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The psyllids (Hemiptera: Psylloidea) of Florida: newly established and rarely collected taxa and checklist

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Abstract. Psyllids are an economically important group of insects. Several species are serious emerging pests with regulatory significance. About 20 adventive species have been discovered in Florida in the past 20 years, including several pests. Additionally, five species new to science have been found. We provide an annotated checklist of Florida species with taxonomic information and identification tools, including keys to Florida genera and known species. Seventy species of Psylloidea currently are reported from Florida. Forty-one are native to Florida, with 12 endemic to the state. Twenty are adventive, the majority being from the Neotropics. One was introduced deliberately for biological control, seven represent temporary populations (eradicated, reared in quarantine), and one is a dubious record. *Craspedolepta euthamiae* Burckhardt and Halbert, **new species**, *Katacephala wineriterae* Burckhardt and Halbert, **new species**, *Pseudophacopteron gumbolimbo* Burckhardt and Halbert, **new species**, *Nothotrioza longipedis* Burckhardt and Halbert, **new species**, and *Trioza myresae* Burckhardt and Halbert, **new species** are described from Florida and are native endemic species. *Aphalara persicaria* Caldwell is redescribed and separated from similar species. *Aphalara persicaria* var. *cubana* Caldwell is confirmed as a junior synonym of *Aphalara persicaria*. The Florida records of *Craspedolepta* spp. are revisited and revised, including *Craspedolepta euthamiae* Burckhardt and Halbert, **new species.** *Bactericera nigrilla* (Crawford), **new combination, revived status** is recognized from Florida, redescribed, and distinguished from similar species. *Rhinopsylla caldwelli* Tuthill is transferred to *Kuwayama* Crawford and becomes *Kuwayama caldwelli* (Tuthill), **new combination.** *Trioza maritima* Tuthill is transferred to *Leuronota* Crawford and becomes *Leuronota maritima* (Tuthill), **new combination.** Species of *Bactericera* Puton on *Salix* L. (Salicaceae) in North America are reviewed. *Bactericera flori* (Crawford), **new combination, new status.** is determined to be the correct name for *Trioza assimilis* Crawford nec Flor (= *Trioza flori* Crawford, replacement name, = *Trioza pomonae* Aulmann, replacement name), and *Trioza dubia* Patch, **new synonym.** Lectotypes are designated for *Trioza marginata* Crawford, *Trioza minuta* Crawford, *Trioza minuta similis* Crawford, and *Trioza nigra* Crawford.

Key words. Taxonomy, new species, adventive species, host plants, distribution

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Introduction

Psyllids comprise an economically important group of insects that includes several important emerging pest species. Psyllids can do direct damage to crops and ornamental plants, but possibly the most severe impacts come from transmitted plant pathogens, primarily fastidious prokaryotes (Halbert and Manjunath 2004). The establishment of *Diaphorina citri* Kuwayama and its associated plant pathogens has resulted in a 74% production decline in citrus, Florida's signature crop (Singerman and Rogers 2020). Psyllids can travel with global trade in plant materials, a trend that has been noticeable in Florida in the past two decades.

One of the most important assignments for the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (DPI) is to find and monitor potential plant pests in the state. Florida is a sentinel state, with numerous seaports, airports, and extensive tourist traffic. Moreover, the climate of Florida is warm and humid, and the plant community includes a diverse assortment of ornamentals, crops, and native plants, providing an ideal environment for insects to establish viable populations. As a result, Florida has become home

to many exotic species (Frank and McCoy 1992, 1995). DPI has several hundred inspectors and fruit fly trappers whose job is to search for and submit arthropods for identification. Additionally, public and research associate submissions, on-going trapping programs and miscellaneous surveys are a source for other new records for Florida, including those for psyllids. Most species found are relatively inconsequential additions to the ecosystem, but some become serious pests.

This paper summarizes psyllids found in Florida, including relatively recent finds (subsequent to Hodkinson 1988), provides additional notes on some rarely collected species, and provides descriptions of five species new to science. Several Florida species required additional taxonomic scrutiny because they were members of unresolved species complexes, including *Aphalara persicaria* Caldwell, Florida species of *Craspedolepta* Enderlein, and *Bactericera nigrilla* (Crawford). These complexes are discussed in detail. Identification information also is provided.

Materials and Methods

Some of the psyllids reported here were collected by DPI and USDA-APHIS-PPQ inspectors. These submissions are part of the regular activities of the DPI diagnostics service. Other psyllids came from Florida suction traps. Suction traps are large machines made of 180 cm long, 38 cm diameter, PVC pipes, mounted vertically on posts about 45 cm above the ground level. The traps have an electric fan in the bottom to suck insects into a collection jar that is mounted above the fan at the bottom of a screen cone, which directs the catch into the jar. Some of the traps (tall) have a tower made of 6 m of 33 cm diameter PVC pipe that is mounted vertically on top of the base described above using a PVC reducing bell (Allison and Pike 1988). Short traps lack the tower assembly. Suction trap collections, even of single specimens, are indicative of high numbers of airborne psyllids (Halbert et al. 1990, 1998).

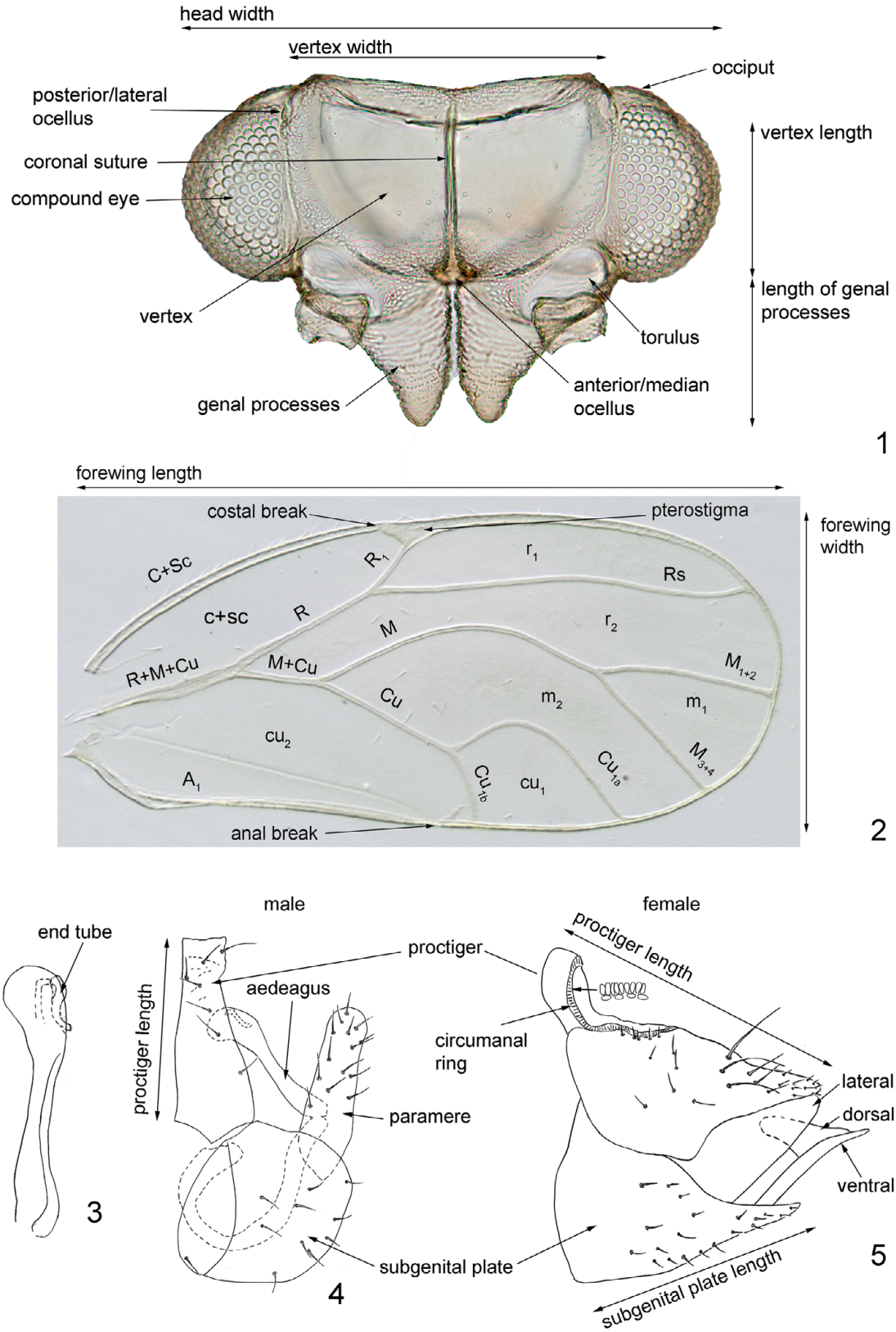
When possible, collections were curated using three different techniques. Adults were pointed and pinned (dry mounted), adults and immatures were slide mounted, and/or preserved in 70% ethanol. Material from the following institutions was examined: **FSCA**—Florida State Collection of Arthropods, Gainesville, FL, USA; **MHNG**—Muséum d'histoire naturelle, Genève, Switzerland; **MMBC**—Moravian Museum, Brno, Czech Republic; **NHMB**—Naturhistorisches Museum, Basel, Switzerland; **USNM**—United States National Museum collections, Beltsville, MD, USA.

Photographs were taken by Lyle Buss, University of Florida (Fig. 86–89, 93, 94, 139–146, 149, 151, 152, 172, 173, 185, 193, 218), Anthony Dickens, DPI (Fig. 150), Jake Farnum, DPI (Fig. 196), Susan Halbert (Fig. 95, 96, 148, 184), Jeffrey Lotz, DPI (Fig. 90, 91, 98, 99, 147, 181, 194, 219, and 100, 101 with David Ziesk, DPI), José Rodriguez, USDA (Fig. 97), Susan Wineriter Wright, USDA (Fig. 92, 102, 103, 115, 116), and David Ziesk, DPI (Fig. 182, 183). The remaining photographs and all drawings were made by Daniel Burckhardt.

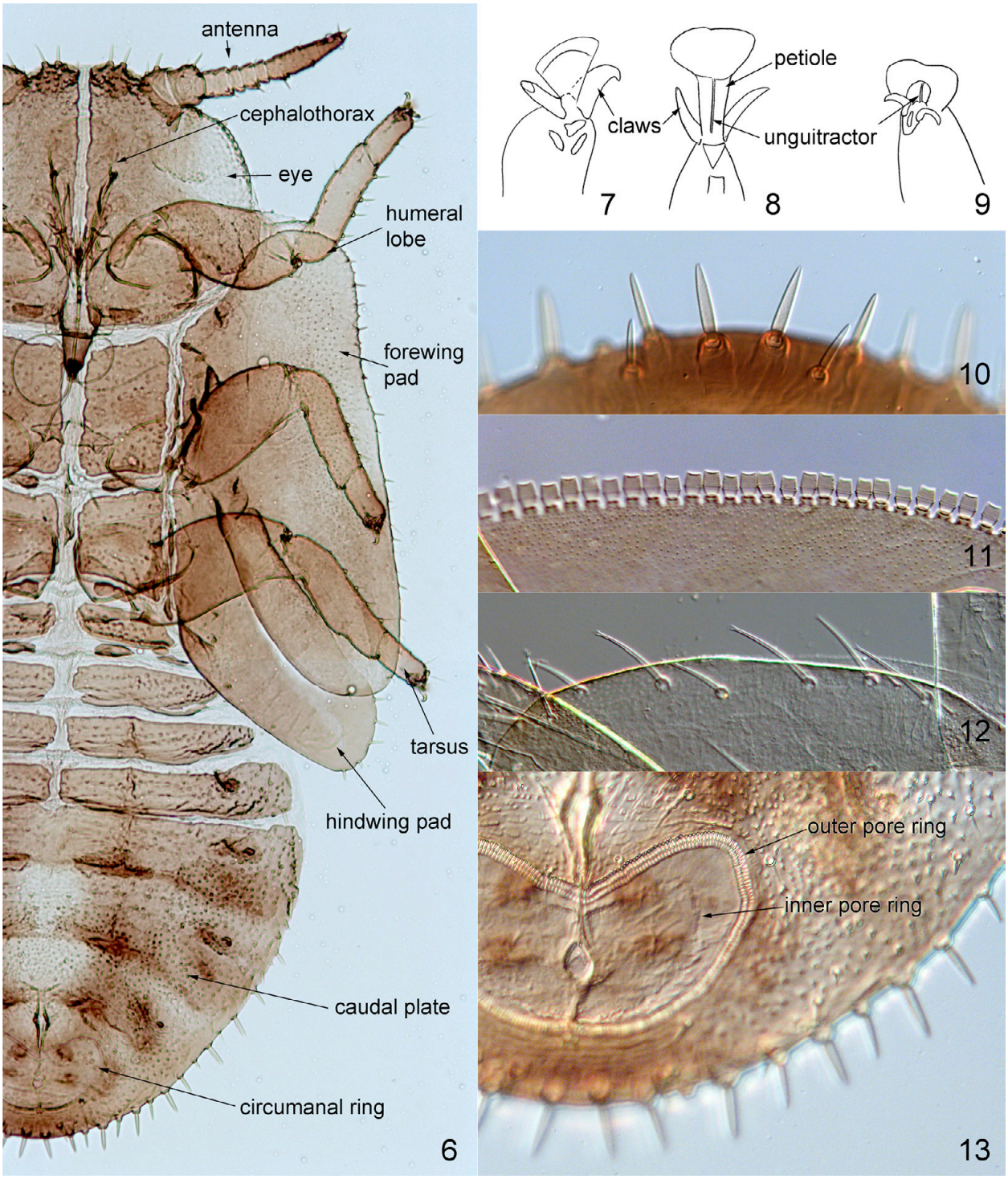
In some cases, page numbers are listed with references so that readers can find the taxa easily, e.g. "Caldwell 1937: 565," where 565 is the page number where the relevant information can be found. In the identification keys we refer to published illustrations, e.g. "Hollis 1987: fig. 35".

The morphological terminology, which follows mostly Ossiannilsson (1992), Brown and Hodkinson (1988) and Hollis (2004), is detailed in Fig. 1–13. The classification adopted here is that of Burckhardt and Ouvrard (2012). The synonymies can be found in the Psyl'list (Ouvrard 2020). The plant names are cited according to the World Flora Online (WFO 2020).

In "Materials examined," detailed collecting/label data are given for specimens used for taxonomic discussions and changes, and for nomenclatural acts. Specimens used only for biological information such as distribution, host information and seasonality are listed more informally by FSCA number (always on the specimen label) and other data as relevant to the discussion. A few older collections have no FSCA number. If extensive, materials examined from Florida are organized by county and within county by collection date. For some new records, the "Distribution" sections are expanded to include relevant range expansion chronology.



Figures 1–5. Morphological terminology of adult Psylloidea. **1)** Head, dorsal view. **2)** Forewing. **3)** Distal segment of aedeagus. **4)** Male terminalia, in profile. **5)** Female terminalia, in profile.



Figures 6–13. Morphological terminology of immature Psylloidea. **6)** Habitus, right half. **7–9)** Apex of tarsus with arolium and claws. **7)** Arolium lacking unguitractor and petiole. **8)** Arolium bearing unguitractor and petiole. **9)** Arolium bearing unguitractor and lacking petiole. **10–12)** Types of setae. **10)** Lanceolate setae. **11)** Truncate sectasetae. **12)** Capitate setae. **13)** Circumanal rings and anus.

Systematics

Key to genera of Psylloidea of Florida

[* = genera not currently known to be established in Florida but with suspected risk for incursion.]

1. Forewing vein R+M+Cu usually clearly bifurcating into veins R and M+Cu (Fig. 2); if M+Cu very short and bifurcation indistinct (*Katacephala*) (Fig. 104) then anal break close to apex of vein Cu_{1b}, metatibia with an open crown of spurs and metabasitarsus with two lateral spurs **2**

— Forewing vein R+M+Cu strictly or approximately trifurcating into veins R, M and Cu, or indistinctly bifurcating into veins R+M and Cu; anal break distant from apex of vein Cu_{1b} (Fig. 204). Metatibial spurs always grouped, usually with 1+2 or 1+3, rarely 2+(3–4) (in *Nothotrioza*). Metabasitarsus lacking lateral spurs **31**

2(1). Forewing veins Rs and M_{1+2} linked by a non-tracheate pseudovein (Hollis 1987: fig. 35) or joined to form a cross-like pattern (Fig. 129). **3**

— Forewing veins Rs and M_{1+2} separate, not linked by a non-tracheate pseudovein (Fig. 2) **4**

3(2). Forewing angular at apex; pterostigma developed; veins Rs and M_{1+2} linked by a non-tracheate pseudovein. On Malvaceae . . . . . ***Paracarsidara*** **Heslop-Harrison**

— Forewing rounded at apex; pterostigma absent; vein Rs joined with M_{1+2} to form a cross-like pattern; veins bordered with brown pattern (Fig. 122–130). On Burseraceae . . . . . ***Pseudophacopteron*** **Enderlein**

4(2). Head with a deep U-shaped cleft in front between the antennae, formed by the strongly produced toruli (Burckhardt et al. 2011: fig. 10). Basal part of antennal segment 3 thickened (Fig. 98) . . . . . ***Mastigimas*** **Enderlein**

— Head not deeply cleft between the toruli (head may appear cleft due to the genal processes, but the antennae are not attached to these) (Fig. 45). Antennal segment 3 not thickened **5**

5(4). Forewings with anal break distant from apex of vein Cu_{1b}. Proximal segment of aedeagus straight . . . . . ***Calophya*** **Löw**

— Anal break in forewings adjacent to apex of vein Cu_{1b}. Proximal segment of aedeagus curved **6**

6(5). Vertex quadrate, flat, longer than its width, and in the same plane with the thorax. Antennae directed forward. Forewings usually leathery and maculated. Median ocellus ventral. Eyes flattened. Metabasitarsus lacking lateral spurs . . . . . ***Livia*** **Latreille**

— Combination of characters different. Vertex not as above; if vertex is flat and quadrate, median ocellus is dorsal, or vertex is not in the same plane as the thorax. Eyes never flattened. Metabasitarsus variable **7**

7(6). Meracanthus of the metacoxae absent **8**

— Meracanthus of the metacoxae tubercular or horn-shaped **11**

8(7). Head lacking genal processes. Forewings covered in small dark dots, irregularly rounded at the tip . . . . . ***Tainarys*** **Brèthes**

— Head bearing genal processes. Forewings lacking dark pattern consisting of small dots **9**

9(8). Genal processes less than 0.4 times vertex along mid-line. Forewings rounded at the tip (Fig. 92) . . . . . ***Blastopsylla*** **Taylor**

— Genal processes 0.8 times or more times as long as the vertex along mid-line. Forewings angulate at the tip **10**

10(9). Antennae short, less than twice as long as head width, about a third of forewing length (Fig. 93). Apical segment of male proctiger about as long as basal segment . . . . . ***Boreioglycaspis*** **Moore**

— Antennae long, more than twice as long as head width, more than half of forewing length. Apical segment of male proctiger much shorter than basal segment. Infestation see Fig. 95 . . . . . ***Glycaspis*** **Taylor**

11(7). Mesotibia bearing a comb-like row of bristles subapically (Burckhardt et al. 1999: fig. 5) ..... **Ctenarytaina* **Ferris and Klyver**

— Mesotibia lacking a comb-like row of bristles subapically **12**

12(11). Head, thorax and forewing veins with numerous spots. Genal processes chubby and as long as the vertex ..... ***Euphalerus* Schwarz**

— Head, thorax and forewing veins lacking spots (wing membrane may have spots). Genal processes either lacking or not chubby and as long as the vertex **13**

13(12). Head lacking genal processes. Metatibia lacking genual spine (= smooth at base); bearing an open crown of evenly spaced apical spurs. Male proctiger with long posterior processes **14**

— Combination of characters different **17**

14(13). Metacoxa with area beneath meracanthus strongly swollen (Burckhardt and Queiroz 2013: fig. 4) .. **15**

— Metacoxa with area beneath meracanthus flattened **16**

15(14). Clypeus long, tubular, extended perpendicularly to ventral head surface, with shoulder-like constriction medially. Forewings transparent, colorless, leading edges of same color as remainder of wings; thorax varying from green to orange-red ..... ***Gyropsylla* Brèthes**

— Clypeus short, subspherical. Forewings translucent yellow with black leading edges; thorax black with deep orange highlights (Fig. 86, 87) ..... ***Limataphalara* Hodkinson**

16(14). Clypeus tubular, often very long. Vertex angular anteriorly, separated from genae by narrow groove ... ***Aphalara* Foerster**

— Clypeus spherical. Vertex usually rounded anteriorly, passing smoothly into genae (Fig. 46, 47) ..... ***Craspedolepta* Enderlein**

17(13). Each half of vertex subquadrate and flat, anteriorly separated from genae by transverse suture or furrow. Genal processes developed, conical **18**

— Each half of vertex usually trapezoidal; if subquadrate (*Aphalaroida*), anteriorly passing smoothly into geneae which lack processes **20**

18(17). Head hardly inclined from longitudinal body axis (Fig. 100) ..... ***Diaphorina* Löw**

— Head strongly inclined (90°) from longitudinal body axis **19**

19(18). Brown insects with maculated forewings ..... ***Pachypsylla* Riley**

— Yellow insects with seven dark spots on the thorax; forewings hyaline (Fig. 90) ..... ***Tetragonocephala* Crawford**

20(17). Genal processes absent. Forewings trapezoidal and translucent orange ..... ***Aphalaroida* Crawford**

— Genal processes developed. Forewings different **21**

21(20). Metabasitarsus lacking lateral sclerotized spurs ..... **Russelliana* **Tuthill**

— Metabasitarsus bearing one or two lateral sclerotized spurs **22**

22(21). Metatibia lacking genual spine; bearing an open crown of 6–9 evenly spaced apical spurs **23**

— Metatibia usually with genual spine; apical spurs always grouped, usually 1+3+1, rarely more **24**

23(22). Forewing with veins R and M+Cu of subequal length. Genal processes widely separated in the middle, clearly separated from vertex by transverse groove; pale insect with a black spot on the metapostnotum ..... ***Freysuila* Aleman**

— Forewing with vein R much longer than M+Cu (Fig. 104). Genal processes contiguous in the middle, weakly separated from vertex (Fig. 107) ..... ***Katacephala* Crawford**

24(22). Genae not produced into processes ..... ***Heteropsylla* Crawford**

— Genae produced into conical processes **25**

25(24). Antennae shorter than twice head width **26**

— Antennae longer than twice head width **29**

26(25). Cell cu_1 of forewing low, vein Cu_{1b} much shorter than vein Cu ..... **Cacopsylla* **Ossiannilsson**

— Cell cu_1 of forewing high, vein Cu_{1b} 0.8 times as long as or longer than vein Cu **27**

27(26). Body small, including folded wings shorter than 2.0 mm. Thorax may be dark, but head almost totally pale with a dark band separating the frons from the genae, resembling the face of a raccoon, ventral side and abdomen green or yellow. On *Avicennia* L. (Acanthaceae) ..... ***Telmapsylla* Hodkinson**

— Body larger, including folded wings longer than 2.0 mm. Body color different. On Fabaceae **28**

28(27). Antenna distinctly longer than head width. Male proctiger with posterior lobes; paramere, in profile, lamellar. Habitus see Fig. 141, 142 ..... ***Acizzia* Heslop-Harrison**

— Antenna about as long as head width. Male proctiger tubular, lacking posterior lobes; paramere, in profile, ax- or hammer-shaped ..... ***Amorphicola* Heslop-Harrison**

29(25). Vertex with prominent ridge on either side of coronal suture, with a depression between the ridges. Male proctiger with posterior lobes ..... ***Mitrapsylla* Crawford**

— Vertex flat on either side of coronal suture. Male proctiger tubular, without posterior lobes **30**

30(29). Forewing slightly truncate apically (Fig. 145, 146). Paramere bifid ..... ***Euceropsylla* Boselli**

— Forewing broadly rounded apically. Paramere simple ..... ***Psylla* Geoffroy**

31(1). Metatibia with more than 4 [(2–4) + (3–4)] metatibial spurs. Habitus see Fig. 185 ..... ***Nothotrioza* Burckhardt**

— Metatibia with 1+2 or 1+3 metatibial spurs **32**

32(31). Vein R+M+Cu of forewing with trifurcation slightly off-set, bifurcating into veins R+M and Cu or R and M+Cu **33**

— Vein R+M+Cu strictly trifurcating into veins R, M and Cu (Fig. 156) **34**

33(32). Forewings entirely hyaline; vein R+M+Cu of forewing conspicuously long (almost half as long as wing), bifurcating into veins R+M and Cu. Body light brown; genae dark ..... ***Ceropsylla* Riley**

— Forewing with a dark cross band; vein R+M+Cu of forewing about a third of wing length, bifurcating into veins R and M+Cu. Body orange and white; genae pale ..... ***Hemitrioza* Crawford**

34(32). Metatibia with 1+2 apical spurs **35**

— Metatibia with 1+3 apical spurs **38**

35(34). Rostrum very long; visible portion of segment 2, in frontal view, distinctly longer than segment 3. Genae lacking processes. Male proctiger weakly produced posteriorly but not with lobes ..... ***Kuwayama* Crawford**

— Rostrum short; visible portion of segment 2, in frontal view, about as long as segment 3. Genae usually bearing conical processes, if lacking then male proctiger with posterior lobes **36**

36(35). Forewing veins bordered in brown; marginal cells small and darkened. Vertex outlined anteriorly by a semi-circular ridge ..... ***Phylloplecta* Riley**

— Forewings different. Vertex variable **37**

37(36). Genal processes absent, or if present, then antennal segments 4–8 dark. Male proctiger with posterior lobes (Fig. 158, 164, 165). Habitus see Fig. 149, 151 ..... ***Bactericera* Puton**

— Genal processes always developed. Antennal segments 4–8 light. Male proctiger without posterior lobes (Fig. 206). Habitus see Fig. 201 ..... ***Trioza* Foerster**

38(34). Body mostly shiny black. Head and thorax with long conspicuous setae. Forewing with cell m_1 much larger than cell cu_2. Hindwing at most half as long as forewing ..... ***Baeoalitriozus* Li**

— Combination of characters different. Hindwing more than half as long as forewing ..... ***Leuronota* Crawford**

Annotated checklist of Psylloidea of Florida

Aphalaridae Löw, 1879
Aphalarinae Löw, 1879
Aphalara Foerster, 1848

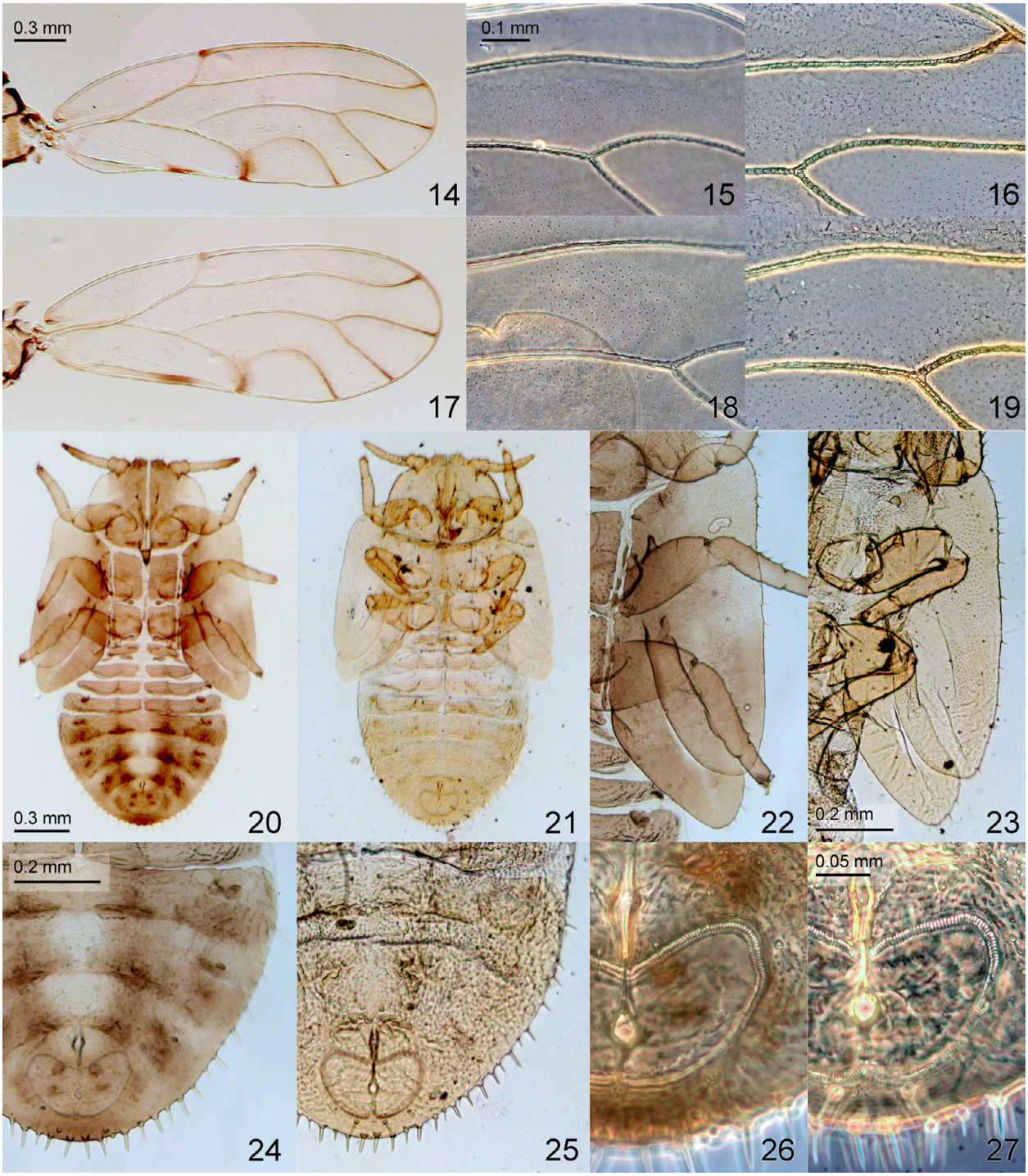
Aphalara persicaria Caldwell, 1937
(Fig. 14–43)

Aphalara persicaria Caldwell 1937: 565; Caldwell 1938a: 237; Hodkinson 1988: 1182; Burckhardt and Lauterer 1997a: 305.
Aphalara persicaria var. *cubana* Caldwell 1937: 565; Hodkinson 1988: 1182; Burckhardt and Lauterer 1997a: 305.

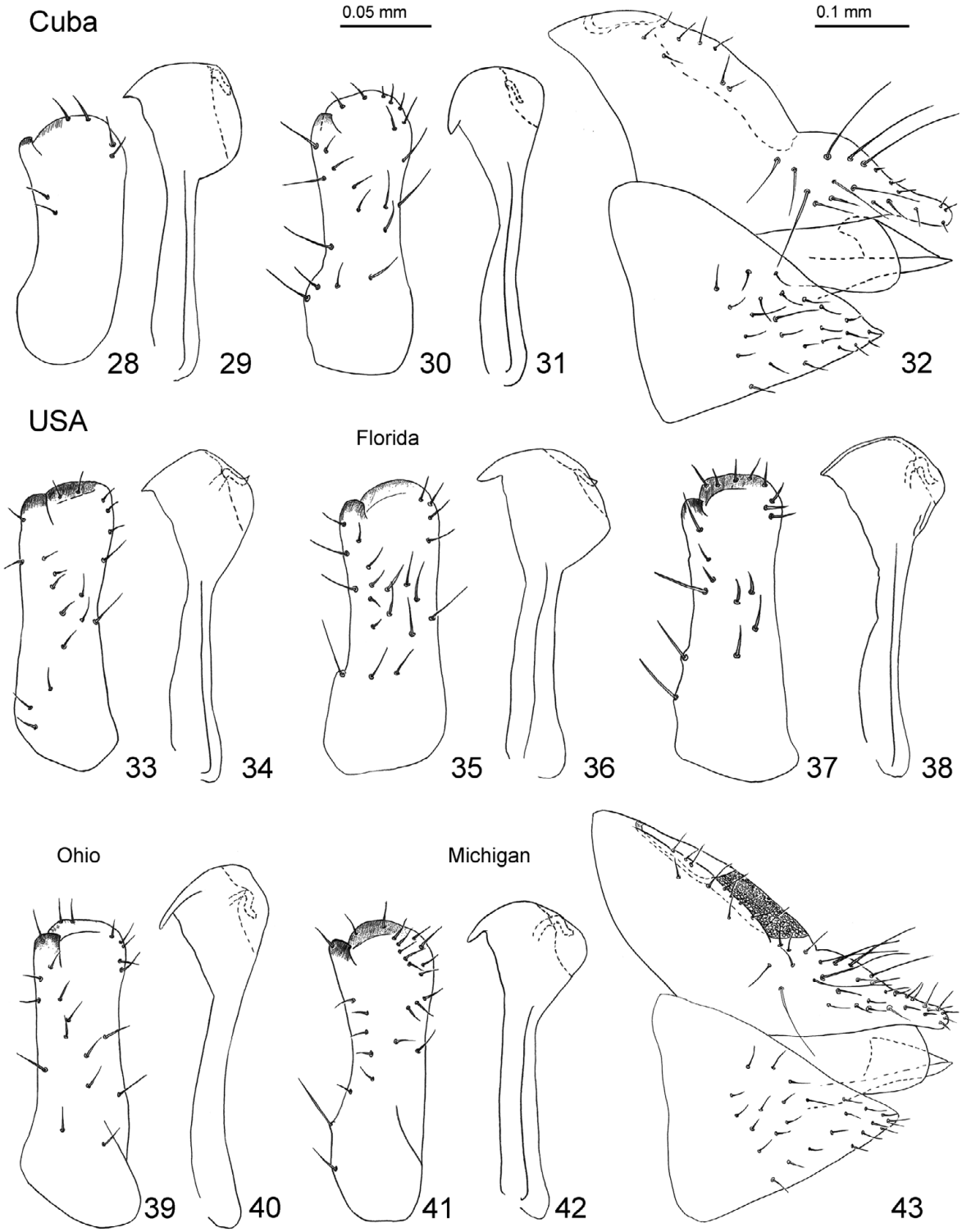
Materials examined. Cuba: holotype ♂ and 1 ♂, 1 ♀ paratype of *Aphalara persicaria* var. *cubana*, Havana (Baker) (USNM, dry mounted). – **Mexico**: 1 ♀, Tlaxcala, Nanacamilpa, San Felipe Hidalgo, 19.4573/4678 -98.5615/5671, 2800–2890 m, 15.viii.2015, *Persicaria hydropiperoides* (D. Burckhardt and D.L. Queiroz) (NHMB, dry mounted). – **USA**: **Florida**: **Alachua County**: 7 ♂, 6 ♀, 2 immatures, Gainesville, pond, 6.vii.1972, *Persicaria punctata* (D.H. Habeck) (USNM, dry and slide mounted); 1 ♂, 2 ♀, Gainesville, Biven's Arm, 4 and 16.viii.1972, *Persicaria punctata* (D.H. Habeck) (USNM, dry mounted); 1 ♂, 2 ♀, Gainesville, 23.viii.1972, *Persicaria punctata* (J.P. Heppner) (USNM, dry mounted); 1 immature, Micanopy, River Styx, 28.xii.2003, *Persicaria glabra* (J. Brambila and E. Cronin) FSCA (slide mounted); 5 ♂, 5 ♀, 2 immatures, McIntosh, Hwy 346 and River Styx, 27.iii.2004, *Persicaria glabra* (D. Burckhardt) (NHMB, in 70% ethanol); 1 ♂, 8 ♀, 2 immatures, Gainesville, SW 42 Street near Interstate 75 and SW 42 Street, 28.iii.2004, *Persicaria* cf. *maculosa* (D. Burckhardt) (NHMB, dry mounted); 1 ♀, Gainesville, between US Post Office and Walker's Furniture store, 29.608283, –82.373283, 40 m, 25.iv.2017, *Persicaria punctata* (D. Burckhardt and D.L. Queiroz). **Collier County**: 1 ♂, Immokalee, SW FL R&E Center, 15–22.v.2014, tall suction trap (S. Croxton) (FSCA, slide mounted); 1 ♀, Immokalee, SW FL R&E Center, 4–11.xii.2014, short suction trap "south" (S. Croxton) (FSCA, slide mounted); 1 ♀, Immokalee, 26.44395, –81.458083, 10 m, 20.iv.2017, *Persicaria punctata* (D. Burckhardt and D.L. Queiroz) (NHMB, dry mounted). **Hardee County**: 1 ♂, 4 ♀, 17 immatures, 2 mi E of Wauchula on 636, 11.iv.1991, *Polygonum* sp. (J. Bennet and K. Hibbard) (USNM, dry and slide mounted). **Highlands County**: 1 ♀, Archbold Biological Station, 26.i.1961 (S.W. Frost) (USNM, dry mounted). **Indian River County**: 2 ♂, 2 ♀, 1 immature, 2 mi Vero Beach, 26.xi.1990, *Polygonum* sp. (K. Hibbard and F. Mead) (USNM, dry and slide mounted); 1 ♀, 5 immatures, nr. Vero Beach, Indian River Co., 2 mi W of I-95 on SR60, 1.ii.1991, *Polygonum* sp. (K. Hibbard and F. Mead) (USNM, slide mounted). **Marion County**: 1 ♀, River Styx, 28.iii.2004, *Polygonum* sp. (J. Brambila) (FSCA, slide mounted). **Palm Beach County**: 1 ♀, rural Palm Beach Co., 26.xi.1982, sweep sample, young cane (D.G. Hall) (USNM, dry mounted). **Pinellas County**: 1 ♀ (abdomen only) St. Petersburg, 4.iv.1938 (DeLong) (USNM, dry mounted). – **Maryland**: several adults, Beltsville, 14.vi.1914, *Persicaria lapathifolia* (W.L. McAtee) (NHMB, USNM, dry mounted). – **Michigan**: 4 ♂, 3 ♀, Keweenaw Co., Copper Harbor, 13.vi.1995 (D. Burckhardt) (MHNG, dry and slide mounted). – **Ohio**: 1 ♂, 1 ♂ (abdomen only), 1 ♀ paratypes of *Aphalara persicaria*, 12 immatures, Pickway Co., vii–viii.1936 (J.S. Caldwell) (USNM, dry and slide mounted). – **Virginia**: 3 ♀, Madison Co., Oak Park, 7–10.viii.1988 (D. Burckhardt) (MHNG, dry mounted).

Diagnosis. Adult. Head and thorax orange to light brown with whitish to yellowish pattern. Forewing membrane semitransparent, colorless or imperceptibly tinged with yellow with brown apex of Cu_{1b} and apical part of clavus. Abdomen dark brown. Clypeus long, tubular, visible in dorsal view. Forewing (Fig. 14, 17) 2.5–2.7 times as long as wide; surface spinules (Fig. 15, 16, 18, 19) fine, forming irregular squares or rhombes; in males often leaving narrow spinule-free stripes along veins, in females covering the entire wing membrane up to veins. Paramere, in lateral view, lamellar, straight, only weakly narrowed in the middle; dorsal margin sclerotized, straight or weakly curved; thumb-like process near antero-apical edge, short, narrow and weakly curved (Fig. 28, 30, 33, 35, 37, 39, 41). Distal segment of aedeagus with straight shaft and inflated apical third that bears an antero-apical hook that is more or less long (Fig. 29, 31, 34, 36, 38, 40, 42). Female terminalia cuneate (Fig. 32, 43). Proctiger, in lateral view, incised distal to circumanal ring, which is strongly expanded caudally; apex narrowly rounded.

Fifth instar immature (Fig. 20, 21). Body 1.6–1.7 times as long as wide. Forewing pads (Fig. 22, 23) narrow, humeral lobes broadly rounded; small lanceolate setae present along margin but not on dorsum. Caudal plate



Figures 14–27. *Aphalara persicaria*. **14–16)** Male. **14)** Forewing, specimen from MI. **15)** Surface spinules, specimen from FL. **16)** Surface spinules, specimen from MI. **17–19)** Female. **17)** Forewing, specimen from MI. **18)** Surface spinules, specimen from FL. **19)** Surface spinules, specimen from MI. **20, 21)** Immature, habitus, dorsal view. **20)** Specimens from FL. **21)** Specimen from OH. **22, 23)** Wing pads. **22)** Specimens from FL. **23)** Specimen from OH. **24, 25)** Caudal plate. **24)** Specimens from FL. **25)** Specimen from OH. **26, 27)** Circumanal rings. **26)** Specimen from FL. **27)** Specimen from OH. Scales: **14, 17)** 0.3 mm; **15, 16, 18, 19)** 0.1 mm; **20, 21)** 0.3 mm; **22, 23)** 0.2 mm; **24, 25)** 0.2 mm; **26, 27)** 0.05 mm.



Figures 28–43. *Aphalara persicaria*. **28, 30, 33, 35, 37, 39, 41)** Inner face of paramere, in profile. **29, 31, 34, 36, 38, 40, 42)** Distal segment of aedeagus. **32, 43)** Female terminalia, in profile. **28, 29)** Holotype of *Aphalara persicaria* var. *cubana*. **30–32)** Paratypes of *Aphalara persicaria* var. *cubana*. **33–38)** Specimens from Florida (FL). **39, 40)** Specimen from Ohio (OH). **41–43)** Specimens from Michigan (MI). Scales: **28–31, 33–42)** 0.05 mm; **32, 34)** 0.1 mm.

narrowly rounded; lanceolate setae present along margin (Fig. 24, 25), about as long as distance between them. Outer circumanal ring (Fig. 26, 27) consisting of two pore rows; rounded laterally.

Distribution. Recorded from Cuba and the USA (OH) (Hodkinson 1988); new for Mexico and parts of the USA (FL, MD, MI, VA) (new records reported here).

Host plants. *Persicaria glabra* (Willd.) M.Gómez, *P. lapathifolia* (L.) Delarbre, *P. maculosa* Gray, *P. punctata* (Elliott) Small (Polygonaceae). The single female from Mexico was collected on *P. hydropiperoides* (Michx.) Small, which is a probable host. The records from *Polygonum* sp. probably refer to *Persicaria* sp.

Comments. *Aphalara* Foerster, 1848, consists of over 40 Holarctic species, many of which develop on Polygonaceae (Burckhardt and Lauterer 1997a; Ouvrard 2020). Species often are difficult to identify, as morphological differences between species are small, and intraspecific variation is pronounced. Also host plant ranges sometimes overlap. Unlike the West Palearctic *Aphalara* species that are fairly well-studied (Ossiannilsson 1992; Burckhardt and Lauterer 1997a), the North American ones are poorly known. The only comprehensive paper (Caldwell 1937) is based on limited material with species descriptions that are not diagnostic. Several important characters are not described, such as structures on the head, the surface spinules on the forewings or the aedeagus of adults, as well as the immatures. A comparison with material that was studied by J.S. Caldwell suggests that his drawings of the paramere were not made from a strict lateral view and are, hence, difficult to interpret. A slightly more detailed description of *A. persicaria* of both adults and immatures was provided by Caldwell (1938a). Currently, 13 species and three varieties are known from the Nearctic region (Hodkinson 1988). *Aphalara persicaria* is similar to *A. nubifera* Patch, 1912, and *A. simila* Caldwell, 1937, in the surface spinules on the forewings that are arranged in squares or rhombes; in all other described Nearctic species the surface spinules form irregular transverse rows. *Aphalara persicaria* differs from *A. nubifera* in the unpatterned forewings (rather than with an indistinct brown transverse band in apical third) that are slightly narrower (forewing length/width ratio in *A. persicaria* 2.5–2.7, in *A. nubifera* 2.2–2.3), in the thumb-like process of the paramere that is close to the apex (rather than in apical quarter), in the caudally strongly expanded circumanal ring of the female (rather than with only 3–4 cell rows) and in the host association (*Persicaria* spp. versus *Descurainia pinnata* (Walter) Britton [Brassicaceae]). From *A. simila* it differs in the slightly finer surface spinules of the forewing membrane and the caudally strongly expanded circumanal ring of the female, which consists of only two rows in *A. simila*. *Aphalara persicaria* currently is known from Cuba and Mexico as well as the eastern and midwestern USA, whereas the other two species have been reported from the western USA and Mexico. The report of *A. nubifera* var. *reducta* Caldwell, 1937, from Maine (Caldwell 1937; Hodkinson 1988) is doubtful. Caldwell (1937) described this variety based on a single specimen: Holotype female in the Herbert Osborne collection, Ohio State University, with following data: "Me. Ag. Exp. Sta., VI–27–1916." This suggests that the specimen was donated by Edith M. Patch who worked for the Maine Agricultural Experiment Station in Orono, ME, and is possibly part of the type series of *A. nubifera* from Ft. Collins, CO.

Caldwell (1937) erected *A. persicaria* var. *cubana* Caldwell, 1937 for specimens from Cuba. He indicated that they appear smaller and darker than *A. persicaria* and possess more obliquely truncate parameres and a less curved female proctiger. The examination of type material of *A. persicaria* var. *cubana* showed that these differences are within the variation of *A. persicaria* from Mexico and the USA (FL, MD, MI, OH, VA). In type material of *A. persicaria* var. *cubana* the paramere is slightly rounded apically (Fig. 28, 30), and the apical inflation of the distal segment of the aedeagus bears a short apical hook (Fig. 29, 31), whereas in types of *A. persicaria* the paramere has subparallel margins and is truncate apically (Fig. 39), and the apical inflation of the distal segment of the aedeagus bears a long apical hook (Fig. 40). Some specimens at hand from Florida bear a characteristic "*cubana*-type" paramere and a "*persicaria*-type" aedeagus (Fig. 35, 36) or vice versa (Fig. 37, 38). In other examined specimens these structures were intermediate between these two types (Fig. 33, 34, 41, 42). Immatures from FL and OH do not significantly differ from each other and correspond to Caldwell's (1938a) description. We conclude that *A. persicaria* var. *cubana* is a synonym of *A. persicaria*, confirming Hodkinson's (1988) synonymy.

Craspedolepta Enderlein, 1921

Comments. *Craspedolepta* is a large Holarctic genus with over 150 described species, of which about two thirds occur in the Palearctic realm, one third in the Nearctic and less than a handful in both. Most of the species

develop on Asteraceae (Ouvrard 2020). Many Central and Northern European species, generally well diagnosed, are monophagous (Ossiannilsson 1992; Lauterer and Burckhardt 2004; Burckhardt and Lauterer 2009). Similar, narrow host ranges also can be expected in other regions, but these patterns are blurred by the lack of a sound taxonomic base or by an inadequate concept of "host" (or by both) (Lauterer and Burckhardt 2004; Burckhardt et al. 2014). The most recent treatment of Nearctic *Craspedolepta* species is the monograph by Journet and Vickery (1979), listing four species from Florida: *C. furcata* (Caldwell, 1936), *C. nota* Journet and Vickery, 1979, *C. numerica* (Caldwell, 1941) and *C. parvula* Journet and Vickery, 1979. All four records are problematic, as Journet and Vickery's (1979) descriptions are not diagnostic, and at least some of their "species" contain mixes of multiple species. Moreover, their host information does not help to define the species, as they did not indicate which records are confirmed by the presence of immatures. The use of the terms "primary" and "secondary" host adds to the confusion as these concepts are not defined by the authors.

In the material from Florida at hand, we identified four species, viz. *C. bifida* (Caldwell, 1936), *C. euthamiae* spec. nov., *C. flavida* (Caldwell, 1938) and *C. furcata*. We did not see specimens of *C. parvula* from Florida. According to Journet and Vickery's (1979) description, the species keys out in our key with *C. flavida* from which it differs in the smaller size.

More material, including adults of both sexes and immatures with confirmed host information, is needed to investigate and fully understand the taxonomy of *Craspedolepta* in Florida.

Key to Florida species of *Craspedolepta*

1. Forewing membrane bearing brown, often very faint dots (Fig. 48). Terminalia (Fig. 72–75, 79, 80) . . . . . ***C. euthamiae* Burckhardt and Halbert, spec. nov.**

— Forewing membrane unicolor whitish or yellowish, lacking brown dots. Terminalia different (Fig. 56–71, 82–85) **2**

2(1). Rear margin of male paramere with a bulge in the middle (Fig. 82, 83); tubercular sculpture on the inner paramere face extending almost to basal third of paramere (Fig. 83: arrow). Membranous sack on dorsum of distal segment of aedeagus almost reaching base (Fig. 84: arrow). Female subgenital plate pointed apically (Fig. 85) . . . . . ***C. flavida* (Caldwell)**

— Rear margin of male paramere with a bulge in apical third; tubercular sculpture on the inner paramere face extending to about the middle of paramere or less (Fig. 56–61: arrows). Membranous sack on dorsum of distal segment of aedeagus reaching the middle (Fig. 62–65: longer arrows). Female subgenital plate indented apically (Fig. 66, 68, 69, 71) **3**

3(2). Distal segment of aedeagus with apical margin hardly convex (Fig. 62: short arrow). Female proctiger, in profile, relatively straight dorsally with short distal process that is hardly inflated apically (Fig. 66). Dorsal and ventral valvulae distinctly curved, ventral valvulae weakly serrate apically (Fig. 67) . . . . . ***C. bifida* (Caldwell)**

— Distal segment of aedeagus with apical margin distinctly concave (Fig. 63–65: short arrow). Female proctiger, in profile, weakly undulated dorsally with long, apically slightly inflated distal process (Fig. 69). Dorsal and ventral valvulae weakly curved, lacking ventral serration (Fig. 70) . . . . . ***C. furcata* (Caldwell)**

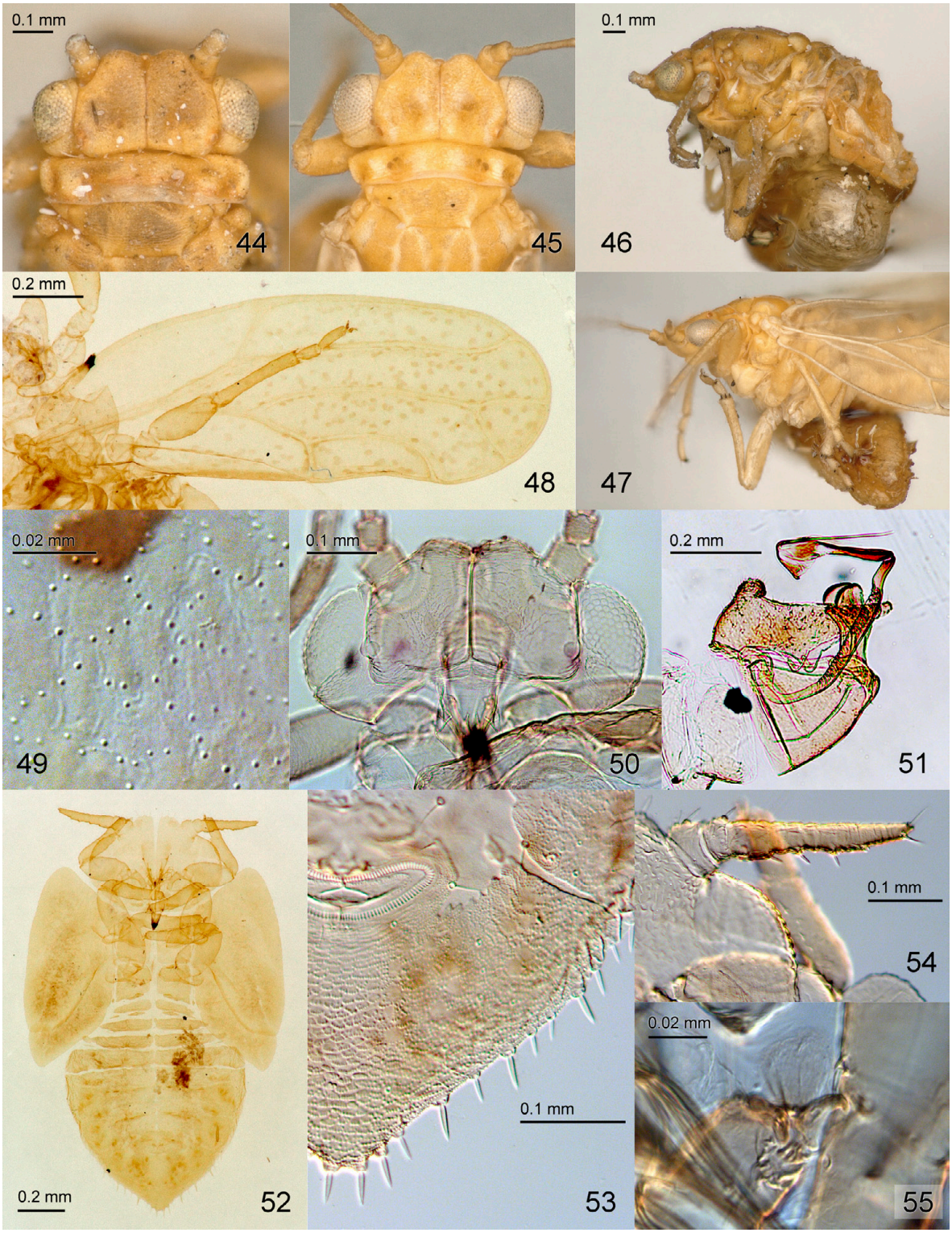
Craspedolepta bifida (Caldwell, 1936), stat. rev.

(Fig. 44, 46, 56, 58, 62, 66–68)

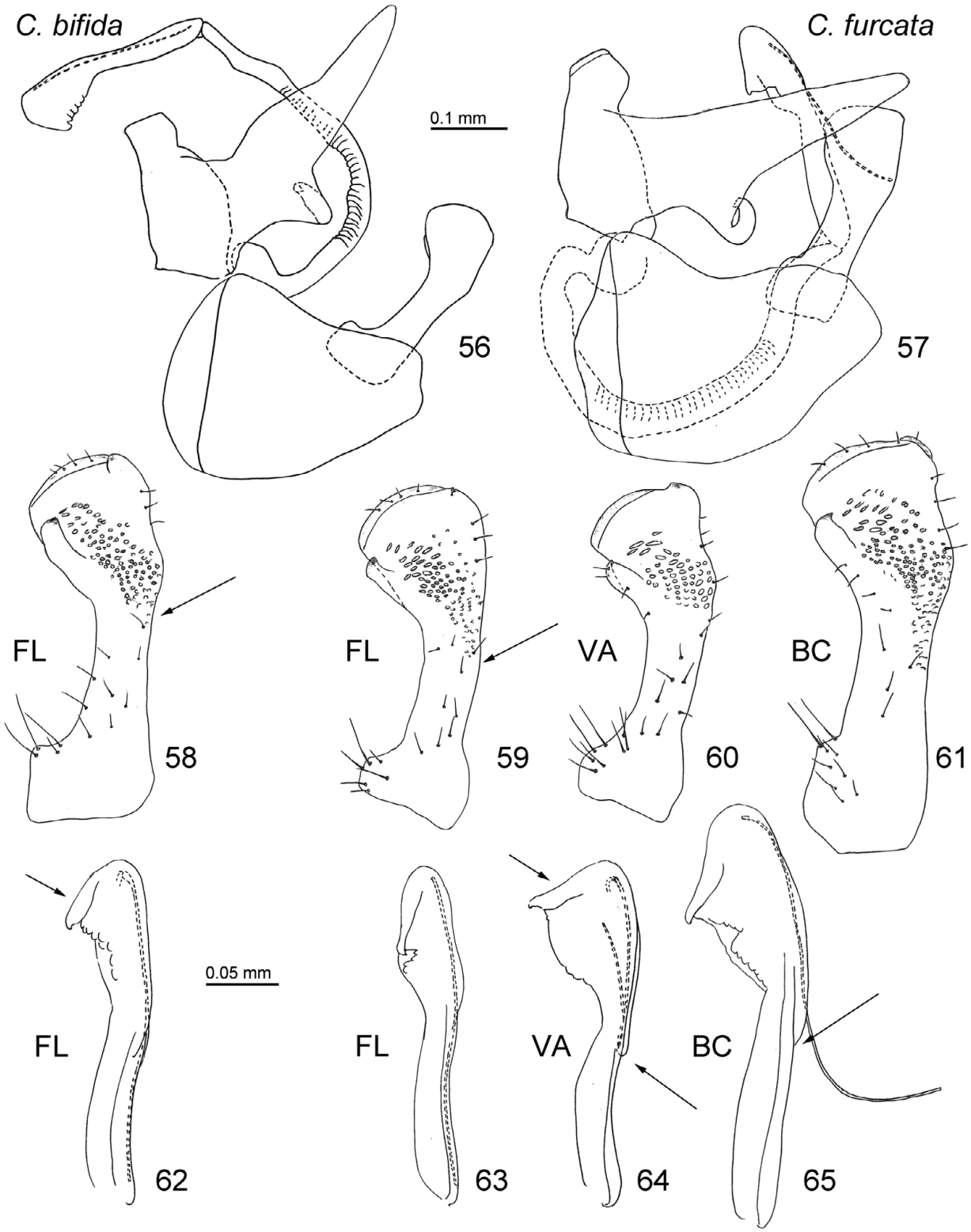
Aphalara bifida Caldwell 1936: 222; Journet 1973: 454; Journet and Vickery 1979: 62.
Craspedolepta bifida (Caldwell); Russell 1973: 157.
Cerna bifida (Caldwell); Klimaszewski 1979: 52.

Materials examined. Holotype ♀ and 1 ♀ paratype: **USA**: **Florida**: **Miami-Dade County**: Miami, 24.i.1934 (J.S. Caldwell) (USNM, dry mounted) [both in poor condition]. Paratypes 1 ♂, 1 ♀, **Florida: Pasco County**: New Port Richey, 7.x.1936 (Oman) (USNM, dry mounted).

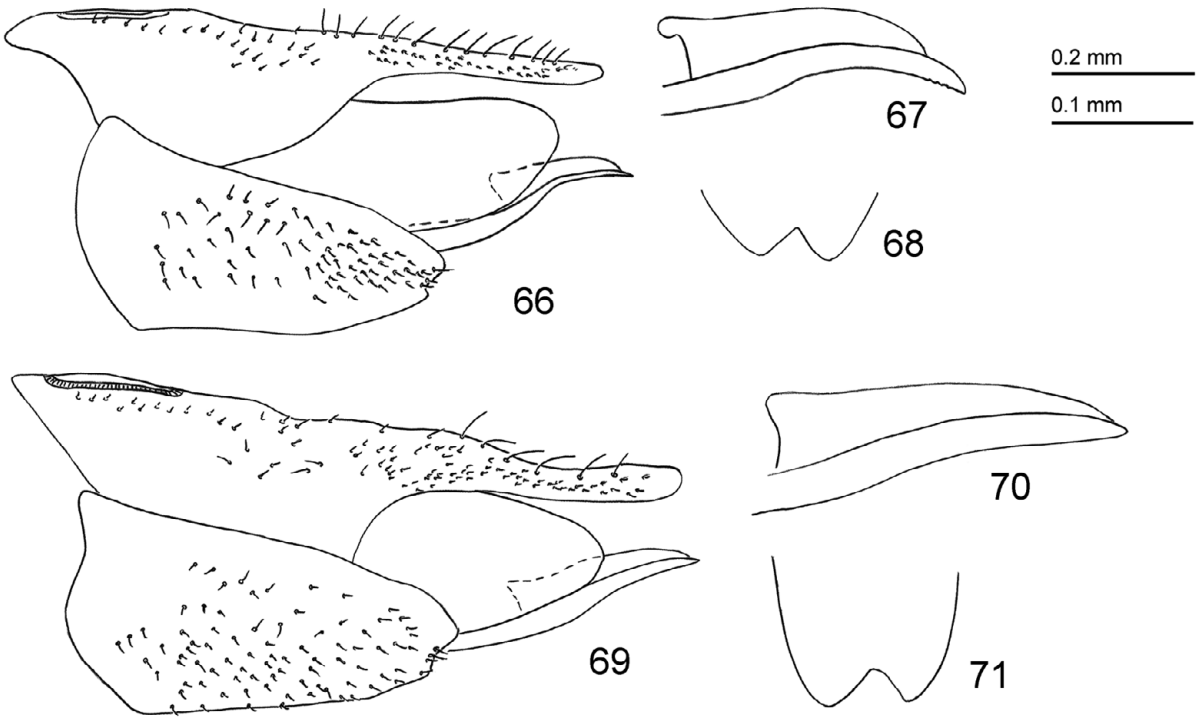
Diagnosis. Differs from the morphologically similar *C. furcata* in the apex of the aedeagus and the female terminalia. Apex of distal segment of aedeagus hardly convex (Fig. 62) rather than distinctly convex as in *C. furcata*



Figures 44–55. *Craspedolepta* spp. **44, 46)** *C. bifida*. **45, 47)** *C. furcata*. **48–55)** *C. euthamiae* new species. **44, 45)** Head, pronotum, dorsal view. **46, 47)** Adult, in profile. **48)** Forewing. **49)** Surface spinules in cell r_2. **51)** Male terminalia, in profile. **52)** Immature, habitus, dorsal view. **53)** Circumanal rings. **54)** Antenna. **55)** Apex of tarsus. Scales: **44, 45)** 0.1 mm; **46, 47)** 0.1 mm; **48)** 0.2 mm; **49)** 0.02 mm; **50)** 0.1 mm; **51)** 0.02 mm; **52)** 0.2 mm; **53)** 0.1 mm; **54)** 0.1 mm; **55)** 0.02 mm.



Figures 56–65. *Craspedolepta* spp. **56, 58, 62)** *C. bifida*. **57, 59–61, 63–65)** *C. furcata*. **56, 57)** Male terminalia, in profile. **58–61)** Inner face of paramere, in profile. **62–65)** Distal segment of aedeagus. **56, 58, 59, 62, 63)** Specimens from Florida (FL). **57, 61, 65)** Specimens from British Columbia (BC). **60, 64)** Specimens from Virginia (VA). Scales: **56, 57)** 0.1 mm; **58–65)** 0.05 mm.



Figures 66–71. *Craspedolepta* spp. **66–68)** *C. bifida*. **69–71)** *C. furcata*. **66, 69)** Female terminalia, in profile. **67, 70)** Dorsal and ventral valvulae. **68, 71)** Apex of female subgenital plate, in ventral view. Scales: **66, 68, 69, 71)** 0.2 mm; **67, 70)** 0.1 mm.

(Fig. 63–65). Female proctiger, in profile, straighter dorsally with slightly shorter distal process that is hardly inflated apically (Fig. 66), compared to *C. furcata* where the proctiger is more undulated dorsally with a longer, apically slightly inflated distal process (Fig. 69). Dorsal and ventral valvulae are slightly more curved, with apically weakly serrate ventral valvulae in *C. bifida* (Fig. 67) rather than only weakly curved valvulae, lacking ventral serration as in *C. furcata* (Fig. 70).

Distribution. USA: Florida: Miami-Dade County (Caldwell 1936: types), Pasco County.

Host plant. Unknown.

Comments. Caldwell (1936) described *C. bifida* from three females from Miami, FL. He separated the species from the similar *C. furcata* by the proportionally shorter vertex, the shallower "notch at end of median line" and the less distinct foveal impressions (Fig. 44: *C. bifida*; Fig. 45: *C. furcata*). Further he suggested that in *C. bifida* the build is less robust, the thorax less arched (Fig. 46: *C. bifida*; Fig. 47: *C. furcata*) and the forewings are very flaveous with a longer and narrower cell cu_1. The female terminalia of *C. bifida* (Fig. 66) are said to differ from those of *C. furcata* (Fig. 69) in the shorter and straighter proctiger, the subgenital plate with a deeper notch at apex (Fig. 68: *C. bifida*; Fig. 71: *C. furcata*) and the entire terminalia being "more thickly beset with small setae". Journet and Vickery (1979) discarded all these differences except for the body size that they interpreted as clinal variation. They listed *Aphalara bifida* as a junior synonym of *Craspedolepta furcata* but stated under comments: "Upon ... the variability of the remaining characters used by Caldwell (1936) in discriminating between his species, relegation of *A. bifida* to the junior synonymy under *C. constricta* [sic] (Caldwell 1936) is justified." This is probably an error and should be *C. furcata*. We agree with Journet and Vickery (1979) that the characters on the head (Fig. 44, 45), thorax (Fig. 46, 47) and forewings, the setosity of the female terminalia (Fig. 66, 69) and the apical notch of the female subgenital plate (Fig. 68, 71) do not significantly differ between *C. bifida* and *C. furcata*. The differences in the aedeagus, female proctiger and valvulae are, however, significant enough to consider *C.*

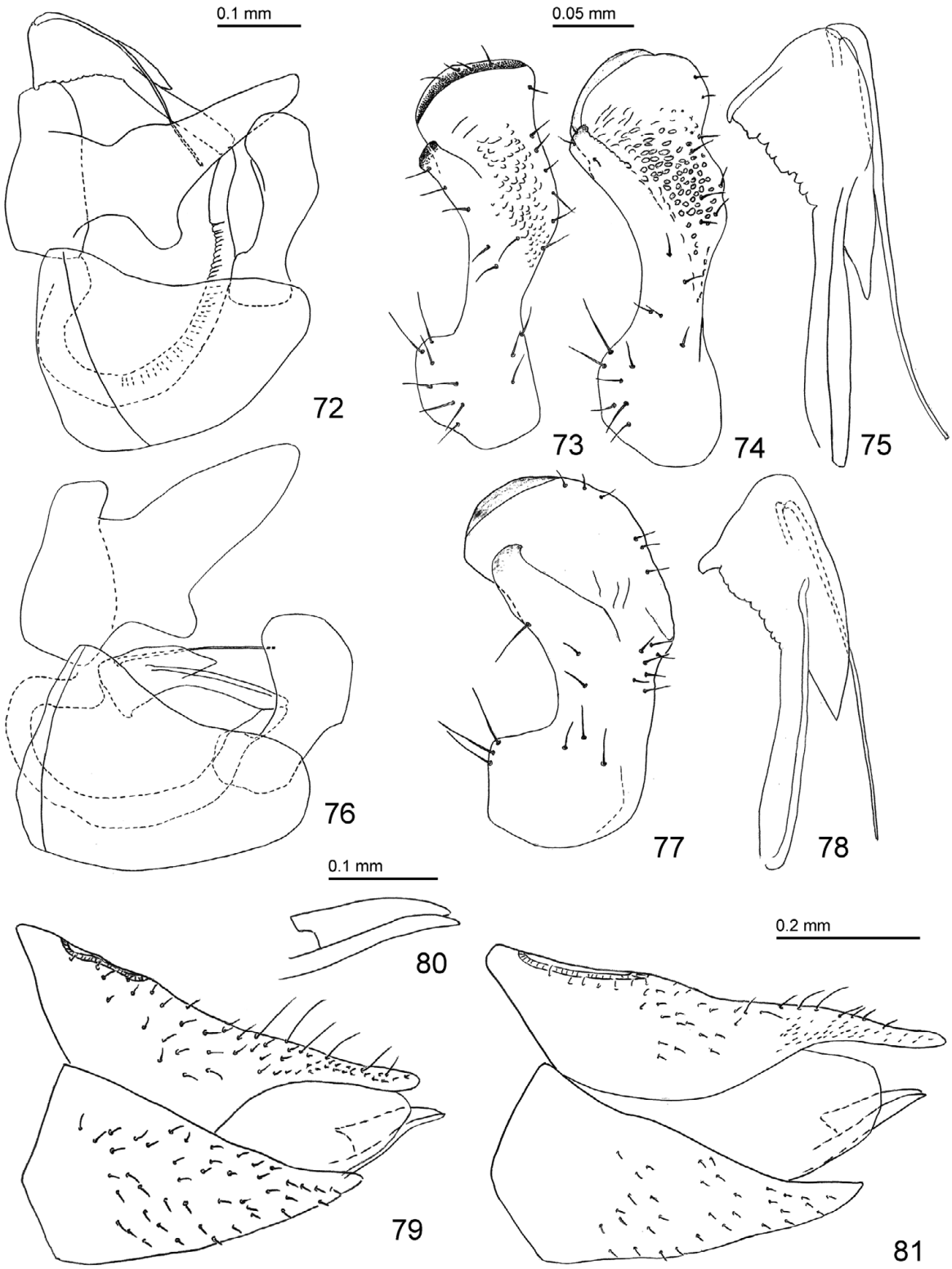
bifida as a good species. Specimens of *C. bifida* have been collected in January and October, those of *C. furcata* from Florida in July and October (USNM data).

Craspedolepta euthamiae Burckhardt and Halbert, new species

LSID: urn:lsid:zoobank.org:pub:2454C96B-5D17-4162-A3BB-296F5C0DC216
(Fig. 48–55, 72–75, 79, 80)

Materials examined. Holotype ♂: **USA**: **Florida**: Highlands County, Lorida, SFWMD Hickory Hammock, 7.xi.2002, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-5478) (FSCA, dry mounted). – Paratypes. **USA**: **Florida**: **Highlands County**: 1 ♀, same data as holotype (FSCA, dry mounted); 1 ♂, 1 ♀, same but Hickory Hammock, 19.xi.2002, *Euthamia graminifolia* (K. Hibbard and J. Bennet) (FSCA# E2002-5702) (FSCA, slide mounted); 3 ♀, same but Venus, Archbold Biological Station, 27.18222, –81.34833, 45–69 m, 1–2.x.2016, sweeping Florida scrub, on *Euthamia graminifolia* (I. Malenovský) (MMBC, dry mounted). **Indian River County**: 3 ♀, E Side 58 Avenue, 1 mile S 69 St., Vero Beach, 25.xi.2002, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-5790) (FSCA, NHMB, dry mounted); 1 ♂, 1 ♀, 1 immature, same but Vero Beach, 29.x.2014, *Euthamia graminifolia* (C. Frere) (FSCA# E2014-7552) (FSCA, slide mounted). **Lake County**: 5 ♀, Mascotte, 11.ix.1938 (Oman), 2 specimens labelled as paratypes of *Craspedolepta numerica* Journet and Vickery (USNM, dry mounted). **Martin County**: 1 ♀, Hobe Sound, 24.vi.1939 (Oman) (USNM, dry mounted); 2 ♂, 1 ♀, 1 mi, E US 1, S side of Jensen Beach Boulevard, Jensen Beach, 11.xii.2002, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-6029) (NHMB, dry mounted). **Miami-Dade County**: 2 ♂, Miami, 24.i.1934 (J.S. Caldwell collection) (USNM, dry mounted). **Nassau County**: 2 ♀, Hilliard, 5.x.1938 (Oman), 1 specimen labelled as paratype of *Craspedolepta numerica* Journet and Vickery (USNM, dry mounted). **Okeechobee County**: 1 ♀, SR 88 & US 441, Fort Drum, 19.xi.2002, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-5711) (FSCA, dry mounted). **Osceola County**: 1 ♀, 2.5 miles S SR 60, Yeehaw, 16.xii.2001, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-6043) (FSCA, dry mounted). **Pasco County**: 1 ♀, Seven Oaks, 1.v.1908 (Van Duzee) (USNM, dry mounted); 1 ♂, New Port Richey, 7.x.1936 (Oman) (USNM, dry mounted). **Pinellas County**: 1 ♀, Dunedin, 7.x.1938 (Oman) (USNM, dry mounted). **St. Lucie County**: 4 ♀, East side of Jenkins Road, 0.25 miles South of SR 70, Fort Pierce, 18.xi.2002, *Euthamia graminifolia* (K. Hibbard) (FSCA# E2002-5699) (FSCA, NHMB, dry mounted). **Volusia County**: 1 ♀, Edgewater, 6.iv.1938 (D.M. DeLong) (USNM, dry mounted).

Description. Adult. Coloration. General body color green or light ochreous. Antennal segments 9 and 10 light brown but not black. Forewings yellowish or light ochreous; membrane transparent, weakly to moderately beset with brown, relatively inconspicuous dots, usually absent in basal third or quarter becoming denser towards apex but rarely confluent. – Structure. Head weakly inclined from longitudinal body axis (20–30°), about as wide as mesonotum in dorsal view (Fig. 50). Vertex subtrapezoidal, 1.9 times as wide as long along median suture; weakly indented antero-medially; toruli, in dorsal view, weakly concave. Antenna 1.3–1.4 times as long as head width. Rostrum 0.3–0.5 times as long as head width. Metatibia 0.6–0.7 times as long as head width. Forewing (Fig. 48) 3.0–3.5 times as long as head width, 2.5–2.8 times as long as wide, widest in the middle. Surface spinules (Fig. 49) forming a hexagonal pattern consisting of a single row of spinules. Male terminalia (Fig. 51, 72–75, 79) with proctiger 0.4 times as long as head width. Paramere, in profile, irregularly lamellar, slightly curved, narrow in basal third, irregularly widening toward apex; anterior thumb-like process relatively broad, apex distant from sclerotized apical rim; apico-posterior edge slightly angular; inner face in apical half with extended rugose microscultpture. Distal segment of aedeagus slightly longer than paramere, with large apical dilatation that is about half as long as segment, with weakly sclerotized apico-anterior ridge ending in a small, hook-like tooth; apical dilatation with very long membranous sack-like extension basi-posteriorly; sclerotized end tube of ductus ejaculatorius thin, almost as long as entire segment. Female terminalia cuneate (Fig. 80). Proctiger 1.0–1.1 times as long as head width, with two submedian longitudinal rows of long hairs in apical half; dorsal margin almost straight or weakly undulate, apex not widened, subacute. Circumanal ring oval, 0.3–0.4 times as long as proctiger; consisting of a single row of elongate pores. Subgenital plate 0.8 times as long as proctiger, subacute apically. Dorsal and ventral valvulae hardly curved, lacking teeth. – Measurements (in mm; 2 ♂, 2 ♀). Head width 0.50–0.58; antenna length 0.66–0.78; forewing length 1.48–1.98; length of male proctiger 0.18; paramere length 0.22–0.24; length of distal segment of aedeagus 0.28; length of female proctiger 0.58–0.60.



Figures 72–81. *Craspedolepta* spp. **72–75, 79, 80)** *C. euthamiae* spec. nov. **76–78, 81)** *C. numerica*. **72, 76)** Male terminalia, in profile. **73, 74, 77)** Inner face of paramere, in profile. **75, 78)** Distal segment of aedeagus. **79, 81)** Female terminalia, in profile. **80)** Dorsal and ventral valvulae. Scales: **72, 76)** 0.1 mm; **73–75, 77, 78)** 0.05 mm; **79, 81)** 0.2 mm; **80)** 0.1 mm.

Fifth instar immature (Fig. 52). Coloration. General body color yellowish. – Structure. Body strongly dorsoventrally flattened, 1.5 times as long as wide. Fore margin of head and antennae with lanceolate setae; antennae (Fig. 54) 3-segmented, 0.5 times as long as forewing pad, bearing 6 rhinaria on segment 3. Forewing pads narrow, weakly truncate apically, with distinct humeral lobes; lacking marginal and dorsal lanceolate setae, as those on margin of caudal plate. Tarsal arolium (Fig. 55) longer than claws, oval, without petiole and unguitractor. Caudal plate (Fig. 53) pointed apically, with microscopic setae dorsally and lanceolate setae along margins. Outer circumanal ring (Fig. 53) small, oblong oval, narrowly rounded laterally; distant from posterior margin of caudal plate, distance from posterior margin of circumanal ring to posterior margin of caudal plate longer than width of circumanal ring, consisting of a single row of pores. – Measurements (in mm; 1 immature). Body length 1.70; antenna length 0.34.

Distribution. USA: Florida: Alachua, Brevard, DeSoto, Highlands, Indian River, Lake, Martin, Miami-Dade, Nassau, Okeechobee, Orange, Osceola, Pasco, Pinellas, St. Lucie, Volusia counties.

The species was identified first in Florida between November 2002 and February 2003 in several Florida counties by DPI inspector Kenneth Hibbard. Some specimens of the new species collected during this period are from additional localities but were not restudied for the description. Thus, they are not included in the data above. These localities (alphabetical by county) include Palm Bay (Brevard County; FSCA# E2002-5849), Arcadia (DeSoto County; FSCA# E2004-7522), Lake Placid (Highlands County; FSCA# E2003-23), Ft. Drum (Okeechobee County; FSCA# E2002-5711), Orlando (Orange County; FSCA# E2002-6104), Ft. Pierce (St. Lucie County; FSCA# E2002-5699, E2003-365), Port St. Lucie (St. Lucie County; FSCA# E2003-258, 418, 6307), and Oak Hill (Volusia County; FSCA# E2002-6051, 6052). Most recently, specimens were collected in Morningside Nature Center, Gainesville (Alachua County; FSCA# E2018-5577) in October 2018.

Host plant. *Euthamia graminifolia* (L.) Nutt. (syn. *Euthamia caroliniana* (L.) Greene ex Porter and Britt.) (Compositae). In the Atlas of Florida Plants (Wunderlin et al. 2020) *Euthamia caroliniana* is considered a valid species; in the World Flora Online (WFO 2020), however, it is a synonym of *E. graminifolia*. All the records from Florida are from *E. caroliniana*.

Derivation of name. Named after its host genus *Euthamia*.

Comments. Adults of *Craspedolepta euthamiae* spec. nov. differ from all other similar North American species, i.e. species with spotted forewings, bearing surface spinules usually forming a hexagonal pattern consisting of a single row of spinules, with a lamellar paramere widening towards the apex, and with distal segment of the aedeagus strongly expanded apically with a small anterior hook, as follows. *Craspedolepta caudata* (Crawford, 1911), *C. minuta* (Caldwell, 1938) and *C. numerica* (Caldwell, 1941) have a broader, slightly more curved paramere. *Craspedolepta fumida* (Caldwell, 1938), *C. macula* Journet and Vickery, 1979, *C. maculimagna* Journet and Vickery, 1979, *C. nota* Journet and Vickery, 1979, and *C. scurra* Journet and Vickery, 1979, have female terminalia that are longer, with the dorsal margin of the proctiger distinctly undulate. The female terminalia of *C. constricta* (Caldwell, 1936) also are longer, but the dorsal margin of the proctiger is distinctly concave. *Craspedolepta smithsoniana* Klimaszeski, 1979, differs in the much smaller apical dilatation of the distal segment of the aedeagus and the much shorter end tube of the ductus ejaculatorius. In *C. parvula* Journet and Vickery, 1979, and *C. vulgaris* Journet and Vickery, 1979, the paramere is similar but the rugose microscultpture on the inner face is much more restricted and the sclerotized end tube of the ductus ejaculatorius is only about half as long as the distal segment of the aedeagus. *Craspdolepta ochracea* (Provancher, 1872) has similar parameres and aedeagus but lacks dark spots in the forewings, has a shorter end tube of the ductus ejaculatorius, and longer female terminalia.

Virtually nothing is known about the immatures of the North American *Craspedolepta* species. Descriptions exists only for *C. nebulosa* (Zetterstedt, 1840) and *C. subpunctata* (Foerster, 1848), two Holarctic species associated with *Epilobium angustifolium* (Onagraceae) (Ossiannilsson 1992). Both species share the 3-segmented antennae with *C. euthamiae* but differ in the circumanal ring that consists of several rows of pores.

Craspedolepta numerica was reported "from southwestern United States and Mexico, though some specimens from Florida seem to fall within this species" (Journet and Vickery 1979). From Florida, they mentioned specimens from Garnett, Mascotte and Hilliard which we examined (USNM). The material from Garnett belongs to *C. numerica* of which we have examined the types (USNM) (Fig. 76–78, 81), however, Garnett is not in Florida but is in Kansas. The specimens from Mascotte and Hilliard belong to *C. euthamiae* and constitute a part of the

type series. *Craspedolepta euthamiae* and *C. numerica* are similar in body size, forewing shape with spotted membrane (Fig. 48), the surface spinules forming hexagonal pattern consisting of a single row of spinules (Fig. 49), the shape of the aedeagus (Fig. 75, 78) and the female terminalia (Fig. 79, 81). They clearly differ in the shape of the paramere and the presence or absence of tubercular microsculpture on the inner surface (Fig. 73, 74 versus 77).

Craspedolepta nota was described from 12 adult specimens from Canada (Alberta, Manitoba) and the USA (FL, KS). Journet and Vickery (1979) stated that the separation from *C. caudata* (Crawford, 1911), *C. macula* Journet and Vickery, 1979, and *C. numerica* is "problematic". We suspect that Journet and Vickery's (1979) *C. nota* is a species mix, and the specimens from Florida belong to *C. euthamiae* spec. nov.

Craspedolepta flavida (Caldwell, 1938)

(Fig. 82–85)

Aphalara flavida Caldwell 1938a: 243.
Craspedolepta flavida (Caldwell); Journet 1973: 468; Russell 1973: 157; Journet and Vickery 1979: 74.
Cerna flavida (Caldwell); Klimaszewski 1979: 52.

Materials examined. Canada: Quebec; **USA**: Florida, Michigan, Wisconsin (FSCA, MHNG, NHMB, USNM, dry and slide mounted). – **Florida**: **Pinellas County**: 1 ♂, 1 ♀, Saint Petersburg, 4.iv.1938 (DeLong) (USNM, dry mounted).

Diagnosis. Differs from other North American species as indicated in the key of Journet and Vickery (1979). Among the species of Florida, it resembles *C. bifida* and *C. furcata* in absence of dark spots on the forewings from which it differs in details of the male and female terminalia. The rear margin of paramere is bulged in the middle (Fig. 83) rather than apical third (Fig. 58, 61); the female subgenital plate is pointed apically (Fig. 85) rather than indented apically.

Distribution. Recorded from Canada (AB, MB, ON, QC, SK); USA (ME, MI, OH, OR, PA, SC, WI) (Hodkinson 1988); USA (new record for Florida).

Host plant. *Euthamia graminifolia* (L.) Nutt. (Compositae).

Craspedolepta furcata (Caldwell, 1936)

(Fig. 45, 47, 57, 59–61, 63–65, 69–71)

Aphalara furcata Caldwell 1936: 221.
Craspedolepta furcata (Caldwell); Journet 1973: 454; Russell 1973: 157; Journet and Vickery 1979: 62.

Materials examined. Canada: British Colombia, Quebec; **USA**: **Maryland**, **Pennsylvania**, **Virginia** (MHNG, NHMB, USNM, dry and slide mounted). – **Florida**: 1 ♀, **Martin County**: Hobe Sound, 24.vi.1939 (Oman) (USNM, dry mounted); 2 ♀, **Nassau County**: Hilliard, 5.x.1938 (Oman) (USNM, dry mounted);

Diagnosis. See under *C. bifida*.

Distribution. Canada (AB, BC, MB, NB, NS, ON, QC, SK); USA (AL, AR, CA, CT, DC, FL, KS, ME, MD, MI, MN, MO, MT, NH, NJ, NY, OH, OR, PA, SC, TN, TX, UT, VA, WI, WY) (Hodkinson 1988). – Florida: Martin and Nassau counties.

Host plant. According to Journet and Vickery (1979), *Euthamia graminifolia* (L.) Nutt. and *Solidago canadensis* L. (Asteraceae), but also *Aster* sp. (Asteraceae) and *Epilobium* sp. (Onagraceae). More studies are required to confirm these taxa as hosts, though the last two are unlikely.

Craspedolepta parvula Journet and Vickey, 1979

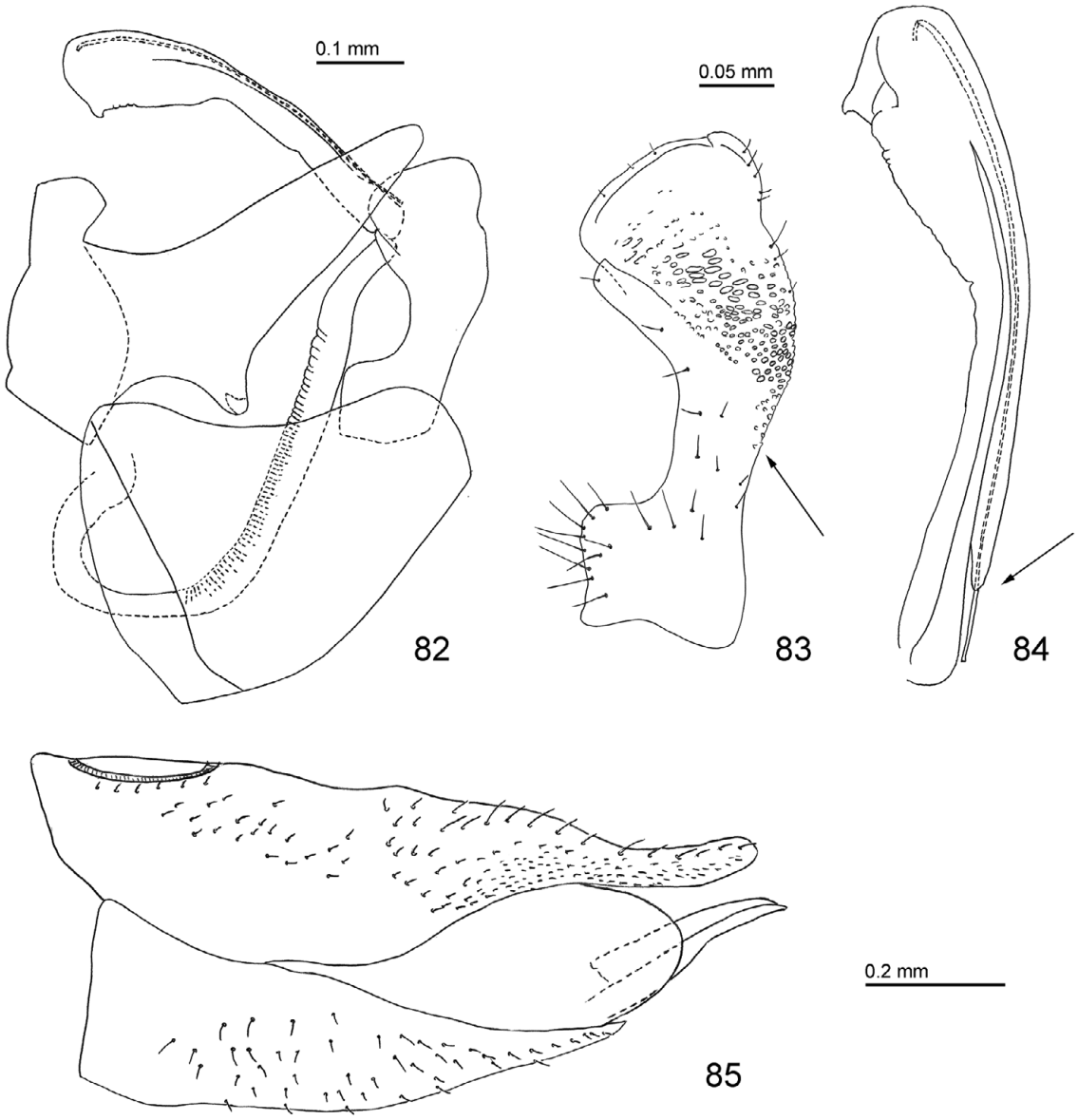
Craspedolepta parvula Journet and Vickey 1979: 54; Journet 1973: 447.

Materials examined. None.

Diagnosis. Description see comments above and Journet and Vickery (1979).

Distribution. "Zone adjacent to the United States and Canadian border," Florida (Journet and Vickery 1979).

Host plant. Unknown.



Figures 82–85. *Craspedolepta flavida*. **82)** Male terminalia, in profile. **83)** Inner face of paramere, in profile. **84)** Distal segment of aedeagus. **85)** Female terminalia. Scales: **82)** 0.1 mm; **83, 84)** 0.05 mm; **85)** 0.2 mm.

Comments. *Craspedolepta parvula* was "recorded only from the zone adjacent to the United States and Canadian border, with the exception of specimens from Florida" (Journet and Vickery 1979). The Florida specimens are reported from Gainesville and Strasburg; the latter, however is not in Florida. We did not see any specimens of this species from Florida. Awaiting the examination of relevant material, the record of *C. parvula* from Florida remains doubtful.

Gyropsylla Brèthes, 1921

Gyropsylla ilecis (Ashmead, 1881)

Materials examined. USA: **Florida**: **Alachua County**: Gainesville, along with representative galls (FSCA, dry mounted).

Diagnosis. The species can be recognized by the finger-like, downward pointing projection on the clypeus. Species in the genus *Aphalara* usually have a tubular, forward pointing clypeus.

Distribution. USA: Florida: Alachua, Baker, Bay, Dixie, Duval, Escambia, Flagler, Franklin, Hillsborough, Jefferson, Lake, Levy, Marion, St. Johns, Volusia, and Walton counties (Mead 1983).

Host plants. This species makes galls on *Ilex vomitoria* Aiton (Aquifoliaceae).

Comments. Both the insect and the plant are native to Florida.

Limataphalara Hodkinson, 1992

Limataphalara brevicephala Hodkinson, 1992

(Fig. 86–89)

Materials examined. USA: **Florida**: **Collier County**: Collier Seminole State Park, 21 and 28.iii.2003, *Nectandra coriacea* (Sw.) Griseb. (Scott Krueger) (FSCA#s E2003-1034, 1179) (FSCA, slide, dry mounted).

Diagnosis. Adults of *Limataphalara brevicephala* are easy to recognize (Fig. 86, 87). The thorax is dark with orange highlights. The forewings are yellow and slightly coriaceous, with a heavy black partial stripe on the leading edge. Genal processes are undeveloped, and antennae are short. This species belongs to a small Neotropical genus with another three described and several undescribed species that all are monophagous on *Nectandra* species. The immatures of *L. brevicephala* (Fig. 88) differ from those of *L. eucosma* Burckhardt and Queiroz, 2013, and *L. lautereri* Burckhardt and Queiroz, 2013, in the smooth body surface that is densely covered in elongate tubercles bearing a lanceolate seta each in the other two species (Burckhardt and Queiroz 2013).

Distribution. *Limataphalara brevicephala* is a rare species described from Florida (Hodkinson 1992a). There are type specimens from Miami (Miami-Dade County), collected on 13.iv.1982 by T. Loyd, and from Ankona (St. Lucie County) collected on *Nectandra coriacea* (Sw.) Griseb. (Lauraceae) on 11.v.1984 by DPI inspector Kenneth L. Hibbard reported in the original description (Hodkinson 1992a). More specimens were found in Collier Seminole State Park (Collier County) on 21 and 28.iii.2003 by DPI inspector Scott D. Krueger on *Nectandra coriacea* (FSCA#s E2003-1034, 1179). The population was still there on the same trees in 2014 and 2017. Currently, no other populations are known to exist.

Host plants. *Nectandra coriacea* (Sw.) Griseb. (Lauraceae). In 2003, DPI inspector Scott D. Krueger observed that the new shoots of the plants were damaged severely by witches' broom growth (Fig. 89).

Pachypsyllinae Crawford, 1914

Pachypsylla Riley, 1883

Comments. Species of *Pachypsylla* are mostly gall-inducers on *Celtis* L. (Cannabaceae) in North America. The genus is a taxonomic chaos, and much of the published distributional data should be treated with caution. Several species were described based on galls only (Riley 1890), which were incorrectly considered nomina nuda by Tuthill (1943). Tuthill (1943) also concluded, for the lack of finding morphological differences between the adults emerged from different galls on the leaves of *Celtis occidentalis* L., that the gall shape is variable induced by the single species *Pachypsylla celtidismamma* (Riley, 1875). Hodkinson (1988) listed the following of Riley's names as synonyms of *Pachypsylla celtidismamma*: *Pachypsylla celtidisasterisca* Riley, 1890, *P. celtidiscucurbita* Riley, 1890, *P. celtidisglobula* Riley, 1890, *P. celtidispubescens* Riley, 1890, and *P. celtidisumbilicus* Riley, 1890. Yang and Mitter (1994) studied *Pachypsylla* galls and concluded that *P. celtidismamma* is a complex of cryptic species. Thomas (2011) reviewed the nomenclatorial aspects and recognized 14 nominal species. At least one serious but unpublished attempt has been made to sort out the Florida species, based on notes in DPI files from John E. Porter, United States Department of Health, Education, and Welfare, Miami, FL. Files include a letter to Frank W. Mead written in 1962. Comprehensive biological, morphological and molecular studies are needed to determine accurate species assignments. All species seem to produce one generation per year in Florida. Hodkinson (1988) does not list any species from Florida and the following list of species present in Florida is tentative. It is based

Figures 86–89. *Limataphalara brevicephala*. **86, 87)** Adults. **88)** Fifth instar immature. **89)** Colony of immatures in witches' broom. (Photos by Lyle Buss, Entomology Department, University of Florida).

on specimens in the FSCA and NHMB provisionally identified by us, mostly using the key of Tuthill (1943). The taxonomy of *Pachypsylla* is in need of revision, which is outside the scope of this paper.

Key to Florida species of *Pachypsylla*

(Mostly from Tuthill 1943 with minor changes)

1. Head and thoracic dorsum with short stiff pubescence, not shining. Cells m_1 and cu_1 of forewing very elongate; forewing not rugose **2**

— Head and thorax appearing glabrous, shining (often with sparse, fine pubescence). Cells m_1 and cu_1 of forewing less elongate, broad; forewing more or less rugose **4**

2(1). Large species: length to tip of folded forewings > 5.5 mm ..... ***P. venusta* Osten-Sacken**

— Smaller species: length to tip of folded forewings < 4.0 mm **3**

3(2). Body length to tip of folded forewings > 3.0 mm ..... ***P. celtidismamma* (Riley) complex**

— Body length to tip of folded forewings < 2.5 mm ..... ***P. celtidisvesicula* Riley**

4(1). Forewings uniformly brown ..... ***P. celtidisgemma* Riley**

— Forewings maculate ..... ***P. celtidisinteneris* Mally**

Pachypsylla celtidisgemma Riley, 1885

Materials examined. USA: **Florida**: Specimens from Alachua, Glades, Hillsborough, Orange, Polk, and St. John's counties (FSCA, dry mounted and galls).

Diagnosis. Galls are formed from the buds (Tuthill 1943). They protrude from the stems.

Distribution. Widely distributed in the eastern USA (Hodkinson 1988).

Host plants. *Celtis occidentalis* L. (Cannabaceae).

Pachypsylla celtidisinteneris Mally, 1894

Materials examined. USA: **Florida**: Specimens from Alachua County (FSCA, dry mounted).

Diagnosis. Galls are formed under the bark (Tuthill 1943).

Distribution. USA: IL, KS, OH (Hodkinson 1988).

Host plants. *Celtis* sp. (Cannabaceae).

Pachypsylla celtidismamma (Riley, 1875)

Materials examined. USA: **Florida**: Specimens from Alachua and Brevard counties (FSCA, dry mounted, ethanol). Some specimens in the gall collection are filed under synonyms (Hodkinson 1988) (see above).

Diagnosis. *Pachypsylla celtidismamma* sensu Tuthill (1943) is a complex of closely related species with similar adult morphology but strongly differing gall shapes.

Distribution. Widely distributed in eastern and central North America, adventive in CA (Percy et al. 2012).

Host plants. *Celtis laevigata* Willd., *C. occidentalis* L. (Cannabaceae).

Pachypsylla celtidisvesicula Riley, 1890

Materials examined. USA: **Florida**: Specimens from Alachua, Leon, and St. John's counties (FSCA, dry mounted).

Diagnosis. Galls are blister-like (Tuthill 1943).

Distribution. Widely distributed in the eastern and central North America, adventive in CA (Percy et al. 2012).

Host plants. *Celtis laevigata* Willd.

Pachypsylla venusta (Osten-Saken, 1861)

Materials examined. USA: **Florida**: Specimens from Alachua, Gilchrist, Hillsborough, Lee, Leon, Marion, Miami-Dade, Orange, Pinellas, St. John's, St. Lucie, and Volusia counties (FSCA, dry and slide mounted, ethanol, gall collection).

Diagnosis. This species is easy to recognize, because it is relatively much larger than the others. It makes large galls in the petioles of the leaves.

Distribution. Widely distributed in the eastern and central USA (Hodkinson 1988).

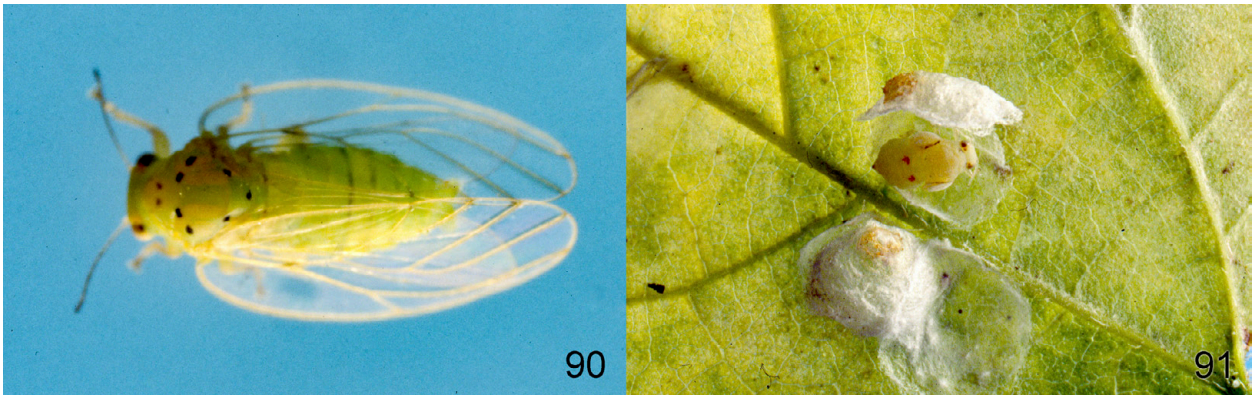
Host plants. *Celtis laevigata* Willd., *C. occidentalis* L. (Cannabaceae).

Tetragonocephala Crawford, 1914

Tetragonocephala flava Crawford, 1914

(Fig. 90, 91)

Materials examined. USA: **Florida**: Specimens from Alachua, Miami-Dade, and Volusia counties (FSCA, dry mounted, ethanol, envelope with dried leaves and lerps).



Figures 90, 91. *Tetragonocephala flava*. **90)** Adult. **91)** Fifth instar immature and lerps. (Photos by Jeff Lotz, FDACS-DPI).

Diagnosis. *Tetragonocephala flava* can be recognized by the lerps on *Celtis* leaves (Fig. 91). Lerps are clam shell shaped and open on the side. They are attached to the undersides of the leaves, often near forks in the leaf veins. Adults resemble the more common *Pachypsylla* species, but they are pale and have six dark spots on the mesonotum and one at the posterior tip of the scutellum (Fig. 90).

Distribution. *Tetragonocephala flava* was described from the southern tip of Texas and is known from Mexico (Ouvrard 2020). Its long presence in Florida, lack of serious damage to hosts, and the presence of a native parasite suggests that it is native to Florida. However, it possibly is adventive in Louisiana, where there was an outbreak that caused serious damage to the trees (Solomon et al. 1997).

Florida distribution information. *Tetragonocephala flava* was recognized in Florida for the first time in April 1997 on *Celtis laevigata* Willd. in Oak Hill (Volusia County) (FSCA# E1997-1214) (Halbert 1997b). Collectors were Avas Hamon, Ru Nguyen, Kenneth Hibbard, and L.J. Chambliss. Previously unrecognized specimens from Florida in the FSCA go back to 1957, when a specimen was collected at Snapper Creek Boy Scout Camp (Miami-Dade County) by sweeping *Celtis*. The exact date is unclear on the label, and no collector is mentioned. We have records, but no specimens, from Jacksonville (Duval County) collected 15.viii.1997 (FSCA# E1997-3281), Lake Jem (Lake County) collected 28.vii.1997 (FSCA# E1997-3438). The most recent collection was in Ft. Myers (Lee County) in June 2005, consisting of 6 empty lerps (FSCA# E2005-2972).

Host plants. *Celtis laevigata* Willd. (Cannabaceae).

Comments. In Louisiana, major dieback of stands of *C. laevigata* was attributed to high populations of *T. flava* (Solomon et al. 1997). In Florida, no similar destruction of trees was observed, possibly because of a native parasite, *Aprostocetus gelastus* (Burks, 1943) (Eulophidae), that controlled psyllid populations (Halbert 1997a). More recently, the Asian aphid, *Shivaphis celti* Das, 1918, (Aphididae) has become established on *C. laevigata* in Florida (Halbert et al. 2000). This aphid is very abundant and may prevent build-up of populations of *T. flava*, which, based on submitted samples, has been rare since the establishment of *S. celti* in Florida.

Rhinocolinae Vondráček, 1957
Tainarys Brèthes, 1920

Tainarys myracrodrui Burckhardt and Queiroz, 2017

Materials examined. Brazil: São Paulo, Matão, numerous suction trap collected specimens (Burckhardt and Queiroz 2017); other material examined in Burckhardt and Queiroz (2017) – **USA**: **Florida**: **Polk County**: Winter Haven, 22.viii.2019, short suction trap (Kenneth Branch and Robinson Lawrence) (FSCA# E2019-4857) (FSCA, dry mounted).

Diagnosis. Description see Burckhardt and Queiroz (2017).

Distribution. Brazil (Distrito Federal, Mato Grosso do Sul, Minas Gerais, São Paulo) (Burckhardt and Queiroz 2017). A single specimen was found in a sample from a short suction trap, collected in Winter Haven, Polk County, Florida (Halbert 2019).

Host plants. *Astronium graveolens* Jacq., *Myracrodruon urundeuva* Allemão (Anacardiaceae).

Comments. As far as we know, neither *Astronium* Jacq. nor *Myracrodruon* Allemão (Anacardiaceae), the reported hosts in Brazil, occur in Florida. DPI personnel, including the first author, surveyed *Schinus terebinthifolia* Raddi, (Anacardiaceae) growing near the trap but failed to find any more *T. myracrodrui*.

Spondyliaspidinae Schwarz, 1898
Blastopsylla Taylor, 1985

Blastopsylla occidentalis Taylor, 1985
(Fig. 92)

Materials examined. USA: **Florida**: Specimens from Collier, Glades, Indian River, Miami-Dade, Orange, Palm Beach, Sarasota counties (FSCA). At least 400 specimens were collected in suction trap samples in Collier and Miami-Dade counties (most not retained).

Diagnosis. *Blastopsylla occidentalis* (Fig. 92) was described from its native Australia and from California, where it is adventive (Taylor 1985). Description see Burckhardt and Elgueta (2000). Halbert et al. (2001) contains a key that separates *B. occidentalis* from other psyllids on *Eucalyptus* in North America.

Distribution. Originating from Western Australia, well established populations of *B. occidentalis* also were discovered in Michoacan, Mexico in 1989 (Hodkinson 1991a). Now, the species occurs on all continents except Antarctica. Details on the distribution and the damage inflicted to *Eucalyptus* are provided by Queiroz et al. (2018).

Blastopsylla occidentalis was found for the first time in Florida in the Orlando (Orange County) area by Susan Halbert and DPI inspectors Barbara Wilder and Anthony Capitano on *Eucalyptus* at an amusement park in April 2001 (FSCA# E2001-1596). More specimens were found in another amusement park in the Orlando area in May 2001 (FSCA# E2001-1989), and the identification was confirmed by Dr. Ray Gill, CDFA (Halbert 2001b). In June 2002, two specimens were collected in the suction trap in Miami (Miami-Dade County) (FSCA# E2002-4697). The presence of the psyllid was confirmed in Miami-Dade County in 2002 (FSCA#s E2002, 4697, E2003-2766, 3199) when colonies were found on *Eucalyptus* in Miami. The psyllid also was found in Sarasota (Sarasota County) on *Eucalyptus* by Bertila Gomez and Julieta Brambila in June 2003 (FSCA# E2003-2302). Since then, there have been numerous detections, particularly in suction traps.

Host plants. *Corymbia* K.D. Hill & L.A.S. Johnson and *Eucalyptus* L'Hér. species (Myrtaceae).

Comments. In Florida, *B. occidentalis* is inconspicuous. The insects form small flocculent colonies on the newest growth of *Eucalyptus* trees. Flight occurs year around in Florida, with most abundant collections in the late spring and early summer. We suspect the Florida population arrived on imported *Eucalyptus* trees from California.

Boreioglycaspis Moore, 1964

Boreioglycaspis melaleucae Moore, 1964
(Fig. 93, 94)

Materials examined. USA: **Florida**: Original permit voucher from Australia (FSCA# 1997-3413), Florida specimens from Broward (site of original release), Brevard, DeSoto, Hillsborough, Lee, Manatee, Miami-Dade Couty, Palm Beach, Pinellas, and Volusia counties (FSCA, dry and slide mounted).

Diagnosis. *Boreioglycaspis melaleucae* is one of only two psyllids in Florida that have long genal processes that are 0.8 times the length of the vertex or longer (Fig. 93). *Boreioglycaspis melaleucae* can be separated from *Glycaspis brimblecombei* by its shorter antennae, which are less than twice head width, and by the forewing venation: the branching of vein M of *B. melaleucae* is distal to the point at which Cu_{1a} intersects the edge of the wing (Wineriter

Figures 92–96. Spondyliaspidinae. **92)** Adult of *Blastopsylla occidentalis*. **93)** Adult of *Boreioglycaspis melaleucae*. **94)** Fifth instar immature of *Boreioglycaspis melaleucae*. **95)** Adult and lerps of *Glycaspis brimblecombei*. **96)** Infestation of *Glycaspis brimblecombei*. (Photos by Susan Wright, USDA, ARS: 92; Lyle Buss, Entomology Department, University of Florida: 93, 94; Susan Halbert: 95, 96).

and Halbert 2002). Adults and immatures of *Boreioglycaspis melaleucae* colonies in the laboratory were tan in color (see photographs in Wineriter and Halbert 2002) but became bright orange after release in the field (Fig. 93, 94).

Distribution. Australia, USA: FL (deliberately introduced for biological control), adventive in Puerto Rico and California (Ouvrard 2020).

Comments. *Boreioglycaspis melaleucae* Moore, an Australian native species, was introduced deliberately to control *Melaleuca quinquenervia* (Cav.) S.T. Blake (Myrtaceae), a noxious weed in the Florida Everglades. Since the release in April 2002, the psyllids, specific to *M. quinquenervia*, have established large populations in several South Florida counties including Broward (FSCA# E2003-1926, 2067, 2262, 2263), Lee (FSCA# E2003-2208, 3609, E2004-433), Collier (FSCA# E2003-3034) and Miami-Dade (FSCA# E2003-6018, 6356, E2004-369). There have been suction trap collections in Miami (Miami-Dade County), beginning in October 2003 (FSCA# E2003-5336). The suction trap in Immokalee (Collier County) also began collecting specimens in October 2003 (FSCA# E2003-5512, 5611). The suction traps in Winter Haven (Polk County) began collecting *B. melaleucae* in 2004, followed by consistent collections with numbers over 100 per sample sometimes occurring in spring and summer months. At least 2,500 specimens were collected in the Winter Haven suction traps. In Immokalee (Collier County), collections occurred in the spring (mostly March – June) and in some years there were collections in the fall and winter (October – January). Since 2013, numbers of the *B. melaleucae* population in Florida have diminished markedly for unknown reasons.

**Ctenarytaina* Ferris and Klyver, 1932

**Ctenarytaina eucalypti* (Maskell, 1890)

Materials examined. Interceptions from **Mexico**, **USA**: **California** and **Texas** (FSCA, dry and slide mounted).

Diagnosis. Description by Hodkinson (2007). See Halbert et al. (2001) for a key to *Eucalyptus* psyllids established in California.

Distribution. *Ctenarytaina eucalypti* originates from Australia and is adventive in New Zealand, Papua New Guinea, Sri Lanka, South Africa, Europe, South America and the USA (CA, OR) (Hollis 2004; Castillo Carrillo et al. 2016).

Host plants. *Eucalyptus* L'Hér. species (Myrtaceae).

Comments. This species has been intercepted in Florida but is not established.

**Ctenarytaina spatulata* Taylor, 1997

Materials examined. Interceptions from **USA**: **California** (FSCA, dry mounted, ethanol).

Diagnosis. Description by Hodkinson (2007). See Halbert et al. (2001) for a key to *Eucalyptus* psyllids established in California.

Distribution. *Ctenarytaina spatulata* originates from Australia and is adventive in Europe, South America and the USA (CA) (Hollis 2004).

Host plants. *Eucalyptus* L'Hér. species (Myrtaceae).

Comments. This species has been intercepted in Florida but is not established.

Glycaspis Taylor, 1960

Glycaspis brimblecombei Moore, 1964

(Fig. 95, 96)

Materials examined. Brazil, **Mexico** (see below). **USA**: **Florida**: Specimens from Collier, Glades, Highlands, Hillsborough, Indian River, Lee, Orange County, Palm Beach, Pinellas, Polk, and Sarasota counties. (FSCA, dry and slide mounted, ethanol).

Diagnosis. Easily recognized by the conical lerps that form on leaves of the host plants (Fig. 95). Infested trees (Fig. 96) often are dripping with honeydew and old lerps. Red gum lerp psyllid adults look very similar to those

of *B. melaleucae*, the biological control agent for *M. quinquenervia*. See discussion under the latter species and generic key for an explanation of the differences.

Distribution. *Glycaspis brimblecombei* originates from eastern Australia and occurs today (adventive) in North and South America, the Mediterranean Region, sub-Saharan Africa, New Zealand and Hawaii (Queiroz et al. 2013; CABI 2019).

Host plants. *Eucalyptus* spp. (Myrtaceae), especially *E. camaldulensis* Dehnh. and *E. tereticornis* Sm. but also on *E. blakelyi* Maiden, *E. brasssiana* S.T. Blake, *E. bridgesiana* R.T. Baker, *E. camphora* R.T. Baker, *E. dealbata* Schauer, *E. diversicolor* F. Muell., *E. globulus* Labill., *E. mannifera* Mudie, *E. maculosa* R.T. Baker, *E. nitens* Maiden, and *E. sideroxylon* Woolls. (Ouvrard 2020).

Comments. *Glycaspis brimblecombei* is the most serious pest of *Eucalyptus* among the eucalypt psyllids (Brennan and Gill 1999; Halbert et al. 2001; Queiroz et al. 2013). The lerps and the honeydew secreted by the psyllids are sticky, and infested leaves become coated with sticky residue from the psyllids and with sooty mold. Severe defoliation and death of trees can occur. The infestations cause a troublesome sticky mess, particularly in urban sites. The humid climate in Florida appears not to be ideal for this species, and it is found mostly in the dry spring months. At first, populations were numerous in the spring but subsided during our subtropical summers. Currently, numbers apparently are very low, but there are occasional suction trap collections in Immokalee (Collier County).

Glycaspis brimblecombei was found to be established on *Eucalyptus* in Florida at an amusement park in the Orlando (Orange County) area in April 2001 by DPI inspectors Barbara Wilder and Amanda Melco (FSCA# E2001-1296) (Halbert 2001a). Subsequent surveys indicated the infestation was fairly localized and heaviest surrounding a dumpster in a holding area for new landscape plants. The likely source of the infestation was imported *Eucalyptus* trees from California. We have one earlier record of an interception on cut flowers from California found in April 2000 in Thonotosassa (Hillsborough County) (FSCA# E2000-1136).

During the spring and summer of 2000, the infestation of *G. brimblecombei* spread to surrounding communities within Orange County (Oakland: FSCA# E2001-1843; Apopka: (FSCA#s E2001-2109, 2110, 3532); Taft: (FSCA# E2001-2541). In June 2003, the new pest was detected in Sarasota (Sarasota County) in Southwest Florida by Bertila Gomez and Julieta Brambila (FSCA# E2003-2302). This species has become established on *Eucalyptus* in the central Florida peninsula.

Glycaspis brimblecombei also was detected in Mexico for the first time in Aguascalientes in November 2001 by Bertila Gomez (FSCA# E2002-55). *Glycaspis brimblecombei* also was found in Matão, São Paulo, Brazil in suction trap collections beginning in 2006 (FSCA# E2007-701).

Calophyidae Vondráček, 1957
Calophyinae Vondráček, 1957
Calophya Löw, 1879

Key to Florida species of *Calophya*

1. Genae rounded, not produced into conical processes. On *Spondias purpurea* L. (Anacardiaceae) ..... ***C. spondiadis* Burckhardt and Mendez**
— Genae produced into conical processes. On other hosts **2**

2(1). Genal processes shorter than vertex along mid-line, conical. On native hosts, not *Schinus* L. **3**
— Genal processes about as long as vertex along mid-line, very slender, tubular. On *Schinus* L. (Anacardiaceae) **4**

3(2). Forewing membrane colorless. Host unknown ..... ***C. arcuata* Caldwell**
— Forewing membrane conspicuously dark brown or almost black. On *Rhus copallinum* L. (Anacardiaceae) ..... ***C. nigripennis* Riley**

4(2). Head and thorax pitch black, strongly contrasting with green or yellow abdomen ..... **C. terebinthifolii* Burckhardt and Basset**
— Body coloration entirely green or yellow **5**

5(4). Distal segment of aedeagus almost as long as proctiger; basal stalk more than three-quarters of total segmental length. Female terminalia long, proctiger with apical spiniform process. On *Schinus molle* L. ..... ***C. schini* Tuthill**

— Distal segment of aedeagus distinctly shorter than proctiger; basal stalk less than half of the total segmental length. Female terminalia short, proctiger without apical spiniform process. On *Schinus terebinthifolia* Raddi **6**

6(5). Forewing with surface spinules leaving relatively narrow spinule-free stripes along the veins. Male proctiger, in lateral view, broad ..... ***C. latiforceps* Burckhardt**

— Forewing with surface spinules leaving relatively broad spinule-free stripes along the veins. Male proctiger, in lateral view, narrow ..... ***C. lutea* Burckhardt**

Calophya arcuata Caldwell, 1944

Materials examined. Holotype ♀ **USA: Florida: Monroe County:** Bonefish Key, 24.ii.1940 (J.S. Caldwell) (USNM, dry mounted); 1 ♀, Stock Island, Key West, 24.vi.1964, black light trap (F.A. Buchanan) (FSCA, in 70% ethanol).

Distribution. USA (FL) (Hodkinson 1988).

Host plants. Unknown.

Comments. The female from Key West is similar to the female holotype in body size and color; in the shape of the genal processes which are about two thirds of the vertex length; in the forewing shape which is ovoid with an indistinctly angular apex; with surface spinules on the wing membrane in all cells leaving moderately broad spinule-free stripes along the veins; in the female terminalia which are cuneate with proctiger bearing a rim around the circumanal ring, dorsal outline of proctiger almost straight, very weakly sinuous; subgenital plate pointed, broken in female from Key West. Antennae missing in holotype. The holotype differs from the other female in the larger cell cu_2 and the shorter vein Cu (about as long as vein Cu_{1a}), longer than vein Cu_{1a} in the Key West specimen.

More material and host plant information are necessary to assess the identity of *C. arcuata* and the identity of the Key West specimen.

**Calophya latiforceps* Burckhardt, 2011

Materials examined. USA: **Florida**: **St. Lucie County**: Ft. Pierce, University of Florida Biological Research and Containment Laboratory, 1.iv.2010. *Schinus terebinthifolia* (Lindsay Christ) (FSCA# E2010-2189) (FSCA, slide mounted, ethanol); same but 1.ix.2012 (Eric Ottoson and Rodrigo Diaz) (FSCA, slide and dry mounted, ethanol) (original permit voucher collections). See also Burckhardt et al. (2018)

Diagnosis. Description by Burckhardt et al. (2018).

Distribution. Brazil (Burckhardt et al. 2018). Reared in quarantine in Florida as possible biological control for Brazilian peppertree.

Host plants. *Schinus terebinthifolia* Raddi (Anacardiaceae).

Comments. Of the three species tested as potential biological control for *S. terebinthifolia*, this one might be the most promising.

**Calophya lutea* Burckhardt, 2018

Materials examined. USA: **Florida**: **St. Lucie County**: Ft. Pierce, University of Florida Biological Research and Containment Laboratory, *Schinus terebinthifolia* (FSCA, NHMB). See also Burckhardt et al. (2018).

Diagnosis. Description by Burckhardt et al. (2018).

Distribution. Brazil (Burckhardt et al. 2018). Reared in quarantine in Florida as possible biological control for Brazilian peppertree.

Host plants. *Schinus terebinthifolia* Raddi (Anacardiaceae).

Calophya nigripennis Riley, 1884

(Fig. 97)

Materials examined. USA: **Florida**: **Alachua County**: Gainesville, San Felasco Hammock, 10.iv.2014, *Rhus copallinum* (Susan Halbert, Rodrigo Diaz, Carolina Arguijo, Kevin Williams) (FSCA# E2014-2328) (FSCA, dry and slide mounted).

Diagnosis. Adults differ from other species in the black forewings. Immatures (Fig. 97) develop on winged sumac (*Rhus copallinum*) in northern Florida.

Distribution. Distributed widely in the eastern USA including northern Florida (Hodkinson 1988).

Figures 97–101. *Calophya*, *Mastigimas* and *Diaphorina*. **97)** Immatures of *Calophya nigripennis*. **98)** Adult of *Mastigimas ernstii*. **99)** Fifth instar immature of *Mastigimas ernstii*. **100)** Adult of *Diaphorina citri*. **101)** Immature of *Diaphorina citri*. (Photos by José Rodriguez, USDA, ARS: 97; Jeff Lotz, FDACS, DPI: 98, 99; Jeffrey Lotz and David Ziesk, FDACS, DPI: 100, 101).

Host plants. *Rhus copallinum* L. (Anacardiaceae).

Comments. Immatures develop on stems (Fig. 97) or leaves of winged sumac. Adults can be found in early April.

Calophya spondiadis Burckhardt and Mendez, 2016

Calophya spondiadis Burckhardt and Mendez, in Mendez et al. 2016: 418.

Materials examined. USA: Florida: Miami-Dade County: 1 ♂, 1 ♀, Miami, Chapman Field, 9–16.xi.2007, suction trap (G. Myres) (FSCA# E2007-8729) (FSCA, dry mounted); Miami, Chapman Field, 3–10.xii.2012, suction trap (H. Escobar) (FSCA# E2013-13) (FSCA, dry mounted). Confirming the presence of this species in Florida, a severe infestation on *Spondias purpurea* plants was found by Rita Duncan (University of Florida) 18.iii.2020 in Homestead (Miami-Dade County) (FSCA# E2020-1141). Both flowers and leaves were infested.

Distribution. Reported from Mexico (Mendez et al. 2016). New record for the USA and for Florida.

Host plant. *Spondias purpurea* L. (Anacardiaceae).

**Calophya schini* Tuthill, 1959

Materials examined. Six intercepted populations from **USA: California**.

Diagnosis. *Calophya schini* can be separated from other *Calophya* species inducing pit galls on *Schinus* spp. as indicated by Burckhardt et al. (2018).

Distribution. Originating from South America, adventive in Africa, Europe, New Zealand and North America (Mendez et al. 2016).

Host plants. *Schinus molle* L. (Anacardiaceae).

Comments. *Calophya schini* was intercepted from California and eradicated six times since 1985 (DPI unpublished records).

**Calophya terebinthifolii* Burckhardt and Basset, 2000

Materials examined. USA: **Florida**: **St. Lucie County**: Ft. Pierce, University of Florida Biological Research and Containment Laboratory, *Schinus terebinthifolia* (FSCA, NHMB).

Diagnosis. Description by Burckhardt et al. (2018).

Distribution. Brazil (Burckhardt et al. 2018). Reared in quarantine in Florida as possible biological control for Brazilian peppertree.

Host plants. *Schinus terebinthifolia* Raddi (Anacardiaceae).

Mastigimatinae Bekker-Migdisova, 1973
Mastigimas Enderlein, 1921

Mastigimas ernstii (Schwarz, 1899)

(Fig. 98, 99)

Materials examined. USA: **Florida**: **Miami-Dade County**: Miami, 6.vi.2003, *Cedrela odorata*, (Duraid Hanna) (FSCA# E2003-2480) (FSCA, slide mounted, ethanol); same but 11.vi.2004 (FSCA# E2003-2416) (FSCA, slide and dry mounted, ethanol).

Diagnosis. Adults of *Mastigimas ernstii* (Fig. 98) are easy to recognize. The head is cleft in front, and there are high antennal tubercles. The third antennal segment is expanded at the base.

Distribution. Mexico, Cuba, Guatemala, Belize, Costa Rica, and Venezuela (Burckhardt et al. 2013), USA (FL) (Halbert 2003b).

Mastigimas ernstii was discovered for the first time in Florida at a nursery in Miami (Miami-Dade County) by DPI inspector Duraid I. Hanna on *Cedrela* on 6.vi.2003 (FSCA# E2003-2480). Subsequent collections were made at the same nursery on 11.vi.2003 and 5.xi.2003 (FSCA#s E2003-2516, 4430).

Host plants. *Cedrela odorata* L. (Meliaceae).

Comments. Immatures secrete white fluffy wax (Fig. 99). The species is not likely to be of economic significance in Florida, although *Cedrela* plants are considered to be high value nursery stock. The species has been found only in south Florida where the host plants occur. After the first detection, no specimens were found for several years, leading us to suspect that the population had been eradicated; however, a small outbreak occurred in Miami-Dade County in 2016, accompanied by suction trap collections and infested plants.

Carsidaridae Crawford, 1911
Paracarsidara Heslop-Harrison, 1960

Key to Florida species of *Paracarsidara*

1. Distal segment of aedeagus with basal lobe developed as slight swelling, truncate apically (Brown and Hodkinson 1988: fig. 93G). Female proctiger with apical extension long and upturned (Brown and Hodkinson 1988: fig. 93E) . . . . . ***P. dugesii* (Löw)**

— Distal segment of aedeagus with prominent basal lobe, rounded apically (Brown and Hodkinson 1988: fig. 95H). Female proctiger with shorter straight apical extension (Brown and Hodkinson 1988: fig. 95E) . . . . . ***P. gigantea* (Crawford)**

Paracarsidara dugesii (Löw, 1886)

Materials examined. USA: **Florida**: **Monroe County**: Key West, 5.vi.1953, *Abutilon hirtum* (Lam.) Sweet (Malvaceae) (O. D. Link) (slide mounted, ethanol FSCA); Key West, 6.i.1965, *Waltheria indica* L. (Malvaceae) (H. A. Denmark) (slide mounted, FSCA).

Diagnosis. Description by Brown and Hodkinson (1988).

Distribution. Cuba, Dominica, Guatemala, Jamaica, Mexico, and Puerto Rico; the occurrence in Brazil is questionable (Hollis 1987); USA (FL) (new record reported here).

Host plants. Perhaps oligophagous on Malvaceae; in Florida on *Abutilon hirtum* (Lam.) Sweet and *Waltheria indica* L. (Malvaceae).

Comments. It is unknown if the population of this Neotropical psyllid has persisted in Florida. Between 2001 and 2014, there were 10 interceptions of this species at US ports of entry (Smith-Pardo 2014). Only one incident involved the family Malvaceae, in which reported hosts can be found. One interception was on lettuce (*Lactuca sativa* L.), a common plant for hitchhikers (DPI unpublished data), and five were found on Lamiaceae Martinov. Most interceptions were from Mexico, but one was from Ecuador, indicating that the species probably is established there.

Paracarsidara gigantea (Crawford, 1911)

Materials examined. USA: **Florida**: **Miami-Dade County**: 1 ♂, Miami, Chapman Field, 31.vii.2009–7.viii.2009, suction trap (H. Escobar) (FSCA# E2009-5853); 1 ♂, Miami-Dade County, Miami, Chapman Field, 14.v.2012–21.v.2012, suction trap (H. Escobar) (FSCA# E2012-4311).

Diagnosis. Description by Brown and Hodkinson (1988).

Distribution. Belize, Brazil, Colombia, Cuba, Guatemala, Nicaragua, and St. Kitts (Hollis 1988), USA (FL). (Halbert 2009, as *Paracarsidara* sp.).

Host plants. *Ceiba* Mill. spp. and perhaps other Malvaceae.

Comments. In Florida, this species has not been confirmed on the host yet. It is not known if this Neotropical species is established in Florida, but suction trap collections usually indicate that many specimens are present in the environment.

Liviidae Löw, 1879
Euphyllurinae Crawford, 1914
Diaphorina Löw, 1880

Diaphorina citri Kuwayama, 1908

(Fig. 100, 101)

Materials examined. USA: **Florida**: The FSCA database has over 10,000 records of this pest, from residences, nurseries, citrus groves, business landscapes, fruit trucks, etc. Most specimens were not retained; many were used for molecular analysis for citrus greening pathogens (Halbert et al. 2012). Counties represented by FSCA specimens include Alachua, Baker, Brevard, Broward, Gadsden, Hendry, Highlands, Hillsborough, Calhoun, Charlotte, De Soto, Escambia, Flagler, Lake, Lee, Levy, Miami-Dade, Okeechobee, Orange, Osceola, Palm Beach, Polk, St. John's, St. Lucie, and Sarasota (FSCA, dry and slide mounted, ethanol). **USA other than Florida**: American Samoa, Guam, Hawaii, Puerto Rico, Saipan, and Tinian (FSCA, dry mounted, ethanol). **Other countries:** Antigua, Argentina, Bahamas, Belize, Bolivia, Brazil, China, Colombia, Costa Rica, Curaçao, Dominica, Ecuador, Guatemala, Grenada, Honduras, India, Indonesia, Jamaica, Kenya, Mexico, Nepal, St. Lucia, Tanzania, Trinidad and Tobago, Uruguay, Venezuela, and Viet Nam (FSCA, dry and slide mounted, ethanol).

Diagnosis. Adults are readily recognizable by the maculation pattern on the forewings (Fig. 100). The fifth instar (Fig. 101) is characterized by three-segmented antennae, forewing pads with prominent humeral lobes and a smooth body surface lacking macroscopic setae.

Distribution. Originating from tropical Asia, adventive in west Asia, Arabian Peninsula, east and west Africa, South, Central and North America (Percy et al. 2012, Ouvrard 2020), USA (FL) (Halbert 1998).

Florida distribution information. *Diaphorina citri*, the Asian citrus psyllid, was found by Susan Halbert, DPI inspectors Ellen Tannehill, and Dennis Clinton, and DPI virologist Lawrence G. Brown on a routine survey for citrus viruses in Delray Beach (Palm Beach County) in June 1998 (FSCA# E1998-1751). Since then, it has colonized Florida everywhere citrus is grown. Thousands of specimens have been collected in Florida from nurseries, citrus groves, dooryards, and suction traps.

Host plants. *Citrus* L. spp., *Murraya* J. Koenig ex L. and other citrus relatives (Rutaceae) (Halbert and Manjunath 2004).

Comments. Much of the range extension of this pest in Florida can be attributed to movement of ornamental *Murraya paniculata* (L.) Jack (Rutaceae) plants through discount and other retail sales (Halbert et al. 2003, 2012). As a direct pest, *D. citri* is not particularly serious, although new growth of young citrus trees can be damaged badly if populations are high. In much of the citrus production area of the world, including Florida, *D. citri* causes severe damage to citrus through transmission of the pathogens that cause citrus greening disease (Halbert and Manjunath 2004). *Diaphorina citri* is the only citrus psyllid present in the New World, and it is distinct from the other species that colonize citrus around the world (Halbert and Manjunath 2004). In the Old World, *Diaphorina* has almost 80 described and at least as many undescribed species (Ouvrard 2020; Burckhardt, unpublished information) whose identification can be tricky and needs some experience.

Katacephala Crawford, 1914

Key to Florida species of *Katacephala*

(Mostly from Hodkinson 1991b with minor changes)

1. Forewing relatively short and broad, with a broadly truncate apex, broadest at or beyond the middle (Fig. 104) **2**

— Forewing longer and narrower with a more angular apex, broadest in basal half **3**

2(1). Forewing membrane somewhat opaque, amber colored, with a restricted speckled pattern around the stem of vein R+M+Cu; cell m_1 large: vein Cu_{1a} evenly convex anteriorly; costal break distinct. Head and thorax dark orange and fuzzy. Genal processes cone-shaped ..... ***K. grandiceps* Crawford**

— Forewing (Fig. 104) membranous, weakly infuscate with a transverse brown banding pattern across the apical margin; cell m_1 smaller; vein Cu_{1a} slightly sinuous; costal break indistinct. Genal processes (Fig. 107) lobe-shaped ..... ***K. wineriterae*** **Burckhardt and Halbert, spec. nov.**

3(1). Forewing more rhomboidal; costal margin relatively straight, apical margin more truncate, wing apex lying in anterior half of wing; setae along veins pale but long and conspicuous; surface spinules present throughout most cells. Paramere and aedeagus more slender. Larger species: head width > 0.9 mm, forewing length > 2.8 mm ..... ***K. arcuata*** **Crawford**

— Forewing weakly rhomboidal; costal margin more evenly curved, apical margin less truncated, wing apex lying at mid-point of wing; setae along veins shorter and less conspicuous, surface spinules restricted to apices of cells. Paramere and aedeagus relatively shorter and more robust. Smaller species: head width < 0.9 mm, forewing length < 2.6 mm ..... ***K. tenuipennis*** **Tuthill**

Katacephala arcuata Crawford, 1914

Materials examined. No FSCA specimens.

Diagnosis. Description by Hodkinson (1991b).

Distribution. Mexico, USA. – Florida: Bonefish Key (Caldwell 1941, as *Spanioneura arcuata*). Hodkinson (1991b) considered the Florida record doubtful. There are no specimens in the FSCA. Mead (1994a) listed *Katacephala fasciata* Jensen, 1952 from Florida, but it has been synonymized with *K. arcuata* (Hodkinson 1991b).

Host plant. Unknown.

Katacephala grandiceps Crawford, 1914

Materials examined. USA: **Florida**: **Monroe County**: Key Largo, 6.viii.2018, beating mixed vegetation (Ed Putland) (FSCA# E2018-4187) (FSCA, dry mounted); same but 4.xi.2019 (FSCA# E2019-6122) (Olga Garcia) (FSCA, dry mounted).

Diagnosis. Description by Hodkinson (1991b) and characters given in the key. This is a spectacular psyllid, with dark orange, fuzzy head and thorax and yellow abdomen. Wings are somewhat opaque with a proximal speckled band.

Distribution. Bahamas, Cuba, Mexico, USA: Florida: Charlotte, Lee, and Monroe counties (Hodkinson 1991b). Two recent specimens (E2018-4187 and E2019-6122) were found in Key Largo, Monroe County.

Host plant. Unknown, perhaps *Eugenia foetida* Pers. (Myrtaceae).

Comments. The immatures are not known.

Katacephala tenuipennis Tuthill, 1944

Diagnosis. Description by Hodkinson (1991b).

Materials examined. USA: **Florida**: Specimens from Collier, Lee, Miami-Dade, and Monroe counties, mostly nursery collections due to plant problems (FSCA, dry and slide mounted, ethanol).

Distribution. Bahamas, Cuba, Mexico, USA: Florida: Broward, Collier, Lee, Martin, Miami-Dade, Monroe, and St. Lucie counties (Hodkinson 1991b, Mead 1994a, unpublished FSCA records).

Host plants. *Eugenia axillaris* (Sw.) Willd., *E. foetida* Pers. (Myrtaceae).

Comments. This is our most commonly collected species in the genus. The insects colonize the new growth causing malformation. It is considered a pest in nurseries and tropical parks. Immatures are submerged in honeydew (Mead 1994a).

Katacephala wineriterae Burckhardt and Halbert, new species

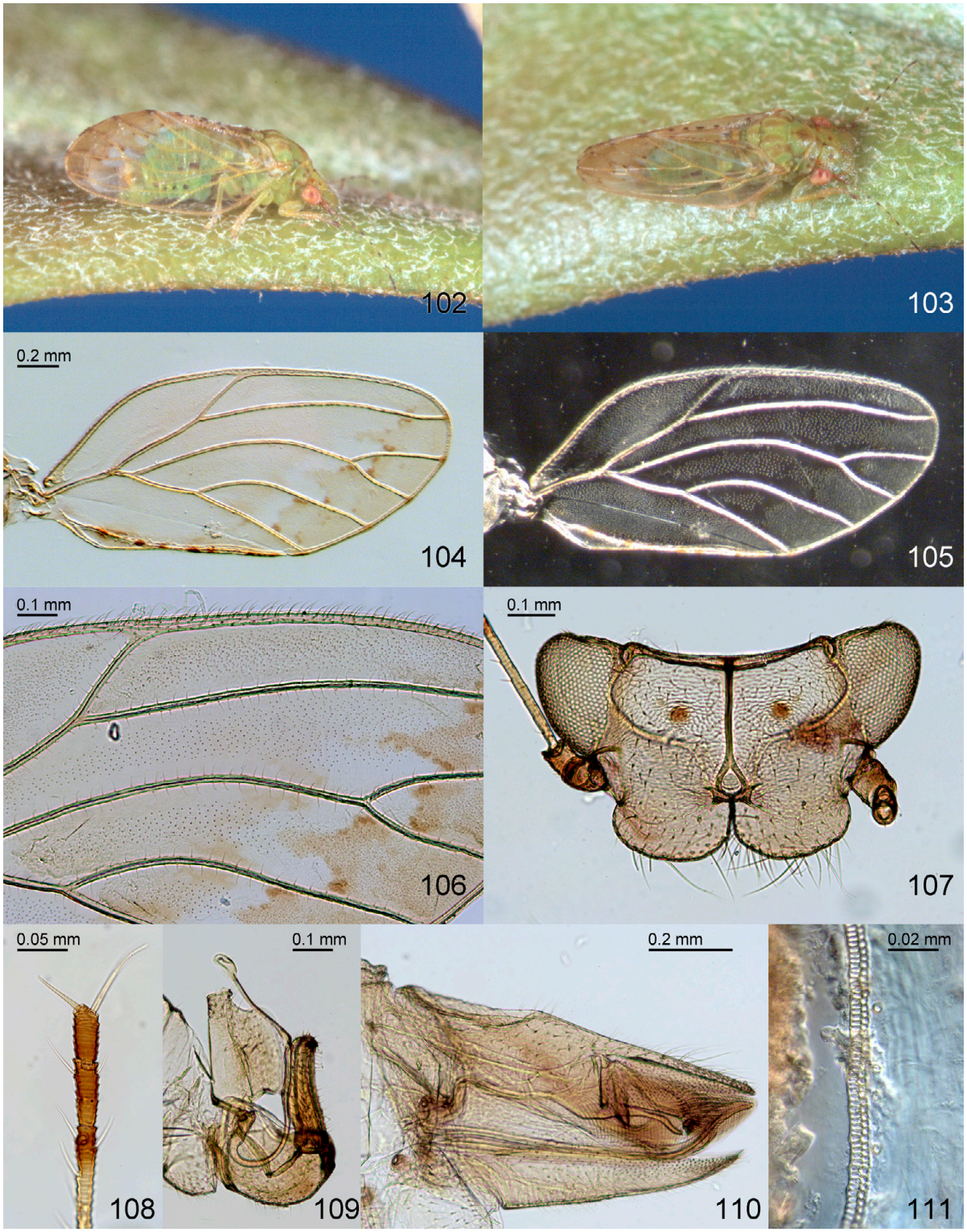
LSID: urn:lsid:zoobank.org:pub:2454C96B-5D17-4162-A3BB-296F5C0DC216
(Fig. 102–121)

Materials examined. Holotype ♂: **USA**: **Florida**: **Alachua County:** Gainesville, Division of Plant Industry, 3.viii.2004, *Calyptranthes pallens*, laboratory colony (S. Wineriter) (FSCA, dry mounted). – Paratypes. **USA**:

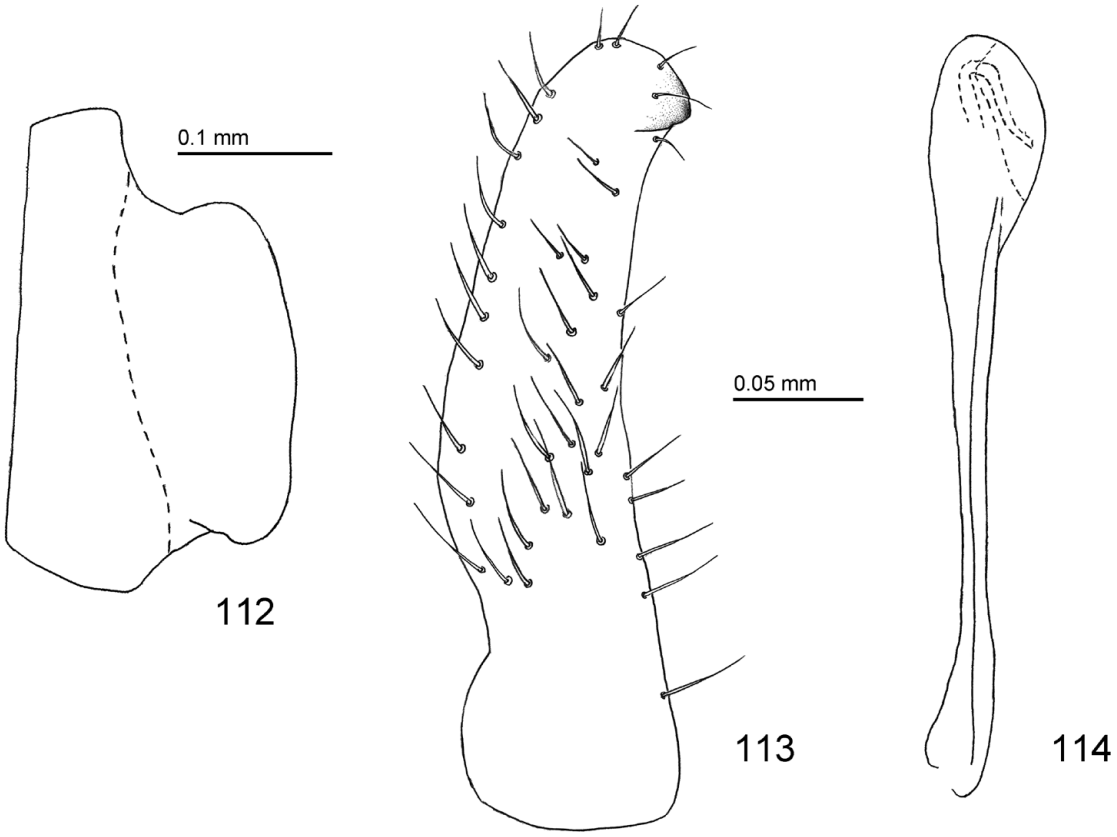
Florida: **Alachua County**: 90 ♂, 38 ♀, same data as holotype (FSCA, NHMB, dry and slide mounted); 6 ♂, 6 ♀, same but 31.iii.2004 (D. Burckhardt) #16(1) (BMNH, MHNG, NHMB, USNM, dry mounted). **Broward County:** 1 ♂, 1 ♀, Fort Lauderdale, 28.v.2003, *Calyptranthes pallens* (K. Tonkel) (FSCA# E2003-2021-201) (NHMB, dry mounted); 1 immature, same but 15.vii.2003, *Calyptranthes pallens* (R. Johnson) (FSCA# E2003-4102) (FSCA, slide mounted): **Monroe County:** 1 ♂, Sugarloaf Key, SE1/4 S23, 29.viii–14.xii.1986, malaise-FIT, hammock (S. & J. Peck) #86-81 (MHNG, dry mounted).

Description. Adult (Fig. 102, 103). Coloration. General body color green or yellow to ochreous. Vertex with brown foveae. Antennal segments 3–8 with dark brown apices, segments 9 and 10 dark brown to almost black. Mesonotum with indistinct brown longitudinal stripes; metapostnotum with dark brown spot. Femora with one or two brown dots or small patches. Forewing membrane yellowish with indistinct brown, transverse band apically and, distal to brown band, with indistinct transverse white band; veins yellow except for fore margin which is whitish; apices of veins with dark dot, and parallel to these with dark dots on the veins following the inner margin of the dark transverse band; with several dark dots on anal vein. Abdominal spiracles brown. Younger specimens with less extended dark pattern. – Structure. Head weakly inclined from longitudinal body axis (45°) (Fig. 102), slightly wider than mesonotum in dorsal view (Fig. 103). Head (Fig. 107) with vertex subrectangular, 1.1 times as wide as long (including anterior lobes), covered in long setae, forming large, anteriorly broadly rounded, anterior lobes that lie in the same plane as vertex; coronal suture fully developed; compound eyes semicircular, slightly flattened laterally; median ocellus visible only in dorsal view, completely enclosed by lobes of vertex; toruli in front of compound eyes; frons on ventral side of head, large, triangular. Antenna 1.4–1.7 times as long as head width; antennal segment 3 longest segment; relative length ratios of segment 10 : shorter terminal seta : longer terminal seta as 1.0 : 0.9 : 1.6 (Fig. 108). Clypeus small, pear-shaped, rostrum 0.3 times as long as head width. Metatibia 0.5–0.6 times as long as head width; with a slightly irregularly spaced crown of 6 metatibial spurs. Forewing (Fig. 104, 105) 2.5–2.8 times as long as head width, 2.1–2.3 times as long as wide, subrhomboidal; costal break ill-defined, pterostigma short and narrow, anal break near apex of vein Cu_{1b}; veins clothed in long setae that are about as long as distance between them, C+Sc slender, strongly curved in apical third, R about 5 times as long as M+Cu, Rs very weakly undulate, not upturned at apex, M curved, longer than its branches, Cu much shorter than its branches, Cu_{1a} curved in basal half; cell m_1 about half as big as cu_2. Surface spinules (Fig. 105, 106) present in all cells, leaving spinule-free stripes along veins; forming irregular transverse rows except for band along apical wing margin where they are irregularly, densely spaced. Hindwing slightly shorter than forewing, membranous; costal setae ungrouped. Male terminalia (Fig. 109, 112–114) with proctiger 0.3 times as long as head width with broadly quadrate posterior lobe. Paramere longer than proctiger, in profile, digitiform, slightly curved posteriad, inner face beset with long hairs in apical two thirds, apex forming backward directed sclerotized tooth. Distal segment of aedeagus slightly longer than proctiger, shorter than paramere, with small bulbous apical dilatation; sclerotized end tube of ductus ejaculatorius short, weakly sinuous. Female terminalia (Fig. 110–111) cuneate. Proctiger 1.0 times as long as head width, with two submedian longitudinal rows of long hairs in apical half; dorsal margin almost straight, apex subacute. Circumanal ring oval, 0.3 times as long as proctiger; consisting of two unequal rows of pores. Subgenital plate 0.7 times as long as proctiger, subacute apically, apex almost reaching that of proctiger. Dorsal and ventral valvulae weakly curved, lacking teeth. – Measurements (in mm; 3 ♂, 3 ♀). Head width 0.76–0.84; antenna length 1.14–1.40; forewing length 1.98–2.30; length of male proctiger 0.26–0.28; paramere length 0.30–0.32; length of distal segment of aedeagus 0.26–0.30; length of female proctiger 0.84–0.88.

Fifth instar immature (Fig. 115–121). Coloration. General body color yellowish with brown sclerites. – Structure. Body strongly dorso-ventrally flattened, 1.2 times as long as wide. Antennae 7-segmented, 1.1 times as long as forewing pad, bearing each one rhinarium on segments 3 and 5 and two on segment 7. Head and thoracic sclerites with a few medium long rod or indistinctly capitate setae. Forewing pads oval, weakly shouldered, with shorter and longer indistinctly capitate marginal setae (Fig. 118) and small falcate dorsal setae (Fig. 121), hindwing pad also with one marginal subacute sectaseta. Tarsal arolium (Fig. 120) triangular, about as long as claws, with petiole and unguitractor. Caudal plate (Fig. 119) 0.6 times as long as wide, broadly rounded apically, with moderately long dorsal and marginal capitate setae and 4+4 subacute marginal sectasetae. Anus ventral near abdominal hind margin, circumanal ring absent. – Measurements (in mm; 1 immature). Body length 1.82; antenna length 0.80.



Figures 102–111. *Katacephala wineriterae* spec. nov., adults. **102)** Habitus, in profile. **103)** Habitus, dorsal view. **104)** Forewing showing pattern. **105)** Forewing showing distribution of surface spinules. **106)** Surface spinules and setae on veins. **107)** Head, dorsal view. **108)** Antennal segments 8–10. **109)** Male terminalia, in profile. **110)** Female terminalia, in profile. **111)** Part of female circumanal ring. Scales: **104, 105)** 0.2 mm; **106)** 0.1 mm; **107)** 0.1 mm; **108)** 0.05 mm; **109)** 0.1 mm; **110)** 0.2 mm; **111)** 0.02 mm. (Photos by Susan Wineriter, USDA, ARS: 102, 103).



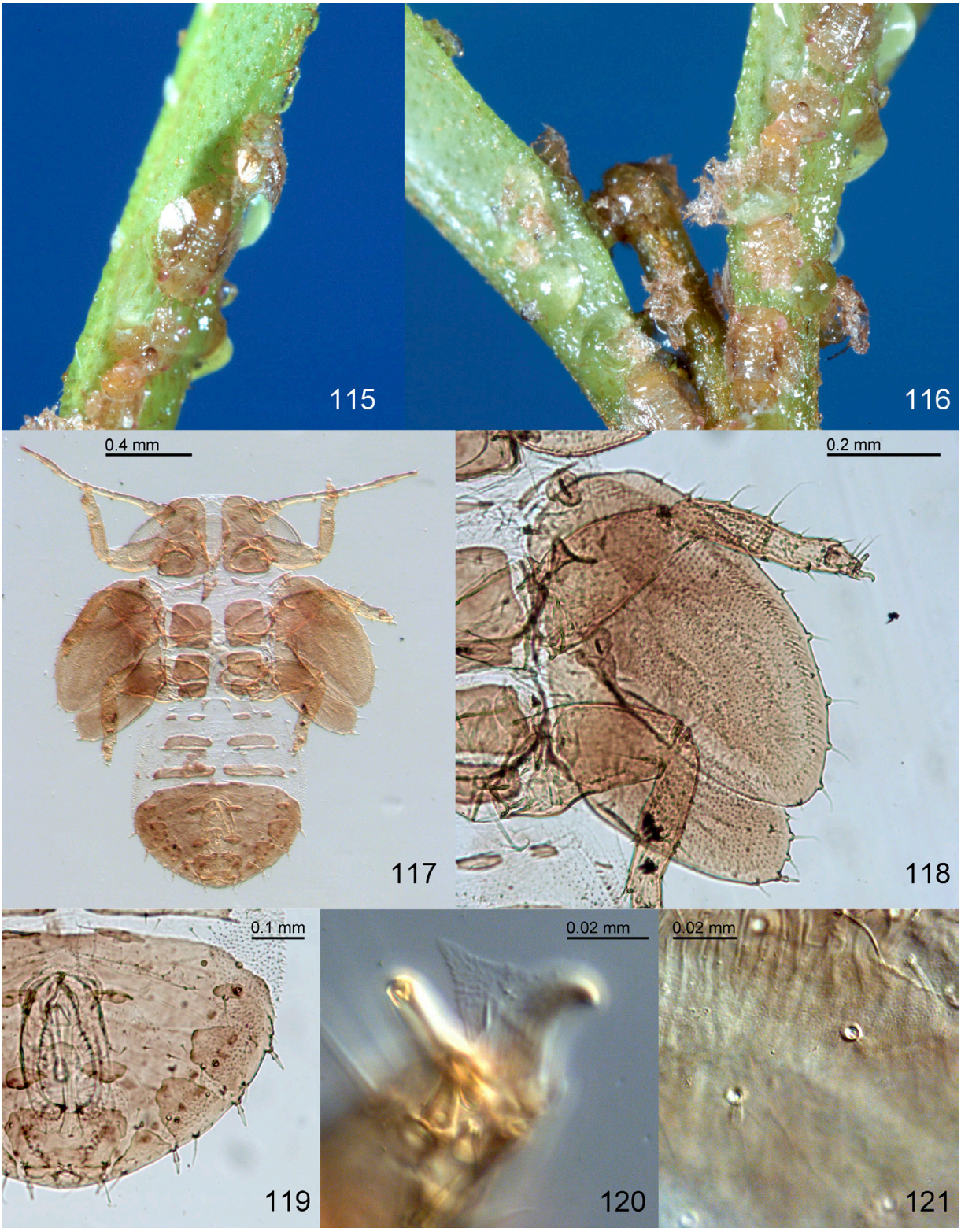
Figures 112–114. *Katacephala wineriterae* spec. nov., male terminalia. **112)** Proctiger, in profile. **113)** inner face of paramere, in profile. **114)** Distal segment of aedeagus. Scales: **112)** 0.1 mm; **113, 114)** 0.05 mm.

Distribution. USA (Florida). *Katacephala winriterae* has been found in Broward, Miami-Dade (FSCA# E2010-2124) and Monroe (FSCA#s E2018-4443, E2019-3396) counties. There are more recent records from the Florida Keys: Monroe County, Key Largo, 16.viii.2018, *Calyptranthes pallens* (E. Putland) (FSCA# E2018-4443); same data except 14.vi.2019, *Calyptranthes pallens* (O. Garcia) (FSCA# E2019-3396). The original find (FSCA# E2003-2021) was reported as a new USA record in Halbert (2003c) as *Katacephala* n. sp.

Host plants. *Calyptranthes pallens* Griseb. (Myrtaceae) (according to Wunderlin et al. (2020): *Myrcia neopallens* A.R. Lourenço and E. Lucas), a threatened South Florida native plant. The immatures are submerged in honeydew (Fig. 115, 116) as this is characteristic for other *Katacephala* and at least some *Notophorina* Burckhardt, 1987, species (Burckhardt, unpublished observation).

Derivation of name. This species is dedicated to Susan Wineriter Wright, who worked for many years for the USDA invasive weed biological control program. This species of *Katacephala* was discovered in research plots maintained by the USDA in Ft. Lauderdale (Broward County). Researchers, under direction of Susan Wineriter Wright, were growing several rare and endangered Myrtaceae to see if *B. melaleucae*, released for control of *M. quinquenervia*, would colonize the native plants. One of the routine inspections by Kirk C. Tonkel, AmeriCorps Volunteer, revealed a population of psyllids on *C. pallens* (FSCA# E2003-2021). Subsequent collections were made from the same location by Robin Johnson in July 2003 and January 2004 (FSCA#s E2003-4102, E2004-1105).

Comments. *Katacephala* Crawford is a small New World genus comprised of eight described species (Hodkinson 1991b; Burckhardt 1994). *Katacephala wineriterae* resembles *K. cinctata* Hodkinson, 1991, from Mexico in the head, which is weakly inclined from the longitudinal body axis and bearing relatively large eyes and lobular genal processes, the subrhomboidal forewings with ill-defined costal break, slender C+Sc, basally curved Cu_{1a} and



Figures 115–121. *Katacephala wineriterae* spec. nov., immatures. **115, 116)** Colonies of immatures and skins partly submerged in honeydew. **117)** Habitus, dorsal view. **118)** Wing pads. **119)** Caudal plate, right half. **120)** Tarsal apex with arolium. **121)** Small falcate setae on dorsum of wing pads. Scales: **117)** 0.4 mm; **118)** 0.2 mm; **119)** 0.1 mm; **120)** 0.02 mm; **121)** 0.02 mm. (Photos by Susan Wineriter, USDA, ARS: 115, 116).

characteristic pattern, as well as the six apical metatibial spurs. *Katacephala wineriterae* differs from *K. cinctata* as follows: genal processes more angular laterally (in *K. cinctata* more rounded), forewing vein C+Sc strongly bent in apical third (in *K. cinctata* evenly curved), the relatively longer forewings (2.1–2.3 versus 1.9 times as long as broad), the narrower and shorter pterostigma and the relatively longer female subgenital plate apically almost reaching tip of proctiger. Differences in the male terminalia cannot be evaluated as the male of *K. cinctata* is unknown. *Katacephala wineriterae* differs from the other three *Katacephala* spp. recorded from Florida in the weakly inclined head, the lobular genal processes, which are conical in the other species, the slender vein C+Sc and the basally strongly curved Cu_{1a}. Immatures of *Katacephala* are currently known only from one species, i.e. *Katacephala longiramis* (Burckhardt, 1987). Immatures of *Katacephala wineriterae* differ from those of *K. longiramis* in the presence of sectasetae and the absence of a circumanal ring (terminal and consisting of multiple rows of pores in *K. longiramis*).

Liviinae Löw, 1879
Livia Latreille, 1802

Livia maculipennis (Fitch, 1857)

Materials examined. USA: **Florida**: **Gadsden County**: Quincy, North Florida Research and Education Center, 27.iii.1998. tall suction trap (Richard Sprenkel) (FSCA# E1998-844) (FSCA, slide mounted).

Diagnosis. Description by Hodkinson and Bird (2000).

Distribution. Widely distributed over the Eastern USA and Canada, rare in Florida (Hodkinson and Bird 2000).

Host plants. *Juncus acuminatus* Michx. (Juncaceae).

Comments. There is only one FSCA specimen, collected in a suction trap (see above).

Phacopteronidae Heslop-Harrison, 1958
Pseudophacopteron Enderlein, 1921

Pseudophacopteron gumbolimbo Burckhardt and Halbert, new species

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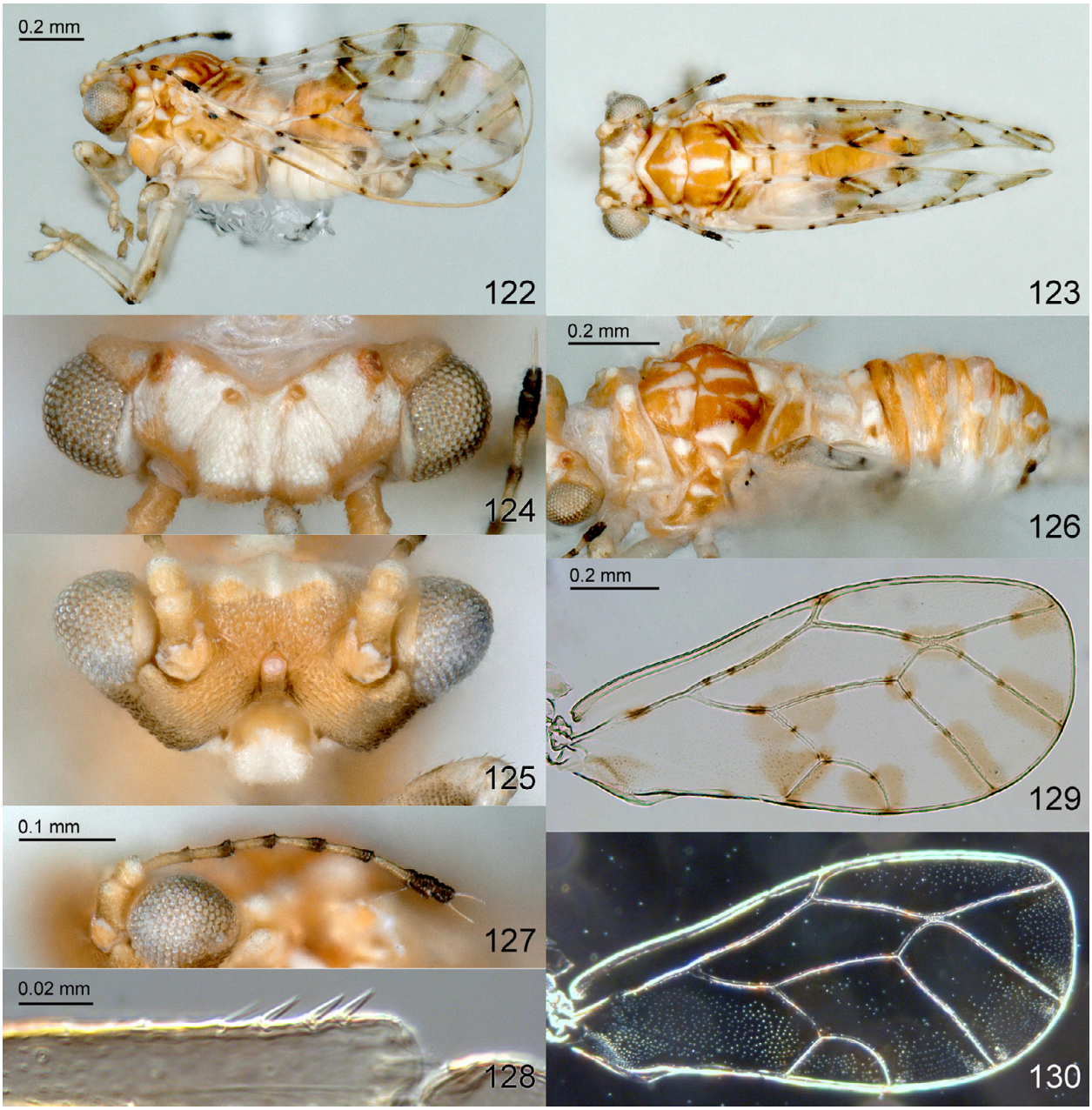
(Fig. 122–138)

Materials examined. Holotype ♂: **USA**: **Florida**: **Miami-Dade County**, Miami, 4400 Rickenbacker Cswy, 4.v.2009, *Bursera simaruba* (O. Garcia) (FSCA# E2009-2943) (FSCA, dry mounted). – Paratypes. **USA**: **Florida**: **Collier County:** 3 ♀, Marco Island, 25.92545, –81.649317, 0 m, 19.iv.2017, *Bursera simaruba* (D. Burckhardt and D.L. Queiroz) #17-12(1) (NHMB, slide mounted, in 70% ethanol). **Miami-Dade County:** 1 ♀, same data as holotype; 3 ♀, Miami, 168 SW170th Ave., 24.xii.2003, *Bursera simaruba* (D. Hanna) (FSCA# E2003-6674) (FSCA, dry mounted, in 70% ethanol); 2 ♂, 2 ♀, 2 immatures, Miami, 33158, Subtropical Research Station USDA, Chapman Field, 13601 Old Cutler Road, 23.iii.2004, *Bursera simaruba* (D. Burckhardt) (NHMB, slide mounted); 1 ♂, Miami, Chapman Field, 2.iv.2004, suction trap (G. Myres) (FSCA# E2004-2395) (FSCA, slide mounted); 2 immatures, Miami, 25.ii.2009, *Bursera simaruba* (O. Garcia) (FSCA# E2009-1008) (FSCA, slide mounted); 2 immatures, Key Biscayne, 4.v.2009, *Bursera simaruba* (O. Garcia) (FSCA# E2009-2943) (FSCA, NHMB, slide mounted); 1 ♂, Miami, 8–10.i.2010, suction trap 8 m (H. Escobar) (FSCA# E2010-345) (FSCA, dry mounted); 1 ♀, same but 19–25.ii.2013, tall suction trap (H. Escobar) (FSCA# E2013-1932) (FSCA, slide mounted); 1 ♂, same but 29.xii.2014–5.i.2015, suction trap (H. Escobar) (FSCA# E2015-90) (NHMB, slide mounted); **Monroe County:** 17 ♂, 7 ♀, Monroe County, Dry Tortugas, Garden Key, 10.vii.1963, blacklight trap (H.V. Weems); 1 ♂, 9 ♀, same but at *Bursera simaruba* (H.A. Denmark); 1 ♀, same but without details on host plant or collecting method (E.M. Collins) (USNM, MMBC, dry mounted).

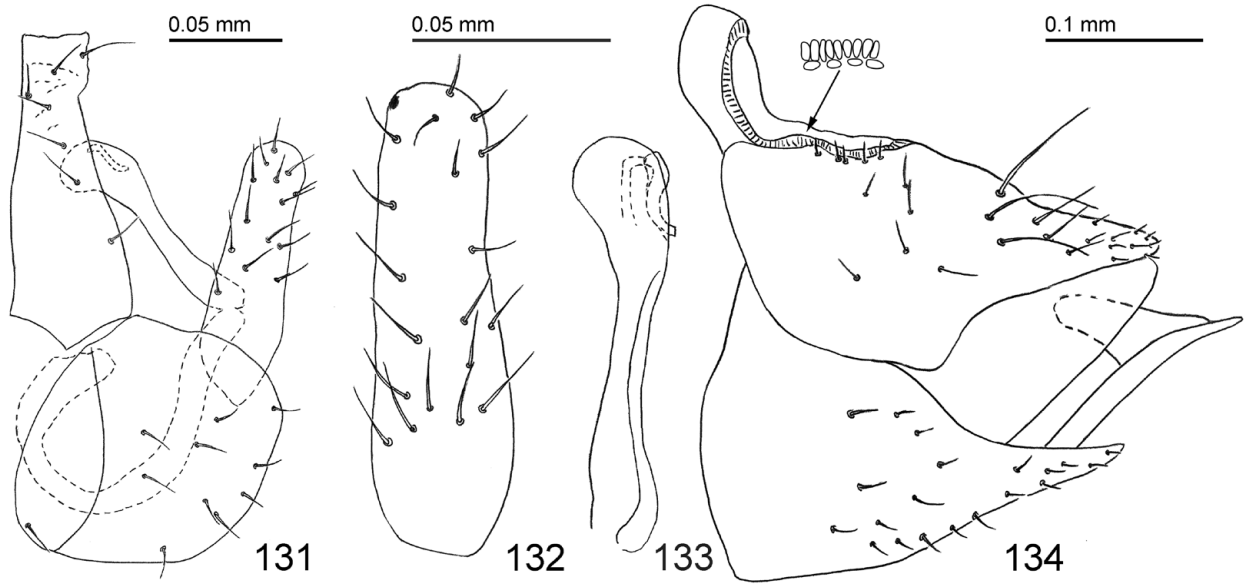
Additional distribution information. This species was first recognized in Florida when it was found on *Bursera simaruba* in Miami by DPI Inspector Gwen Myres on 7.viii.2003 (FSCA# E2003-3561). More collections were made from the same location on 28.viii.2003 (FSCA# E2003-3841), 22.ix.2003 (FSCA# E2003-4610), 17.xii.2003 (FSCA# E2003-6519), 5.i.2004 (FSCA# E2004-135). Collections were made at another location in Miami on



Figures 122–130. *Pseudophacopteron gumbolimbo* spec. nov., adults. **122)** Habitus, in profile. **123)** Habitus, dorsal view. **124)** Head, dorsal view. **125)** Head, frontal view. **126)** Thorax and abdomen, oblique dorsal view. **127)** Antenna. **128)** Apex of mesotibia. **129)** Forewing, showing pattern. **130)** Forewing, showing distribution of surface spinules. Scales: **122, 123)** 0.2 mm; **124, 125, 127)** 0.2 mm; **126)** 0.2 mm; **128)** 0.02 mm; **129, 130)** 0.2 mm.

24.xii.2003 (FSCA# E2003-6674) and on 6.i.2004 on *B. simaruba* by DPI inspector Duraid I. Hanna (FSCA# E2004-130). A specimen, apparently this species, was collected in a blacklight trap on Plantation Key (Monroe County) by H.V. Weems on 1.i.1967.

Description. Adult (Fig. 122, 123, 126). Coloration. Head mostly white dorsally, orange-brown ventrally; foveae on vertex reddish. Clypeus white. Antennal segments 1 and 2 orange dorsally, white ventrally, segments 3–8 white with dark brown tips, segments 9 and 10 dark brown or black. Thorax orange with white dots and longitudinal

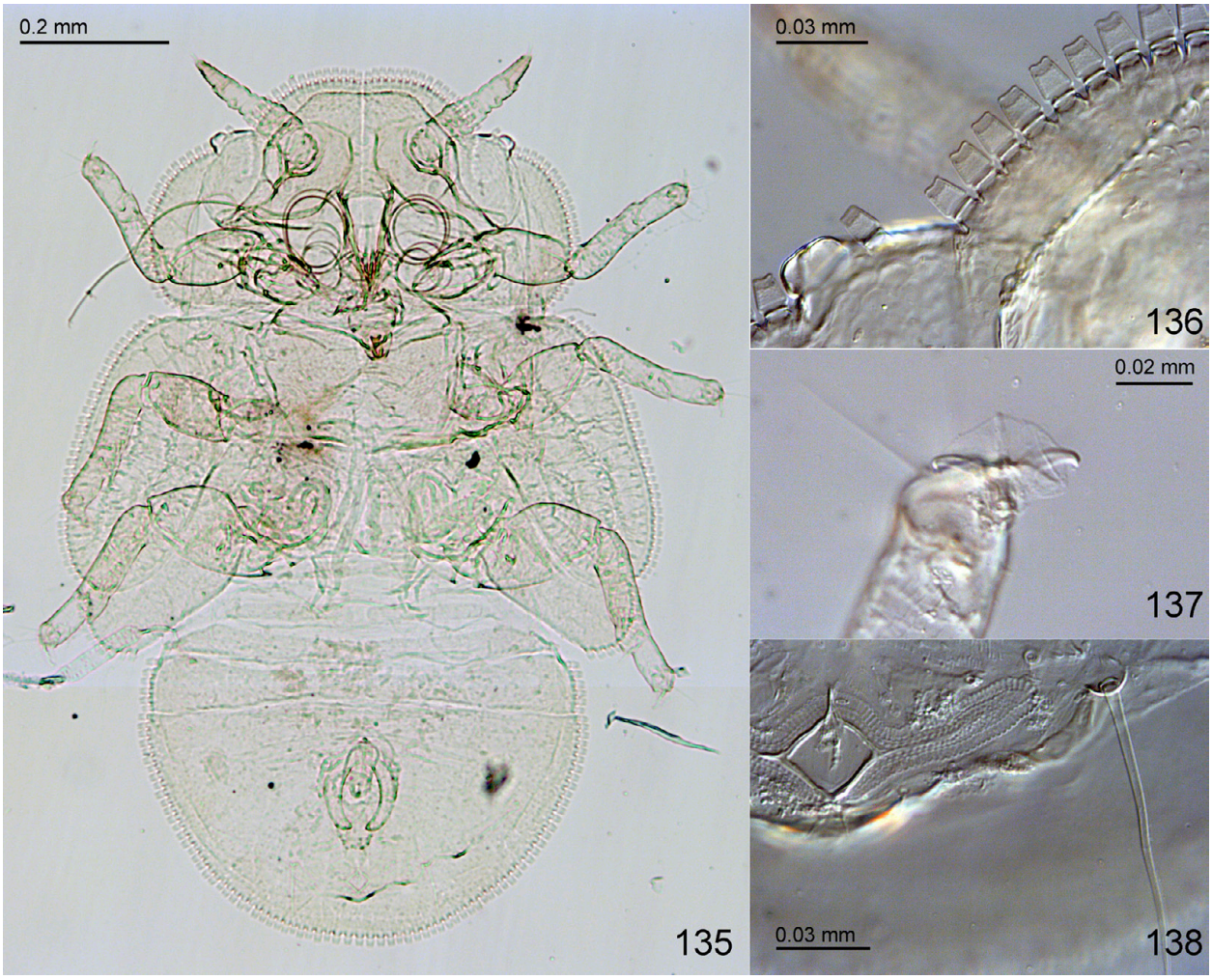


Figures 131–134. *Pseudophacopteron gumbolimbo* spec. nov., male and female terminalia. **131)** Male terminalia, in profile. **132)** Inner face of paramere, in profile. **133)** Distal segment of aedeagus. **134)** Female terminalia, in profile. Scales: **131)** 0.05 mm; **132, 133)** 0.05 mm; **134)** 0.1 mm.

stripes dorsally, ochreous with brown patches and white dots laterally and ventrally. Legs whitish, pro and mesofemora with brown markings in the middle, metacoxa with a brown patch laterally, metafemur brown dorsally and metatibia dark brown basally. Forewings whitish, membrane transparent, marginal vein ochreous, brown patches as follows: broad bands along veins in apical quarter of wing, along the middle of R and the base of M, as well as patches at bifurcation of M and touching point of Rs and M_{1+2}. Hindwings whitish with brown fore margin in basal half. Abdominal dorsum reddish in the middle with a narrow white longitudinal submedian stripe on either side and a broader reddish-brown sublateral band on either side, dirty whitish ventrally, with some dark brown spots laterally. – Structure. Head hardly inclined from longitudinal body axis (Fig. 122), wider than mesonotum in dorsal view (Fig. 123); in frontal view, about 2.4 times as wide (including eyes) as high (Fig. 125). Vertex dorsally (Fig. 124) with raised median ridge and each a submedian swelling on either side in front; median coronal suture completely reduced; lateral ocelli on slightly raised tubercles; occiput and anteoccipital sclerite narrow. Eyes hemispherical. Genae small, weakly swollen, tubercle below torulus small and acute (Fig. 125). Antenna (Fig. 127) 0.8–1.1 times as long as head width, in males slightly longer than in females, robust, segments 4–9 distinctly widening to apex, each with an apical rhinarium; rhinaria lacking a wreath of long cuticular spines; relative lengths of antennal segment 10 and terminal setae as 1.0 : 1.4 : 1.8. Clypeus small, pear-shaped, rostrum 0.3–0.4 times as long as head width. Pronotum with one median and a sublateral and lateral tubercle on both sides (Fig. 126). Mesotibia with a row of 3–4 stout setae on outer side subapically (Fig. 128); metafemur relatively long and slender, medially distinctly constricted; metatibia 0.7–0.8 times as long as head width, bearing an open crown of 8–9 unsclerotized spurs apically and one row of 3–4 similar lateral spurs. Forewing (Fig. 129, 130) 2.4 times as long as head width, 2.1–2.3 times as long as wide, irregularly oblong-oval, apex slightly truncate; costal break situated at distal fifth of vein C+Sc; cell cu_1 developed; radular spinules restricted to small patches on both sides of apices of veins M_{1+2} and M_{3+4} and outer side of Cu_{1a} apex; surface spinules filling mainly distal half of cells r_1, r_2, m_1, m_2 and entire cells cu_1 and cu_2, leaving spinule-free bands along the veins (Fig. 130). Visible abdominal tergites 2–4 each with large median tubercle (Fig. 126). Male terminalia (Fig. 131–133)with proctiger 0.3 times as long as head width, cylindrical, with a few moderately long setae. Male subgenital plate subglobular, with slightly convex dorsal margin. Paramere about as long as proctiger; digitiform, in profile, nearly straight, apex hardly curved posteriad; inner face sparsely beset with long setae, apex forming a small sclerotized tooth. Distal

segment of aedeagus almost as long as proctiger, with long shaft, apical dilation about a third as long as entire segment, irregularly widening towards apex, broadly rounded apically; sclerotized end tube of ductus ejaculatorius relatively long and sinuate. Female terminalia (Fig. 134) with proctiger 0.6 times as long as head width, sparsely covered with a few moderately long setae and with a transverse row of long setae in apical third; dorsal margin of proctiger distal to circumanal ring, in lateral view, weakly concave. Circumanal ring oval, 0.4 times as long as proctiger; consisting of two unequal rows of pores. Subgenital plate 0.7–0.9 times as long as proctiger, subacute apically, apex almost reaching that of proctiger. Dorsal valvulae irregularly triangular, ventral valvulae weakly curved; lacking teeth. – Measurements (in mm; 2 ♂, 2 ♀). Head width 0.48–0.50; antenna length 0.40–0.54; forewing length 1.14–1.32; length of male proctiger 0.12; paramere length 0.12; length of distal segment of aedeagus 0.12–0.14; length of female proctiger 0.30.

Fifth instar immature (Fig. 135). Coloration. In life, nearly transparent; fringed with wax filaments. General body color light in slide mounted specimens. – Structure. Body oval, 1.4–1.5 times as long as wide; dorsally flat, sclerotized, ventrally inflated, membranous. Dorsal sclerites covered in indistinct, fine granular microsculpture and sparse microscopic setae. Body margin with following numbers (one side only) of truncate lanceolate setae (Fig. 136): head in front of antennal insertion: 15–16; eye: 1; cephaloprothorax behind eye: 22–25; forewing pad: 33–39; hindwing pad: 11–13; third visible abdominal segment: 1; fourth visible abdominal segment: 6–7; caudal



Figures 135–138. *Pseudophacopteron gumbolimbo* spec. nov., adults. **135)** Habitus, in dorsal view. **136)** Marginal sectasetae on head. **137)** Tarsal apex. **138)** Circumanal rings. Scales: **135)** 0.2 mm; **136)** 0.03 mm; **137)** 0.02 mm; **138)** 0.03 mm.

plate: 37–40. Antenna 0.4–0.5 times as long as forewing pad length; inserted on ventral side, three-segmented, flagellum indistinctly subdivided, with two rhinaria. Tarsal arolium (Fig. 137) pad-like, with unguitractor but lacking petiole, small, extending approximately to half of length of claws. Anus small, rhomboid, in ventral position; circumanal ring (Fig. 138) relatively small on either side with long seta, with fore and hind margins close together; outer ring composed of a single row of pores, hardly sinuate laterally. – Measurements (in mm; 4 immatures). Body length 1.14–1.24; antenna length 0.18–0.20.

Distribution. USA: Florida: Collier, Miami-Dade and Monroe counties.

Host plants. *Bursera simaruba* (L.) Sarg. (Burseraceae).

Derivation of name. Named after its host, *Bursera simaruba*, locally called gumbo-limbo. Applied as a noun in apposition.

Comments. *Pseudophacopteron* is a pantropical genus previously not recorded from North America. In the Neotropics, the genus is known from five species from Panama (Brown and Hodkinson 1988) and two species from Brazil (Malenovský et al. 2015). *Pseudophacopteron gumbolimbo* resembles *P. antennatum* Brown and Hodkinson, 1988, in the forewing pattern and the shape of the paramere and the female terminalia but differs in the subequal terminal antennal setae, the apically more angular forewings, and in the shape of the apical dilation of the aedeagus, which is relatively narrower and only slightly curved ventrally, hardly hooked.

The species probably is native to Florida. Immatures are found on undersides of new leaves, causing no damage other than an occasional indistinct yellow spot. Adults have been collected in the suction trap in Miami-Dade County in all months except August and September.

Psyllidae Latreille, 1807
Acizziinae White and Hodkinson, 1985
Acizzia Heslop-Harrison, 1961

Key to Florida species of *Acizzia*

1. Forewings yellow, ochreous or brown without distinct pattern . . . . . ***A. jamatonica* (Kuwayama)**
— Forewings yellowish or ochreous with distinct pattern consisting of dark brown spots mostly in apical half of wing **2**

2(1) Apical tubular part of male proctiger about as long as basal part. Paramere, in profile, slightly pear shaped with sclerotized apex pointing backward. Female proctiger, distal to circumanal ring evently tapering to apex. On various *Acacia* and *Albizia* spp. (Fabaceae) . . . . ***Acizzia uncatoides* (Ferris and Klyver)**
— Apical tubular part of male proctiger about twice as long as basal part. Paramere, in profile, slightly lamellar with sclerotized apex pointing forward. Female proctiger, distal to circumanal ring abruptly narrowing into an short apical process. On *Acacia auriculiformis* A. Cunn. ex Benth. (Fabaceae) . . . . . ***Acizzia* sp.**

Acizzia jamatonica (Kuwayama, 1908)

(Fig. 141–144)

Materials examined. USA: **Alabama** (FSCA, dry mounted). – **USA**: **Georgia**: **Douglas County**: Douglasville, 20.ix.2006. *Albizia julibrissin* (S. Good) (FSCA# E2006-8035) (FSCA, dry mounted) (**USA record** (Halbert 2007)). – **USA**: **Florida**: Specimens from Gadsden, Jackson, Jefferson, and Leon counties (FSCA, dry and slide mounted). – **USA**: **West Virginia** (FSCA, dry mounted).

Diagnosis. Superficially, *Acizzia jamatonica* (Fig. 141, 142) resembles *Amorphicola amorphae* (Mally, 1894), a rare species in Florida that occurs only on *Amorpha* L. (Fabaceae). The male paramere will separate these insects easily. The females differ in the longer antennae (see generic key) and the longer, more conical and basally contiguous genal processes in *Acizzia jamatonica*.

Distribution. This species was described from Japan, is widespread in East Asia, and is adventive in the Middle East, Europe and North America (Ouvrard 2020). It was first discovered in the USA in September 2006 (Ulyshen and Miller 2007). The first Florida records were reported from a survey in June 2007 by Wheeler and Hoebeke

(2009). The first DPI record for Florida was in 2014 (Jefferson County, Monticello, 6.viii.2014, *Albizia julibrissin* (Russell F. Mizell III) (FSCA# E2014-5376)).

Host plants. *Albizia julibrissin* Durazz. (Fabaceae).

Comments. Eggs (Fig. 143) usually are laid in clusters at the base of the leaflets. Immatures (Fig. 144) are free-living on the young leaflets of the host. This newly arrived species might have been missed because it shares the host in Florida with *Heteropsylla huasachae* Caldwell, which can be overwhelmingly abundant on the plants.

**Acizzia uncatoides* (Ferris and Klyver, 1932)

Materials examined. None.

Diagnosis. Description by Ferris and Klyver (1932).

Distribution. Originating from Australia, adventive in New Zealand, Mediterranean, South America, Mexico, USA (CA, HI) (Hodkinson 1988).

Host plants. *Acacia* and *Albizia* A. ex Benth. (Fabaceae).

Comments. This species does not occur in Florida, but it has been intercepted at least once. Three other Australian species of *Acizzia* have become established in California (Percy et al. 2012).

Acizzia sp.

Materials examined. USA: **Florida: Collier County:** Naples, 5.ii.2016, *Acacia auriculiformis* (Scott D. Krueger) (FSCA# E2016-384) (FSCA, dry mounted); **Miami-Dade County:** Miami, 26.i.2015, *Eucalyptus* (Olga Garcia) (FSCA# E2015-394) (FSCA, dry and slide mounted).

Diagnosis. This species can be recognized by the forewing maculation pattern (spotted in this species and clear in *A. jamatonica*) and by the male and female terminalia.

Distribution. Australia (Gary Taylor, pers. comm.), adventive in USA (FL).

Host plants. *Acacia auriculiformis* A. Cunn. ex Benth. (Fabaceae).

Comments. This undescribed species of *Acizzia* was discovered in Miami by Florida Department of Agriculture and Consumer Services, Division of Plant Industry (DPI) inspector Olga Garcia. The first specimens were found as stray adults on *Eucalyptus*. Subsequent specimens were found in suction traps in Miami-Dade and Collier counties. DPI inspector Scott Krueger solved the host association when he discovered colonies in Collier County on *Acacia auriculiformis*, a native Australian plant, suggesting that the psyllid also originates from Australia.

This species has become numerous in Florida. Based on suction trap collections, flight activity occurs in spring and fall.

Aphalaroidinae Vondráček, 1963
Aphalaroida Crawford, 1914

Aphalaroida masonici Caldwell, 1940

Materials examined. USA: **Florida**: Specimens from Collier, Miami-Dade, Monroe counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. In life, *A. masonici* is a small, compact yellow/orange psyllid with thickened, rhomboidal forewings and rounded genae not produced into distinct processes. The immatures have seven segmented antennae and several long setae with blunt tips on the posterior margin of the abdomen. A description of the adults is provided by Hodkinson (1991c).

Distribution. Known only from Florida (Caldwell 1938b, 1940; Hodkinson 1991c). The first collection, i.e. the type series, was from Key Largo (Monroe County) Florida, collected on 30.iii.1938 from *Acacia* (Caldwell 1938b). The species was found again in Miami-Dade County by DPI inspector Duraid Hanna (Miami-Dade County, Homestead, 18.xii.2000, unidentified Fabaceae (Duraid I. Hanna), (FSCA# E2000-4829)). More DPI

Figures 139–148. Psyllidae. **139)** *Telmapsylla minuta*: teneral adult, in profile. **140)** *Telmapsylla minuta*: immature with tubular wax secretion filled with honeydew. **141)** *Acizzia jamatonica*: female, in profile. **142)** *Acizzia jamatonica*: oblique dorsal view. **143)** *Acizzia jamatonica*: eggs. **144)** *Acizzia jamatonica*: immatures. **145)** *Euceropsylla martorelli*: female. **146)** *Euceropsylla russoi*: female. **147)** *Heteropsylla fusca*: female. **148)** Damage by immatures of *Mitrapsylla albolineata* on *Senna polyphylla*. (Photos by Lyle Buss, University of Florida, Entomology Department: 139–146; Jeff Lotz, FDACS, DPI: 147; Susan Halbert, FDACS, DPI: 148).

collections (FSCA#s E2001-20; E2002-941, 4710, E2003-564) were made from Miami-Dade County from *Lysiloma latisiliquum* (L.) Benth. (Fabaceae).

Host plants. *Lysiloma latisiliquum* (L.) Benth. (Fabaceae). Caldwell (1938b, 1940) reported the species from *Acacia* Mill. (Fabaceae) which is an unlikely host in the light of repeated findings of the psyllid on *Lysiloma*.

Comments. There are eight species of *Aphalaroida* listed in Hodkinson (1991c). Of those, only *A. masonici* occurs in Florida.

Freysuila Aleman, 1887

Freysuila dugesii Aleman, 1887

Materials examined. USA: Florida: Broward County: Hollywood, vii.1995, x.1995, *Haematoxylum campechianum* (K. Vanyo) (FSCA#s E1995-2997, 4174). **Miami-Dade County**: Miami, 11.vii.1995, *Caesalpinia* (Olga Garcia) (FSCA# E2006-7814) (FSCA, dry and slide mounted, ethanol).

Diagnosis. The only other psyllid on *H. campechianum* is *Heteropsylla fusca* Crawford, 1914. *Freysuila dugesii* can be distinguished from *H. fusca* by its short conical genal processes (*H. fusca* lacks genal processes) and by the prominent black tubercle on the metapostnotum.

Distribution. Mexico (Hodkinson and White 1981), USA (CA) (Percy et al. 2012), USA (FL) (Halbert 1995).

Host plants. *Caesalpinia cacalaco* Humb. & Bonpl., *Haematoxylum campechianum* L. (Fabaceae).

Comments. *Freysuila dugesii* was found for the first time in Florida by DPI inspector Karolyn Vanyo on *Haematoxylum campechianum* L. (Fabaceae) in July 1995 and recollected in October of the same year (FSCA#s E1995-2997, 4174). The infestation was severe, but only a single dooryard tree was infested. The infestation evidently was eradicated when the single infested tree was removed. This species turned up again in 2006 in Miami-Dade County on *Caesalpinia* (FSCA# E2006-7814). Once again, a single plant was infested heavily.

**Russelliana* Tuthill, 1959

Materials examined. See Serbina et al. (2015) and Serbina and Burckhardt (2017). **Brazil**: **São Paulo**: Matão suction trap collections.

Comments. This genus does not occur in Florida, but at least two species are pests of Solanaceae in South America (Serbina and Burckhardt 2017).

**Russelliana solanicola* Tuthill, 1959

Diagnosis. A description can be found in Serbina and Burckhardt (2017). *Russelliana solanicola* differs from other Florida psyllids as indicated in the generic key above.

Distribution. Western South America, adventive in eastern South America (Serbina et al. 2015).

Host plants. Polyphagous on a least ten families of eudicots in the clade Caryophyllales + asterids (Serbina et al. 2015).

Comments. *Russelliana solanicola* is a significant pest. It is implicated in transmission of plant pathogens in potato (Chávez et al. 2003, Serbina et al. 2015) and, according to Syfert et al. (2017), it has a high risk of emerging in Florida.

Telmapsylla Hodkinson, 1992

Telmapsylla minuta Hodkinson, 1992

(Fig. 139, 140)

Materials examined. USA: Florida: Miami-Dade County: Key Biscayne, 14.ii 1989, *Avicennia germinans* (R. Shaw) (FSCA); Biscayne National Park, 13.i. 2003, *Avicennia germinans* (L.D. Howerton) (FSCA# E2003-169); Black Point Marina, 17.ii.2003, *Avicennia germinans* (J. Brambila and E. Varona) (FSCA# E2003-568). **Monroe**

County: Stock Island, 29.viii.1962, 3.ix.1964 , blacklight trap (F.A. Buchanan) (FSCA). **Sarasota County:** Sarasota, 15.ii.2004, *Avicennia germinans* (FSCA# E2004-941).

Diagnosis. Adults of *Telmapsylla minuta* (Fig. 139) can be recognized by the small size, triangular genal processes that meet in the middle, long forewings, characteristic dark "raccoon" stripe across the vertex (sometimes not visible in teneral specimens), and association with *Avicennia*.

Distribution. This species may be native to Florida, but it also is known from Costa Rica (Hodkinson 1992b).

Host plants. *Avicennia germinans* (L.) L. (Acanthaceae).

Comments. *Telmapsylla minuta* has been in Florida for a long time, but it was recognized and described relatively recently from specimens collected on *Avicennia germinans* (L.) L. (Acanthaceae) on Pigeon Key (Monroe County) Florida on 23.v.1982 by F.W. Howard (Hodkinson 1992b). The earliest specimen on record at the FSCA was collected on 29.viii.1962 on Stock Island.

Immatures (Fig. 140) are free-living on the leaves. They tend to cluster between leaves and newly emerging buds, causing some spotting on the leaves, but little overall damage to the plants.

Ciriacreminae Enderlein, 2010
Euceropsylla Boselli, 1929

Comments. *Euceropsylla* contains 14 Central and South American species (Ouvrard 2020), two of which are adventive in Florida. The genus is in need of a taxonomic revision.

Key to Florida species of *Euceropsylla*

1. Forewing truncate apically (Fig. 145). When alive, with bright white stripes on thorax. Head with well-defined white markings on either side of coronal suture (Fig. 145) ..... ***E. martorelli* (Caldwell)**
— Forewing evenly rounded apically (Fig. 146). When alive, without bright white stripes on thorax. Head without defined white markings on either side of coronal suture (may have vague pale areas on head) (Fig. 146) ..... ***E. russoi* Boselli**

Euceropsylla martorelli (Caldwell, 1944)
(Fig. 145)

Materials examined. USA: **Florida**: **Miami-Dade County**:1 ♂, 2 ♀, Homestead, SW 178th Avenue and SW 248th Street, Fruit and Spice Park, 24.iii.2004, *Inga* sp. (D. Burckhardt) #8 (NHMB, dry mounted).

Diagnosis. This species can be recognized, in live specimens, by the bright white calloused lines on the thorax and by the well-defined white markings near the coronal suture.

Distribution. Neotropics (Costa Rica, Guatemala, Panama, Peru, Puerto Rico) (Ouvrard 2020), USA (FL) (new record for Florida and the USA reported here).

Host plants. *Inga* Mill. spp. (Fabaceae)

Comments. *Euceropsylla martorelli*, a Neotropical species, was found again in Florida in May 2010 by USDA/APHIS/PPQ Regional Identifier Julieta Brambila (FSCA# E2010-2229) and again at the same location by DPI inspectors Melba Otero and Stephen Beidler (FSCA# E2010-2594). There have been no more finds since then. Although this psyllid was collected a long time ago, it was not reported formally.

Euceropsylla russoi Boselli, 1929
(Fig. 146)

Materials examined. USA: **Florida**: **Collier County**: 1 ♂, Naples, 11.ix.2013, *Inga feuilleei* (S. Krueger) (FSCA# E2013-6557) (FSCA, slide mounted). **Miami-Dade County**: 1 ♂, Homestead, SW178th Avenue and SW 248th Street, Fruit and Spice Park, 26.iii.2004, *Inga* sp. (D. Burckhardt) #11(3) (NHMB, dry mounted); 3 ♂, 5 ♀, 17 immatures, Homestead, SW178th Avenue and SW 248th Street, Fruit and Spice Park, 30.vii.2008, *Inga* sp. (E. Camero and J. Garcia) (FSCA# E2008-5048-1) (FSCA, in 70% ethanol); 5 ♂, 2 ♀, 24 immatures, 2 skins, Homestead, Redland Road and 25th Street, 18.ix.2008, *Inga* sp. (J. Pena) (FSCA# E2008-6309-1) (FSCA, in 70% ethanol); 16

♂, 20 ♀, Homestead, SW178th Avenue and SW 248th Street, Fruit and Spice Park, 2.v.2010, *Inga* sp. (J. Brambila) (FSCA# E2010-2229) (FSCA, NHMB, dry mounted, in 70% ethanol); 1 ♂, 1 ♀, 1 immature Miami, 26.iv.2012, *Inga* sp. (H. Cruz-Escoto) (FSCA# E2012-3017) (FSCA, slide mounted). **Palm Beach County**: 3 ♂, 2 ♀, 1 skin, Loxahatchee, 17670 37th Rd N, 29, 29.iii.2013 (Michael Cartrett) (FSCA# E2013-2105).

Diagnosis. This species can be recognized, in live specimens, by the lack of bright white lines on the thorax and the lack of well-defined white markings near the coronal suture on the head. Females have a prominent black apex of the subgenital plate.

Distribution. Neotropics (Brazil, Dominican Republic, Panama, Puerto Rico) (Ouvrard 2020), USA (FL) (Halbert 2004).

Host plants. *Inga* Mill. spp.

Comments. The first find of *Euceropsylla russoi* in Florida was on *Inga* sp. in Miami in February 2004 by DPI inspector Haydee Escobar (FSCA# E2004-950). This species is found more commonly in Florida than *E. martorelli*. So far, collections are restricted to Miami-Dade, Collier, and Palm Beach counties.

Heteropsylla Crawford, 1914

Key to Florida species of *Heteropsylla*

1. Outer lobe of male paramere with a black tooth in the middle of hind margin; inner lobe modified into a sharp black spine. Female terminalia very short; proctiger strongly angled down; subgenital plate, in profile, truncate **2**
— Outer lobe of male paramere without teeth in the middle of hind margin (might have a tooth at the top). Inner lobe of the paramere not modified into a sharp black spine. Female terminalia longer; proctiger straighter; subgenital plate, in profile, pointed apically **3**

2(1). Inner lobe of male paramere consisting of a black spine that shows easily in lateral view. Females cannot be separated ..... ***H. mimosae* Crawford**
— Inner lobe of male paramere consisting of a black spine that is hidden behind the outer lobe in lateral view. Females cannot be separated ..... ***H. flexuosa* Muddiman, Hodkinson and Hollis**

3(1). Outer lobe of male paramere with a black tooth on posterior apical corner, both lobes nearly horizontal and equal in length in posterior view. Female subgenital plate with sinuate dorsal margin ..... ***H. cubana* Crawford**
— Lobes of male paramere unequal in length and not horizontal on the top, outer lobes without teeth (inner lobes might have teeth). Female subgenital plate not sinuate dorsally **4**

4(3). Forewing with infuscated membrane, dorsal surface of thorax dark with orange markings (not visible on teneral specimens). Lobes of paramere divided more than half the length of the inner lobes in rear view. Subgenital plate of female bulging ventrally and without a defined central horizontal ridge ..... ***H. fusca* Crawford**
— Forewing with clear membrane; dorsal surface of the thorax dusky or pale. Lobes of paramere divided up to half the length of the inner lobe in rear view. Subgenital plate of female not bulging ventrally, and with a defined central horizontal ridge **5**

5(4). Inner lobe of male paramere, in rear view, only slightly shorter than outer lobe. Female subgenital plate, in profile, triangular ..... ***H. huasachae* Caldwell**
— Inner lobe of male paramere, in rear view, about ½ the length of the outer lobe or less. Female subgenital plate, in profile, rounded ..... ***H. quassiae* Crawford**

Heteropsylla cubana Crawford, 1914

Materials examined. USA: **Florida**: Specimens from Alachua, Brevard, Manatee, Miami-Dade, Monroe, Pinellas (FSCA, dry and slide mounted, ethanol).

Diagnosis. Genitalic characters are needed for species diagnosis. *Heteropsylla cubana* male parameres are flat across the top in posterior view. The female subgenital plate is sinuate on the dorsal margin.

Distribution. *Heteropsylla cubana* currently is pan-tropical and subtropical, including Florida (Ouvrard 2020). The probable origin is the Neotropics.

Host plants. *Leucaena* Benth. spp., particularly *Leucaena leucocephala* (Lam.) de Wit (Fabaceae) and perhaps other mimosoid legumes. *Leucaena leucocephala* is a plant used as forage, but classified as a noxious weed in Florida (Wunderlin et al. 2020).

Heteropsylla flexuosa Muddiman, Hodkinson and Hollis, 1992

Materials examined. USA: **Florida**: **Broward County**: Port Everglades, 30.i.2013. *Acacia farnesiana* (Stephen Beidler) (FSCA# E2013-638) (FSCA, dry and slide mounted); additional specimens from Collier, Hillsborough, Lee Monroe, and Polk counties (FSCA, dry and slide mounted).

Diagnosis. This species is one of two species in which the inner lobe of the paramere is modified into a black spine. In *H. flexuosa*, the spine is hidden in lateral view. Females, with short, truncate terminalia, cannot be separated from those of *H. mimosae* Crawford.

Distribution. Neotropics (Costa Rica, El Salvador, Mexico), western USA (Arizona, California) (Ouvrard 2020), USA (FL) (Halbert 2013) .

Host plants. *Acacia farnesiana* (L.) Willd. (Fabaceae).

Comments. *Heteropsylla flexuosa* was found established at Port Everglades, FL in late January 2013 by DPI inspector Stephen Beidler on *Acacia farnesiana* (FSCA# E2013-522). This species is similar to *Heteropsylla mimosae*, which has been in Florida since 1983 (see below). Recent examination of populations from both sites reveals consistent differences in the male terminalia. Unlike *H. mimosae*, *H. flexuosa* has spread to Hillsborough (FSCA# E2013-2620), Monroe (FSCA# 2018-5926), Lee (FSCA# E2015-3444), Collier (FSCA# E2016-221), and Polk (FSCA# E2014-7038) counties. The Polk County record is from a suction trap.

Heteropsylla fusca Crawford, 1914

(Fig. 147)

Materials examined. USA: **Florida**: **Miami-Dade County**: Homestead, Fruit and Spice Park, *Haematoxylum campechianum* (five collections, FSCA, slide and dry mounted). A specimen also was intercepted in a garden on a cruise ship docked in Broward County at Port Everglades (FSCA# E2011-3699) (FSCA, slide mounted).

Diagnosis. This is the only Florida species in which non-teneral specimens have darkened forewings and thorax. See the key above for additional genitalic features.

Distribution. Neotropics (Costa Rica, Colombia, many Caribbean islands, Mexico), Pacific islands (Hawaii, Mariana Islands), western USA (California) (Ouvrard 2020), USA (FL) (Halbert 2003a) .

Host plants. *Haematoxylum* L. spp. (Fabaceae). Our collections indicate the Florida host is *Haematoxylum campechianum* L. A consistent population can be found on the *H. campechianum* tree at the Fruit and Spice Park in Homestead, FL (Miami-Dade County) (FSCA#s E2003-560, 2156, 2542, E2004-2064, E2005-2469).

Comments. It was thought that *Heteropsylla fusca* was reported in Florida (Muddiman et al. 1992) based on a specimen at the United States National Museum (USNM) from "Arrocera, Florida," collected in April 1957 by "J. Acuna." However, this location is in Florida, Camaguey Province, Cuba. Julian Acuña, who worked in Cuba, is the collector, and "Arrocera" probably refers to a rice field (Robert E. Woodruff, FSCA, personal communication, 2011). Thus, ours is the first Florida (USA) record. Evidently, the species is native to the Caribbean but has become established in the Pacific islands and California.

Heteropsylla huasachae Caldwell, 1941

Heteropsylla propinqua Muddiman Hodkinson and Hollis, 1992, **syn. nov.**

Materials examined. Cuba: (MHNG). – **Mexico:** (NHMB). – **Nicaragua:** (NHMB). – **USA: Florida:** Specimens from Alachua, Collier, Hernando, Highlands, Hillsborough, Indian River, Miami-Dade, Palm Beach, and Polk counties (FSCA, pin and dry mounted); **USA**: **Hawaii** (MHNG).

Diagnosis. Genitalic characters are required for identification of this species. In posterior view, the inner lobe of the parameres is slightly shorter than the outer lobe, and not flat across the top. Female terminalia are triangular. See key above.

Distribution. Reported from Antigua and Barbuda (Antigua), Costa Rica, Cuba, Dominica, Dominican Republic, Guatemala, Jamaica, Mexico, Trinidad and Tobago (Trinidad), UK (Anguilla), USA (Puerto Rico, Virgin Islands) and as introduction from USA (Florida, Hawaii, Saipan) (Muddiman et al. 1992, as *H. huasachae*), as well as from Cuba, Haiti, Jamaica and Mexico (Muddiman et al. 1992, as *H. propinqua*). – Florida: Alachua, Citrus, Collier, Hernando, Highlands, Hillsborough, Indian River, Marion, Martin, Miami-Dade, Palm Beach, Polk, Volusia counties (FSCA specimens, DPI unpublished records).

Host plants. Reported from *Acacia* Mill., *Albizia* Durazz., *Desmanthus* Willd, and *Lysiloma* Benth. spp., perhaps also *Mimosa* L., *Neptunia* Lour., *Schrankia* Willd. and *Zapoteca* H.M.Hern. spp. (Fabaceae) (Muddiman et al. 1992).

Comments. Muddiman et al. (1992) separated *H. huasachae* from *H. propinqua* by the straighter posterior margin of the inner lobe of the paramere, the more pronounced ridge on the female subgenital plate, and the frons with an anterior groove in the middle of the immature in *H. propinqua*. These authors admitted that there are no significant differences between the two taxa in their distributions nor host ranges. We are unable to attribute the material from Florida at hand to either of the two species with certitude, and to corroborate morphological differences between the two species based on the study of the material from several countries (see above). The difference in the paramere shape is mostly due to the angle of observation. In several larger samples, assumed to constitute a single population each, we found females with more or less shallow subgenital plate with more or less pronounced subapical ridge. The presence of an anterior groove on the frons of immatures appears to be due to the age of a specimen (more or less sclerotized; pharate adult development inside immature) and, mostly, the type of preservation (slide mounted or in ethanol). For these reasons we consider *H. propinqua* a junior synonym of *H. huasachae* and formally synonymize the two species.

Specimens of *H. huasachae* in the FSCA go back to May 1955, when specimens were collected by H. Burnett in Vero Beach on "*Morongia uncinota*." This plant name, even after "*uncinota*" is corrected to "*uncinata*" is not valid (Barneby 1995). It is not clear what the host was. Other specimens have been collected from *Acacia* and *Albizia* in Florida. It is common on *Albizia*.

Heteropsylla mimosae Crawford, 1914

Materials examined. USA: **Florida**: **Orange County**: Orlando, 6.ii.1991, *Acacia* sp. (FSCA# E1991-1939); same but 21.viii.2013, *Acacia* sp. (FSCA# E2013-6066) (FSCA, dry and slide mounted, ethanol).

Diagnosis. Like *H. flexuosa* this species has the inner lobe of the paramere modified into a sharp black spine. In the case of *H. mimosae*, the spine shows easily in lateral view. Females cannot be separated from *H. flexuosa*.

Distribution. Neotropics (Colombia, Costa Rica, El Salvador, Mexico Cuba,), USA (Texas), Pacific islands (Hawaii) (Ouvrard 2020), USA (FL) (new record for FL and the USA reported here).

Host plants. *Acacia farnesiana* (L.) Willd. (Fabaceae).

Comments. The only collections of *Heteropsylla mimosae* reported in Florida are from an amusement park in the Orlando (Orange County) area. The first collection was in November 1983. The species was recollected at the same place in January 1991. The host was *A. farnesiana*. The insects were found again at the same location in 2013 (FSCA# E2013-6066, 6068, 6711). This species has not spread to other sites that we know of. Even though the first collection occurred nearly 40 years ago, this species was not reported formally before.

Heteropsylla quassiae Crawford, 1914

Materials examined. USA: **Florida**: Specimens from Collier, Miami-Dade, Monroe counties (FSCA, dry and slide mounted).

Diagnosis. Males of *H. quassiae* are recognized easily by the very short inner lobe of the parameres as seen in posterior view. Females have short, rounded terminalia (see key above).

Distribution. Caribbean islands (Cuba, Bahamas), USA (FL) (Ouvrard 2020). We treat this species as native to Florida.

Host plants. *Lysiloma latisiliquum* (L.) Benth. (Fabaceae)

Comments. *Heteropsylla quassiae* is common in suction trap samples from Miami-Dade County and has been found numerous times on *Lysiloma latisiliquum* (FSCA#s E2002-621, 4710, E2009-5534, E2012-4356, E2013-3415, E2015-1530, 6419, E2016-3595, 1429). Little is known about the biology of this psyllid. We have four specimens from Stock Island (Monroe County) Florida collected on *Flaveria linearis* Lag. (Compositae) by H.V. Weems on 27.xii.1954, and three specimens collected on Key Largo (Monroe County) on 9.iv.1955 (no host listed) that are labeled as *H. quassiae*. All are females, thus their diagnosis is not completely certain; however, if these specimens are indeed *H. quassiae*, the 1954 collection is our earliest. The host record on *F. linearis* is doubtful.

Mitrapsylla Crawford, 1914

Key to Florida species of *Mitrapsylla*

1. Forewings yellow; lines on the head and thorax outlined in bright white. Paramere digitiform ..... ***M. albalineata*** **Crawford**
— Forewings hyaline, at most weakly fumate; lines on head and thorax dull yellow. Paramere claviform .. ***M. cubana*** **Crawford**

Mitrapsylla albalineata Crawford, 1914

(Fig. 148)

Materials examined. USA: **Florida**: Specimens from Collier, Lee, Miami-Dade, and Sarasota counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. Forewings are yellow. The lines on the head and thorax are outlined in bright white callous.

Distribution. Neotropics (El Salvador, Mexico, Nicaragua, Venezuela) (Ouvrard 2020), USA (FL) (Halbert 2002).

Host plants. *Senna* Mill. spp. (Fabaceae).

Comments. *Mitrapsylla albalineata* was discovered for the first time in Florida on 26.iii.2002 at a nursery in Miami (Miami-Dade County) on *Senna polyphylla* (Jacq.) Irwin and Barneby (Fabaceae) by DPI inspector Duraid I. Hanna (FSCA# E2002-1005) (Fig. 148). More specimens were collected from the same location in August and September 2002 (FSCA#s E2002-4022, 4475, 4693). A population was found at the Fruit and Spice Park in Homestead (Miami-Dade County) in May 2003 on *Senna pendula* (Willd.) H.S. Irwin and Barneby (FSCA# E2003-2160). One specimen was collected in Collier County on 20.iv.2017 (FSCA# E2017-1590), and a population was found at a nursery in Sarasota County on 27.ix.2019 (FSCA# E2019-5455). The more recent collections indicate that this species is still around and possibly moving in nursery trade.

Prior to its discovery in Florida, *M. albalineata* was known only from Mexico, Nicaragua, El Salvador, and Venezuela (Hodkinson and White 1981). The Florida host is *Senna*, on which it is a pest, causing severe leaf curling and distortion (Fig. 148). A single primary parasite, *Psyllaephagus* sp. (Hymenoptera: Encyrtidae), was obtained from the colony collected on 2.x.2002 from the infested nursery. There have been a few subsequent collections, but the species has not become a widespread pest, even though the plant is a popular ornamental.

Mitrapsylla cubana Crawford, 1914

Materials examined. USA: **Florida**: Specimens from Highlands, Hillsborough, Miami-Dade, and Polk counties (FSCA, dry and slide mounted).

Diagnosis. Forewings are hyaline, sometimes weakly fumate. The lines on the head and thorax are dull yellow and not calloused.

Distribution. Neotropics (Brazil, Cuba, Mexico, Panama, Puerto Rico) (Ouvrard 2020), USA (FL) (new record for FL and the USA reported here).

Host plants. *Desmodium* Desv. spp. (Fabaceae).

Comments. *Mitrapsylla cubana* has been known from Florida for a long time, but it is rarely collected except in traps. At the USNM, there are specimens from "Arrocera, Florida" (no host information) collected on "17.iv.1957, J. Acuna." This location actually is in Cuba (see note under *Heteropsylla fusca* for details). Thus, the first confirmed USA record is represented by an FSCA specimen from Archbold Biological Station (Highlands County) collected by H.V. Weems and Thomas A. Webber in an insect flight trap on 5.xi.1979. The USNM has specimens that were collected from Ft. Pierce, FL, by A.E. Kretschmer in March 1980 from *Desmodium heterocarpon* (L.) DC. (Fabaceae) in a greenhouse. Stray adults were collected twice on *Euthamia graminifolia* by DPI inspector Kenneth L. Hibbard in Port St. Lucie on 8.xii.2003 (FSCA# E2003-6307) and in Lorida (Highlands County) on 19.xi.2002 (FSCA# E2002-5702). This species was described from Cuba and occurs in Brazil, Mexico, Panama and Puerto Rico, where the host plants are *Desmodium* spp. (Brown and Hodkinson 1988). We have suction trap collected specimens from nearly all the traps we have utilized. Judging by the number of trap collections over the years, *M. cubana* is common in Florida, but it is collected rarely on its host plants. Based on suction trap collections, flight activity occurs mostly, if not exclusively, in winter months; however, the two early host-associated collections occurred in March and April. Even though this psyllid has been known for decades in Florida, it was never reported formally, probably because "Arrocera, Florida" was assumed to be in the USA.

Macrocorsinae Vondráček, 1963
Euphalerus Schwarz, 1904

Euphalerus nidifex Schwarz, 1904

Materials examined. USA: **Florida**: Specimens from Charlotte, Collier, Miami-Dade, Monroe counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. Head, thorax and forewing veins (but not membranes) covered with red-brown spots; hunch-backed appearance; genae chubby and about as long as the vertex; immatures living in lerps on *Piscidia piscipula* (L.) Sarg. (Fabaceae).

Distribution. Neotropics (several Caribbean islands, Belize, Mexico) (Ouvrard 2020), USA (southern FL)(Mead 1967)

Host plants. *Piscidia piscipula* (L.) Sarg. (Fabaceae).

Comments. This species makes clam shell shaped lerps that open at the top on *Piscidia piscipula* and is restricted to south Florida (Mead 1967). Over half of our collections are from the Florida Keys (Monroe County).

Psyllinae Latreille, 1807
Amorphicola Heslop-Harrison, 1961

Amorphicola amorphae (Mally, 1894)

Materials examined. USA: **Florida**: Specimens from Duval, Hamilton, Highlands, and Volusia counties (FSCA, dry and slide mounted, ethanol, dry-preserved pitted stems).

Diagnosis. Description by Tuthill (1943, as *Arytaina amorphae*). Differs from other psyllids in Florida as indicated in the generic key above.

Distribution. USA (FL, IA, NE) (Hodkinson 1988).

Host plants. *Amorpha* L. spp. (Fabaceae).

Comments. This is a rare species in Florida. We have few Florida collections. The immatures produce pit galls in the stems of the plant. See comments above under *Acizzia jamatonica* for separation of these two superficially similar species.

**Cacopsylla* Ossiannilsson, 1970

Comments. No species are known from Florida, but the genus is included in the key because some species in this genus are significant pests, and there is risk of establishment in Florida. For example, *Cacopsylla tobirae* (Miyatake, 1964), the pittosporum psyllid, has been intercepted in Florida (FSCA# E2015-1748). *Pittosporum* is a popular and lucrative ornamental plant.

Psylla Geoffray, 1762

Key to Florida species of *Psylla*

1. Antennal segments 5–9 light with dark apex. Metatibia with 5 apical sclerotized spurs. On *Carpinus* L. . . . . ***P. carpinicola* Crawford**

— Antennal segments 5–9 completely dark brown or black. Metatibia with 6 apical sclerotized spurs. On *Prunus* L. . . . . ***P. sanguinea* (Provancher)**

Psylla carpinicola Crawford, 1914

Materials examined. USA: **Florida**: Single specimens from Alachua and Jackson counties (FSCA, dry mounted).

Diagnosis. Description by Tuthill (1943). Differs from other psyllids in Florida as indicated in the keys above.

Distribution. Widely distributed in mid-western and eastern North America; also reported from Florida (Hodkinson 1988).

Host plants. *Carpinus caroliniana* Walter (Betulaceae).

Comments. This psyllid appears rare in Florida.

Psylla sanguinea (Provancher, 1872)

Materials examined. No Florida specimens in FSCA.

Diagnosis. Description by Tuthill (1943, as *Psylla trimaculata* Crawford, 1911). Differs from other psyllids in Florida as indicated in the keys above.

Distribution. North America, also reported from Florida (Hodkinson 1988, as *Psylla trimaculata* Crawford, 1911).

Host plants. *Prunus* spp. (Rosaceae).

Comments. There are no FSCA specimens from Florida.

Triozidae Löw, 1879

Bactericera Puton, 1876

Comments. *Bactericera* is a predominantly Holarctic genus with over 160 described species (Ouvrard 2020). Its known host range is unusually wide, covering 13 families and 11 orders of eudicots and one family and one order of monocots (Burckhardt and Lauterer 1997b). Salicaceae hosts the largest number of *Bactericera* species (over 40 spp.), followed by Compositae (17 spp.) and Solanaceae (6 spp.) (Burckhardt and Lauterer 1997b). Not included in these counts are five polyphagous *Bactericera* species.

Bactericera is a taxonomically difficult genus. Particularly problematic in this respect are the Nearctic species associated with *Salix*. When trying to identify and name the species on *Salix caroliniana* Michx. from Florida it became evident that this group is in a taxonomic chaos. For putting our conclusions regarding the Florida species in a general context we provide a list of all valid Nearctic *Bactericera* species associated with *Salix* with synonyms and homonyms (Appendix 1).

Key to Florida species of *Bactericera*

(Characters to separate *B. arcuata* and *B. schwarzii* are taken from Tuthill (1942); see also comments under *B. arcuata* and *B. schwarzii*)

1. Genal processes well-developed, about as long as vertex along mid-line (Fig. 153). On *Salix caroliniana* Michx. (Salicaceae). Habitus in Fig. 151 ..... ***B. nigrilla* (Crawford)**
— Genal processes absent or very short, pad-like. On other hosts **2**

2(1). Head, in dorsal view, not cleft anteriorly. Color of antennal segments: 3 light; 4–8 light at base, dark at apex; 9 and 10 dark brown to black. Habitus in Fig. 149 ..... **3**
— Head, in dorsal view, cleft anteriorly. Color of antennal segments: 3 brown basally, light otherwise; 4, 5 light; 6–10 dark brown to black. **4**

3(2). Vein Rs of forewing long: bifurcation of vein M proximal to line joining apices of veins Rs and Cu_{1a}. Polyphagous, particularly on Solanaceae ..... ***B. cockerelli* (Šulc)**
— Vein Rs of forewing short: bifurcation of vein M distal to line joining apices of veins Rs and Cu_{1a} (Fig. 149). On *Lycium* spp. ..... ***B. dorsalis* (Crawford)**

4(2). Head with eyes lateral rather than anterior. Profemora weakly inflated. Vein Rs of forewing shorter and more strongly arched ..... ***B. arcuata* (Tuthill)**
— Head with eyes anterior rather than lateral. Profemora strongly inflated. Vein Rs of forewing longer and less strongly arched ..... ***B. schwarzii* (Riley)**

Bactericera arcuata (Tuthill, 1942)

Materials examined. USA: Florida: Holmes County: 1♀ paratype, Ponce de Leon, 13.vii.1934 (R.H. Beamer) (USNM, dry mounted).

Diagnosis. Description by Tuthill (1942).

Distribution. *Bactericera arcuata* is known presently only from Florida (Holmes County) (Hodkinson 1988).

Host plants. Unknown.

Comments. Tuthill (1942) suggested that "this species is quite distinct from *schwarzii*". The female paratype we examined (USNM) seems within the range of morphological variation of *Bactericera schwarzii* and we suspect that the two are synonymous, but more material is required to solve this problem.

**Bactericera cockerelli* (Šulc, 1909)

Materials examined. Specimens intercepted from western USA and Mexico, along with reference specimens provided from a laboratory culture in Washington State.

Diagnosis. Separated from other Florida species of *Bactericera* as indicated in the keys above.

Distribution. Western and mid-western North America; adventive in Central America, Ecuador, Australia and New Zealand (Ouvrard 2020).

Host plants. Polyphagous, in particular Solanaceae.

Comments. This is a serious pest on Solanaceae as vector of *Candidatus* Liberibacter solanacearum (Lso). Currently, it is not known from Florida. This species has been intercepted 134 times since 2006. Interceptions consist mostly of immatures feeding on the calyxes of *Capsicum* peppers, but there also have been 18 interceptions of adult hitchhikers on lettuce. Interceptions are most common in the fall, peaking in October and November. Many of our intercepted *B. cockerelli* have been tested for Lso, with positive specimens found in April, June, September, October, and November (DPI unpublished data).

Bactericera dorsalis (Crawford, 1914)

(Fig. 149, 150)

Materials examined. USA: **Florida**: Specimens from Hillsborough, Levy, Miami-Dade, and Pinellas counties; culture vouchers from the Gainesville DPI laboratory colony (FSCA, dry and slide mounted).

Diagnosis. Description by Tuthill (1943, as *Paratrioza dorsalis*). Separated from other Florida species of *Bactericera* as indicated in the key above. There is sexual dimorphism in the markings on the head. Males have a white line around the vertex like *B. cockerelli*, whereas females do not.

Distribution. USA (Arizona) (Hodkinson 1988), USA (FL) (new record reported here).

Host plants. *Lycium* L. spp. (Solanaceae).

Comments. *Bactericera dorsalis* was documented for the first time in Florida in 1975. Specimens (currently at the USNM) were found on a "halophytic shrub" at St. Marks Wildlife Refuge, Wakulla Beach (Wakulla County), by J. Ray in June 1975. More specimens were found on *Lycium carolinianum* Walter (Solanaceae) in Cocoa Beach (Brevard County) by R. E. Burns on 29.ii.1984. More recently, specimens were found by DPI inspector Thomas Turner on *Lycium carolinianum* at Weedon Island State Park (Pinellas County) (FSCA#s E2002-152, 192, 224, 503, 522, 1020). The same inspector also collected specimens at Hammock Park near Dunedin (Pinellas County) (FSCA# E2002-253). There were other collections from Miami-Dade County (E2008-8234) and Levy County (E2014-210). This species can be cultured fairly easily on *L. carolinianum* and sometimes on *Lycium barbarum* L. *Bactericera dorsalis* was known previously from the western USA, but not from Florida. However, the plant is native, so we suspect that *B. dorsalis* is also native to Florida. It usually occurs in very low numbers on plants just above the reach of the tides. Although native, this species has not been reported formally before from Florida, probably because it usually occurs in such low numbers.

Bactericera nigrilla (Crawford, 1911), new combination, revived status

(Fig. 151–157, 162–180)

Trioza salicis Mally 1894: 161; junior secondary homonym of *Chermes salicis* Linnaeus 1761: 264, in *Trioza*.

Trioza nigra Crawford 1910a: 232; junior primary homonym of *Trioza nigra* Kuwayama 1910: 57; synonymized with *Trioza salicis* Mally by Crawford 1914: 91.

Trioza nigrilla Crawford 1911b: 503; replacement name for *Trioza nigra* Crawford nec Kuwayama.

Trioza louisianae Aulmann 1912: 144; replacement name for *Trioza nigra* Crawford nec Kuwayama.

Trioza minuta similis Crawford 1911a: 425, 433; unavailable name (ICZN 1999/2012: Article 45.6.4), deemed to be infrasubspecific; synonymized with *Trioza salicis* Mally by Crawford 1914: 91. *Phylloplecta salicis*; Caldwell 1938a: 250.

Phylloplecta multidubiata Caldwell 1939: 211; replacement name for *Trioza salicis* Mally nec *Chermes salicis* Linnaeus (in *Phylloplecta*).

Materials examined. Type material of *Trioza salicis* Mally. **USA:** syntypes 6 adults, Iowa, Ames (USNM, dry mounted).

Type material of *Trioza nigra* Crawford. Lectotype ♂: **USA:** "Colo", "Coll. CF Baker" (USNM, dry mounted), **here designated**; paralectotypes 4 ♂ same as lectotype; paralectotypes 2 ♀, Louisiana (G.R. Pilate) (USNM, dry mounted); paralectotypes 2 ♂, Illinois, Algonquin (Nason) (USNM, dry mounted).

Figures 149, 150. *Bactericera dorsalis*. **149)** Adult. **150)** Immature. (Photos by Lyle Buss, University of Florida, Entomology Department: 149; Anthony Dickens, FDACS, DPI: 150).

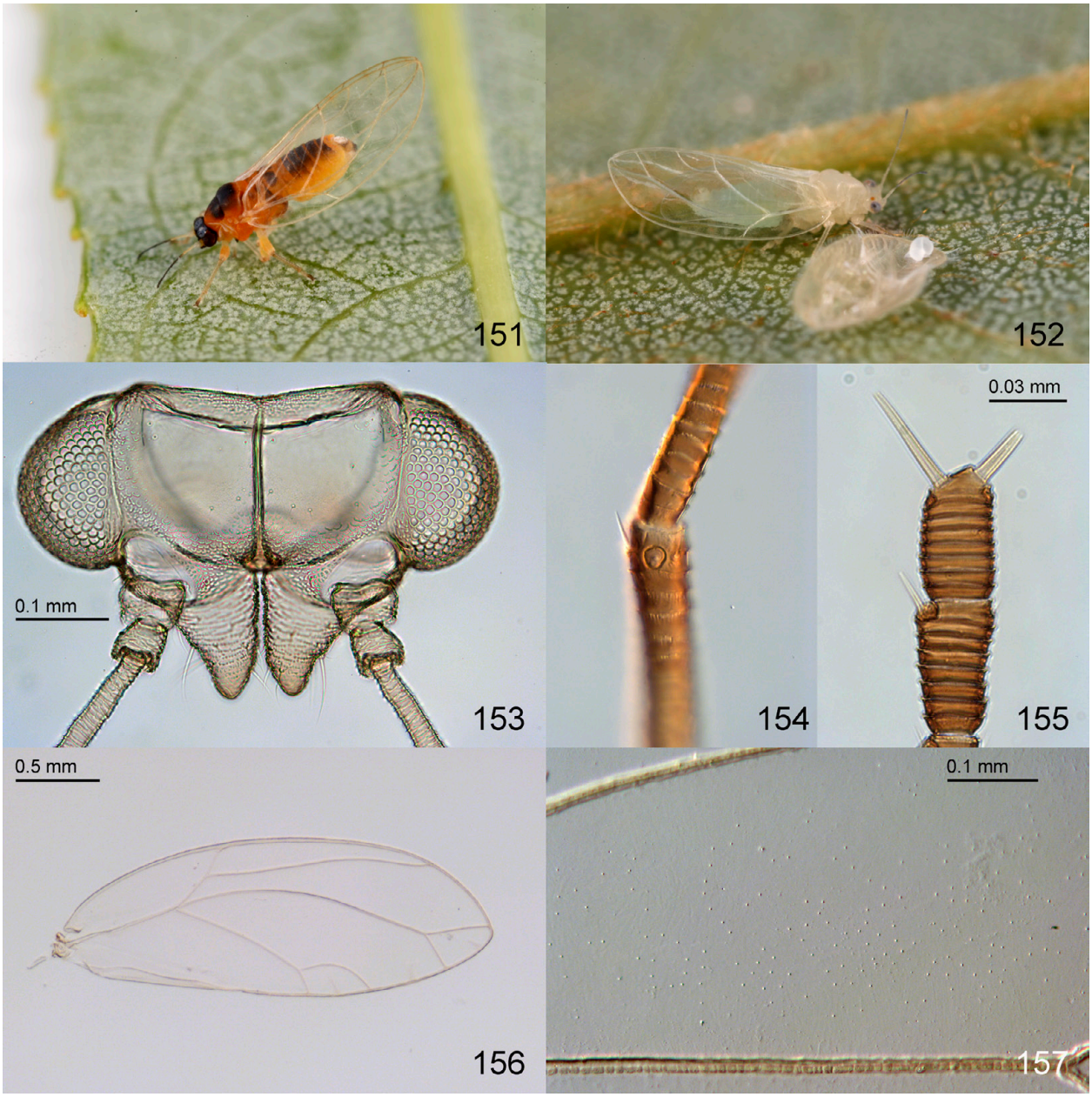
Type material of *Trioza minuta similis* Crawford. Lectotype ♂: **USA:** "Oreg. 2506", "Coll CF Baker", "*Trioza minuta* similis Crawf." (USNM, dry mounted), **here designated**; paralectotypes 5 ♂, 6 ♀, 1 pin without specimen, same data as lectotype.

Additional material. **USA: Florida**: Specimens from Alachua and Collier counties.

Description. Adult (Fig. 151, 152). Coloration (Fig. 151). Head jet-black. Clypeus dark brown. Antennal segments 1–3 whitish, segments 4–10 dark brown or black. Thorax dark orange with dorsum mostly dark brown to black. Legs yellowish; pro- and mesotibiae dark brown posteriorly; apical segments of pro- and mesotarsi brown. Forewings with colorless, transparent membrane; veins whitish in basal three quarters and ochreous apically, vein A_1 of the same color as other veins. Hindwings with colorless, transparent membrane. Abdomen yellow to orange with mostly black tergites; intersegmental membrane orange. Male and female proctiger with black patches; paramere dark brown. – Structure. Head inclined in a 45° angle from longitudinal body axis (Fig. 151), narrower than mesonotum in dorsal view. Vertex (Fig. 153) subtrapezoidal, about twice as wide as long along mid line; disk with some scattered short hairs, mostly smooth except for margins which bear a tubercular microsulpture; genal processes about as long as vertex along mid-line, conical, subacute apically. Antenna 1.8–1.9 times as long as head width, with a single subapical rhinarium (Fig. 154) on each of segments 4, 6, 8 and 9; segments 3, 9 and 10 slightly thicker than 4–8; relative length of flagellar segments as 1.00 : 0.5 : 0.5 : 0.4 : 0.5 : 0.4 : 0.2 : 0.1; relative length of antennal segment 10 and terminal setae as 1.0 : 0.9 : 0.5 (Fig. 155). Rostrum 0.5 times as long as head width. Forewing (Fig. 156) 5.2–5.5 times as long as head width, 2.8 times as long as wide, lanceolate, widest in the middle, apex subacute, lying in cell m_1; vein Rs weakly sinuous; bifurcation of vein M distal to line connecting apices of veins Rs and Cu_{1a}; surface spinules (Fig. 157) present in distal half of wing, sometimes faint, irregularly spaced, leaving spinule-free stripes along the veins. Male terminalia (Fig. 164–171) with proctiger 0.3 times as long as head width, posterior lobes short, triangular. Male subgenital plate short, with very few setae. Paramere longer than proctiger; digitiform, in profile, relatively straight; inner face beset with moderately long setae, apex acute. Distal segment of aedeagus slightly longer than proctiger; apical inflation slightly longer than a third of the segment; sclerotized end tube of ductus ejaculatorius short and sinuate. Female terminalia (Fig. 162–163) with proctiger 0.6 times as long as head width, sparsely covered with a few moderately long setae; dorsal margin of proctiger distal to circumanal ring, in lateral view, almost straight in the middle, curved down apically; apex, in profile rounded, with a very small hook. Circumanal ring oval, 0.4 times as long as proctiger; consisting of two unequal rows of pores. Subgenital plate 0.6 times as long as proctiger, truncate apically with a small median lobe. Dorsal valvulae triangular, ventral valvulae almost straight; lacking teeth. – Measurements (in mm; 1 ♂, 1 ♀). Head width 0.52; antenna length 0.94–1.00; forewing length 2.68–2.86; length of male proctiger 0.16; paramere length 0.20; length of distal segment of aedeagus 0.18; length of female proctiger 0.32.

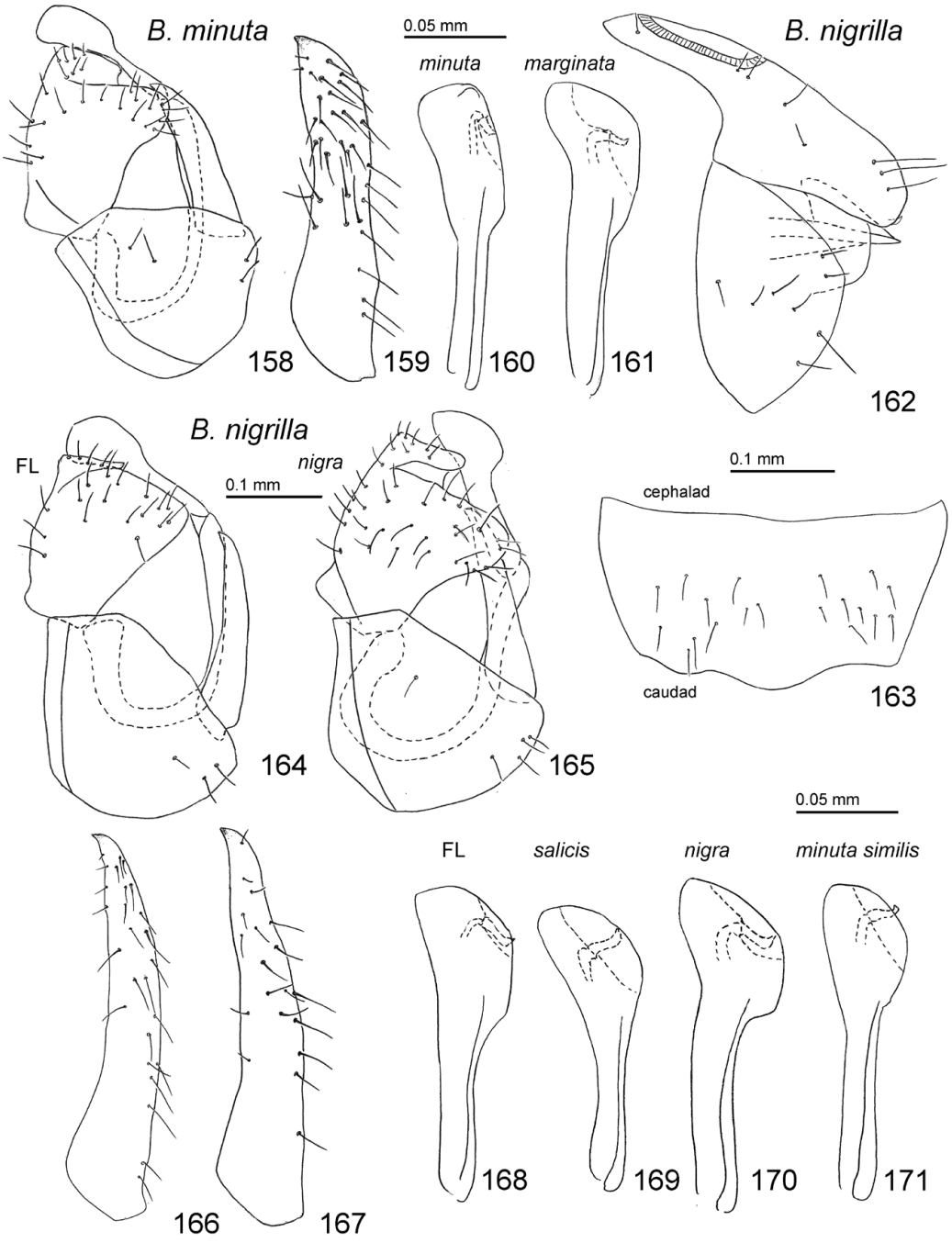
Fifth instar immature (Fig. 172–174). Coloration. In life, dirty yellowish, weakly sclerotized, semitransparent. Tips of antennae and rostrum dark. Abdomen light green; yellow in the middle because of the translucent bacteriome. – Structure. Body strongly dorso-ventrally flattened, oval, 1.5 times as long as wide; dorsally flat. Dorsal sclerites covered in granular microsculpture and sparse microscopical setae, lacking sectasetae. Marginal sectasetae truncate present in following numbers (one side only): head (Fig. 175) 31–37; forewing pad (Fig. 176) 72–85; hindwing pad (Fig. 177) 14–15; caudal plate (Fig. 178) 71–81. Each half of head broadly rounded anteriorly. Antenna 0.3 times as long as forewing pad; inserted on ventral body side, three-segmented, segment 3 with four rhinaria. Humeral lobe reaching well beyond anterior eye margin, narrowly rounded. Tarsal arolium (Fig. 180) lobe-like, oval, with short unguitractor, lacking petiole, slightly longer than claws which are both well developed. Outer circumanal ring (Fig. 179) small, transversely oval; on ventral body side; distance from hind margin to hind margin of caudal plate 4.0 times as long as distance from fore to hind margin of outer circumanal ring (measured in the middle); consisting of a single row of oval pores. – Measurements (in mm; 4 immatures). Body length 1.90–2.12; antenna length 0.28–0.30.

Distribution. Reported from USA: IA (Mally 1894, as *Trioza salicis*), CO, LA, IL (Crawford 1910b, as *Trioza nigra*), OR (Crawford 1911a, as *Trioza minuta similis*). – Florida: Alachua, Collier, Hillsborough, Marion, Miami-Dade, Polk, St. Lucie counties. This species was discovered in Florida in suction trap samples. The first specimen was collected in the Miami-Dade County trap (FSCA# E2007-8729). In 2010 (FSCA# E2010-4570), a specimen

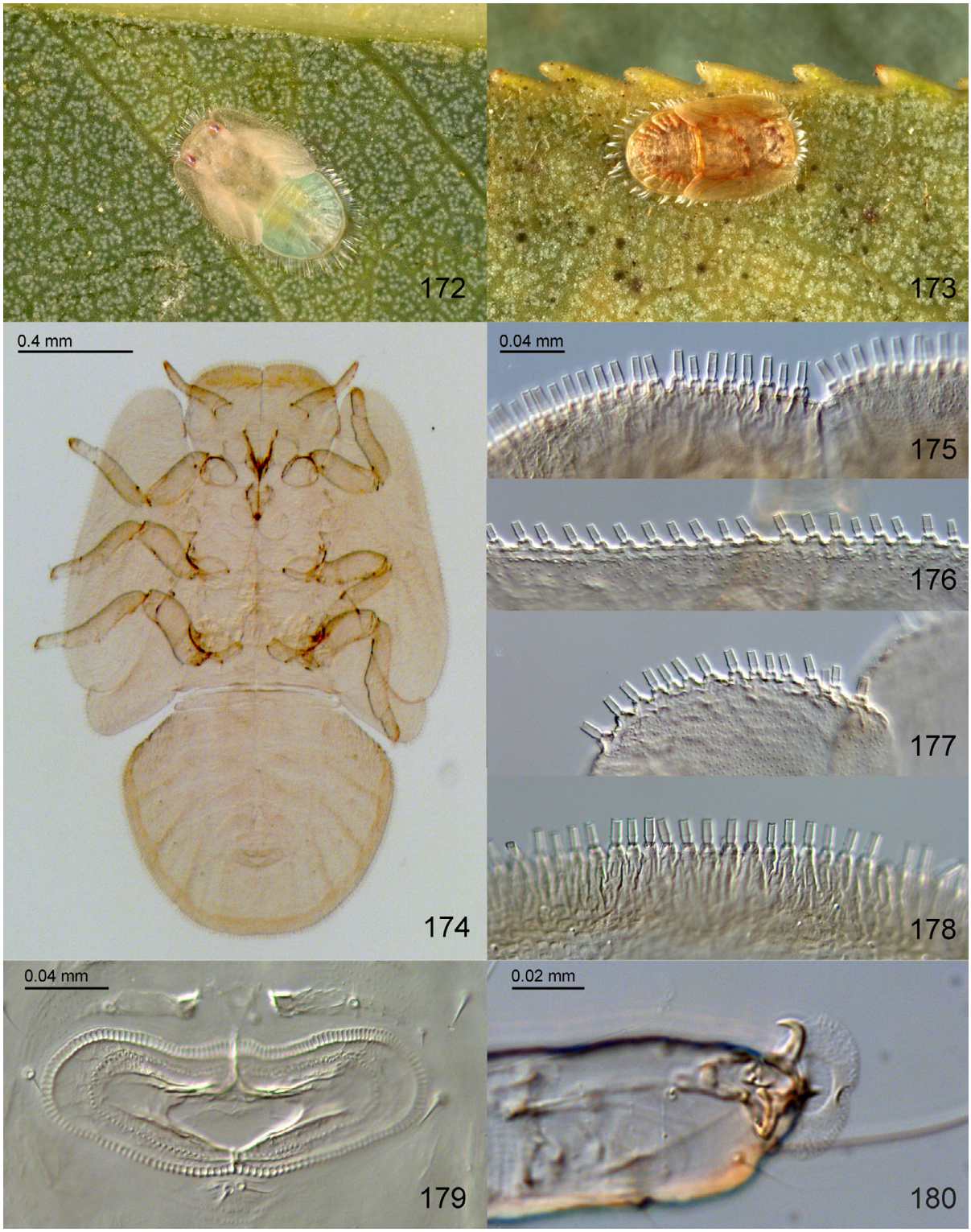


Figures 151–157. *Bactericera nigrilla*. **151)** Mature adult. **152)** Teneral adult and skin. **153)** Head, dorsal view. **154)** Rhinarium on antennal segment 4. **155)** Antennal segments 9 and 10. **156)** Forewing. **157)** Surface spinules. Scales: **153)** 0.1 mm; **154, 155)** 0.03 mm; **156)** 0.5 mm; **157)** 0.1 mm. (Photos by Lyle Buss, University of Florida, Entomology Department: 151, 152).

was collected in a Collier County suction trap. The psyllid has become much more common in the Collier County traps than in Miami-Dade County. A single specimen was collected in a Polk County trap in 2012 (FSCA# E2012-1758). Suspecting that this psyllid was on willows, we surveyed by sweeping willows near the Immokalee (Collier County) suction trap. Several adults were found by sweeping willows in both Collier (FSCA# E2013-6535, E2014-2837, 2840) and Hillsborough (FSCA# E2016-1490) counties. The first immatures were found on willows (*Salix caroliniana* Michx., Salicaceae) in Alachua Co. on 3.iii.2017 (FSCA# E2017-1199, 1552). This is a new record for Florida, reported here.



Figures 158–171. Terminalia of *Batericera* spp. from *Salix*. **158–161)** *Bactericera minuta*. **158)** Male terminalia, in profile. **159)** Inner face of paramere, in profile. **160)** Distal segment of aedeagus; with the same locality data as lectotype of *Trioza minuta* Crawford. **161)** Distal segment of aedeagus; lectotype of *Trioza marginata* Crawford. **162–171)** *Bactericera nigrilla*. **162)** Female terminalia, in profile. **163)** Female subgenital plate, in ventral view. **164)** Male terminalia, in profile; specimen from Florida. **165)** Male terminalia, in profile; lectotype of *Trioza nigra* Crawford. **166)** Inner face of paramere, in profile; specimen from Florida. **167)** Inner face of paramere, in profile; lectotype of *Trioza nigra* Crawford. **168)** Distal segment of aedeagus; specimen from Florida. **169)** Distal segment of aedeagus; syntype of *Trioza salicis* Mally. **170)** Distal segment of aedeagus; lectotype of *Trioza nigra* Crawford. **171)** Distal segment of aedeagus; lectotype of *Trioza minuta similis* Crawford. Scales: **158, 164, 165)** 0.1 mm; **159–161)** 0.05 mm; **162, 163)** 0.1 mm; **166–171)** 0.05 mm.



Figures 172–180. *Bactericera nigrilla*, last instar. **172)** Habitus. **173)** Habitus, probably parasitized. **174)** Habitus, cleared specimen. **175)** Marginal sectasetae of head. **176)** Marginal sectasetae of forewing pad. **177)** Marginal sectasetae of hindwing pad. **178)** Marginal sectasetae of caudal plate. **179)** Circumanal rings. **180)** Tarsal apex. Scales: **74)** 0.4 mm; **175–178)** 0.04 mm; **179)** 0.04 mm; **180)** 0.02 mm. (Photos by Lyle Buss, University of Florida, Entomology Department: 172, 173).

Host plant. *Salix caroliniana* Michx. (Salicaceae); probably also other *Salix* spp.

Comments. *Salix* is a predominantly Holarctic genus which was at least twice successfully colonized by psyllids, viz. by species of *Cacopsylla* and of *Bactericera*. In *Salix* and both psyllid genera the identification of species is difficult for the non-specialist as often interspecific differences are small and intraspecific variation is pronounced. The Nearctic *Cacopsylla* species associated with *Salix* spp. have been studied in detail (e.g. Jensen 1951; Hodkinson 1978) but not those of *Bactericera*. In the series of papers "American Psyllidae", Crawford (1910a, 1910b, 1911a, 1911b) erected eleven new species and forms of *Trioza* associated with *Salix*. Most of his descriptions and illustrations are not diagnostic. In the monograph on the psyllids of the New World, Crawford (1914) synonymized several of his taxa recognizing five species of *Salix* inhabiting triozids: *Ceropsylla californica* (Crawford), *Trioza arizonae* Aulmann, *T. maura* Foerster (with five synonyms), *T. salicis* Mally (with five synonyms and three replacement names) and *T. varians* Crawford. Caldwell (1938a) and Tuthill (1943) followed mostly Crawford (1914) but noted the name *T. salicis* Mally cannot be used for reasons of homonymy. Caldwell (1939) introduced the replacement name *Phylloplecta multidubiata*, an unnecessary action as there were available names for this taxon among the synonyms of *T. salicis* Mally. Tuthill (1943) chose the oldest synonym, *T. minuta*, as valid name and included *T. arizonae* as a variety of the former. He also moved *T. californica* from *Ceropsylla* back to *Trioza*. Tuthill's (1943) species concepts were adopted in the catalogues of Hodkinson (1988) and Burckhardt and Lauterer (1997b). The last two authors redefined *Bactericera* and included all previous *Trioza* species that developed on *Salix*. They pointed out that *B. minuta* of Crawford (1914), Caldwell (1938a) and Tuthill (1943) was a species complex.

The specimens from Florida fit the broad concept of *Bactericera minuta* by the North American authors. We have examined the relevant types (USNM) of the species currently listed as synonyms of *B. minuta*: i.e. *Trioza assimilis* Crawford, *T. marginata* Crawford, *T. minima* Crawford, *T. minima similis* Crawford, *T. nigra* Crawford and *T. salicis* Mally. We conclude that the types of the six nominal taxa represent three species but there are additional undescribed species in the USNM misidentified as *Trioza minuta* by J.S. Caldwell and L.D. Tuthill. Hence, all published records of *Bactericera* (or *Trioza*) *minuta* are doubtful. The three species we recognize here should be named *Bactericera flori*, *B. minuta* and *B. nigrilla*. The synonymies of the first two are detailed in Appendix 1. Here we discuss the ones of *B. nigrilla*.

Trioza salicis Mally nec Linnaeus, *Trioza nigra* Crawford nec Kuwayama and *Trioza minuta similis* Crawford represent the same species, confirming, in part, Crawford's (1914) synonymies. It differs from related species as indicated in the key in Appendix 1. It should be called *Bactericera nigrilla* Crawford for the following reasons.

Trioza salicis Mally, 1894, constitutes a junior secondary homonym of *Chermes salicis* Linnaeus, 1761 (in *Trioza*). According to Löw (1882), *Chermes salicis* Linnaeus is congeneric with five European *Trioza* species developing on *Salix* (*Trioza albiventris* Foerster, 1848, *T. curvatinervis* Foerster, 1848, *T. maura* Foerster, 1848, *T. salicivora* Reuter, 1876, and *T. striola* Flor, 1861). All these species are now referable to *Bactericera* (Burckhardt and Lauterer 1997b). As the description of Linnaeus (1761) is not diagnostic, Löw (1882) considered *T. salicis* Linnaeus a nomen dubium. Junior secondary homonyms are available as species names when the homonymy is removed by transfer to another genus. As *Trioza salicis* Mally and *Chermes salicis* Linnaeus are congeneric, independent if in *Trioza* or in *Bactericera*, and despite the fact that the latter is a nomen dubium, *Trioza salicis* Mally cannot be used as valid species name. The next oldest is *Trioza nigra* Crawford, 1910, a junior primary homonym of *Trioza nigra* Kuwayama, 1910, with the replacement names *Trioza nigrilla* Crawford, 1911, and *Trioza louisianae* Aulmann, 1912. The former is older and has priority and should, therefore, be used for the species under discussion as *Bactericera nigrilla* (Crawford, 1911), **new combination** and **revived status**. Another synonym, *Trioza minuta similis* Crawford, 1911, is deemed to be infra-subspecific and, therefore, invalid (ICZN 1999/2012: Article 45.6.4). Crawford (1911a) used the name "*similis*" for three taxa: the species *Trioza similis* Crawford, 1910 (a junior subjective synonym of *Trioza albifrons* Crawford, 1910), and the two forms *Trioza fulvida similis* Crawford, 1911, and *Trioza minuta similis* Crawford, 1911. Later, Crawford (1914) referred to the last taxon as *Trioza minuta* var. *similis*, indicating that he considered these forms as varieties rather than subspecies. Caldwell (1939), finally, proposed the replacement name *Phylloplecta multidubiata* for *Trioza salicis* Mally nec Linnaeus, which we consider a junior objective synonym of *Bactericera nigrilla*.

Bactericera nigrilla is characterized by the following combination of characters: long genal processes; black head; antennal color; lanceolate forewings bearing surface spinules; relatively short posterior lobes on the male proctiger; digitiform, apically pointed parameres; relatively short apical dilatation of the aedeagus with the moderately long sclerotized end tube of the ductus ejaculatorius; short female terminalia; apically truncate female proctiger and subgenital plate. There is some variation in the shape of the posterior lobes of the male proctiger (Fig. 162, 163) and the distal segment of the aedeagus (Fig. 166–169). These differences are mostly due to the state of preservation of the specimens, the types being older than a century, to a lesser degree also to individual variation. The genal processes of the types of *Trioza minuta similis* appear slightly shorter. The types appear to represent young specimens lacking the very dark color, which may also explain the shorter genal processes. More material, including long series from all over North America, will be necessary to test our conclusions.

Bactericera schwarzii (Riley, 1885)

Materials examined. USA: **Florida**: Single specimens from Nassau and Collier counties (FSCA, dry mounted).

Diagnosis. Description by Tuthill (1942, as *Rhinopsylla schwarzii*). Separated from other Florida species of *Bactericera* as indicated in the key above.

Distribution. USA (FL, GA, NC) (Tuthill 1942; Hodkinson 1988, as *Rhinopsylla schwarzii* Riley, 1885). – Florida: Nassau and Collier counties.

Host plant. Unknown.

Comments. Nothing is known about this species.

Baeoalitriozus Li, 2011

Baeoalitriozus diospyri (Ashmead, 1881)

Materials examined. USA: **Florida**: Specimens from Alachua, Collier, Columbia, Gadsden, Highlands, Lake, Manatee, Miami-Dade, Polk, and Suwannee counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. Description by Tuthill (1943, as *Trioza diospyri*). Separated from other Florida psyllids as indicated in the generic key above. Body dark with long hairs.

Distribution. Widely distributed in Mexico and the USA (Hodkinson 1988, as *Trioza diospyri*).

Host plants. *Diospyros virginiana* L. (Ebenaceae).

Comments. This species is a significant pest of persimmon in Florida where it is distributed throughout the state (Mead 1966a). Mead (1966a) reported over 60 records. The DPI databases (1980–present) have 79 more records. The immatures roll the leaves, which become tattered.

Ceropsylla Riley, 1885

Ceropsylla sideroxyli Riley, 1885

Materials examined. USA: **Florida**: Specimens from Brevard, Broward, Manatee, Martin, Miami-Dade, Palm Beach counties (FSCA, slide and dry mounted, ethanol).

Diagnosis. Description by Tuthill (1943). Separated from other Florida psyllids as indicated in the generic key above. Immatures are deep blue and covered with wax on top.

Distribution. Caribbean Islands, Mexico, USA (FL) (Hodkinson 1988).

Host plants. *Sideroxylon foetidissimum* Jacq. (Sapotaceae).

Comments. This species induces pit galls on the undersides of the leaves of *Sideroxylon foetidissimum* in south Florida (Mead 1964).

Hemitrioza Crawford, 1914

Hemitrioza sonchi Crawford, 1914

(Fig. 181)

Materials examined. USA: **Florida**: Alachua County: Gainesville, Arredondo (FSCA, dry and slide mounted).

Diagnosis. Forewings have a dark cross band and partly infuscated marginal cells. The body is orange and white. Separated from other Florida psyllids as indicated in the generic key above.

Distribution. Eastern USA (Hodkinson 1988) (FL) (Mead 1984a, b).

Host plants. *Lactuca graminifolia* Michx. and possibly also on *Sonchus* L. spp. (Compositae).

Comments. *Hemitrioza sonchi* is a rare species reported from Florida (Clay County) for the first time in 1984 (Mead 1984a, b). There are additional records from Alachua County (FSCA# E2005-2615, E2007-3944). It induces waxy pit galls on the leaves of its host (Mead 1984).

Kuwayama Crawford, 1911

Kuwayama caldwelli (Tuthill, 1944), new combination

Rhinopsylla caldwelli Tuthill 1944a: 6.
Trioza caldwelli (Tuthill); Burckhardt and Lauterer 1997b: 115.

Materials examined. No FSCA specimens.

Diagnosis. Description by Tuthill (1944a, as *Rhinopsylla caldwelli*). Separated from other Florida psyllids as indicated in the generic key above.

Figures 181–184. Triozidae. **181)** *Hemitrioza sonchi*: immatures with waxy secretions. **182)** *Leuronota maritima*: immature with wax stands on the abdomen. **183)** *Leuronota maritima*: roll gall with immatures. **184)** Damage on *Avicennia germinans* by *Leuronota maritima*. (Photos by Jeff Lotz, FDACS, DPI: 181; David Ziesk, FDACS, DPI 182, 183; Susan Halbert, FDACS, DPI: 184).

Distribution. USA (FL) (Hodkinson 1988).

Host plants. Unknown.

Comments. Virtually nothing is known about this psyllid. According to the description, it was found in Bonefish Key, which has been subsumed by Fat Deer Key (Monroe County). As far as we know, it has never been collected again.

This species was described by Tuthill (1944a) in *Rhinopsylla* Riley, 1885, probably because the head that is "scarcely cleft anteriorly." When synonymizing *Rhinopsylla* with *Bactericera* Puton, 1876, Burckhardt and Lauterer (1997b) transferred the species to the artificial genus *Trioza* Foerster, 1848, as it did not fit the generic definition of *Bactericera*. Tuthill (1944a) mentioned in his description the broadly rounded genae, similar to *Kuwayama* Crawford, 1911, and the large clypeus. While *Kuwayama* in its present definition is highly artificial, it can be restricted to a group of triozids defined by the rounded genae, the adpressed, hemispherical eyes, the large bulbous clypeus and the long rostrum. The group is Neotropical in distribution and restricted to Compositae. As *Trioza caldwelli* fits this definition, we formally transfer it here as *Kuwayama caldwelli* (Tuthill, 1944), **comb. nov.** from *Rhinopsylla*.

Leuronota Crawford, 1914

Key to Florida species of *Leuronota*

1. Forewing membrane clear, lacking dark pattern. On *Avicennia* spp. . . . . ***L. maritima* (Tuthill)**
— Forewing membrane bearing dark pattern. On other hosts **2**

2(1). Dark pattern covering most of forewing membrane. On *Zanthoxylum fagara* . . ***L. fagarae* Burckhardt**
— Dark pattern restricted to apical third of forewing membrane. Host unknown . . . . . ***L. longipennis* Crawford**

Leuronota fagarae Burckhardt, 1988

Materials examined. USA: Florida: Specimens from Alachua, Brevard, Broward, Hillsborough, Miami-Dade, Palm Beach, Sarasota, and St. Lucie counties; culture vouchers from DPI laboratory culture (FSCA, dry and slide mounted; dry-preserved galled leaves).

Diagnosis. *Leuronota fagarae* is a very slender psyllid with dark forewings. Separated from other Florida psyllids as indicated in the keys above.

Distribution. Paraguay (Burckhardt 1988), USA (FL) (Halbert 2001c).

Host plants. *Zanthoxylum fagara* (L.) Sarg. (Rutaceae).

Comments. *Leuronota fagarae* was recognized first in North America when a population was found by DPI inspectors Mark Runnals and Phillip Baioni on *Zanthoxylum fagara* at a nursery in Sarasota (Sarasota County, FSCA#s E2001-2772, 2909, 3222). This psyllid was described from Paraguay, and, prior to its discovery in Florida, it was not known to occur outside of South America. The Sarasota infestation was traced to another nursery in Delray Beach (Palm Beach County) (FSCA# E2001-3353). Other infestations were found in Palm Beach County at Atlantic Dunes Park (FSCA#s E2001-3352, 3353), a private park in Miami (Miami-Dade County, E2001-3552) and in a greenhouse in Gainesville (Alachua County, FSCA# E2002-5273). The populations at the original Sarasota nursery and in the greenhouse were eradicated. Examination of old unknown psyllid collections in the FSCA revealed a collection by F. Smith on 19.vi.1981 from Cape Canaveral (Brevard County) Florida, also collected from *Z. fagara*. This collection is our earliest record for this species. There are more recent collections from Lee (FSCA# 2009-1025), Hendry (FSCA# E2009-5500), St. Lucie (FSCA# E2009-8965), and Collier (FSCA# E2012-2666) counties. *Zanthoxylum* spp. are considered medicinal plants in parts of South America, so we speculate that *L. fagarae* arrived on living *Zanthoxylum* plants or plant parts imported for personal use.

Immatures roll the edges of the leaflets adjacent to the petiole. The psyllid did not appear to colonize or feed on citrus trees near heavily infested *Zanthoxylum*. The species is cultured easily on *Z. fagara*, and it did not colonize other Florida species of *Zanthoxylum* or *Citrus* in the laboratory (Russell et al. 2014). Transmission of Florida *Candidatus* Liberibacter asiaticus has not been demonstrated, and so far, the pathogen has not been found in *Z. fagara*.

Leuronota longipennis Crawford, 1914

Materials examined. No FSCA specimens.

Diagnosis. Description by Crawford (1914). Separated from other Florida psyllids as indicated in the keys above.

Distribution. USA (FL) (Hodkinson 1988).

Host plants. Unknown.

Comments. This psyllid was collected in Palm Beach (Palm Beach County) by H.G. Dyar, with no other data (Crawford 1914). As far as we know, it has not been collected again.

Leuronota maritima (Tuthill, 1944), new combination

(Fig. 182–184)

Trioza maritima Tuthill 1944b: 158.

Materials examined. USA: **Florida**: Specimens from Brevard, Broward, Collier, Hillsborough, Lee, Manatee, Miami-Dade, Palm Beach, Pasco, and Pinellas counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. This species is separated easily from the other Florida species of *Leuronota* by its clear wings, and from Florida species of *Trioza* it differs as indicated in the generic key.

Distribution. Colombia, Mexico (Rendón-Mera et al. 2017, Ouvrard 2020), USA (FL) (new record for FL and for the USA reported here).

Host plants. *Avicennia germinans* (L.) L. (Acanthaceae).

Comments. For a number of years, DPI inspectors have noticed a triozid on *Avicennia*. In 2003, it was identified as *Leuronota maritima*. The psyllid was described from Mexico and reported from Colombia (Rendón-Mera et al. 2017).

Specimens at DPI go back to a large series from Manatee County collected on *A. germinans* on 15.vi.1972 by Frank W. Mead. We also have specimens from Ft. Myers (Lee County) collected on *A. germinans* on 30.v.1980 by K. Delate, from Hollywood (Broward County) collected on *A. germinans* on 20.i.1993 by Karolynne Vanyo, from Green Key Park (Pasco County) collected on *A. germinans* on 25.v.1989 by Cindy Kamelhair, from Miami-Dade County collected on *A. germinans* (FSCA#s E2003-169, 441, 568, 2174), from North Palm Beach (Palm Beach County) collected on *A. germinans* (FSCA# E2003-2147), and from Fleming Key (Monroe County) collected in traps in 1979 and 1980.

Although we have specimens dating from nearly 50 years ago, this species has not been reported formally from Florida. We consider it adventive because of the rather sudden appearance of damaging populations on mangroves.

The triozids roll the edges of new leaves (Fig. 183), severely damaging the new growth (Fig. 184). The damaged portion of the leaf eventually turns black and falls off. Immatures (Fig. 182) secrete copious sticky wax inside the rolled leaves. Tuthill (1944b) described the species as *Trioza*; however, characters of the head, pronotum, metatibiae and male and female terminalia place this species in *Leuronota*, as defined by Burckhardt (1988) and Brown and Hodkinson (1988). The immatures (Fig. 182) have the thickened antennal segment 3 also characteristic for *Leuronota*. Here we formally transfer the species as *Leuronota maritima* (Tuthill, 1944), **comb. nov.** from *Trioza*.

Nothotrioza Burckhardt, 2013

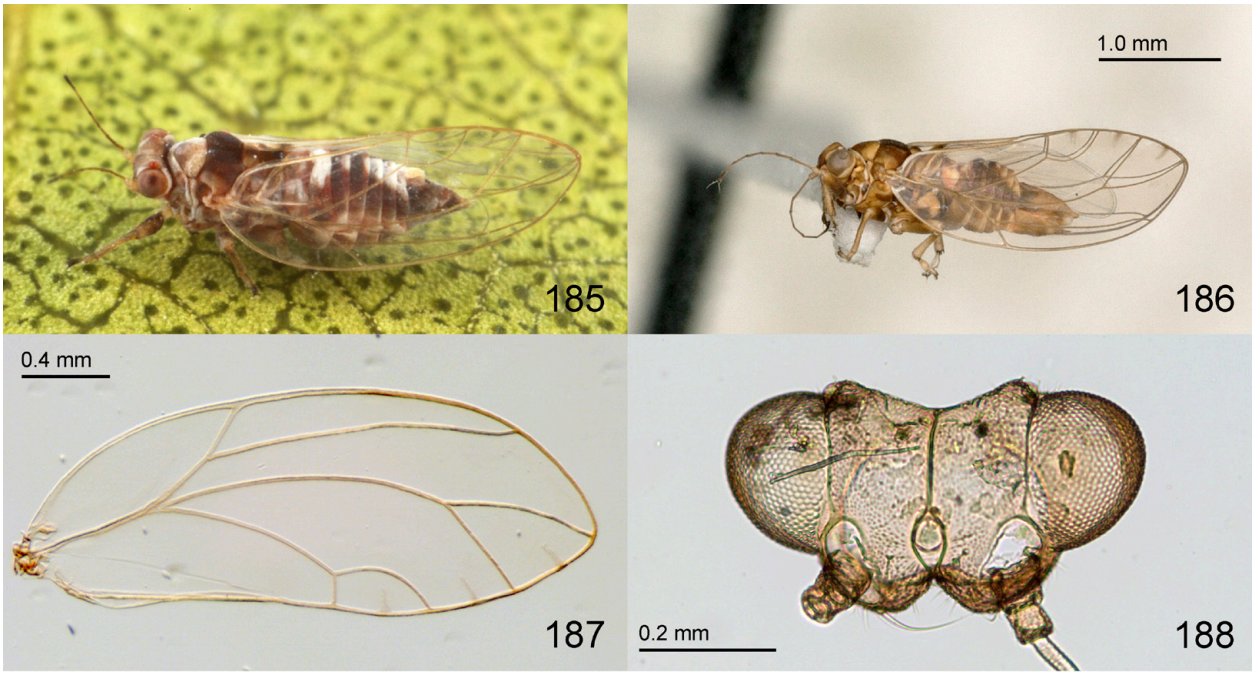
Nothotrioza longipedis Burckhardt and Halbert, new species

LSID: urn:lsid:zoobank.org:act:73C22DC3-A9D7-465D-A080-1DDD8D429EA4
(Fig. 185–200)

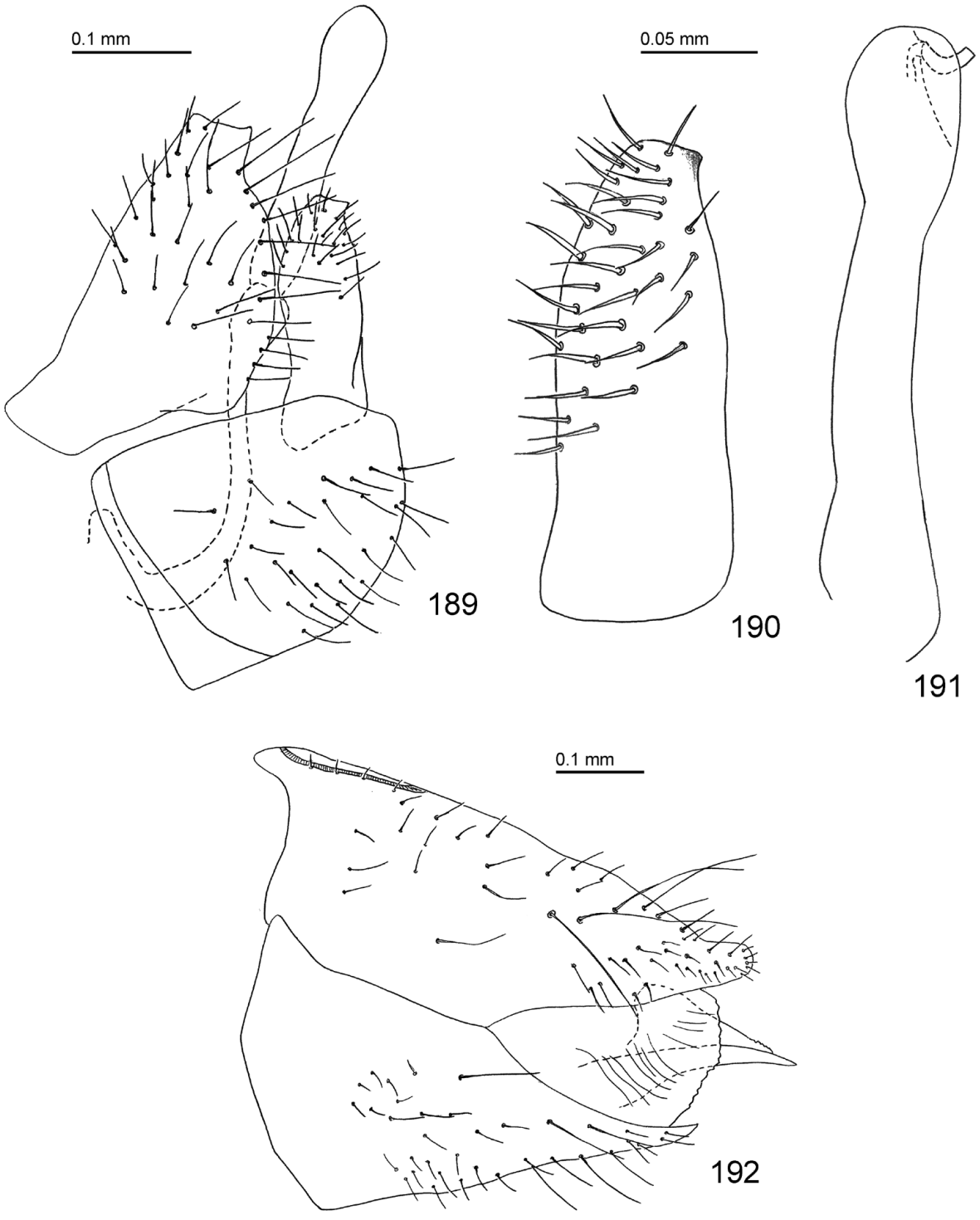
Materials examined. Holotype ♀: **USA**: **Florida**: Monroe County, Big Pine Key, Key Deer Boulevard across street from Wildwood Lane, 24.69651, –81.37375, 17.ii.2017, *Mosiera longipes* (J. Farnum) (FSCA# E2017-428) (FSCA, dry mounted). – Paratypes. **USA**: **Florida**: **Monroe County:** 2 ♂, 5 ♀, 54 immatures, 13 skins, same but 22.ix.1988, leaf galls on *Mosiera longipes* (M. Hennessey) (FSCA, slide mounted, in 70% ethanol); 1 ♀, 1

immature, same data as holotype but 24.688445, –81.369544, 7.ix.2016, *Mosiera longipes* (J. Farnum) (FSCA# E2016-4246) (FSCA, slide mounted, 70% ethanol); 1 immature, same data but dirt road opposite 1525, 24.68937, –8136969, 17.ii.2017, *Mosiera longipes* (J. Farnum) (FSCA# E2017-429) (FSCA, slide mounted).

Description. Adult (Fig. 185, 186). Coloration. General body color dark brown with light pattern as follows. Vertex with brown disc and whitish margins; occiput whitish. Antennal segments 1 and 2 yellowish, 3–8 brown with dark apex, 9 and 10 dark brown or almost black. Pronotum dirty whitish with brown dots laterally; mesopraescutum brown anteriorly, whitish posteriorly; mesoscutum with four brown longitudinal stripes; mesoscutellum whitish laterally; metapostnotum orange laterally. Tibiae and basitarsi yellowish. Forewing membrane (Fig. 187) transparent, colorless; veins whitish basally light brown apically. Hindwing membrane transparent, colorless. Abdomen dorsally with white median longitudinal stripe, broad at base and apex, narrow in the middle; intersegmental membranes orange or yellow; terminalia brown. – Structure. Head (Fig. 188) inclined at about 45° from longitudinal body axis, wider than pronotum and slightly narrower than mesoscutum. Vertex and dorsal surface of thorax beset with short inconspicuous setae. Antenna 1.7 times as long as head width; relative length of flagellar segments as 1.0 : 0.5 : 0.6 : 0.5 : 0.5 : 0.5 : 0.2 : 0.2; relative length of segment 10, longer and shorter terminal setae as 1.0 : 2.5 : 1.8; shorter terminal seta shorter than antennal segments 9 and 10 together. Rostrum 0.5–0.6 times as long as head width. Thorax weakly arched dorsally. Metatibiae 0.7 times as long as head width; with (2–4)+(3–4) apical spurs. Forewing (Fig. 187) 3.8–4.1 times as long as head width, 2.6–2.7 times as long as wide; vein Rs weakly curved; cell cu_1 relatively large and high, distance between apices of veins M_{3+4} and Cu_{1a} around 0.9 times as long as that between apices of veins Cu_{1a} and Cu_{1b}, and distance between apices of vein Cu_{1a} and Cu_{1b} about 2.0 times as long as length of vein Cu_{1b}; surface spinules absent except for a few scattered ones at base; field of radular spinules in cell m_2 about as long as those in cells m_1 and cu_1. Male terminalia (Fig. 189–191) with proctiger 0.5 times as long as head width, beset with long hairs in apical two thirds; in profile, with irregularly curved posterior lobe widest in basal third. Male subgenital plate subglobular, covered in long hairs mostly ventrally. Paramere, in profile, lamellar, with subparallel margins in basal two thirds, slightly narrowing to apex in apical third, with strongly sclerotized apical tooth directed caudad; covered in long setae in apical third on



Figures 185–188. *Nothotrioza longipedis* new species, adult. **185)** Habitus, oblique dorsal view. **186)** Habitus, in profile. **187)** Forewing. **188)** Head, dorsal view. Scales: **186)** 1.0 mm; **187)** 0.4 mm; **188)** 0.2 mm. (Photos by Lyle Buss, University of Florida, Entomology Department: 185).



Figures 189–192. *Nothotrioza longipedis* spec. nov., terminalia. **189)** Male terminalia, in profile. **190)** Inner face of paramere, in profile. **191)** Distal segment of aedeagus. **192)** Female terminalia, in profile. Scales: **189)** 0.1 mm; **190, 191**) 0.05 mm; **192)** 0.1 mm.

outer face and in long bristles in apical two thirds on inner face. Proximal segment of aedeagus strongly inflated apically; distal segment nearly straight in basal two thirds, hardly inflated apically; sclerotized end tube of ductus ejaculatorius short, strongly curved. Female terminalia (Fig. 192) cuneate. Female proctiger 0.9 times as long as head width, slightly sinuous dorsally, strongly narrowed near apex which is blunt; circumanal ring 0.4 times as long as proctiger, consisting mostly of two rows of unequal pores, except for caudal area which is slightly expanded consisting of a field of round pores; base and apex bearing scattered setae, denser apically, in the middle with medium long setae, with an oblique longitudinal row of very long setae in apical third. Female subgenital plate 0.7 times as long as proctiger, cuneate, pointed apically, beset with setae in apical two thirds, short towards base, long towards apex. Dorsal valvulae cuneate, strongly narrowed apically and bearing a row of dorsal teeth; ventral valvulae almost straight, pointed apically, without teeth. – Measurements (in mm; 1 ♂, 1 ♀). Head width 0.62–0.64; antenna length 1.08; forewing length 2.38–2.62; length of male proctiger 0.30; paramere length 0.24; length of distal segment of aedeagus 0.28; length of female proctiger 0.60.

Fifth instar immature (Fig. 193–195). Coloration. General body color yellowish or ochreous. Eyes dark red. Sclerotized dorsal abdominal plate dark brown; in life, abdomen covered dorsally with white wax (Fig. 193). – Structure. Body elongate and very narrow, 2.4–3.1 times as long as wide; dorsal surface covered in short and very long setae. Antennae 0.4–0.5 times as long as forewing pad, curved, 3-segmented with 4 rhinaria on segment 3. Tarsal arolium (Fig. 197) triangular about twice as long as claws, with unguitractor but without pedicel. Fore and hindwing pads long and narrow, glabrous dorsally. Abdominal dorsum modified into strongly sclerotized almost circular disc-like plate (Fig. 198); several rows of very long setae along the margins, disc covered by lanceolate setae (Fig. 199); abdominal apex rounded. Venter, proximal to circumanal ring with two irregular transverse rows of sclerotized peg setae; outer circumanal ring (Fig. 200) V-shaped, consisting of several rows of pores. – Measurements (in mm; 6 immatures). Body length 2.26–2.58; antenna length 0.36–0.44.

Distribution. USA: Florida (Monroe County).

Host plant. *Mosiera longipes* (O. Berg) Small (Myrtaceae). The immatures induce pouch galls on the leaves (Fig. 194). The immature can close the opening of the gall with its strongly sclerotized, modified abdomen.

Derivation of name. Named after its host *Mosiera longipes*.

Comments. *Nothotrioza* Burckhardt is a small Neotropical genus with three described species from Brazil inducing globular leaf galls (Carneiro et al. 2013). Two species are associated with *Psidium* spp. (Myrtaceae) and one was reported from an unidentified species of Malpighiaceae which is, however, a misidentification of a *Psidium* species (R.G.S. Carneiro, pers. comm.). In recently collected material from Brazil, there are at least as many undescribed species inducing globular leaf galls on *Psidium* spp. *Nothotrioza longipedis* shares with the other *Nothotriza* species the lack of genal processes and the large number of metatibial spurs in the adults, the 3-segmented antennae and the V-shaped outer circumanal ring in the immatures, as well as the association with Myrtaceae and the gall-inducing habit. It differs from the Brazilian species in the smaller body size, the less inclined head, the less hairy (shorter and sparser) vertex and thoracic dorsum, the dorsally less arched thorax, in details of the male and female terminalia, the very narrow, elongate last instar immature, with an apically rounded abdomen which is dorsally sclerotized and modified into an almost circular disc. It differs also in the pouch galls it induces on the host leaves, as opposed to the globular galls produced by Brazilian species.

Phylloplecta Riley, 1884

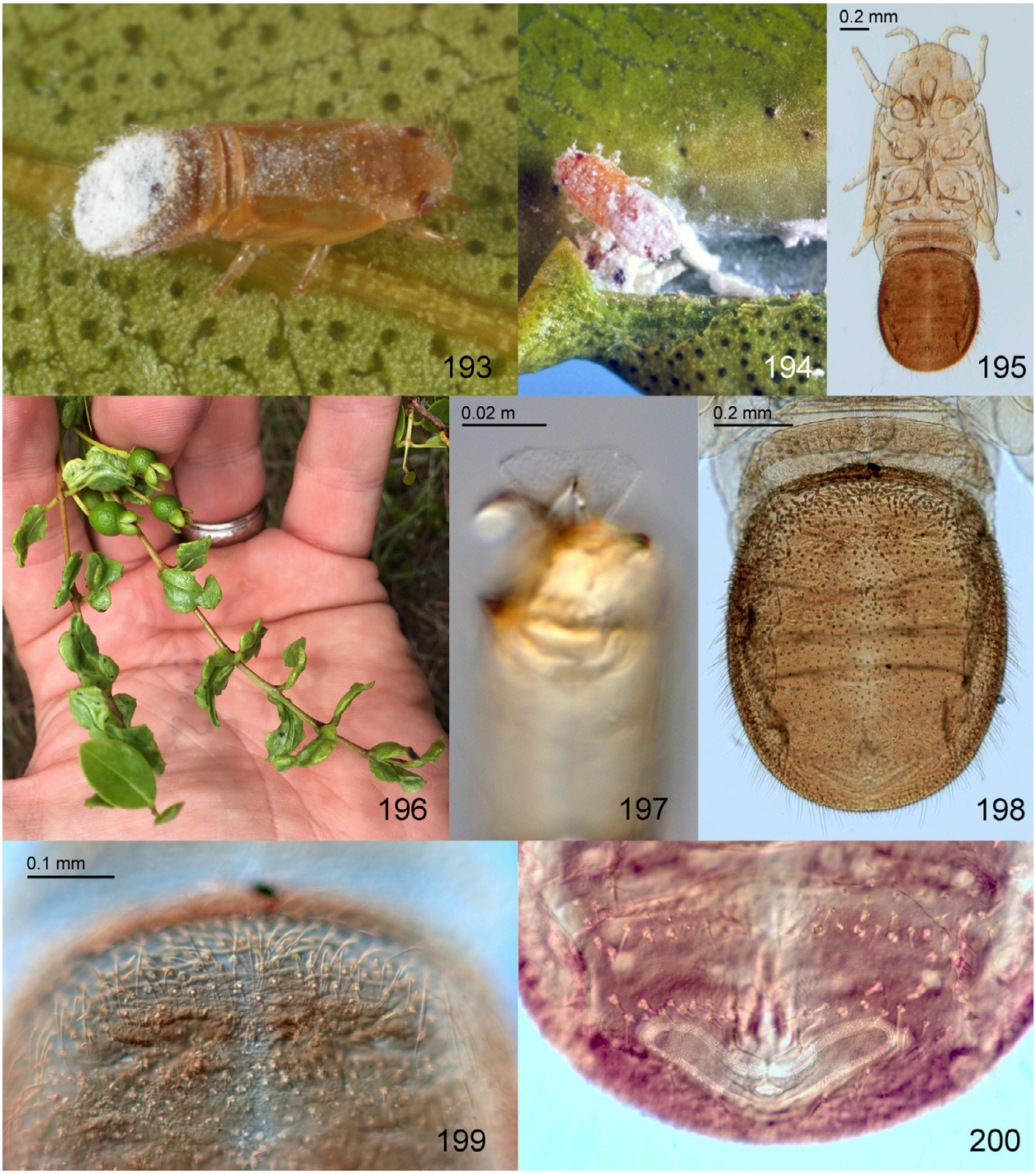
Phylloplecta tripunctata (Fitch, 1851)

Materials examined. USA: **Florida**: Specimens from Alachua, Gilchrist, Hamilton, and Nassau counties (FSCA, dry mounted, ethanol).

Diagnosis. Separated from other Florida psyllids as indicated in the generic key above.

Distribution. Eastern North America (Hodkinson 1988).

Host plants. *Rubus* L. spp. (Rosaceae).



Figures 193–200. *Nothotrioza longipedis* spec. nov., immature. **193)** Habitus, oblique dorsal view. **194)** Immature in opened gall. **195)** Habitus, in dorsal view. **196)** Galls on *Mosiera longipes*. **197)** Tarsal apex. **198)** Caudal plate, dorsal view. **199)** Base of caudal plate, dorsal view. **200)** Circumanal rings, ventral view. Scales: **195)** 0.2 mm; **197)** 0.02 mm; **198)** 0.2 mm; **199, 200)** 0.1 mm. (Photos by Lyle Buss, University of Florida, Entomology Department: 193; Jeff Lotz: 194; Jake Farnum, FDACS, DPI: 196).

Comments. This species can be found on Florida weedy blackberries (e.g. *Rubus cuneifolius* Pursh, Rosaceae), where it produces a large dense "head" on the end of the stem, consisting of tightly curled tiny leaves full of immatures (Mead 1966b).

Trioza Foerster, 1848

Key to Florida species of *Trioza*

1. Head and thorax covered in conspicuous macroscopic setae dorsally. On *Syzygium* P. Browne ex Gaertn. spp. ..... ***T. adventicia* Tuthill**
— Head and thorax lacking macroscopic setae dorsally. On other hosts **2**
2(1). Large, length to tip of folded forewings > 3.0 mm. Body color light, green or light brown. Antenna > 1.5 times as long as head width. On *Persea borbonia* (L.) Spreng. and *Persea palustris* (Raf.) Sarg. ..... ***T. magnoliae* (Ashmead)**
— Small, length to tip of folded forewings < 3.0 mm. Body color dark maroon, brown or almost black. Antenna < 1.5 times as long as head width. On *Ficus aurea* Nutt. ..... ***T. myresae* Burckhardt and Halbert, spec. nov.**

**Trioza adventicia* Tuthill, 1952

Materials examined. Interceptions from **USA**: **California** (FSCA, dry and slide mounted, ethanol).

Diagnosis. Description by Taylor and Martoni (2020). Separated from other Florida psyllids as indicated in the generic key above. This species makes pit galls on the undersides of *Syzygium* (Mead 1994b, as "*T. eugeniae* Froggatt"), commonly known as "eugenia" in California.

Distribution. Australia, adventive in New Zealand and USA (CA, FL) (Taylor and Martoni 2020).

Host plants. *Syzygium* P. Browne ex Gaertn. spp. (Myrtaceae).

Comments. *Trioza adventicia* Tuthill, 1952, described from New Zealand, is the correct name for *Trioza eugeniae* auct. nec Froggatt, 1901 (Taylor and Martoni 2020). This species does not occur in Florida, but it is intercepted in Florida on *Syzygium paniculatum* Gaertn. (especially on topiaries) (Mead 1994b). Taylor and Martoni (2020) had specimens from California and Florida. They state clearly that the populations in Florida have been eradicated, and FSCA numbers given in the paper match those in our records of intercepted populations. We have 15 recorded interceptions of this species since 1985.

Trioza magnoliae (Ashmead, 1881)

Materials examined. USA: **Florida**: Specimens from Collier, Franklin, Lake, Miami-Dade, Orange, Osceola, Seminole, and St. Lucie counties (FSCA, dry and slide mounted, ethanol).

Diagnosis. Description by Tuthill (1943). Separated from other Florida psyllids as indicated in the keys above.

Distribution. Mexico, USA (FL, GA) (Hodkinson 1988).

Host plants. *Persea borbonia* (L.) Spreng., *P. palustris* (Raf.) Sarg. (Lauraceae).

Comments. This species, widely distributed in Florida, induces pouch galls on *Persea borbonia* and *Persea palustris* (Mead 1963). Although the insect was named after sweetbay, *Magnolia virginiana* L. (Magnoliaceae), this is an unlikely host. It is possible that Ashmead (1881) confused one of the *Persea* species with *M. virginiana* (Mead 1963). Significantly, *T. magnoliae* does not colonize *Persea americana* Mill. (avocado).

Trioza myresae, Burckhardt and Halbert, new species

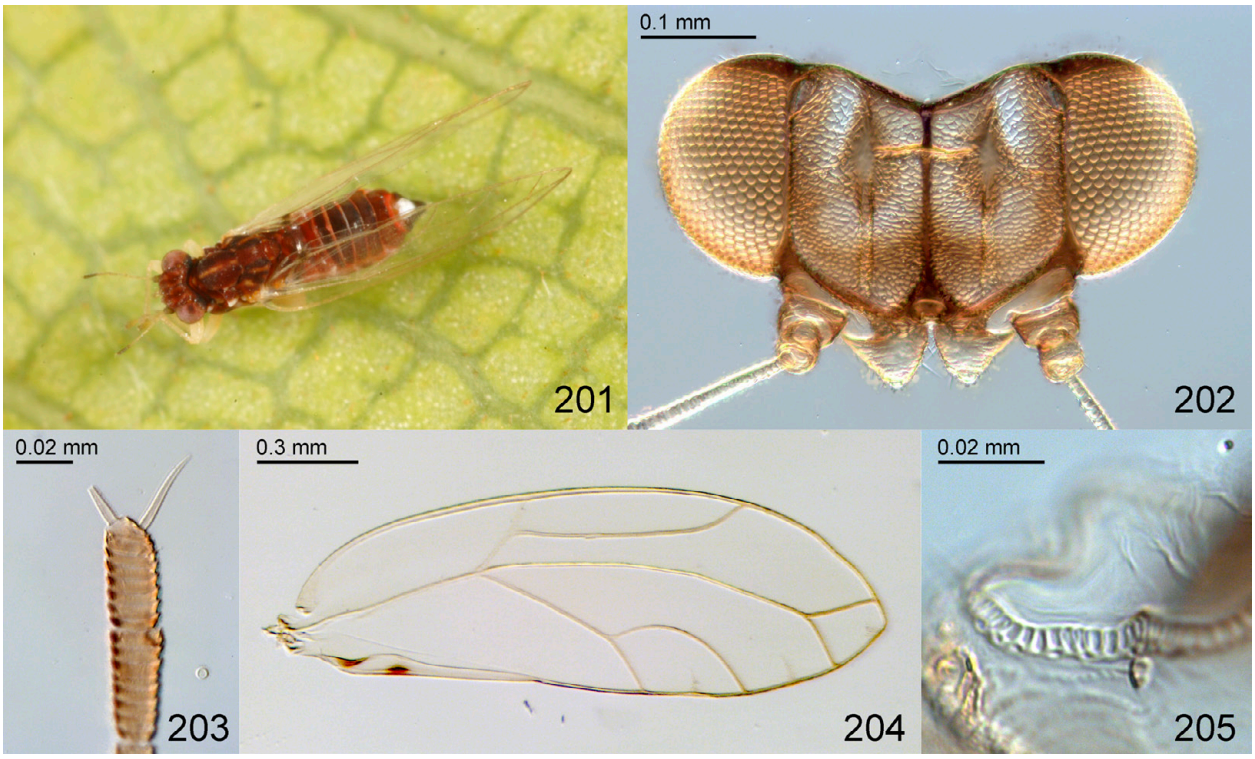
(Fig. 201–219)

LSID: urn:lsid:zoobank.org:act:EFFB67EB-38D4-4F30-8CF4-D8D0AE0D33BB

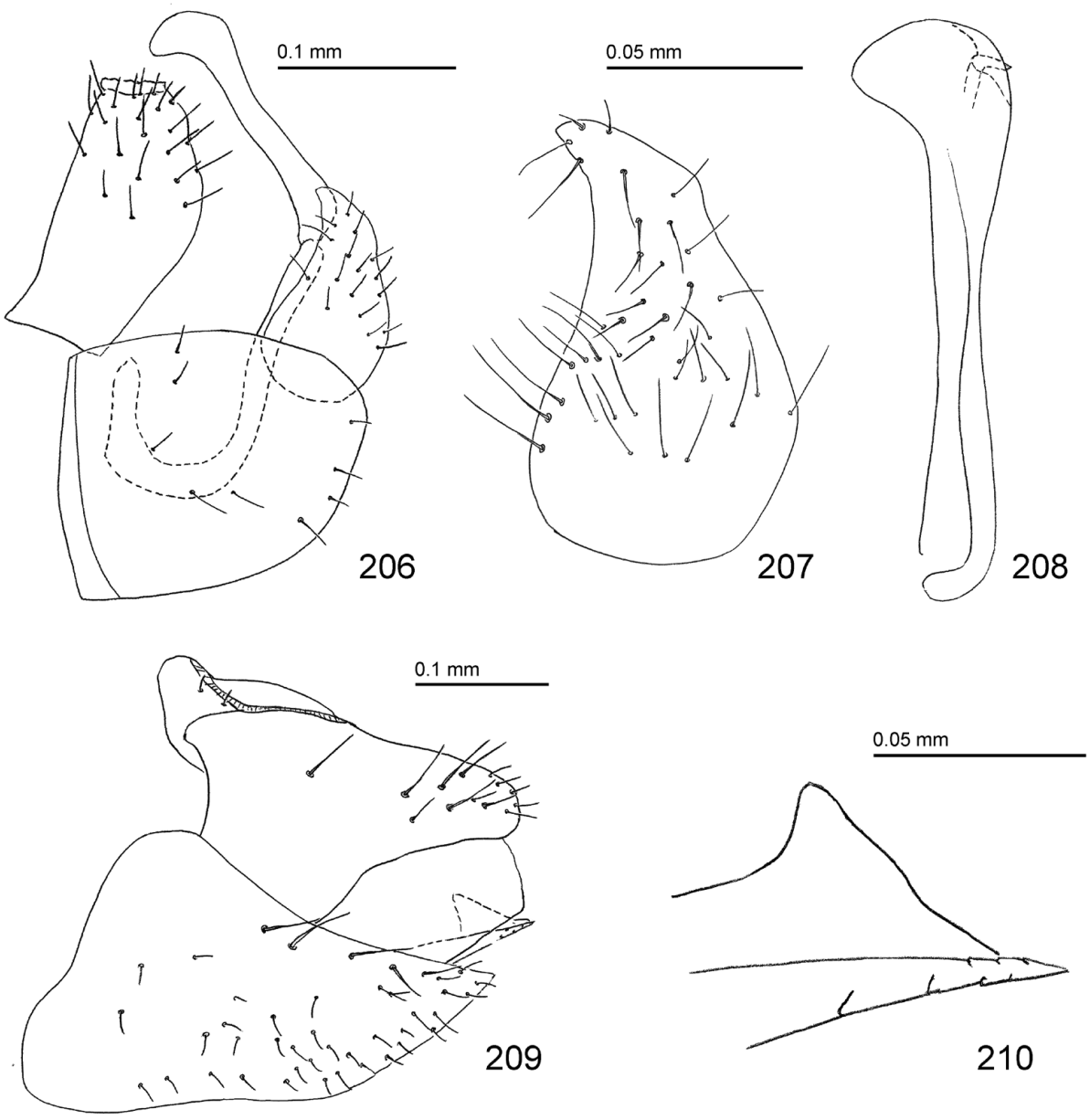
Materials examined. Holotype ♂: **USA: Florida**: Miami-Dade Co., Miami, Chapman Field, 26.iii.2007, *Ficus aurea* (S. Halbert) (FSCA# E2007-1849) (FSCA, dry mounted). – Paratypes. **USA**: **Florida**: **Miami-Dade County**:

1 ♂, Miami-Dade Co., Miami, 4.iii.2003, *Ficus aurea* (G. Myres) (FSCA# E2003-677) (FSCA, slide mounted); 1 ♂, 1 ♀, Miami, 13601 Old Cutler Rd., 4.iii.2003, *Ficus aurea* (G. Myres) (FSCA# E2003-766) (NHMB, dry mounted); 1 ♀, Miami-Dade Co., Miami, Fairchild Botanical Garden, 20.v.2003, *Ficus aurea* (S. Halbert, G. Hodges and G. Myres) (FSCA# E2003-2148) (FSCA, slide mounted); 1 immature, Miami-Dade Co., North Miami, 24.ix.2003, *Ficus aurea* (C. Pelegrin) (FSCA# E2003-4641) (FSCA, slide mounted). 3 ♂, 5 ♀, Miami-Dade Co., Miami, 13601 Old Cutler Road, 23.iii.2004, *Ficus aurea* (S. Halbert) (FSCA# E2004-2082) (FSCA, preserved in 70% ethanol); 15 ♂, 9 ♀, 3 immatures, Miami-Dade Co., Miami, Subtropical Research Station USDA, Chapman Field, 13601 Old Cutler Road, 23.iii.2004, *Ficus aurea* (D. Burckhardt) #1(1) (NHMB, dry and slide mounted);1 ♂, Miami-Dade Co., Miami, 2.iv.2004 (G. Myres) suction trap (FSCA# E2004-2395) (FSCA, slide mounted); 1 immature, same but 12.v.2005 (S. Halbert and D. Ziesk) (FSCA# E2005-2470) (FSCA, slide mounted); 1 ♂, 2 ♀, same data as holotype; 1 ♀, same but 23.ii.2007, suction trap (G. Myres) (FSCA# E2007-1152) (FSCA, dry mounted); 1 ♀, Miami-Dade Co., Miami, DPI station Old Cutler Rd, 4.iv.2008, suction trap (C. Padron) (FSCA# E2008-1963) (FSCA, dry mounted).

Description. Adult (Fig. 201). Coloration. General body color dark maroon to almost black. Some specimens are dark. Vertex slightly lighter than thorax and abdomen, fore margin and each two lateral and submedian dots on either side ochreous; tips of genal processes yellowish. Antennal segments 1 and 2 greyish brown, 3–8 whitish, 9 and 10 (Fig. 203) dark brown or almost black. Mesoscutum with a median and each a lateral white longitudinal stripe; mesoprescutum in younger specimens with each a submedian and sublateral white longitudinal strip on either side; thorax laterally, in front of articulation of forewing with a white longitudinal stripe on either side. Legs white, pro- and mesofemora dark at base, metacoxae laterally ochreous, metafemur except for tip dark brown. Forewing (Fig. 204) membrane transparent, colorless; veins greyish yellow at base, becoming brown towards apex, vein A_1 with dark spot in basal third. Hindwing membrane colorless, posterior margin at base dark. Younger specimens lighter with more expanded light elements. – Structure. Head hardly inclined from



Figures 201–205. *Trioza myresae* spec. nov., adult. **201)** Habitus, oblique dorsal view. **202)** Head, dorsal view. **203)** Antennal segments 9 and 10. **204)** Forewing. **205)** Detail of female circumanal ring. Scales: **202)** 0.1 mm; **203)** 0.02 mm; **204)** 0.3 mm; **204)** 0.02 mm. (Photo by Lyle Buss, University of Florida, Entomology Department: 201).



Figures 206–210. *Trioza myresae* spec. nov., male and female terminalia. **206)** Male terminalia, in profile. **207)** Inner face of paramere, in profile. **208)** Distal segment of aedeagus. **209)** Female terminalia, in profile. **210)** Dorsal and ventral valvulae. Scales: **206)** 0.1 mm; **207, 208)** 0.05 mm; **209)** 0.1 mm; **210)** 0.05 mm.

longitudinal body axis, about as wide as mesoscutum in dorsal view. Vertex (Fig. 202) subrectangular, 1.4 times as wide as long along mid line; disk with short microscopical pubescence and scale-like microsulpture; genal processes 0.3 times as long as vertex along mid-line, conical, subacute apically. Antenna 1.2–1.4 times as long as head width, with a single subapical rhinarium on each of segments 4, 6, 8 and 9; relative length of flagellar segments as 1.0 : 0.5 : 0.3 : 0.4 : 0.3 : 0.3 : 0.2 : 0.3; relative length of antennal segment 10 and terminal setae as 1.0 : 0.7 : 0.3 (Fig. 203). Rostrum 0.4–0.5 times as long as head width. Metatibia 1.2–1.3 times as long as head width, slender. Forewing (Fig. 204) 4.1–4.6 times as long as head width, 2.9 times as long as wide, irregularly lanceolate, widest in the middle, apex subacute, lying in cell m_1; vein Rs short, curved towards fore margin; bifurcation of

vein M distal to line connecting apices of veins Rs and Cu_{1a}; surface spinules absent except for small area at base of cell cu_2. Hindwing with grouped costal setae and trifurcating vein R+M+Cu. Male terminalia (Fig. 206–208) with proctiger 0.3–0.4 times as long as head width, beset with long hairs in apical half; tubular, in profile, with weakly curved posterior margin. Male subgenital plate subglobular, bearing a few medium long setae laterally and apically. Paramere shorter than proctiger; in profile, broad at base, irregularly narrowing to apex which is slightly curved cephalad; outer and inner face beset with long setae. Distal segment of aedeagus (Fig. 208) as long as or slightly longer than proctiger; apical inflation approximately hook-shaped, shaft straight; sclerotized end tube of ductus ejaculatorius short, almost straight. Female terminalia (Fig. 205, 209–210) with proctiger 0.6 times as long as head width, sparsely covered in moderately long setae mostly apically; dorsal margin of proctiger distal to circumanal ring, in lateral view, almost straight in the middle, narrowly rounded apically. Circumanal ring oval, 0.5 times as long as proctiger; consisting of two unequal rows of pores. Subgenital plate 1.4 times as long as proctiger, angular ventrally. Dorsal valvulae triangular, ventral valvulae almost straight bearing four tooth-like tubercles. – Measurements (in mm; 2 ♂, 1 ♀). Head width 0.42–0.46; antenna length 0.54–0.58; forewing length 1.72–2.12; length of male proctiger 0.14–0.16; paramere length 0.12; length of distal segment of aedeagus 0.14; length of female proctiger 0.26.

Fifth instar immature (Fig. 211, 218). Coloration. In life, orange with a yellow or green longitudinal stripe in the middle. Tips of antennae and rostrum dark. – Structure. Body strongly dorso-ventrally flattened, oval, 1.6 times as long as wide; dorsally flat. Dorsal sclerites covered in granular microsculpture and sparse microscopical peg setae, lacking sectasetae. Marginal sectasetae truncate, present in following numbers (one side only): head (Fig. 212) 28; forewing pad (Fig. 213) 72–77; hindwing pad (Fig. 214) 8–10; caudal plate (Fig. 215) 55–70. Each half of head broadly rounded anteriorly; bearing a lobe at the base of eye. Antenna 0.2 times as long as forewing pad; inserted on ventral body side, indistinctly 8-segmented, with one rhinarium each on segments 3 and 5 and two rhinaria on segment 7. Humeral lobe reaching well beyond anterior eye margin, narrowly rounded. Tarsal arolium (Fig. 217) almost circular, with short unguitractor, lacking petiole; claws completely reduced. Outer circumanal ring (Fig. 216) medium sized, transversely oval; on ventral body side; distance from hind margin to hind margin of caudal plate 5.4 times as long as distance from fore to hind margin of outer circumanal ring (measured in the middle); consisting of a single row of oval pores. – Measurements (in mm; 2 immatures). Body length 1.50–1.52; antenna length 0.16–0.18.

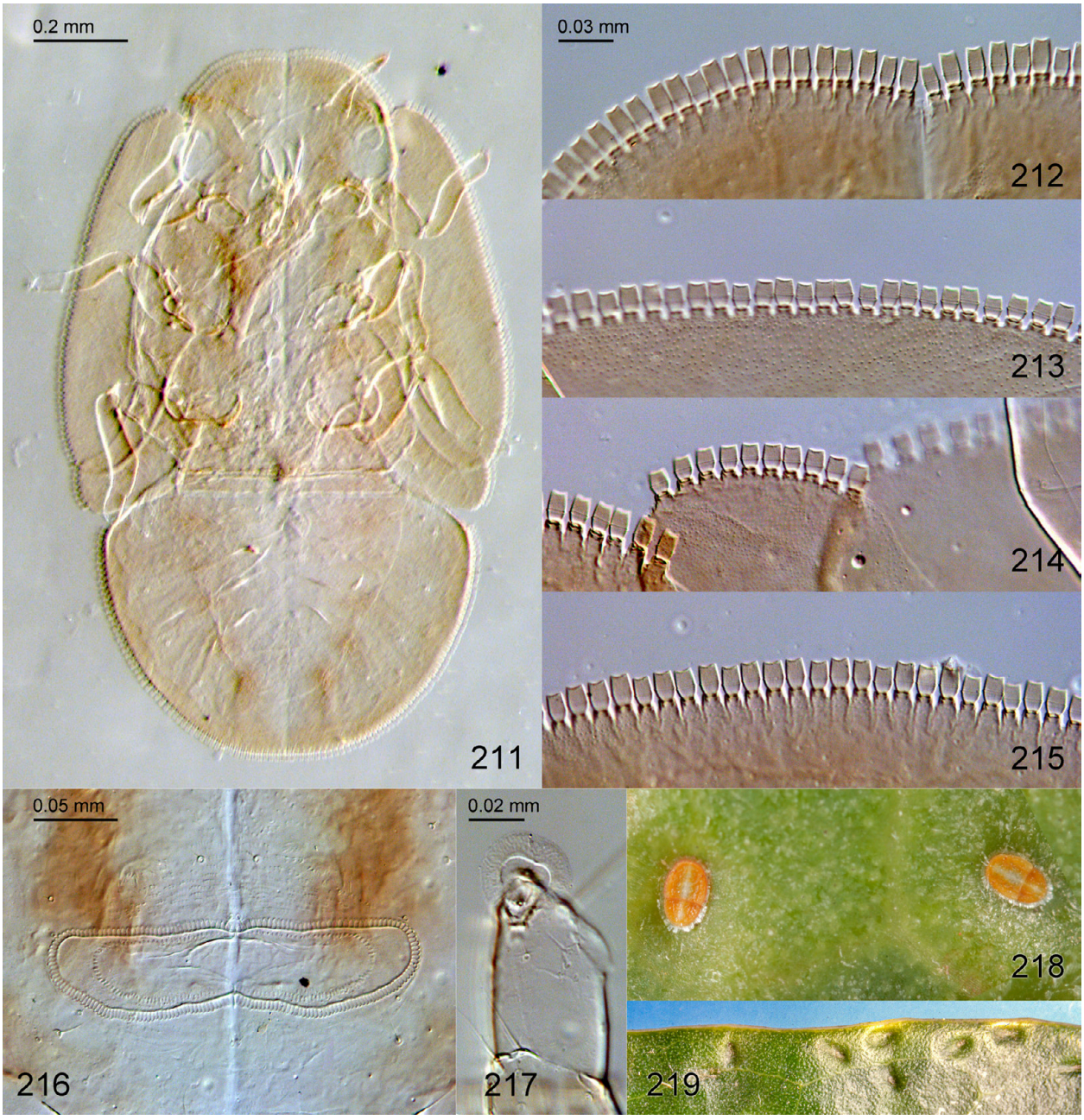
Distribution. USA: Florida (Collier, Miami-Dade, Palm Beach, and Polk counties).

Additional Florida distribution information. This species was recognized for the first time in Florida on *Ficus aurea* at Chapman Field, Miami (Miami-Dade County) Florida on 18.ii. 2003 by DPI inspector Gwen Myres, DPI entomologist Susan Halbert, and DPI botanist Mark Garland (FSCA# E2003-567). More specimens were collected in the Miami area on 4.iii.2003 (FSCA# E2003-766), 18.iii.2003 (FSCA# E2003-975), 20.v.2003 (FSCA# E2003-2148), 20.v.2003 (FSCA# E2003-2149), 25.v.2003 (FSCA# E2003-2765), 24.ix.2003 (FSCA# E2003-4641), 22.i.2004 (FSCA# E2004-489), 30.i.2004 (FSCA# E2004-681), and 4.ii.2004 (FSCA# E2004-738). The species is known from suction trap samples in Polk Co., Winter Haven, 21.v.2004 (P. Sieburth) (FSCA# E2004-4114) and Collier Co., Immokalee, 6.iv.2006 (P. Stansly) (FSCA# E2006-1923). There is a collection from *F. aurea* in Palm Beach Co., Jupiter, 29.i.2008 (J. Brambila) (FSCA# E2008-454). There is also an old collection of immatures from *F. aurea* in Ft. Lauderdale collected 22.ii.1982 by DPI inspector Dennis Clinton, which may be this species. If so, it is the oldest record.

Host plant. *Ficus aurea* Nutt. (Moraceae). The immatures induce shallow pits on either leaf surface (Fig. 218, 219).

Derivation of name. Named after inspector Gwen Myres, DPI, who first collected the species in 2003.

Comments. *Trioza myresae* is a member of the *Trioza russellae* group defined by Brown and Hodkinson (1988) as follows: genal processes small, compound eyes large, metatibiae with 1+2 sclerotized apical spurs, forewing with short evenly curved vein Rs and small cell m_1. Four Neotropical species are included in the group: *Trioza russellae* Tuthill on *Brosimum alicastrum* (Moraceae), as well as *T. arribensis* Brown and Hodkinson, 1988, *T. inequalis* Brown and Hodkinson, 1988, and *T. novalata* Brown and Hodkinson, 1988, without host information. *Trioza myresae* differs from the last two species in the strict trifurcation of vein R+M+Cu of the forewing (rather



Figures 211–219. *Trioza myresae* spec. nov., last instar. **211)** Habitus. **212)** Marginal sectasetae of head. **213)** Marginal sectasetae of forewing pad. **214)** Marginal sectasetae of hindwing pad. **215)** Marginal sectasetae of caudal plate. **216)** Circumanal rings. **217)** Tarsal apex. **218)** Immatures in pits. **219)** Empty pits. Scales: **211)** 0.2 mm; **212–215)** 0.03 mm; **216)** 0.05 mm; **217)** 0.02 mm. (Photos by Lyle Buss, University of Florida, Entomology Department: 218; Jeff Lotz, FDACS, DPI: 219).

than bifurcation into veins R+M and Cu), the slightly longer genal processes, the paramere which is distinctly shorter than the male proctiger (rather than longer) and the shorter female terminalia. From the first two species, *T. myresae* differs in the apically slender, forward pointing paramere and the slender, hook-shaped distal segment of the aedeagus. From *T. russellae* it differs in the host plant and general body shape of the immature, oval and flattened in *T. myresae*, and very narrow and elongate in *T. russellae*.

Trioza spp.

There are several *Trioza* spp. in the FSCA that cannot be placed or described yet due to insufficient material.

Discussion and Conclusions

Origins of Florida psyllid fauna. Here, we report 69 described and one undescribed species of Psylloidea from Florida (Table 1). Of these, one constitutes a doubtful record, four species are interceptions that were eradicated, and three species are reared in quarantine for the potential control of Brazilian peppertree. Of the remaining 62 species, two thirds (41 spp.) can be considered native and one third (20 spp.) adventive, judging from the status of their host plants, or new detections of damaging populations. One species, *B. melaleucae*, was introduced deliberately for control of melaleuca. The native species constitute a mix of biogeographical elements: Neotropical 13 spp., Holarctic 13 spp., Nearctic 9 spp., pantropical 2 spp. and cosmopolitan 4 spp. A majority of the adventive species (14 spp.) are New World species from Mexico, the Caribbean, and Central or South America. Three species, associated with eucalypts or acacias, originate from Australia, and two originate from Asia.

The prevalence of Neotropical origins of adventive psyllids is in contrast to the primarily Old World origins of adventive aphids. In Florida, about 1/3 of the aphids are adventive, similar to psyllids, but about 50% are from the West Palearctic, 40% are east Asian, and 10% are from other parts of the world. All of the recent aphid arrivals are Asian except for one species from Cuba (Halbert and Nuessly 2004). The reason for this discrepancy might be that aphids are predominantly North temperate, but with high diversity in tropical Asia, and the aphid fauna of the Neotropics is relatively depauperate (Blackman and Eastop 2020). Psyllids are predominantly tropical and South temperate, and the Neotropical psyllid fauna is species rich (Burckhardt and Queiroz 2020). At least some of the recently adventive Asian aphids arrived to the Neotropics before they became established in Florida (Halbert et al. 2000; Foottit et al. 2006), so the pathway for introduction into Florida could be similar for psyllids.

Despite its biogeographical mix, the native psyllid fauna of Florida is relatively depauperate compared with that of Western North America. On the other hand, almost a third of the native species appear to be endemic (12 spp.) or subendemic (1 sp.) which reflects, to a certain extent, the endemism in plants. This endemism is well documented for the following species *Aphalaroida masonici*, *Gyropsylla ilecis*, *Katacephala wineriterae*, *Limataphalara brevicephala*, *Nothotrioza longipedis*, *Pseudophacopteron gumbolimbo* and *Trioza myresae*. For these species, the taxonomy is resolved and the host plants are known. At present, *Craspedolepta bifida* and *C. euthamiae* are known only from Florida but it is likely that they have a wider distribution once neighboring states are more intensively explored. Four species (*Bactericera arcuata*, *Calophya arcuata*, *Kuwayama caldwelli* and *Leuronota longipennis*) are known only from one or a few specimens without host data and have unresolved taxonomy. More studies are needed to clarify their identity.

Interceptions. The percentage of adventive psyllids is quite high at about 1/3 of the total species. This situation is explained at least in part by the high number of interceptions of psyllids that are not established in Florida. Based on DPI unpublished sample data, there have been 225 interceptions of psyllids since 1985, of which only eight were species already known to be established in the state. Interceptions came from eight US states and two foreign countries (Mexico and Venezuela).

By far, the most commonly intercepted psyllid is *B. cockerelli*, the potato psyllid, with 134 collections (see above under species discussion). *Glycaspis brimblecombei* was intercepted once prior to becoming established in the state and several times thereafter. Other notable interceptions include *Cacopsylla tobirae* (Miyatake, 1964), the pittosporum psyllid, and *Trioza anceps* Tuthill, 1944, a significant pest of avocados.

Most intercepted psyllids were discovered on their own host plants by DPI inspectors; however, 35 collections were hitchhikers on lettuce (*Lactuca sativa*), six on chicory (*Cichorium endive* L.), six on *Brassica* L. spp., and two on celery (*Apium graveolens* L.).

Conclusions. The native psyllid fauna of North America is relatively poorly known. There are few modern revisions such as those by Hodkinson (1978, 1991b, c) and Hodkinson and Bird (2000). Particularly problematical are the genera *Aphalara*, *Bactericera*, *Cacopsylla*, *Craspedolepta*, *Pachypsylla* and *Trioza* where the original species descriptions often are not diagnostic, lack information on surface spinules in the forewing, lack details on

Table 1. Psyllids from Florida with the host plants, status, distribution (origin for adventive, intercepted and deliberately introduced species) and biogeographic relationship (mostly reflecting genus distribution). An asterisk (*) denotes species not established in Florida.

Species	Host plant in Florida	Status	Native distribution	Native distribution of genus
APHALARIDAE				
Aphalarinae				
Aphalara persicaria Caldwell, 1937	*Persicaria glabra* (Willd.) M.Gómez, *P. lapathifolia* (L.) Delarbre, *P. maculosa* Gray, *P. punctata* (Elliott) Small (Polygonaceae)	native	eastern North America	Holarctic
Craspedolepta bifida (Caldwell, 1936)	unknown	native	endemic	Holarctic
Craspedolepta euthamiae Burckhardt and Halbert, spec. nov.	*Euthamia graminifolia* (L.) Nutt. (Compositae)	native	endemic	Holarctic
Craspedolepta flavida (Caldwell, 1938)	*Euthamia graminifolia* (L.) Nutt. (Compositae)	native	eastern North America	Holarctic
Craspedolepta furcata (Caldwell, 1936)	?*Euthamia graminifolia* (L.) Nutt. and ?*Solidago canadensis* L. (Compositae)	native	North America	Holarctic
Craspedolepta parvula Journet and Vickery, 1979	no information for FL	FL record doubtful	eastern North America	Holarctic
Gyropsylla ilecis (Ashmead, 1881)	*Ilex vomitoria* Aiton (Aquifoliaceae)	native	subendemic (FL, GA)	Neotropical
Limataphalara brevicephala Hodkinson, 1992	*Nectandra coriacea* (Sw.) Griseb. (Lauraceae)	native	endemic	Neotropical
Pachypsyllinae				
Pachypsylla celtidisgemma Riley, 1885	*Celtis occidentalis* L. (Cannabaceae)	native	North America	Nearctic
Pachypsylla celtidisinteneris Mally, 1894	*Celtis* sp. (Cannabaceae)	native	North America	Nearctic
Pachypsylla celtidismamma (Riley, 1875)	*Celtis* spp. (Cannabaceae)	native	North America	Nearctic
Pachypsylla celtidisvesicula Riley, 1890	*Celtis laevigata* Willd. (Cannabaceae)	native	North America	Nearctic
Pachypsylla venusta (Osten-Saken, 1861)	*Celtis laevigata* Willd., *C. occidentalis* L. (Cannabaceae)	native	North America	Nearctic
Tetragonocephala flava Crawford, 1914	*Celtis laevigata* Willd. (Cannabaceae)	native	North America	Nearctic
Rhinocolinae				
Tainarys myracrodrui Burckhardt and Queiroz, 2017	no information for FL	adventive	Brazil	Neotropical
Spondyliaspidinae				
Blastopsylla occidentalis Taylor, 1985	*Eucalyptus* spp. (Myrtaceae)	adventive	Australia	Australian

Species	Host plant in Florida	Status	Native distribution	Native distribution of genus
Boreioglycaspis melaleucae Moore, 1964	*Melaleuca quinquenervia* (Cav.) S.T.Blake (Myrtaceae)	introduced deliberately	Australia	Australian
**Ctenarytaina eucalypti* (Maskell, 1890)	no information for FL	intercepted from California and eradicated	Australia	Old World tropical/subtropical
Glycaspis brimblecombei Moore, 1964	*Eucalyptus* L'Hér. spp. (Myrtaceae)	adventive	Australia	Australian
CALOPHYIDAE				
Calophyinae				
Calophya arcuata Caldwell, 1944	unknown	native?	endemic?	cosmopolitan except for Africa
**Calophya latiforceps* Burckhardt, 2011	*Schinus terebinthifolia* Raddi (Anacardiaceae)	reared in quarantine as possible biocontrol for Brazilian peppertree	Brazil	cosmopolitan except for Africa
**Calophya lutea* Burckhardt, 2018	*Schinus terebinthifolia* Raddi (Anacardiaceae)	reared in quarantine as possible biocontrol for Brazilian peppertree	Brazil	cosmopolitan except for Africa
Calophya nigripennis Riley, 1884	*Rhus copallinum* (Anacardiaceae)	native	North America	cosmopolitan except for Africa
Calophya spondiadis Burckhardt and Mendez, 2016	*Spondias purpurea* L. (Anacardiaceae)	adventive	Mexico	cosmopolitan except for Africa
**Calophya schini* Tuthill, 1959	*Schinus molle* L. (Anacardiaceae)	intercepted from California and eradicated	South America	cosmopolitan except for Africa
**Calophya terebinthifolii* Burckhardt and Basset, 2000	*Schinus terebinthifolia* Raddi (Anacardiaceae)	reared in quarantine as possible biocontrol for Brazilian peppertree	Brazil	cosmopolitan except for Africa
Mastigimatinae				
Mastigimas ernstii (Schwarz, 1899)	*Cedrela odorata* L. (Meliaceae)	adventive	Caribbean	Neotropical

Species	Host plant in Florida	Status	Native distribution	Native distribution of genus
CARSIDARIDAE				
Paracarsidara dugesii (Löw, 1886)	*Waltheria indica* L. (Malvaceae)	adventive	South America	Neotropical
Paracarsidara gigantea (Crawford, 1911)	no information from FL	adventive	South America	Neotropical
LIVIIDAE				
Euphyllurinae				
Diaphorina citri Kuwayama, 1908	*Citrus* spp., *Murraya paniculata* (L.) Jack, other citrus relatives (Rutaceae)	adventive	tropical Asia	Old World tropical
Katacephala arcuata Crawford, 1914	unknown	native?	Caribbean	Neotropical
Katacephala grandiceps Crawford, 1914	*Eugenia foetida* Pers. (Myrtaceae)?	native	Caribbean	Neotropical
Katacephala tenuipennis Tuthill, 1944	*Eugenia axillaris* (Sw.) Willd., *E. foetida* Pers. (Myrtaceae)	native	Caribbean	Neotropical
Katacephala wineriterae Burckhardt and Halbert, spec. nov.	*Calyptranthes pallens* Griseb. (Myrtaceae)	native	endemic	Neotropical
Liviinae				
Livia maculipennis (Fitch, 1857)	*Juncus acuminatus* Michx. (Juncaceae)	native	eastern North America	Holarctic
PHACOPTERONIDAE				
Pseudophacopteron gumbolimbo Burckhardt and Halbert, spec. nov.	*Bursera simaruba* (L.) Sarg. (Burseraceae).	native	endemic	pantropical
PSYLLIDAE				
Acizziinae				
Acizzia jamatonica (Kuwayama, 1908)	*Albizia julibrissin* Durazz. (Fabaceae)	adventive	East Asia	Old World tropical/subtropical
**Acizzia uncatoides* (Ferris and Klyver, 1932)	no information for FL	intercepted from California and eradicated	Australia	Old World tropical/subtropical
Acizzia sp.	*Acacia auriculiformis* A. Cunn. ex Benth. (Fabaceae)	adventive	Australia	Old World tropical/subtropical
Aphalaroidinae				
Aphalaroida masonici Caldwell, 1940	*Lysiloma latisiliquum* (L.) Benth. (Fabaceae)	native	endemic	Nearctic

Species	Host plant in Florida	Status	Native distribution	Native distribution of genus
Freysuila dugesii Aleman, 1887	*Caesalpinia* sp., *Haematoxylum campechianum* L. (Fabaceae)	adventive	Mexico	Neotropical
Telmapsylla minuta Hodkinson, 1992	*Avicennia germinans* (L.) L. (Acanthaceae)	native	Caribbean, Central America	Nearctic
Ciriacreminae				
Euceropsylla martorelli (Caldwell, 1944)	*Inga* sp. (Fabaceae)	adventive	Central and South America	Neotropical
Euceropsylla russoi Boselli, 1929	*Inga feuilleei* DC., *I.* sp. (Fabaceae)	adventive	Central and South America	Neotropical
Heteropsylla cubana Crawford, 1914	*Leucaena leucocephala* (Lam.) de Wit (Fabaceae)	adventive	Carribean	Neotropical
Heteropsylla flexuosa Muddiman, Hodkinson and Hollis, 1992	*Acacia farnesiana* (L.) Willd. (Fabaceae)	adventive	Mexico, Central America	Neotropical
Heteropsylla fusca Crawford, 1914	*Haematoxylum campechianum* L. (Fabaceae)	adventive	Central and South America	Neotropical
Heteropsylla huasachae Caldwell, 1941	*Acacia* sp., *Albizia* sp. (Fabaceae)	adventive	Mexico, Central and northern South America	Neotropical
Heteropsylla mimosae Crawford, 1914	*Acacia farnesiana* (L.) Willd. (Fabaceae)	adventive	Mexico, Caribbean	Neotropical
Heteropsylla quassiae Crawford, 1914	*Lysiloma latisiliquum* (L.) Benth. (Fabaceae)	native	Caribbean	Neotropical
Mitrapsylla albalineata Crawford, 1914	on *Senna pendula* (Willd.) H.S.Irwin & Barneby, *S. polyphylla* (Jacq.) Irwin & Barneby (Fabaceae)	adventive	Mexico, Central and northern South America	Neotropical
Mitrapsylla cubana Crawford, 1914	*Desmodium heterocarpon* (L.) DC. (Fabaceae)	native?	Caribbean, Central and South America	Neotropical
Macrocorsinae				
Euphalerus nidifex Schwarz, 1904	*Piscidia piscipula* (L.) Sarg. (Fabaceae)	native	Caribbean	Neotropical
Psyllinae				
Amorphicola amorphae (Mally, 1894)	*Amorpha* L. (Fabaceae)	native	North America	New World
Psylla carpinicola Crawford, 1914	*Carpinus caroliniana* Walter (Betulaceae)	native	mid-western and eastern North America	Holarctic

Species	Host plant in Florida	Status	Native distribution	Native distribution of genus
Psylla sanguinea (Provancher, 1872)	*Prunus* spp. (Rosaceae)	native	North America	Holarctic
TRIOZIDAE				
Bactericera arcuata (Tuthill, 1942)	unknown	native	endemic	Holarctic
Bactericera dorsalis (Crawford, 1914)	*Lycium carolinianum* Walter (Solanaceae)	native	throughout North America	Holarctic
Bactericera nigrilla (Crawford, 1911)	*Salix caroliniana* Michx. (Salicaceae)	native	North America	Holarctic
Bactericera schwarzii (Riley, 1885)	unknown	native	southeastern USA	Holarctic
Baeoalitriozus diospyri (Ashmead, 1881)	*Diospyros virginiana* L. (Ebenaceae)	native	mid-western and eastern North America	pantropical
Ceropsylla sideroxyli Riley, 1885	*Sideroxylon foetidissimum* Jacq. (Sapotaceae)	native	Caribbean	Neotropical
Hemitrioza sonchi Crawford, 1914	*Lactuca graminifolia* Michx., *Sonchus* spp. (Compositae)	native	eastern USA	Nearctic
Kuwayama caldwelli (Tuthill, 1944)	unknown	native	endemic	Neotropical
Leuronota fagarae Burckhardt, 1988	*Zanthoxylum fagara* (L.) Sarg. (Rutaceae)	adventive	South America	Neotropical
Leuronota longipennis Crawford, 1914	unknown	native	endemic	Neotropical
Leuronota maritima (Tuthill, 1944)	*Avicennia germinans* (L.) L. (Acanthaceae)	adventive	Caribbean	Neotropical
Nothotrioza longipedis Burckhardt and Halbert, spec. nov.	*Mosiera longipes* (O.Berg) Small (Myrtaceae)	native	endemic	Neotropical
Phylloplecta tripunctata (Fitch, 1851)	*Rubus cuneifolius* Pursh, *R.* spp. (Rosaceae)	native	eastern North America	Holarctic
**Trioza adventicia* Tuthill, 1952	*Syzygium paniculatum* Gaertn. (Myrtaceae)	intercepted from California and eradicated	Australia	cosmopolitan
Trioza magnoliae (Ashmead, 1881)	*Persea borbonia*, *P. palustris* (Lauraceae)	native	Caribbean	cosmopolitan
Trioza myresae Burckhardt and Halbert, spec. nov.	*Ficus aurea* Nutt. (Moraceae)	native	endemic	cosmopolitan

the structure and chaetotaxy of the terminalia, or lack information on the immatures. From work in the USNM (DB, pers. observation), it appears that several species are hidden under some species names. It can be assumed also that many literature records are mixes or misidentifications. Much work remains to be done on native North American psyllid fauna, including species in Florida.

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Appendix 1

List of Nearctic *Bactericera* species associated with *Salix*. In addition to the named species, there are many undescribed species represented in the collections of the MHNG, NHMB and USNM.

Bactericera arctica (Hodkinson, 1978)

Trioza arctica Hodkinson 1978: 355.
Bactericera arctica; Burckhardt and Lauterer 1997b: 120.

Distribution. Russia (Chukotka Autonomous Okrug, Sakhalin oblast), USA (AK) (Hodkinson 1978, 1988; Labina 2006).

Host plant. *Salix* spp. (Salicaceae) (Hodkinson 1988).

Bactericera atkasookensis (Hodkinson, 1978)

Trioza atkasookensis Hodkinson 1978: 357.
Trioza (?*Bactericera*) *atkasookensis*; White and Hodkinson 1985: 166.
Eubactericera atkasookensis; Li and Yuan 1994: 128.
Bactericera atkasookensis; Burckhardt and Lauterer 1997b: 122.

Distribution. Russia (Chukotka Autonomous Okrug), USA (AK) (Hodkinson 1978, 1988).

Host plant. *Salix lanata* subsp. *richardsonii* (Hook.) A.K.Skvortsov, *S. niphoclada* Rydb., *Salix pulchra* Cham. (Salicaceae) (Hodkinson 1978; Hodkinson and MacLean 1980).

Bactericera californica (Crawford, 1910)

Trioza californica Crawford 1910a: 234.
Triozoida californica; Crawford 1911b: 492.
Ceropsylla californica; Crawford 1914: 102.
Trioza ichneumonia Crawford 1914: 103, nomen nudum.
Bactericera californica; Burckhardt and Lauterer 1997b: 124.

Distribution. USA (AZ, CA, CO) (Hodkinson 1988).

Host plant. *Salix bebbiana* Sarg. (Salicaceae) (Crawford 1914).

Bactericera flori (Crawford, 1911b), new combination and new status

Trioza assimilis Crawford 1910a: 233; primary homonym of *Trioza assimilis* Flor 1861: 408.
Trioza flori Crawford 1911b: 503; replacement name for *Trioza assimilis* Crawford nec Flor.
Trioza pomonae Aulmann 1912: 22; replacement name for *Trioza assimilis* Crawford nec Flor.
Trioza dubia Patch 1912: 226; **syn. nov.**

Distribution. USA (CA) (Crawford 1910a; Patch 1912).

Host plant. Unknown, probably *Salix* spp. (Salicaceae).

Comments. Crawford (1914: 91) listed under *Trioza salicis* Mally the following synonyms: *Trioza assimilis* Crawford nec Flor and its replacement names *Trioza flori* Crawford and *Trioza pomonae* Aulmann, *Trioza dubia* Patch, *Trioza nigra* Crawford nec Kuwayama and its replacement names *Trioza nigrilla* Crawford and *Trioza louisianae* Aulmann, as well as *Trioza minuta* Crawford and *Trioza minuta* var. *similis* Crawford. Later Tuthill (1943: 555) questioned the synonymy of *T. dubia* and synonymized it instead with *Trioza longicornis* Crawford, an act which was followed by Hodkinson (1988). According to the original descriptions, the forewing of *T. longicornis* is broadly rounded but that of *T. dubia* subacute suggesting they are not conspecific. On the other hand, *T. assimilis* Crawford and *T. dubia* are congeneric and share the slender falcate paramere that is curved cephalad, the relatively long cuneate female terminalia with a pointed subgenital plate and their origin from California. We believe they are conspecific and synonymize them. As *Trioza assimilis* Crawford is a primary homonym of *Trioza assimilis* Flor, the name is not available and the oldest synonym, i.e. *Trioza flori*, has to be used which is transferred here to *Bactericera* as *Bactericera flori* (Crawford, 1911), **comb. nov**.

Bactericera incerta (Tuthill, 1943)

Trioza incerta Tuthill 1943: 564.
Bactericera incerta; Burckhardt and Lauterer 1997b: 126.

Distribution. Canada (BC), USA (AK, CA, CO, OR, UT, WA) (Hodkinson 1988).

Host plant. *Salix bebbiana* Sarg. (Salicaceae) (Hodkinson 1988).

Bactericera minuta (Crawford, 1910)

(Fig. 158–161)

Trioza minuta Crawford 1910a: 232.
Trioza marginata Crawford 1910a: 232; secondary homonym of *Psylla marginata* Hartig 1841: 374 (in *Trioza*).
Trioza arizonae Aulmann 1912: 144, replacement name for *Trioza marginata* Crawford nec *Psylla marginata* Hartig (in *Trioza*).
Phylloplecta minuta; Caldwell 1940: 50.

Materials examined. Type material of *Trioza minuta* Crawford, 1910. Lectotype ♀: **USA:** "Ariz 2304" "Coll CF Baker" "*Trioza minuta* Crawf." (USNM, dry mounted), **here designated**; paralectotypes 3 ♀, same data as lectotype.

Type material of *Trioza marginata* Crawford, 1910. Lectotype ♀: **USA:** "Ariz 2015", "Coll CF Baker", "type No. 18087 U.S.N.M.", "*Trioza marginata* Crawf." (USNM, dry mounted), **here designated**; paralectotypes: 1 adult without abdomen (according to original description a ♂), 2 ♀, same data as lectotype.

Additional material. **El Salvador:** San Miguel (USNM, dry mounted). – **Mexico:** México (NHMB, dry mounted and in 70% ethanol); Mexico City (USNM, dry mounted); Michoacán (NHMB, in 70% ethanol; USNM, dry mounted); Morelos (USNM, dry mounted); Oaxaca (USNM, dry mounted); Puebla (USNM, dry mounted); San Luis Potosí (USNM, dry mounted); Sinaloa (USNM, dry mounted); Sonora (USNM, dry mounted); Veracruz (USNM, dry mounted). – **USA:** Arizona: 1 ♂, same data as type series of *Trioza minuta* (USNM, dry mounted) and additional material from various localities (USNM, dry mounted); California (USNM, dry mounted); Kansas (USNM, dry mounted); Oklahoma (USNM, dry mounted); Texas (USNM, dry mounted).

Distribution. Reported from USA (AZ) (Crawford 1910b, 1911a). El Salvador (USNM); Mexico (NHMB, USNM); USA (AZ, CA, KS, OK, TX) (USNM).

Host plant. *Salix bonplandiana* Kunth (Salicaceae) (NHMB data); probably also other *Salix* spp.

Comments. The examination of types of *Trioza minuta* and *T. marginata* Crawford (USNM) showed the two are conspecific. Specimens of the former are very teneral but bear indistinct brown areas along the hind margin of the forewing, a character not mentioned by Crawford (1911a). The species is characterized by the narrow dark band along the hind margin of the forewing, often lighter and less expanded in males, the presence of surface spinules on the forewing membrane, the straight, relatively short posterior lobes on the male proctiger (Fig. 158), the lamellar paramere (Fig. 159), the long apical inflation (half as long as segment) of the distal segment of the aedeagus with very short sclerotized end tube of the ductus ejaculatorius (Fig. 160, 161) and the short, apically truncate female subgenital plate (see also key in Appendix 1). There is some variation in the antennal coloration and the extent of the dark wing pattern. In the types of *T. minuta* the antennal segments 3–8 are light and 9–10 dark brown, in the types of *T. marginata* Crawford segments 4–8 gradually darken towards the antennal apex; in specimens from Mexico (NHMB, USNM) only segment 3 is light and segments 4–10 are dark brown or black, strongly contrasting from segment 3.

Bactericera nigrilla (Crawford, 1911)

(Fig. 151–157, 162–180)

Distribution. USA (CO, FL, IA, OR).

Host plant. *Salix caroliniana* Michx. (Salicaceae); perhaps other *Salix* spp.

Comments. See synonymy and thorough discussion for *B. nigrilla* in main text of this work.

Bactericera salicivora (Reuter, 1876)

Trioza salicivora Reuter 1876: 72.
Trioza nigrifrons Crawford 1910a: 230; Crawford 1914: 89.
Trioza fulvida Crawford 1910a: 231; Crawford 1914: 89.
Trioza aurantiaca Crawford 1910a: 231; Crawford 1914: 89.
Trioza fulvida similis Crawford 1910b: 359; Crawford 1914: 89.
Trioza aurantiaca var. *frontalis* Crawford 1910a: 323; unavailable name.
Trioza ?*maura* Foerster 1848: 94; Patch 1912: 228.
Trioza maura sensu Crawford 1914: 89; Tuthill 1943: 560, nec Foerster 1848: 94; Hodkinson 1978: 359.
Trioza saliciperda Crawford 1914: 89; nomen nudum.
Bactericera (*Smirnovia*) *salicivora*; Klimaszewski 1968: 14.
Trioza (*Bactericera*) *salicivora*; White and Hodkinson 1985: 166.
Bactericera salicivora; Burckhardt and Lauterer 1997a: 130.

Distribution. North America: Canada (AB, BC), USA (AK, CA, CO, IL, MI, NH, NM, NV, OR, UT, WA, WI). – Asia: Azerbajan, Georgia, Japan, Mongolia, Russia (Far East). – Europe: Austria, Finland, France, Germany, Italy, Moldova, Norway, Poland, Russia (European part), Sweden, Slovakia, Switzerland, Ukraine, United Kingdom (Ossiannilsson 1992; Hodkinson 1988; Gegechkori and Loginova 1990; Burckhardt and Lauterer 1997b; Burckhardt 2006).

Host plants. *Salix* spp. (Salicaceae). Adults overwinter on conifers (Hodkinson 1988; Ossiannilsson 1992).

Comments. The records of *B. salicivora* from Korea (Burckhardt 2006) concern *Bactericera distinctissima* Kwon and Lee, 1981 (Kwon 1983).

Bactericera varians (Crawford, 1910)

Trioza varians Crawford 1910a: 231.
Bactericera varians; Burckhardt and Lauterer 1997b: 132.

Distribution. Canada (AB, BC), USA (CA, CO, UT) (Hodkinson 1988).

Host plants: *Salix* spp. (Salicaceae) (Hodkinson 1988).

Key to North American *Bactericera* species associated with *Salix* spp. (Salicaceae)

1. Forewing with a dark stripe along veins R+M+Cu and R_1 . . . . . ***B. californica*** **(Crawford)**
— Forewing lacking dark stripe along veins R+M+Cu and R_1 . . . . . **2**

2(1). Forewing lacking surface spinules in apical half of the wing . . . . . ***B. arctica*** **(Hodkinson)**, ***B. atkasookensis*** **(Hodkinson)**, ***B. incerta*** **(Tuthill)** and ***B. varians*** **(Crawford)**
— Forewing bearing surface spinules in apical half, sometimes very faint **3**

3(2). Vein A_1 of forewing, sometimes also a narrow stripe along hind margin, conspicuously dark brown, contrasting from other veins. Paramere, in profile, lamellar (Fig. 159) **4**
— Forewing without dark pattern; vein A_1 of forewing concolorous with other veins. Paramere, in profile, falcate or digitiform (Fig. 166, 167) **5**

4(3) Forewing widest in the middle, with brown stripe or patches along hind margin; cell cu_2 around 2.5 times as wide as high . . . . . ***B. minuta*** **(Crawford)**
— Forewing widest in apical third, dark color restricted to vein A_1; cell cu_2 less than 1.5 times as wide as high . . . . . ***B. salicivora*** **(Reuter)**

5(3) Paramere, in profile, falcate, slender, curved cephalad. Female subgenital plate long and cuneate, pointed apically . . . . . ***B. flori*** **(Crawford)**
— Paramere almost straight, digitiform (Fig. 166, 167). Female subgenital plate short, truncate apically (Fig. 162), at most with a small bulge in the middle (Fig. 163) . . . . . ***B. nigrilla*** **(Crawford)**