. Kuitert (1m male, SEMC); Monterey Co., Big Creek, Res., S. Highlands, 610 m, IX-4/5-1991, J. Powell, bl trap (1m male, EMEC); Riverside Co., P.L. Boyd Des. Res. Center 3.5m S. Palm Desert, 6 July 1978, R. Mitchell, U.V. light (4m males, 2m females, CDAE); P.L. Boyd Desert Res. Center 3.5mi S. Palm Desert, Coyote Creek, 17-May-75, J. B. Tucker (1m male, CDAE); same, V-15-1969, at black light, marker #58, S. Frommer & L. LaPre (1m male, CDAE); Indio, 10-15-47, R. A. Flock (1m male, CDAE); R.R.Cyn., 4mi.E Elsinore, IV-17-65, C.A. Toschi (1m male, 1m female, EMEC); Joshua Tree Nat. Mon., 10 mi. NW Cottonwood Spr., IV-11-63, C. A. Toschi, Collector (1m male, EMEC); Cathedral City, VII/3/1950, L.W. Isaak (1m male, UCDC); San Diego Co., Solana Beach, VI-19-63, P. D. Hurd, collector (1b male, 1m female, EMEC); Santa Barbara Co., San Miguel Isl., Cuyler Hbr, VII-11-70, A.A. Grigarick, R.O. Schuster (2b males, 1b female CDAE); [Santa Barbara Co.], Prisoner's Harbor, Sta. Cruz. Id., III-14-69 (2m males, 2b females, EMEC); U.C., Goleta, Sta. Barb. Co., Calif. VI-22-65, J. Powell, collector (1m male, EMEC); Siskiyou Co., Mt. Shasta City, VIII-3-58, J. Powell, Collector (1m male, EMEC); same, VIII-13-58 (1m male, EMEC); Gazelle, John Hunter Rnch., 24-25.VII.1979, D. Horn (1m male, UCDC); Solano Co., nr Dozier, 11 mi S Dixon, IV-29-1977, B. D. Wahl (1m male, CDAE), same, M. T. Wahl (1m male, CDAE); same, R. L. Hanson (1m male, CDAE); same, V-20-1977, T. W. Gibson (1m male, CDAE); Vallejo, VIII-31-1953, E. I. Schlinger (1m male, 1b males, 2b females, 1m female); Vacaville, VI 9 1954, E.

Mezger (1m male, CDAE) same, X-8 1954 (1m male, CDAE); no specific locality or date given, 2364, Collection CFBaker (1m male, USNM); Green Valley, X.30.1935, N.W. Frazier (1m male, UCDC); Yolo Co., Davis, V-14-1952, ELSchlinger (1m male, UCDC). DELAWARE: New Castle Co., Newark, X-09 [Oct. 9]-1999, N. Cai, Sweepnet (1m male, UDCC); Middletown, Brick Mill Farm., 522 St. Michael Dr., 22-VIII-2003, A Gonzon, sweeping grasses (1m male, UDCC); Newark, TNS Bo. Garden, 5-IX-2003, I. Johnson, sweeping (1m male, UDCC); same, 11-IX-2003, I. Johnson, net (1m male, UDCC); Newark, Near Woodlot, 02-X-2003, C. Beal (1m male, UDCC); nr. Summit, 1-X-2000, C.R. Bartlett, C&D Canal (1m male, UDCC); Nr Woodland Beach, 7-IX [IX]-1994, C. Bartlett, @1miN JcRts6x9 (1m male, UDCC); Newark, UofD S Campus, 15-XI-2004, J. A. Wildonger, Swept in Alfalfa (1m male, UDCC);Middletown, Brick Mill Farm, 522 St. Michael Dr, 22-VIII-2003, A Gonzon, sweeping grasses (2m males, UDCC); Sussex Co., Laurel, X-06 [Oct. 6]-1999, N. Cai., sweepnet (1m male, UDCC). FLORIDA: [Alachua Co.] Gainesville, XII-25-1950, R. H. Beamer (1m male, SEMC); Citrus Co., Ft. Island Beach, 24 September, 1988, G.F. & J.F. Hevel (1m male, USNM); [Duval Co.], Jacks[on]ville, XI-1932, Collected at light (1m male, USNM); Franklin Co., Nr. Panacea, Bald Point and Ochlochee, 27-VII-2000, CRBartlett, Sweeping Roadside (2m males, UDCC); [Hardee Co.] Ona, July 1967, E. F. Fagan (1m male, UDCC); [Hendry Co.], La Belle, July 16, Oman 1939 (1m male, USNM); Highlands Co., Lake Placid, Archbold Biol. R.S., 10-X-2003, V Golia, blacklight (1m male, VGC); [Indian River Co.], Fellsmere, 2-13-[19]14, Bermuda grass, GGA[r]nslie, Webster No 8458 (1b male, USNM); Jefferson Co., 2.4 mi. S. W[a]lcissa, 27-VII-2000, C. R. Bartlett (1m male, 36m females, UDCC); 2 mi S Wacissa, 27.vii.00 CRBartlett, Roadside Sweep (14m males, UDCC); nr. W[a]lcissa, 2mi.S Jct SR 259 & 60, 27-VII-2000, C R Bartlett, Sweeping Roadside (3m males, 20m females, UDCC); 3mi. S. Wacissa, 27-VII-2000, C.W. O'Brien (1m male, 2m females, LBOB); same, 4mi. S. Wacissa (1m male, 1m female, LBOB); [Lee Co.], Ft. Myers, 18-IX-1957, JPKramer, at light (1m male, USNM); Leon Co., Tallahassee, 12-X-2002, UVLight, GJWibmer (4m males, 1m female, UDCC); same, 23-VIII-2002 (1m male, 2m females, UDCC); Miami-Dade Co., 11 km SW Florida City, 30 April 1986, W. Steiner & D. Bogar (1m male, 1m female USNM); Homestead, 19 Apr. 1981, T.J. Henry, BL Trap (13m males, CUIC); Monroe Co., Middle Keys, US Route 1, MM 53.5; Marathon Holiday Inn; 24 43 56N 81 01 09W 10-Jan-2006; A Gonzon, sweeping turfgrasses (29m males, UDCC); same, 12-Jan-2006 (4b males, UDCC); [Orange Co.], Orlando, Jan. 14, 1914, Swept from rye, Webster No 9405 (1m male, USNM); Palm Beach Co., Lake Worth, Geneva Lakes Court, May 13, 2003, Vince Golia, Black Light (1m male, VGC); [Pinellas Co.], St. Petersburg, Aug.12'10, [T]. C. Bradley (1m male, EMEC); Western Martin Co., Indian Town, 19-XI-1951, Stoner 36 (3m males, UCDC). GEORGIA: [Chatham Co.], Tybee Isl., VII.26.13, [no other information provided] (3m males, 2m females, EMEC); Liberty Co., Compound, St Catherines's I[sland], VI 26 1974, R O Schuster, E C Toftner (1m male, 1m female, CDAE). KANSAS: [Seward Co.], Liberal, [4]-15-[50], B Hodgden (1m male, SEMC). KENTUCKY: [Calloway Co.] Murray, 14 Aug. [19]41, L. Spann (1m male, USNM); [Madison Co.] Berea, 3 July [19]41, J. S. Bangson (1m male, USNM). LOUISIANA: Bossier Parish, 11-10-[19]71 (1m male, LSUC); Cameron Parish, 5-28-1974 (1m male, LSUC); Franklin Parish, 8-7-1972 (1m male, LSUC); 8-28-1972 (2m males, 1m female, LSUC); 9-6-1972 (1m male, LSUC); 10-31-1972 (1m male, LSUC); 11-6-1972 (7b males, 2b females, LSUC); East Baton Rouge Parish, Baton Rouge, LSU Campus, Life Science Bldg, at lights, 23-May-2003, ST Dash (1m male, 1m female, UDCC); Iberville Parish, Bayou Paul, Off River Rd., Mississippi R. Levee, Riparian For., 21-Jul-2003, Hg Vapor Lt, N 30 18.583 W091 09.074 (2m males, 1m female, UDCC); Jefferson Parish, Metairie, 13-X-1992, J. T. McBride (1m male, LSUC); Natchitoches Parish, Kisatchie NF, Kisatchie Bayou Campground, 19-Jul-2003, Hg Light, Beech mix hardwood, N31 26.712 W093.05.728 (2m males, 2m females, UDCC). Rapides Parish, 1-13-1972 (1m male, LSUC); Red River Parish, 2-7-1972 (1m male, 3b males, LSUC); [St. Tammany Parish], Covington, 6-23-1948, E. L. Todd (1m male, SEMC); Tangipahoa

Parish, 11-[?]-1971 (1m male, LSUC); Tensas Parish, 11-12-1971 (2m males, 3b males, LSUC). MARYLAND: Cecil Co., Fair Hill, Fair Hill NRA, 26-IX-2003, C R Bartlett, Sweeping Field (2m males, 4m females, UDCC); same, R.H. Walters (1m male, UDCC). MISSISSIPPI: Washington Co., nr. Hollandale, 24 Sept. 1971, J. C. Bailey 460 (1m male, INHS). NORTH CAROLINA: Bladen Co., nr. Bladen Lakes S.F., 17-IX-1994, UVL, C. R. Bartlett, Bladen Lakes Sch. Rd. (1m male, UDCC); Cabarrus Co., Coddle Crk Reservoir, Aug-1999, Light Trap, B. A. Harrison (1m male, UDCC); same, NJ Light Trap, VIII-1994 (1m male, UDCC). Haywood Co., GSMNP, Cataloochee ATBI Plot, 83 04 54 W 35 35 10 N, (19-X)-(15-XI)-2000, Malaise Trap 09, Parker, Stocks, Petersen, MT0920001115 (1m male, 1m female, UDCC); Hoke Co., McCain Nat. Area, 4-IX-1991, R.L. Blinn (1m male, NCSU); Jackson Co., nr. Balsam B.R.P. "Wesner Bald View", 35 26.784N 83 06.930W, 4914ft, 31-July-03, CBartlett, A Gonzon, D Nonne (1m male, UDCC); Onslow Co., Ashe Island, 19 Aug. 1975, J. C. Dukes, on *Distichlis spicata* (1b male, NCSU); Swain Co., GSMNP, Clingman's Dome Rd. Site #2, 83 28 26 W 35 34 03 N, Elev. 5929 ft, 30-VII-2003, CR Bartlett, D Nonne, A Gonzon, Sweeping (10m males, 7m females, UDCC); Swain Co., GSMNP Appalachian Trail Site #1, 83 28 451 W 35 35 437 N, 30-VII-2003 elev. 5987 ft., C R Bartlett, D Nonne, A Gonzon; sweeping (2m males, 1m female, UDCC); Swain Co., GSMNP at Purchase Knob ATBI house, 83 04 422 W 35 35 171 N, 28-VII-2003, elev. 4916 ft, C R Bartlett, D Nonne, A Gonzon; sweeping (7m males, 2m females, UDCC); Swain Co., nr Clingman's Dome GSMNP, Clingman[d]'s Dome Rd, Rdside, nr Noland's Divide Trail, 9-VII-2002 CRBartlett et al. (2m males, 1m female, UDCC); GSMNP, Andrews Bald ATBI Plot, 83 29 39W 35 32 20N, (20-X)-(13-XI)-2000, Malaise Trap MT12; Parker, Stocks, Petersen, MT1220001113 (2m males, UDCC); GSMNP, Andrews Bald ATBI Plot, 83 29 39W 35 32 20N, (24-XI)-(18-XII)-2001, Malaise Trap MT11; I Stocks, A Lehe, D Hobgood, MT1120011218 (1m male, UDCC); same, 27 38 76E 39 35 462N, (24-XI)-(18-XII)-2001, Malaise Trap MT12; Stocks, AvonLehe, D Hobgood, MT1220011218 (1m male, 3m females, UDCC); same, 83 29 39W 35 32 20N, (20-X)-(13-XI)-2000, Parker, Stocks, Petersen, MT1220001113 (7m males, 2m females, UDCC); Wake Co., Raleigh, Schenck Mem For[est], 24-vi-2000, CRBartlett, Sweeping (2m males, 1m female, 2b females, UDCC); Raleigh, 10-10-1965, J. Lopez-P (1m male, NCSU); Raleigh, @NCSU, 13-IX-1994, C.R. Bartlett, Sullivan Dr. Sweep (1m male, UDCC). SOUTH CAROLINA: Barwell Co. 21 Sept. 1971, S. G. Turnipseed 403 (1m male, INHS); [Pickens Co.], Clemson. Nov.[9], 1956, Bermuda Grass, 108 (1m male, USNM). TENNESSEE: Blount Co., GSMNP, Cades Cove oldfield ATBI Plot, 23 28 63 E 39 42 201 N, (19-XI)-(3-XII)-2001, Malaise Trap MT04, R Hightower, J Burbank, MT0420011203 (1m male, UDCC); nr. Townsend, GSMNP, Cades Cove, Forge Crk Rd, WetMedw, 8-VII-2002, CRBartlett et al. (1m male, UDCC); Sevier Co., GSMNP, Newfound Gap Rd., Site #2, 83 29 402 W 35 38 341 N, 30-VII-2003, elev.2616 ft., C R Bartlett, D Nonne, A Gonzon; sweeping (1m male, UDCC); GSMNP, Albright Grove ATBI Plot, 83 16 50 W 35 43 60 N, (16-X)-(14-XI)-2000, Malaise Trap MT17, Parker, Stocks, Petersen, MT1720001114 (1m male, UDCC); GSMNP, Indian Gap ATBI Plot, 83 26 37 W 35 36 39 N, (18-X)-(10-XI)-2000, Malaise Trap MT05, Parker, Stocks Petersen, MT0520001110 (1m male, UDCC); same, (16-VIII)-(03-IX)-2001, R Fox, MT0520010903 (1m male, UDCC); GSMNP, Twin Creeks ATBI Plot, 83 29 94W, 35 41 10N, (12-IX)-(26-IX)-2000, Malaise Trap MT02, Parker, Stocks, Petersen; MT0220000926 (1m male, UDCC); GSMNP, Brushy Mtn. ATBI Plot, (23-X)-(06-XI)-2000, Malaise Trap MT14, Parker, Stocks, Petersen; MT1420001106 (1m male, UDCC); GSMNP, Indian Gap ATBI Plot, 83 26 37W 35 36 39N, (24-X)-(08-XI)-2001, Malaise Trap MT06, I C Stocks, MT0620011108 (1m male, UDCC); Gatlinburg, IX:14:53, Henry S. Dybas (1m male, FMNH). TEXAS: [Brewster Co.], Big Bend Park, July 73 (1m male, LSUC); Culberson Co., 10 m N Van Horn, VIII 27 [19]71, EF Grissen, RF Denno (1m male, CDAE); Matagorda Co., Matagorda, May-5-1953, R.H. Beamer (1m male, SEMC); Bay City, May 4 1953, R. H. Beamer (3m males, SEMC); same, May-6-1963 (1m male, SEMC); Maverick Co., 25 mi S Del Rio XI-4-1982, J. Hubner (1m male, CDAE); Starr Co., 2 mi S El Sauz,

2-VI-1980, Webb & Lisowski (1m male, INHS); [San Jacinto Co.], San Jacinto, April 25, 2953, R.H. Beamer (2m males, SEMC). UTAH: [Box Elder Co.], 3 1/2 mi SW Penrose, 7-10-1934, G.F. Knowlton, C. F. Smith, Utah Exp. Sta. (1m male, USNM); Felding, IX-13-1960, G.F. Knowlton (1m male, CDAE); [Cache Co.], Providence, 8-2-1934. At light, C. F. Smith, Fulgorid (1m male, USNM); [Salt Lake City Co.], Salt Lake City, VII 19 1974, G. Knowlton (15m males, 11m female, CDAE); same VIII 2 1974 (3m males, 4m females, CDAE); same VIII 4 1974 (2m males, 13m females, CDAE); [San Juan Co.], Bluff, VIII-8-1963, G. F. Knowlton (1m male, CDAE); same, VII-1-1974 (1m male, 1m female, UCDC); [Utah Co.], Provo, Brigham Young Univ., 1-IX-1999, I. S. Winker, Belltower, to light (1m male, 2m females, UDCC); Provo, Aug-99 (6m males, 6m females, UDCC); Provo, BYU Bell Twr, 5.vi.2000, TD Waite (12m males, 8m females, UDCC); same, 7.vii.2000 (1m male, UDCC); Goshen Ponds, SW of Santaquin, 15.vii.2000, J A Robertson (1m male, 1m female, UDCC). WASHINGTON: [Pierce Co.], Mount Rainier, 7-6-[19]35, R. H. Beamer (1m male, SEMC).

MEXICO: [Baja Calif.], Valle de Mexicali, 28 Sept. 1973, M. Machain (222m males, 198m females INHS); [Baja Calif. Sur.], 3.5 km WNW San Isidro (Cyn/Oasis) 22/23 April 1983, M. Wasbauer, Malaise trap (1m male, CDAE); [Chiapas], Chorrreadera St. Pk. 26-V-1987, D B Thomas, D A Rider, E. G. & T. J. Riley, mercury vapor & blacklight (1m male, LBOB); rt.195, km#31, 10km NE Chiapa de Corzo, 1000m, 16°49'N 92°58'E, 4 Nov 2001, C.H. Dietrich, vacuum, 01-051-03 (1m male, 1b males, 2b females, INHS); Tuxtla Gutierrez, July 31, 1974, UV trap, L.B. O'Brien (1m male, LBOB); [Federal District], Mexico City area, 1920's, Dr. A. Dampf, MB-33 (2m males, UKYL); same, 1940's, D. M. Delong, MB-295 (1m male, UKYL); [Jalisco], 20mi SW Autlan, VII-13-1982, Fred G. Andrews, blacklight (1m male, CDAE); Hwy54, 11 mi. S Atenquique, 3600', 9Aug.1982, CW & L. O'Brien & GB Wibmer (1m male, LBOB); ; [Nayarit], 36 km NE San Blas, VIII 30 1971, D. Sheridan (1m male, CDAE); Rio Ayuquilla ca. Zenzontla, 800m, 19°40'6"N 104°1'53"W, 13 Oct-2001, C.H.Dietrich, sweeping, 01-004-01 (1m male, 1m female, INHS); [Nuevo Leon], Mun. Allende, VII-9-1983, Reyes + Gonzalez (2m males, CDAE); Mun. Bustamante, VII-13-1983, A. Gonzalez (5m males, CDAE); Bustamante, VII-13-1983, A. Gonzalez (1m male, CDAE); [Oaxaca], 1.5 mi. E. Zopilote, nr. Pan Am. Hwy. VI-5-1987, UV light, W.B. Warner (2m males, LBOB); Oaxaca, 2mi. NW, IV-13-53, *Medicago* E. I. Schlinger (1m male, EMEC); [Puebla], Tehuacan, VII-1965, NLH Krauss (1m male, 1m female, USNM); [Sinaloa], nr. Juan Jose Rios, 11 June 1973, F. Pacheco (2m males, 1m female, INHS); same, 12 June 1973 (1m male, INHS); Mun. Es[c]uinapa, 5 de Mayo, 10-IX-1978, UV trap, R.E. Woodruff (1m male, LBOB); [Sonora], nr. La Casita, 21 Sept. 1973, R. L. Leon-L. (1m male, INHS); Guaymus, IV 8 1979, D G Denning (73m males, 4b males, 20m females, 2b females, CDAE); same, (4m males, 1b male, 1m female, UCDC); [Vera Cruz], 9mi. N. Tempoal [de Sanchez], 50', XII-29-1963, L.B. & C.W.O'Brien (1m male, LBOB); 3 mi N Cardel, X-31-1982 (1m male, CDAE); Ver[a Cruz]. 3800m. Cofre de Perote, 8 June, 1983, C.W.&L. O'Brien & G.B. Marshall, on straight bunch grass (4m males, LBOB); Mex 2301, Collection C F Baker [no date or locality data provided] (2m males, USNM); rt. 185, km#60, 3km W Minatitlan, 75m, 17°57'25"N 94°50'1"W, 31 Oct 2001, C.H. Dietrich, vacuum, 01-044-01 (4m males, 1m female, 1b female, INHS); Orizaba, at light, 14 May 1983, C.W.&L. O'Brien & GB Marshall (1m male, LBOB); [Yucatan], 70km S. Merida, alt < 100m, 16 X 1974, SDKoch, weedy roadside (1m male, NCSU).

BERMUDA: Paget, 0-50 meters, 23-VII-1971, N. L. H. Krauss (1m male, USNM); St. George, 2 Feb '34, Melander (1m male, USNM).

BAHAMAS: Bahama Island, Nassau, Nov. 1950, NLHKrauss (1m male, USNM). **CUBA:** P. Tarafa, Camagüey, Mar.24/[19]27, S.C. Bruner (1b males, NCSU); Matanzas, Mar. 25/[19]27, S. C. Bruner (1m male, NCSU) ; no specific locality or date given, 132., Poye

Coll. No. (1m male, 1b male, ANSP); Havana, Baker, Collection C F Baker [no date provided] (1m male, 1b male, USNM). **CAYMAN ISLANDS:** *Cayman Brac.*, The Creek, UV Trap, 6-XII-1995, C.R. Dilbert (1m male, 1m female, FSCA); same, 8-XII-1995 (3m males, FSCA); same, 18-XI-1995 (1m male, LBOB); same, 28-XI-1995 (1m male, 1m female, FSCA); same, 7-XI-1995 (3m males, LBOB). **JAMACIA:** Kingston, II-2-[19]37, sta 377, Chapin and Blackwelder (1m male, USNM); GordonTn, II-1-[19]37, Chapin and Blackwelder (1m male, USNM); ClarksTown, Feb 16'[19]37, Sta 409, Chapin and Blackwelder (1m male, USNM). **DOMINICAN REPUBLIC:** LaRomana Centr., July 15 1917, Harold Morrison (3m males, 2b females, USNM); Roseau, X 1967, N. L. H. Krauss (1m male, USNM); Springfield, XI 1967, NLH Krauss (2m males, USNM); Prov. La Vega, 2 Km SE Jara Bacoa, 4.xi.2000, Sweep, TK Wood, RL Snyder et al (1m male, UDCC); Santo Domingo, 18-II-1970, AAHarper (1m male, 1? males, NCSU). **HAITI:** Port au Prince, Feb. (1m male, USNM). **PUERTO RICO:** Cartagena Lagoon, Jan. 20, 1954, J. Maldonado Capriles (3m males, USNM); Rio Piedras Experiment Sta., July 11, 1917, Harold Morrison (1m male, USNM); Ensenada, Sep.-Nov.-1960, A. Aviles (1m male, USNM); Ensenada, Sep.-Nov.- 1960, A. Aviles (1m male, 1m female, USNM); Lajas, Sep-Nov 1960, M. Beauchamp (1m male, 1m female, USNM). **US VIRGIN ISLANDS:** **ST. THOMAS:** March 27-30, 1961, J. Maldonado C[apriles] (4m males, 1m female, USNM); Charlotte Amalie, June 2, 1917 (92), Harold Morrison (4m males, USNM); **ST. CROIX:** Spring Gut, June 14, 1917, Harold Morrison (3m males, 2b females, USNM). **ANTIGUA:** CoolidgeAirt XI 1967, NLH Krauss (1m male, USNM); [no specific locality given], 21.XI.1913, (WD), AHJennings Coll (1m male, USNM); St. John's, XII 1967, NLHKrauss (1m male, USNM). **DOMINICA:** Portsmouth, 0-100m, July 1976, N. L. H. Krauss (1m male, 1m female, USNM); Roseau, 0-100m, July 1976, N. L. H. Krauss (1m male, USNM). **MARTINIQUE:** St. Pierre, Nov. 1950 NLH Krauss (1m male, USNM). **ST. VINCENT:** H. H. Smith, PRUhlen Collection (3m males, 1m male stylopized, 1b females, USNM). **BARBADOS:** nr. Marine Hotel, Swept from Grass, etc., Sept 14, 1918, H. Morrison (1m male, 1m female, USNM); Bridgetown, 24 Sept. '19, J. C. Bradley, Cornell Univ. Expedition Lot 569 (3b males, 8m males, CUIC). **TRINIDAD AND TOBAGO:** Trinidad, Port-of-Spain, Bot. Garden, Oct. 13, 1918, Harold Morrison (1m male, USNM); Caroni River, Oct. 12, 1918, Harold Morrison (1b male, 1m female, USNM); Curepe, Santa Margarita Circular Rd., 17-VII-1971, F. D. Bennet, Blacklight Trap (1m male, NCSU); 12-[6?], Aug. Busck (1m male, USNM).

BELIZE: *Cayo District*, 5 mi. S Teakettle Bank, N17 10'18.5" W88 50'14.7", 8-July-03, Cornfield Edge, C. R. Bartlett, Sweeping (3m males, 1b male, 1m female, 4b females, UDCC); same, nr ~5mi S Teakettle Bank, nr Pook's Hill, edge of ag field, N17 10'9.3" W88 50'1.0", 8-VII-2003, CRBartlett (5m males, UDCC); nr Teakettle Bank, nr Pook's Hill at river, 8-Jan-2003, CRBartlett (1m male, UDCC); same, 5-Jan-2003 (2m males, 1m female, 1b males, UDCC); same, 8-Jan-2003, swp@river (1b female, UDCC); nr. Teakettle Bank, Pook's Hill, 17 09.257N 88 51.091W, 279ft, 7-VII-2003 CRBartlett (6m males, 1m female, 3b females, UDCC); same, 8-VII-2003 (2m males, UDCC); same, N17 09.257 W88 51.094 (1m male, UDCC); Western Highway, Mile 66, 20-VI-68, W. & D. Hasse, Blacklight Trap (1m male, LBOB); Rio Grande, June 1982, J. J. White (1m male, NCSU); San Antonio, June 1931, J. J. White (1m male, NCSU). **GUATEMALA:** L. Amatitlan, viii.16.1961, M. E. Irwin (1m male, 1b male, CDAE); Rabinal, Baja Verapaz, VIII-28-1964, J.E. Slansky (1m male, CDAE); Concepcion, El.1400 ft., C N Ainslie (1m male, USNM); Antigua, X-1965, NLHKrauss (1m male, USNM). **HONDURAS:** Zomorano, viii-29-1964, G. A. Axtell (1m male, CDAE). **ELSALVADOR:** Quezaltepeque, VIII-4-1963, D. Cavagnaro, M. E. Irwin (1m male, 1m female, CDAE); San Salvador, 4 May 1958, OLCartwright (3m males, USNM). **NICARAGUA:** Managua, XI-5-1965, NLH Krauss (1m male, 1b females, USNM). **COSTA RICA:** S. J., Zurqui deMoravia, 1600m.iii-iv-1993, C.Godoy, PHanson (1m male, LBOB); San Pedro de Montes deOca, #3370, C H Ballou, on grass, Feb.22,'35 (1b males, USNM); Turrialba, 600-700 m, 12-

VIII-1975, N. L. H. Krauss (1m male, USNM); Guanacaste Ranch, 1[8?] km NE Cañas, February 21, 1992, Paul N. Freytag, Merv R. Nielson, & Carolina Godoy (1m male, UKYL); 7.6km E on Atenas, XII-15-1987, D. J. Burdick (1m male, CDAE); Cart. vi-viii-1993, 1300m. Dulce Nombre, Vivero Linda Vista, Malaise, Hanson (2m males, 6m females, LBOB); Guan. 3 mi NW Cañas (LaPacifica) VII-12-1974, UV trap, L. B. O'Brien (3m males, 2m females, LBOB); Puntarenas Prov., Monteverde, 26 March 1987, W. E. Steiner (35m males, 1m female, 9b females, USNM); Monteverde, V-22/23 1976, malaise trap, 4500', M. Wasbauer (1m male, EMEC). **PANAMA:** Taboga Is., Oct. 1946, NLH Krauss (1m male, USNM); Panama Prov., Las Cumbres, VII 28 1971, M. Daykin (1m male, 1m female, CDAE); same, light trap, 22 April 1973, H. Wolda (1m male, USNM); Chepo, 25 ix 52, FSBlanton (1m male, USNM); Canal Zone, Balboa Prado, Jul.2, 1918, H. F. Dietz, G32D (3m males, NCSU).

COLOMBIA: Boyaca, SFF Iquague Park Enterence, 5°70'N 73°45'W, 25-26.vi.2000, MSharkey, Sweeping (1m male, UKYL); same, Ayabuco SFF Iquague, Malaise, 16.iii-1.iv-2000, above 2500m, P. Reina (1m male, UKYL); Cali, CAIT, 29-VII-2002, D. W. Tallamy, *Pithecellobium dulce* (2m males, 9b males, 1m female, 17b females, UDCC); Villa de Lerva, 7100', 17-II-1974, AHarper, by Irrig.ditch (3m males, NCSU). **VENEZUELA:** Amazonas, Aqua Linda R., 18-20.vi.2000, 5°49'5"N 67°26'29"W, P.Freytag et al., sweep (1m male, UKYL); Apure, near San Fernando de Apure, 7°50'44"N 67°29'10"W, 20-VII-2000, blacklight trap, P.M. Freytag, M.A. Gaiani, Q. Arias, (36m males, UKYL); Guarico, rd Calabozo-Dos Caminos, Sweep, 9°15'56"N, 67°24'11"W, 21.vi.2000, P.M. Freytag, M.A. Gaiani, Q. Arias (1m male, UKYL); Bolivar, 7.6kmSE Guasipati, 22 March 1982 G.F. & J. E. Hevel (9m males, 3m females, 3b females, USNM); El Valle, 1707, V-12-[19]39, CHBallou, *Cucumis sativus* [Cucumber] (2m males, USNM); Lara: Quíbor, Jiménez, VII 8 1979, R W Brooks, A A Grigarick, J McLaughlin, R O Schuster (3m males, CDAE); Cagua, 25-XI-1975, CK & CF Smith (2m males, NCSU); Zulia: El Tucuco Perija, VI 24 1979, R W Brooks, A A Grigarick, J McLaughlin, R O Schuster (1m male, CDAE). **GUYANA:** Bartica, 14 April 1913 (3b males, CUIC). **SURINAME:** Moengo, Boven Cottica, May 12, 1927, Cornell Univ., Lot 760, Sub 51 (2m males, CUIC); Paramaribo, l'Hermitage at light, 29 Dec 1969, N. Nieser (2m males, LBOB). **BRAZIL:** Piracicaba, Sao Paulo 9-XII-1964, C.A. & W.E. Triplehorn, Blacklight trap (200m males, 58m females, UDCC); Rondonia, 8km. N. Porto Velho, 7 Oct. 1984, ex light fixture, J.F. Cornell Collection (1m male, NCSU); RO Fazenda, Rancho Grande, 62km s. Ariquemes, 26.XI.1991, S.L. Heydon, mercury vapor (1m male, UCDC). **ECUADOR:** El Triunfo, 60kmE. Guayaquil, 11-II-1973, MA Deyrup (1m male, NCSU); Guayllabamba, ~2000' below Quito, 20km NE Quito, Old Av[o]cado orchard, MDeyrup (2m males, NCSU); Carchi Prov., Rio Chota, km 32 on Ibarra-Tulcan sec of Pan Am Hwy, 1-03-1990, ex. Malaise trap, M. Wasbauer, J. Wasbauer & H. Real (2m males, CDAE). **PERU:** Lima, July 1914, HSParish (1b male, USNM); Pasco, Villa Rica, 1400m, 10°43'21"S 75°15'43"W, 21 Oct 2002, C. H. Dietrich, vacuum, 02-281-1 (1m male, 1b male, INHS). **REPUBLIC OF BOLIVIA:** Santa Cruz Dept., 3.7kmSSE Buena Vista, Hotel Flora y Fauna, 430m, 17°29'S 63°33'W, MC Thomas, 14-28.x.2000 (45m males, UKYL); 10 mi W. Pto. Banegas, 25 March 1978, UV Trap, G.B. Marshall (9m males, 1m female, LBOB); Saavedra Res. Sta. 25Mar. 1978, UVtrap, CO'Brien & [H.]Serrate (2m males, LBOB); Saavedra Res. Sta. 15Apr. 1978, UVtrap, H. Serrate (13m males, LBOB); Saavedra Res. Sta. 22Mar.; . 1978, UVtrap, CRWard & CW O'Brien (10m males, LBOB); Saavedra Res. Sta. 3 Apr. 1978, UVtrap, H. Serrate (6m males, LBOB); Saavedra Res. Sta. 7Apr. 1978, UVtrap, H. Serrate (6m males, LBOB). **PARAGUAY:** San Pedro Cororo-Rio Ypane, XI-24/27-1983, Malaise Trap, M. Wasbauer (11m male, 8m females, CDAE); San Pedro Cororo-Rio Ypane, XII-1/5-1983, M. Wasbauer (3m males, 2m females, CDAE); San Pedro Cororo-Rio Ypane, XII-1/4-1983, Malaise Trap, M. Wasbauer (1m male, 2m females, CDAE); San Pedro Cororo-Rio Ypane, XII-6/10-1983, M. Wasbauer (6m males, 1m female, CDAE); San Pedro Cororo-Rio Ypane, XII-5/9-1983, Malaise Trap, M. Wasbauer (1m

male, 2m females, CDAE); 38km S. Santa Cruz de la Sierra, Ingenio la Belgica, L.A. Stange, 19-I-80, Backlight trap (1m male, LOBC). **CHILE**: Cachapoal, (int FL), 25-iii-92, N. Villegas, ex *Rubens idaens* (1m male, USNM); Colchagua, int. Phila. PA, 5-IV-91, M. Palma, *Pyrus communis* (1m male, USNM); Chiloe, Isla Chiloe, Mocopulli, 19.II.1989, T. Cekalovic (1m male, UCDC). **ARGENTINA**: Salta Rosario de Lerma XI-10/14-1983, Malaise Trap, M. Wasbauer (4m males, 1m female, CDAE); same, XI-17/18-1983 (4m males, 1m female, CDAE), same, XII-16/18-1983 (2m males, 2m females, CDAE); same, XII-21/23-1983 (2m males, 1m female, CDAE); Catamarca Pr., Andalgaia, X[I] 27 75, R M Bohart (1m male, UCDC).

Old World:

PALEARCTIC

TURKEY: Iskenderun, 6.VIII.63, Linnavuori (2m males, AMNH). **CYPRUS**: Akrotiri Forest, November 23, 1919, et *Juncus* – stipa beds (1m male, 1m female, NCSU); near Limassol, Nov.9, 1949 (1m male, NCSU); Limassol, Oct.30-Nov.1, 1949, from turf (1m male, NCSU). **ISRAEL**: [label illegible except] 1958, R. Linnavuori (1m male, AMNH). **EGYPT**: Meadi, 5.II.33 L, Dr. H. Priesner (1m male, AMNH); same, 24.II.31 (1m male, AMNH). **LIBYA**: El Merj-Gubba road, 31.VIII.62, Linnavuori (1m male, AMNH). **MOROCCO**: Granja del Muluya, A.L. Capener (1m male, AMNH); Monte Arruit, Melilla, [remainder illegible] (1m male, AMNH). **UNITED ARAB EMIRATES**: Nakhali Dubai, III-28-1984, E A Sugden (1m male, CDAE); same, IV-21-1984 (1m male, CDAE); same, IV-23-1984 (1m male, CDAE); Awir Dubai, IV-30-1984, E A Sugden (1m male, CDAE); same, V-17-1984 (1m male, CDAE). **UZBEKISTAN**: Sahlb[erg], 703 (1m male, AMNH). **KYRGYZSTAN**: Chuy ca. Telek, 590m, 43°6'20"N 74°5'40"E, 13 VIII 1998, C.H. Dietrich, vacuum, 98-003-01 (2m males, 1b males, UDCC). **JAPAN**: Ryukyu Islands, Iwa, Okinawa, VIII-30-1945, at light (1m male, FMHN).

INDOMALAYAN

INDIA: Mysore, Bangalore, viii 1957 N. L. H. Krauss (1m male, USNM); Coimbatore, Madras, P. S. Nathan, at light (1m male, 2m females, NCSU); Uttar Pradesh, Varanas, 18-VII-1992, J. F. Cornell, Light Trap (1m male, NCSU). **THAILAND**: Nakhon P., Kampangsaen Natl Biol Cont Res Ctr, UV Light, 5.xi.1995, W Suas-ard (3m males, UDCC).

AFROTROPICAL:

NIGER: Tin Telloust, Air Massif, VIII 20 1983, 18° 35'N 8° 59' E, P C Matteson (3m males, CDAE); same, 18°55'N 8°40'E (1m male, UCDC). **ETHIOPIA**: Debre Marcos, 10 18 N, 37 43 E, VII-24-1967, R. E. Peck, A. K. Roy, Abebe Abey (1m male, CDAE). **KENYA**: Nairobi, VII-1-1974, L. Schlesinger, Coll., grass & clover, grey day (1m male, UDCC). **CÔTE D'IVOIRE**: Foro-Foro, 25-28.IX.73, Linnavuori (1m male, AMNH). **ZAMBIA**: Lusaka, I 20 74, W H Lange (1m male, UCDC); same, V 6 1974 (1m male, UCDC); same, XII 7 1973 (1m male, UCDC); same, V-22-1974, W H Lange (1m male, CDAE); same, III 2 1974 (1m male, CDAE); same, XI-23-1974 (1m male, CDAE) same, V-8-1974 (1m male, CDAE); same, II-8-1974 (2m males, CDAE); same, III-1-1974 (2m males, CDAE); 10km W Lusaka, VI 3 74, W H Lange (1m male, CDAE); 10km W. Lusaka, 3 VI 1974, W. H. Lange (2m males, UCDC). **ZAMBIA/ ZIMBABWE** [as RHODESIA]: Victoria Falls, III-18-1974, W. H. Lange (3m males, 1m female CDAE); same III-16-1974 (2m males, 10m females, CDAE). **MADAGASCAR**: Berenty Reserve, 80km w. Ft.Dauphin, 25°00'S 46°17'E, 7.IV.1994, M.Wasbauer. M[alaise]T[rap] (1m male, UCDC). **SOUTH AFRICA**: Keurboomstrand, IV-15-1992, CW&LB. O'Brien&GB.Marshall (1m male, FSCA); Transvaal Prov Tweefontein, 14 km NE Warmbaths, I 17 1987, R B Kimsey (1m male, UCDC).

OCEANIA

NORTHERN MARIANA ISLANDS: Saipan I[sland], As Mahetog area, IV: -: 45, Henry S. Dybas (1m male, FMNH); same, IX:30:45, at light (1m male, FMNH); Saipan I[sland], 1-2mi. E of Tanapag, 10: I: 45, Henry S. Dybas (1m male, FMNH, labeled as "*Delphacodes shirozui*"). **GUAM:** Anderson Air Force Base, X-1957, Bermuda grass, N. L. H. KRAUSS (2 males, 1 female, USNM, tentatively included). **PALAU:** Koror Island, 30 Nov. 1947, Pacific Sci.Board Ent.Surv.of Micronesia, H.S.Dybas (1m male, FMNH); SW Koror, 25m., XII-11-'52, Light trap, J.L.Gressitt (1m male, FMNH, labeled as "*Delphacodes neopropinqua*").

AUSTRALIA: NT, Trepang Bay, Cobourg Pen., 11°14.302S, 131°58.396E, 17.JUN.2002, G. Bellis, Sweeping *Ipomoea batatas*, GAB60209 (1b male, UDCC); Tentatively included: NT, Trepang Bay, Cobourg Pen., 11°14.302S, 131°58.396E, 17.JUN.2002, G. Bellis, Sweeping *Cynodon dactylon*, *Desmodium triflorum*, *Dactloctenium aegyptium* (1b female, UDCC).

Metadelphax wetmorei

USA: FLORIDA: Alachua Co., Gainesville, Austin Cary For. 15-VII-1966, L. A. Hetrick, UV Trap (1m male, UDCC); Broward Co., Deerfield, 7-26-1948, E. L. Todd (1m male, SEMC); [Hendry Co.], LaBelle, July 16 1939, Oman (2m males, USNM); Okaloosa Co., Niceville, 28-VII-1972, S. Southern, Light Trap (1m male, NCSU). GEORGIA: [Charlton Co.], Billy's Id, Okfenokee Swamp, June 1912 (1m male, EMEC); same, July 1912 (1m male, EMEC); [Thomas Co.], Thomasville, IV/11/15, C.S. Spooner (1m male, USNM); Hinesville, X-4, [P.] Oman1938 (1m male, USNM); Waycross, Oct 5, 1938 [P.] Oman (1m male, USNM). LOUISIANA: [St. Tammany Parish], Slidell, XII-31-1950, R. H. Beamer (1m male, SEMC). NORTH CAROLINA: [Avery Co.], Grandfather Mt. X-4-1959, Tom Daggy (1m male, NCSU); [Johnston Co.], Clayton, July 18 1958, in light trap, DuBose (1m male, NCSU); [Wake Co.], Raleigh, Oct16 1938, Oman (1m male, USNM).

Toya attenuata

SRI LANKA: Kan. Dist., Udawattakele, 2100 ft, black light, 4-5 October 1976, G. F. Hevel, R. E. Dietz IV, S. Karunaratne, D.W. Balasooriya (1b male, USNM); N.E. Dist., Kande-ela, 2 June 1975, S.L.Wood & J.L. Petty (1b male, USNM).

Toya boxi

USA: FLORIDA: Collier Co., H. V. Weems, Jr., 1 XII '55, on *Cynodon dactylon* (1b male, USNM). **PUERTO RICO:** Cartagena Lagoon nr. L alas, H L Dozier, XI-11-35, grass sweeping (1m male, USNM). **ST. LUCIA:** Gastries, 10-22 Sept. '19, J.C.Bradley, Cornell University Expedition, lot 5[6]9 (2m males, CUIC). **TRINIDAD AND TOBAGO:** Trinidad, Caroni nr Chaguanas, 22 March 1985, G.F. & J.F. Hevel (1m male, USNM). **PARAGUAY:** D.Central, Capiata, X-7-1968, at night, L.B. & C.W. O'Brien (1m male, LBOB).

Toya idonea

USA: FLORIDA: Broward Co., Ft. Lauderdale, Sunrise, 8-VII-2000, Sweeping lawn & weeds (1m male, UDCC); Ft. Lauderdale, Sunrise, NW20thCt, 26-XII-1999, C. R. Bartlett, Sweeping grass & weeds nr. canal (1m male, UDCC); Ft. Lauderdale, Lauderdale, Invarrary, 19-I-2002, C. R. Bartlett, Sweep lawn/sedge in shallow ditch (1m male, 1b males UDCC), same, 24-XII-1999 (1m male, UDCC); same, 25-XII-1999 (2m males, UDCC); same, 5-VII-2000 (2m males, UDCC); Ft Lauderdale, Invarrary, 24.xii.1999 CRBartlett (12m males, 4b males, UDCC); Ft. Lauderdale, 5. XII.1974, low rotary net, N.L. Woodiel (1m male, LBOB); same, 26 Feb 1975, rotary net med, NLWoodiel (1m male, LBOB); same,

20 March 1975 (1m male, LBOB); Ft. Lauderdale, 1 Sept. 1943, F. H. Stutz (1m male, USNM); [Collier Co.], Immokalee, 26 March 1968, Mark Deyrup (1m male, CUIC); Highlands Co., Archbold Biol. Sta. S.W. Frost, 11-12-58 (1m male, USNM); Lake Placid, Archbold Biological Station, April 17, 2003, Vince Golia, Black Light (1m male, VGC); same, June 14, 1999, 'night sweeping' (1m male, VGC); Lake Placid, Archbold Biol. Res. Sta., Jan. 21 2002, CRBartlett at light (1m male, UDCC); Archbold Biol. Sta., Lk. Placid, 4 APR 1989, M. Deyrup, N. SHORE, LK. ANNIE (2m males, UDCC); same, 30 NOV 1988 (1m male, UDCC); Archbold Biol. Sta., 19 February 2000, Mark Deyrup, Sweeping road through damp seasonal pond, west of lab (1b male, UDCC); Indian River Co., Vero Beach, 11.x.1999 at light, C W O'Brien (1m male, UDCC); Jefferson Co., 1mi. S. Wacissa, 16 Sept. 1976, G. B. Marshall (1m male, LBOB); [Lee Co.], Ft. Myers, 18-IX-1957, JPKramer, at light (6m males, USNM); Leon Co., Tallahassee, 15-VII-2002, GJWibmer, UVLight (1m male, UDCC); same, 16-VIII-2002 (1m male, UDCC); same, 12-X-2002 (1b male, UDCC); Miami-Dade Co., Homestead, X.22.[19]42, E. D. Hardy (1m male, SEMC); Homestead, 8-9-30, I. D. Tuthill (3m males, SEMC); Miami, Doral Country Club, 7.XI.1974, high rotary trap, NL.Woodiel (2m males, LBOB); ca 4mi N Homestead on Rt 997, 7.vii.2000, CR Bartlett, Sweep (1m male, UDCC); Monroe Co., Middle Keys, US Route 1, MM 53.5; Marathon Holiday Inn; 24 43 56N 81 01 09W 10-Jan-2006; A Gonzon, sweeping turfgrasses (2m males, UDCC); Okaloosa Co., Niceville, 28-VII-1972, S. Southern, Light Trap (2m males, NCSU); Palm Beach Co., Delray Beach, Country Lake, April 16, 1994, Vince Golia, Black Light (1m male, VGC); Lake Worth, Cedar Hurst Court, January 10, 2002, Vince Golia, 'sweeping grass' (2m males, VGC); same, January 14, 2002, Vince Golia, 'sweeping grass' (1b male, VGC); same, January 31, 2002, (1b male, VGC); same, January 29, 2002 (1m male, 1b male, VGC); same, January 31, 2002 (1m male, VGC); Lantana, A1A & Lantana Park, January 1, 1995, Vince Golia, 'sweeping' (1m male, VGC); Lake Worth, Lantana Road, February 12, 2002, Vince Golia, 'sweeping grass' (2b males, VGC); Lake Worth, Geneva Lakes Court, May 12, 2003, Vince Golia, Black Light (1m male, VGC); same, May 13, 2003 (1m male, VGC); same, May 19, 2003 (1m male, VGC); same, July 25, 2003 (1m male, VGC); same, July 27, 2003 (2m males, VGC); same, July 29, 2003 (1m male, VGC); Boynton Beach, Nautica Sound, February 28, 1999, Vince Golia, 'sweeping' (2b males, VGC); Sarasota Co., Myakka River S P, 24-VII-1976, UV Trap, C W O'Brien et al, Concession Area (1m male, UDCC); Seminole Co., Okaloosa, 28-VI-1972, S. Southern, Light Trap (1m male, NCSU). LOUISIANA: Cameron Parish, 4-15-74 (1m male, LSUC); St. Helena Parish, Baton Rouge, 21-VII-1975, Light Trap (1m male, LSUC), 11-9-[19]79 (1b male, LSUC). NORTH CAROLINA: Swain Co., GSMNP, Andrews Bald ATBI Plot, 83 29 39 W 35 32 20 N, (16-VIII)-(29-VIII)-2001, Malaise Trap MT12; I C Stocks, MT1220010829 (1m male, UDCC).

GULF OF MEXICO: 29°50'N., 87°32'W., 20-X-1983, K. Irvin (1m male, USNM). **BAHAMAS:** South Bimini Isl., May 195[1?], Cazier & Gertech (1m male, AMNH). **CAYMAN ISLANDS:** Cayman Brac., The Creek, UV Trap, 7-XI-1995, C.R. Dilbert (2m males, LBOB); same, 15-XII-1995 (1m male, LBOB). **BELIZE:** Orange Walk, Rio Bravos Cons. Area. Mahogany Trail, VII-11-1996, UV&Hg Vapor light, C.W. & L.B.O'Brien (1m male, LBOB); O.W. Dist, Rio BravoConsv,Area, Well Trail, VII-9-1996, UV&HgV,CW.&L.B.O'Brien (1m male, LBOB); same, Hdgtrs., VII-13-1996, UV trap, L.B.O'Brien (1m male, LBOB). **GUATEMALA:** Morales, Oct. 1930, J. J. White (1m male, NCSU). **HONDURAS:** Zomorano, IX-3-1964, G.A. Axtoll (1m male, CDAE). **PANAMA:** 10 ix 52 (1m male, USNM); same, FSblandon (1m male, USNM); Pt. Aguadulce, 21 xi 52, FSblandon (1m male, USNM). [**COLOMBIA:** Interception at Miami, FLA. [USA], Oct.6, 1957, on *gladiolus* flowers (1m male, USNM). **VENEZUELA:** Guarjico], 35km.N.Calabozo, 610', 7-21-1988, C&L O'Brien & G. Wibmer (1m male, LBOB); Guar., 13km.NW.SanFdo de Apure, 7-23-1988, C&L. O'Brien & G. Wibmer, UV (2m males, LBOB); same, 7-24-1988 (2m males, LBOB); Guar., 28km.N.Calabozo,

350', 7-27-1988, C&L. O'Brien & G. Wibmer (1m male, LBOB); 13km.E.ElSombero, 640', 7-27-1988, C&L. O'Brien & G. Wibmer (2m males, LBOB); Apure, 300', 32km.SE.SanJuan de Payara, 7-25-88, C&L. O'Brien & G. Wibmer (4m males, LBOB); Apure, Hato El Frio, 26km.W. El Saman de Apure, 340', 7-24-88, C&L O'Brien & G. Wibmer (1m male, LBOB); Apure, near San Fernando de Apure, 7°50'44"N 67°29'10"W, 20-VI-2000, blacklight trap, P.M. Freytag, M.A. Gaiani, Q. Arias (2m males, UKYL). **SURINAME:** Nickerie, Aug. 1953, J.M.B. vanDinther (2m males, NCSU). **BRAZIL:** Nova Teutonia, Santa Catarina, 1953, F. Plaumann (1m male, NCSU); Piracocaba, Sao Pulo, 20 Jan 1966, CA Triplehorn, Light Trp (1m male, LBOB). **BOLIVIA:** Santa Cruz Dept., 3.7kmSSE Buena Vista, Hotel Flora y Fauna, 430m, 17°29'S 63°33'W, MC Thomas, 14-28.x.2000 (2m males, UKYL); 10 mi. W. Portachuelo, 27March 1978, UV trap, G.B. Marshall (1m male, LBOB). **PARAGUAY:** 3 km. E. Ypacarai, VII-6-1968, at night, L. & C.W. O'Brien (2m males, LBOB); same, X-7-1968, C.W. & L. O'Brien (9m males, LBOB); 7 km. N. B. Acerval, X-12-1968, at night, C.W. & L. O'Brien (1m male, LBOB); 9km. S. San Bernadino, 6-VII-1968, L. & C.W. O'Brien (1m male, LBOB); Capiata, VII-6-1968, L. & C.W. O'Brien (1m male, LBOB). **URUGUAY:** Colonia, Colonia del Sacramento, 30-III-1969, en la Resaca, G.J. Wibmer & M.S. Moratorio (1m male, LBOB).

Toya nigra

USA: FLORIDA: Monroe Co., Middle Keys, US Route 1, MM 53.5; Marathon Holiday Inn; 24 43 56N 81 01 09W 10-Jan-2006; A Gonzon, sweeping turfgrasses (1m male, UDCC). **MEXICO:** Vera Cruz, Vera Cruz, XI-1963, NLHKrauss (1m male, USNM); Coatepec, 4100ft. K-342, 14.x.1945, Meadow, weed + sycamore, D.M. DeLong (2m males, UKYL).

PUERTO RICO: Carite IF, 10-2-47 (1m male, USNM). **CAYMAN ISLANDS:** Cayman Brac, TheCreek, UV trap, 7-XI-1995, C.R. Dilbert (2m males, LBOB); same, 6-XII-1995 (1m male, LBOB); same, 8-XII-1995 (1m male, LBOB). **JAMAICA:** St. Jam. Par., ca. 6kms Montego Bay near Mocho Cave, 12 XII 1975, 300 mtrs, Gary F. Hevel (1m male, USNM). **GUADALOUPE:** Grande Terre, July 1963, J Maldonado C (1m male, USNM). **DOMINICA:** Clark, Hall, 8 X 1966, ELTodd (1m male, USNM).

BELIZE: Demerara River Bank, 1mi from Georgetown, [606], HMorrison, Sep 22 '18 (1m male, USNM); Stann Creek Dist., nr Silkgrass Southern Hwy, Roadside, 7-Jan-2003, CRBartlett, (1m male, UDCC); Toledo Dist., Blue Creek Village, 26-V-1999, J.Shuey, UVlight (1m male, LBOB). **COSTA RICA:** San Pedro de Montes de Oca, #3517, CHBallou, on grass, Feb.22'35, (1m male, USNM); Cart. vi-viii-1993, 1300m, Dulce Nombre, Vivero Linda Vista, malaise, Hanson (1m male, LBOB). **PANAMA:** Canal Zone, Ft. Sherman, Light Trap (1m male, USNM); Banlith, 30 vii 52, F.S.Blanton (1m male, USNM); 10 xi 52, FSBlanton (1m male, USNM). **COLOMBIA:** Cun[dinamarca], Funza, 15-III-1956, Alt. 2550 mts., L. Posada, *Solanum andigenum* (1 male, USNM, genitalia only). **VENEZUELA:** Guar[ico], Calabozo Dam, near city, 7-22-1988, C&L O'Brien & G. Wibmer (1m male, LBOB); Amazonas, Aqua Linda R., 18-20.vi.2000, 5°49'5"N 67°26'29"W, P.Freytag et al., sweep (3m males, UKYL); same, 5°49'5"N 67°27'29"W, Sweep, P. Freytag MAGaiani QArias (1m male, UKYL); Apure, near San Fernando de Apure, 7°50'44"N 67°29'10"W, 20-VII-2000, blacklight trap, P.M. Freytag, M.A. Gaiani, Q. Arias, (1m male, UKYL). **BRAZIL:** Piracicaba, San Paulo, 9-XII-1964, C.A. & W.E. Triplehorn, Blacklight trap (2m males, UDCC); Rondonia, 8km.N.Porto Velho, 7 Oct.1984, ex light fixture, J. F. Cornell Collection (2m males, NCSU). **BOLIVIA:** Santa Cruz [Dept.], 3.7km SSE Buena Vista, Hotel Flora y Fauna, 430m, 17°29'S 63°33'W, MC Thomas, 14-28.x.2000 (1m male, UKYL); 5 mi.W. Pto Banegas, March 25, 1978, G. B. Marshall (1m male, LBOB). **ARGENTINA:** Ciudad Universitaria, P. Tucuman, X-18-1968, L&C.W. O'Brien (1m male, LBOB).

Toya venilia

TURKS AND CAICOS ISLANDS: Long Cay (south of South Caicos Isl.), February 10, 1953, Van Voast – A.M.N.H., Bahama Isl. Exped., E.B.Hayden (1b males, AMNH). **PUERTO RICO:** Muertos I[slan]d, XII-5-47, JSCaldwell (5b males, USNM); same, XII-11-47 (5b males, 1b female, USNM). **US VIRGIN ISLANDS:** St. John, April 1, 1961, H.J. Maldonado C (1m male, USNM). **BRITISH VIRGIN ISLANDS:** Guana Island: 27-X-1997, C.R.Bartlett, Beating/sweeping (4b males, 1b female, UDCC); Guana Flats @Pond, 3-X-1994, C.R.Bartlett, sweeping (1b male, 3b females, UDCC); Necker Island, 24-X-1997, B. Denno, D-Vac@Salt pond (1m male, 4b males, 5b females, UDCC); 24-X-1997, B. Denno, D-Vac@salt pond, *Sporobolus* grass (1b male, UDCC); 27-X-1999, R Denno – dvac (10m males, 40b males, 1m female, 23b females, UDCC); same, Necker Flats (13m males, 206b males, 3m females, 178b females, UDCC).