

Taxonomic Changes in North American Issidae (Homoptera: Fulgoroidea)

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ABSTRACT Taxonomic changes since Doering's (1936-1941) monograph of the U.S. Issidae are summarized. Two new combinations, *Danepteryx sequoiae* (Bliven) (*Epidanepteryx*) and *Hysteropterum ustulata* (Uhler) (*Tylana*), and seven new synonymies are reported. *Epidanepteryx* Bliven is synonymized with *Danepteryx* Uhler and *Issovarcia* Bliven with *Neaethus* Stål. *Epidanepteryx santana* Bliven is synonymized with *Danepteryx barbarae* Kirkaldy, *Dictyonia psychodimorpha* Bliven with *Dictyonia obscura* Uhler, *Hysteropterum beameri* Doering with *Hysteropterum severini* Caldwell and DeLong, *Hysteropterum morum* Van Duzee with *Tylana ustulata* Uhler, and *Issovarcia dipteroides* Bliven with *Neaethus bicornis* Doering. Doering's generic key is modified and species described since her monograph are listed, including those in contiguous states of Mexico.

KEY WORDS Insecta, key, introduced species

DOERING'S (1936, 1938, 1939, 1941) monograph of the Issidae is the definitive work on this planthopper family for America north of Mexico. There have been numerous changes at the subfamily, generic, and species levels since publication of her monograph. I summarize these changes and synonymize genera and species in this paper, based on comparisons with Bliven's, Van Duzee's, and Horvath's types, and Doering's illustrations.

Several changes have been made at the subfamily level. Fennah (1954) reduced Acanaloniidae to a subfamily within Issidae, considering "the gap between typical Issidae and Acanalonia is very nearly bridged by the condition in *Euthiscia* . . ." Although not followed by most U.S. workers (O'Brien & Wilson 1985), Fennah has recently been supported by Wheeler & Wilson (1987). For the time being, I have retained *Euthiscia* in the key to issid genera. In addition, Fennah (1984) placed nine issid genera—*Dyctidea*, *Dictyobia*, *Dictyonia*, *Osbornia*, *Neaethus*, *Dictyonysus*, *Misodema*, *Dictyssa*, and *Danepteryx*—in the nogodinid subtribe Gaetuliina. Although the nogodinid genus *Gaetulia* and the issid genus *Neaethus* appear to be sister taxa (unpublished data), Fennah's (1984) rearrangement has resulted in great confusion: Issidae and Nogodinidae cannot be separated as families by a simple key but must be identified to tribe through a series of four papers, including a key to five tribes, a description of one subfamily, and descriptions of six other tribes (Fennah 1954, 1978, 1984, 1987). For this reason, I am following the old classification and treating these North American genera as issids until a more practical guide is worked out.

Changes at the generic level include the addition of two genera introduced into California, the date palm (*Phoenix dactylifera* L.) pest, *Asarcopus palmarum* Horvath (McAtee 1926, Stickney et al. 1950, Carpenter & Elmer 1978), and *Caliscelis bonellii* Latreille (O'Brien 1967). Doering (1938) did not include the genus *Tylanira* in her key because of lack of specimens. The genus *Tylana* is deleted from the United States because the only representative, *T. ustulata* Uhler (which was not seen by Doering), belongs in *Hysteropterum*. Fennah (1954) states that the genus *Tylana* occurs only in the Mascarene Islands, and *T. ustulipunctata* Uhler from Mexico should be referred to *Thionia*. The genera *Epidanepteryx* Bliven and *Issovarcia* Bliven are synonyms of *Danepteryx* Uhler and *Neaethus* Stål, respectively.

Changes at the species level include synonymy and recent additions to the United States fauna (Caldwell, 1945; Caldwell & DeLong 1948; Doering 1948; Bliven 1966; O'Brien 1986a,b; Wheeler & Wilson 1987). Only one of the four species described by Bliven (1966) is valid; the others and his two new genera are synonymized (the species in his genera are junior synonyms of species in other genera). The valid species *Epidanepteryx sequoiae* is placed in *Danepteryx*. The changes at the species level total two new combinations and five new synonymies; the additions include two species introduced into the United States, one corrected misidentification, and five recently described species; thus a total of 23 genera and 132 species are found in America north of Mexico (not including the genus *Acanalonia* with 18 species). Seven species described from the six states of Mexico contiguous to

the United States are listed because they may be found in the United States in the future.

Key to the Genera of Issidae

(Modified from Doering 1938: 448-449)

Because Doering did not publish an index, I have added numbers following generic names in the key which refer to the part and page of her monograph where the key to the species is found.

1. Tegmina entirely covering abdomen or greater portion of it, parchmentlike or vitreous, or a combination of both 2
Tegmina short and usually extending only partially over abdomen, except in macropterous forms of some species, which are always more or less hyaline, parchmentlike, thick, or opaque 16
2. Hind wings either absent, rudimentary, or very narrowed with vein Sc₁ present and veins Cu₁ branched or hind wings long, notched at apex, vein Sc₁ not present and vein Cu₁ not branched; posterior tibiae with 2 to 5 spines, or entirely unarmed . . . 3
Hind wings present, narrow, not notched at apex, anal area small or rudimentary: posterior tibiae with 2 to 4 lateral spines; vein Sc₁ absent 4
3. Hind wings present, entire, with strongly marked notches at the joints of the folds, anal area large; vein Sc₁ absent; usually large insects varying from 5.5 to 8.1 mm 6
Hind wings usually absent or rudimentary (a few species of *Neaethus* excepted); vein Sc₁ present (*Dictyssonina* excepted); small insects, usually under 5.5 mm 7
4. Frons deeply emarginate at base, vertex emarginate at apex, thus forming lateral triangular projections inclined upward, in dorsal view exceeding eye by length of eye *Tylanira* Ball (3: 144)
Vertex not as above 5
5. Frons deeply concave or perpendicular; clypeus strongly deflexed and horizontal *Traxus* Metcalf (2: 449)
Frons not concave; clypeus not as deeply inflexed or horizontal . . . *Ulixes* Stål (2: 452)
6. Cubital vein of tegmen simple and costal region vertical to the body; posterior tibiae with 2 spines . . . *Thionia* Stål (2: 458)
Cubital vein of tegmen branched; posterior tibiae with usually 4 spines *Picumna* Stål (2: 471)
7. Tegmina more or less opaque or with vitreous spots and oblique bands 8
Tegmina vitreous entirely (except *Misodema* and some species of *Neaethus* parchmentlike) 12
8. Vertex not conically produced; posterior tibiae with one or more spines 9
Vertex conically produced; posterior tibiae without spines; tegmina not extending beyond tip of clavus *Euthiscia* Van Duzee (2: 479)
9. Tegmina with vitreous patches or spots (*Dictyssa fusca* excepted), not necessarily narrowed at apices; posterior tibiae with 2 to 4 spines 10
Tegmina uniformly opaque with no vitreous spots or bands, narrowed and rounded at apices; more or less thickly branched veins; posterior tibiae with 1 or 2 spines *Hysteropterum* Amyot et Serville (2: 481)
10. Tegmina either as broad as long or approximately semicircular in shape, partly opaque, usually with an oblique hyaline band across clavus and corium or with some sort of hyaline markings; costal margin decidedly rounding 11
Tegmina oblong, costal margin nearly straight, or if rounding, with a distinct bulla present at base of each wing 14
11. Tegmina semicircular in shape, not closely adpressed to body, veins of corium forming irregular cells, some of which usually (not always) are vitreous or light colored *Dictyssa* Melichar (1: 424)
Tegmina almost as broad as long, held almost vertically, cells of corium exceptionally few and large and distinctly angular *Dictyonina* Uhler (2: 496)
12. Upper surface hispid; vertex obtusely produced; posterior tibiae with 3 spines; tegmina with a fine network of coarse veins, main veins not evident *Dictyonissus* Uhler (2: 498)
Upper surface not hispid; vertex not produced or, if so, triangularly produced; posterior tibiae with 2 or 4 spines 13
13. Tegmina placed more or less vertically, close to body; posterior tibiae with 2 spines; head and eyes as broad as or broader than pronotum *Neaethus* Stål (2: 502)
Tegmina opaque, strongly inflated, gradually narrowed behind and with very short clavus; head narrower than pronotum; posterior tibiae with 4 strong spines *Misodema* Melichar (2: 534)
14. Tegmina broad, costal margin rounding . . 15
Tegmina decidedly oblong, approximately same length throughout, with costal margin nearly straight . . *Dictydea* Uhler (3: 89)
15. Tegmina with distinct bullae at outer angles of the corium; reticulation finer *Dictyssonina* Ball (2: 536)
Tegmina broadest just at middle; reticulation coarser *Dictyobia* Uhler (3: 84)
16. Body robust; narrow, lance shaped tegmina, extending spearlike to or beyond apex of abdomen *Danapteryx* Uhler (3: 136)
Body more elongate, tegmina not strap

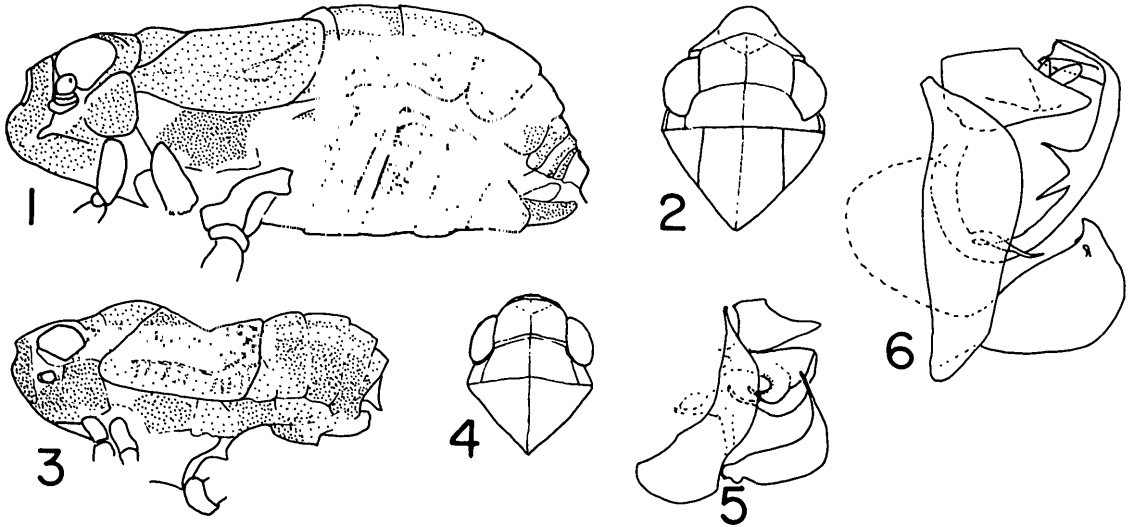


Fig. 1-6. *Asarcopus palmarum* Horvath. (1) Female, lateral view. (2) Female, dorsal view of head. (3) Male, lateral view. (4) Male, dorsal view of head. (5) Male genitalia, lateral view. (6) *Danepteryx sequoiae* Bliven, male genitalia, lateral view.

- shaped, usually covering only one-half of abdomen 17
- 17. Fore tibia expanded, foliaceous 18
- Fore tibia not expanded, not foliaceous ... 19
- 18. Fore and middle tibiae expanded (only slightly in *robertsoni*); frons, vertex, or pronotum pustulate
..... *Fitchiella* Van Duzee (4: 209)
- Only the fore tibia expanded; no pustules on head or thorax .. *Caliscelis* de Laporte
- 19. Frons, vertex, or pronotum with pustules .. 20
- Pustules absent 22
- 20. Vertex longer than broad
..... *Papagona* Ball (3: 146)
- Vertex broader than long 21
- 21. Head produced snoutlike; vertex crescent shaped, 5-6 times as broad as long
..... *Bruchomorpha* Newman (3: 102)
- Head not produced snoutlike; vertex usually less than 4 times as broad as long (*decorata*, *simplex*, and *obscura* excepted) ...
..... *Aphelonema* Uhler (4: 187)
- 22. Forewings touching medially, tightly fitted to body; introduced, on date palms in California *Asarcopus* Horvath
- Forewings slightly separated medially, not touching body along all margins
..... *Osbornia* Ball (3: 96)

New Generic Synonymies

- Danepteryx* Uhler 1889: 42.
- Epidanepteryx* Bliven 1966: 105. New synonymy.
- Neaethus* Stål 1861: 208.
- Issovarcia* Bliven 1966: 104. New synonymy.

Specific Additions and Synonymies

Asarcopus palmarum Horvath 1921: 179. CALIFORNIA. (Fig. 1-5)

This species is sexually dimorphic in the shape of the lateral and frontal view of the head and the color pattern of the wing, which is pale straw in the female. In the male, the wing has a dark veinless oval spot in the claval area contiguous to a smaller white veinless oval spot slightly behind and below it. The male is shinier, has more color contrast, and has a humped thorax and an indentation at the junction of the thorax and abdomen, whereas the female is smoothly tubular. Specimens from California are straw-colored with darker brown markings. The type series of males from Egypt is medium brown with the same wing marking. A long series of males and females collected on the palm *Caryota urens* L. near Bangalore and Pune (Poona), India is medium brown, much darker than the California specimens. The Indian specimens were found in the axils of the leaf fronds, as many as three in a group, being guarded by ants (*Camponotus* sp.). They were most numerous on the young fronds which had just achieved full color and shape after separating from the growing tip.

Bruchomorpha dorsolineata Caldwell 1945: 90. MEXICO: Nuevo León.

Bruchomorpha duocantha Caldwell 1945: 92. MEXICO: Coahuila.

Caliscelis bonellii Latreille 1807: 166. CALIFORNIA.

Colpoptera bifurcata Caldwell 1945: 116. MEXICO: Sonora.

Colpoptera stigmata Caldwell 1945: 114. MEXICO: Sonora.

Danapteryx barbarae Kirkaldy 1908: 23. CALIFORNIA.

Epidanapteryx santana Bliven 1966: 107. **New synonymy.**

The holotype of *E. santana* is a female. In the absence of a male specimen with distinctive genitalia, I would place it as *D. barbarae*, using the morphological characters Doering used in her key, comparative notes, and illustrations.

Danapteryx sequoiae (Bliven) 1966: 106. **New combination.** CALIFORNIA.

Epidanapteryx sequoiae Bliven 1966: 106. (Fig. 6)

This species cannot be identified from Bliven's description or illustration, but the male genitalia are illustrated here (Fig. 6). It may be distinguished from the other species by the two sets of spines on the aedeagus being equal in length, with the left distal spine pointed toward the apex and the right distal one pointed toward the body.

Dictydea texana O'Brien 1986b: 68. TEXAS.

Dictyonia obscura Uhler 1889: 41.

Dictyonia psychodimorpha Bliven 1966: 103. **New synonymy.**

The male genitalia of the holotype matches Doering's (1938) illustrations of *D. obscura*.

Dictyssa leonilae O'Brien 1986a: 138. MEXICO: Baja California.

Dictyssa schuhi O'Brien 1986b: 69. OREGON.

Hysteropterum bistriatum Caldwell 1945: 100. MEXICO: Nuevo Leon. TEXAS: Cameron, Hidalgo, Starr, and Webb counties (L.O.B. collection). **New record.**

Hysteropterum severini Caldwell & DeLong 1948: 176. CALIFORNIA.

Hysteropterum beameri Doering 1948: 101. **New synonymy.**

Although Doering and Caldwell & DeLong imply the species feeds on grape, subsequently they list other hosts. Schlinger (1958) reared this species on grasses and stated that none was observed feeding on grapevines during his study.

Schlinger (1958) described the mud egg cases of *Hysteropterum* on grape stakes in Sonoma County but was unable to observe oviposition. Sacchi (1930) observed and studied oviposition of *Hysteropterum liliimacula* Costa in Italy; a brief translation of her account is printed in O'Brien & Wilson (1985). She also illustrated the female genitalia and the membraneous "geotheca" in which she thought the mud was carried (I doubt this; I think mud would abrade the membrane).

Hysteropterum ustulata (Uhler) 1876: 354. **New combination.**

Tylana ustulata Uhler 1876: 354. ARIZONA, NEW MEXICO, COLORADO.

Hysteropterum morum Van Duzee 1923: 191. **New synonymy.**

Doering (1938) stated that she had not seen specimens of *H. morum* Van Duzee, which explains why she did not recognize it as a synonym of *Tylana ustulata* Uhler. The holotype female of *H. morum* was compared with a cotype of *T. ustulata*, which I here designate as lectotype. It is a female marked with the pale broad transverse band on the disk of the forewing described by Van Duzee (1923), but not by Uhler (1876), which is more representative of the variable color pattern in the series I have seen. The four labels are: "Ari" (Arizona); "P. R. Uhler Collection"; "co-type"; and "Lectotype, *Tylana ustulata* Uhler, L. B. O'Brien 1987" on red paper.

Mesodema dubia Caldwell 1945: 98. MEXICO: Coahuila.

Neaethus bicornis Doering 1941: 216. CALIFORNIA.

Issovarcia dipteroides Bliven 1966: 104. **New synonymy.**

Thionia elliptica (Germar) nec Doering (described and illustrated by Wheeler & Wilson 1987: 442). ARKANSAS, KENTUCKY, MISSOURI, NORTH CAROLINA, PENNSYLVANIA.

Thionia obrienae Wilson in Wheeler & Wilson 1987: 449. **New name for *Thionia elliptica* Doering nec Germar.** TEXAS.

Ulixes perpendicularis Caldwell 1945: 108. MEXICO: Tamaulipas.

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