

Table 1. Selected larval features, mean \pm SE, *n*, of *Eucelatoria bryani* and *E. rubentis*. Means with different letters are significantly different for each character within each instar (t-test; $P < 0.005$); other values are not significantly different ($P > 0.05$); n.o., not observed.

Species	Instar	Cephalopharyngeal Skeleton, Length ¹	Dorsal Cornu, Height ²	Number of Anterior Spiracular Openings
<i>E. bryani</i>	1	0.16 \pm 0.004 (10)a	0.02 \pm 0.001 (10)a	n.o.
<i>E. rubentis</i>	1	0.18 \pm 0.011 (8)a	0.02 \pm 0.002 (7)a	n.o.
<i>E. bryani</i>	2	0.33 \pm 0.008 (10)a	0.07 \pm 0.002 (10)a	n.o.
<i>E. rubentis</i>	2	0.34 \pm 0.007 (6)a	0.09 \pm 0.002 (6)b	n.o.
<i>E. bryani</i>	3	0.67 \pm 0.013 (11)a	0.16 \pm 0.003 (11)a	3.7 \pm 0.17 (11)a
<i>E. rubentis</i>	3	0.76 \pm 0.020 (10)b	0.19 \pm 0.006 (10)b	2.6 \pm 0.17 (10)b

¹ Tip of mandible to posterior of dorsal cornu in mm.

² Greatest height in mm.

Potential for biological control.—Given that both species are facultatively gregarious (Reitz 1996a) and have relatively high fecundities (Gross and Rogers 1995, Reitz and Adler 1995), both species could be important biological control agents. Knipling (1992) considered *E. bryani* to be one of the most important parasitoids of *H. zea* and *H. virescens* and proposed a plan for using *E. bryani* to suppress these host populations. The possibility exists for using *E. rubentis* in a similar program against other pest noctuids. While host specificity is a desirable attribute of biological control agents (e.g. Greathead 1986), polyphagy is not necessarily a detrimental attribute, if a polyphagous parasitoid attacks several sympatric pest species (Ehler and van den Bosch 1974). The potential for using augmentative releases of *E. bryani* and *E. rubentis* would be further enhanced with continued refinement of *in vitro* rearing methods (Bratti and Nettles 1992). No one biological control agent is likely to manage a pest population completely, but if used properly, *E. bryani* offers an excellent opportunity to help manage *H. zea*, and *E. rubentis* offers a similar opportunity to help manage several other noctuid pests.

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A NEW SPECIES OF *MEZIRA* AMYOT AND SERVILLE (HETEROPTERA: ARADIDAE) FROM FLORIDA, WITH A KEY TO THE SMALL *MEZIRA* SPECIES OF AMERICA NORTH OF MEXICO

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Abstract.—*Mezira froeschneri* n. sp. is described from Florida. A key to the small *Mezira* species of America north of Mexico, including *M. froeschneri*, is provided.

Key Words: Heteroptera, Aradidae, *Mezira*, diagnostic key, *Mezira froeschneri*, North America

The aradid genus *Mezira* contains about 160 species worldwide (Kormilev and Froeschner 1987), nine of which occur in America north of Mexico (Froeschner 1988). Blatchley (1926) constructed a key to four species from eastern North America and Usinger (1936) for seven species from America north of Mexico, including those treated by Blatchley. Both authors used body length (5.5 mm or less, 6.5–7.0 mm or more) as a distinguishing character in the first couplet of their keys; those species 5.5 mm or less were *M. granulata* (Say) and *M. novella* Blatchley.

Two species have been added to the fauna of America north of Mexico since Usinger's (1936) key. Kormilev (1982a) described *M. smithi*, which is 6.6 mm long, and (1982b) *M. sayi*, which is 5.3 mm long in males, 6.45 mm in females. He (1982b) also provided a key to the small (5.3–6.45 mm) species of *Mezira* (i.e., *M. granulata*, *M. novella*, and *M. sayi*). Here we describe *M. froeschneri*, a small species from Florida, and include a key to these four species.

KEY TO THE SMALL *MEZIRA* SPECIES OF AMERICA NORTH OF MEXICO

1. Genae forming notch anterior to clypeus (Fig.

1); pronotum subrectangular (Fig. 3); pygophore in lateral view angulate apically, slightly rounded posteroventrally (Fig. 5), in dorsal view with median longitudinal ridge reaching apex (Figs. 7, 11); female in dorsal view with paratergite 9 usually exceeding tergite 9 by at least half width of paratergite 9 (Fig. 12), genitalia in ventral view with pair of median, shallow longitudinal grooves that are parallel throughout length (Fig. 15)

. *M. froeschneri*, n. sp.

– Genae with or without notch anterior to clypeus (Fig. 2); pronotum subtrapezoidal (Fig. 4); pygophore in lateral view broadly rounded posteriorly (Fig. 6), in dorsal view with median longitudinal ridge not reaching apex (Figs. 8–10); female in dorsal view with paratergite 9 usually exceeding tergite 9 by less than half width of paratergite 9 (Fig. 13) or paratergite 9 not exceeding tergite 9 (Fig. 14), genitalia in ventral view with pair of median, shallow longitudinal grooves that diverge anteriorly (Fig. 16) 2

2. Scutellum with lateral margins of median longitudinal ridge carinate; pygophore with median longitudinal ridge greater than 90% of length of tuberculate area, tuberculate area with anterolateral region expanded into broad lobe (Fig. 8) *M. novella*

– Scutellum with lateral margins of median longitudinal ridge rounded, irregular, often obscured by tubercles; pygophore with median longitudinal ridge less than 90% of length of tuberculate area, tuberculate area with antero-

- lateral region not expanded into broad lobe (Figs. 9, 10) 3
3. Body with long, thick, erect setae; pygophore with median longitudinal ridge averaging 84% length of tuberculate area (Fig. 9); paratergite 8 with maximum width averaging 1.2 times length of tuberculate area beyond median longitudinal ridge (Fig. 9); parameres as in Figs. 17–20 *M. granulata*
- Body with short, thin, appressed setae, each seta curving around associated tubercle; pygophore with median longitudinal ridge averaging 77% of length of tuberculate area (Fig. 10); paratergite 8 with maximum width averaging 0.8 times length of tuberculate area beyond median longitudinal ridge (Fig. 10); parameres as in Figs. 21–24 *M. sayi*

**MEZIRA FROESCHNERI DAVIDOVÁ-VILÍMOVÁ,
TAYLOR, AND MCPHERSON, NEW SPECIES**
(Figs. 1, 3, 5, 7, 11–12, 15, 25–29;
Table 1)

Ground color brown to brownish black, often with scattered darker areas, particularly dorsally. Dorsal surface with sclerotized areas tuberculate; occasional larger, black tubercles also present, most frequently limited to lateral margins, but may be scattered elsewhere on sclerotized areas. Appressed setae present, most numerous dorsally, each seta curving around associated tubercle.

Head (Fig. 1) with clypeus elevated medially. Genae exceeding clypeus, producing V-shaped notch; each gena broadly lobe-shaped. Antenniferous tubercle well developed, acute apically, directed anterolaterally, extending half the length of antennal segment 1. Postocular tubercle well developed, posterior margin carinate. Vertex elevated. Antennae with segment 1 broadest, distinctly clavate; segment 2 clavate; segment 3 elongate, clavate; segment 4 clavate, subacute apically with conspicuous setae. Ventrally, atrium present anterior to and continuous with rostral groove, atrium narrowed medioventrally. Rostral groove distinct, wide, with lateral margins subparallel in middle half, converging anteriorly and posteriorly. Rostrum reaching posterior margin of rostral groove.

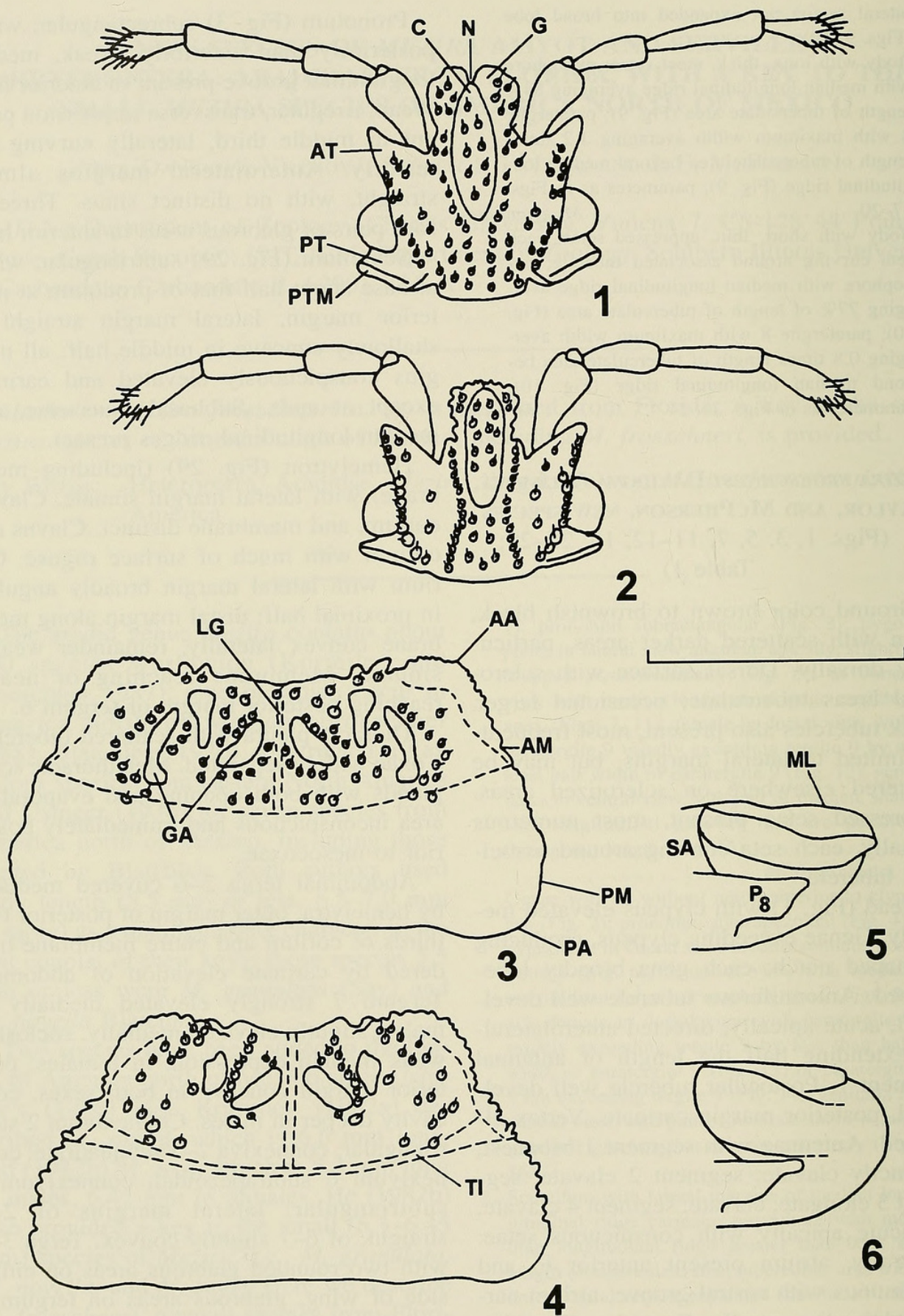
Pronotum (Fig. 3) subrectangular, wider posteriorly than anteriorly. Weak, median longitudinal groove present in anterior half. Weak, irregular, transverse impression present in middle third, laterally curving anteriorly. Anterolateral margins almost straight, with no distinct sinus. Three to four pairs of glabrous areas in anterior half.

Scutellum (Fig. 29) subtriangular, width at base about half that of pronotum at posterior margin, lateral margin straight to shallowly concave in middle half; all margins conspicuously elevated and carinate except at apex. Subbasal transverse, and median longitudinal, ridges present.

Hemelytron (Fig. 29) (including membrane) with lateral margin sinuate. Clavus, corium, and membrane distinct. Clavus and corium with much of surface rugose. Corium with lateral margin broadly angulate in proximal half; distal margin along membrane convex laterally, remainder weakly sinuate. Membrane reaching or nearly reaching posterior margin of tergum 6.

Thoracic pleura with scattered tubercles. Coxae widely separated. Metathoracic scent glands with both opening and evaporative area inconspicuous and immediately posterior to mesocoxae.

Abdominal terga 2–6 covered medially by hemelytra, outer margin of posterior two thirds of corium and entire membrane bordered by carinate elevation of abdomen. Tergum 7 strongly elevated medially in males; slightly elevated medially, enclosing weak median depression, in females; posterior margin concave in both sexes, concavity deeper in males. Connexivum 2 subtriangular; connexiva 2–5 subquadrate; connexivum 6 subtrapezoidal; connexivum 7 subtriangular; lateral margins of 2–5 straight, of 6–7 slightly convex. Terga 3–6 with two rounded glabrous areas on either side of wing, glabrous areas on tergum 7 indistinct; connexiva 2–7 each with two rounded glabrous areas (connexivum 7 with only one glabrous area in females). Venter moderately convex. Spiracles 2–8 ventral, conspicuous; 2–6 equidistant from lateral



Figs. 1-6. 1, 3, 5, *Mezira froeschneri*. 1, Head. 3, Pronotum (representative tubercles shown only on anterior lobe). 5, Pygophore, lateral view. 2, *M. granulata*, head. 4, 6, *M. sayi*. 4, Pronotum (representative tubercles shown only on anterior lobe). 6, Pygophore, lateral view. Scale: 1.0 mm for all figs. Abbreviations: AA = anterolateral angle of pronotum, AM = anterolateral margin of pronotum, AT = antenniferous tubercle, C = clypeus, G = gena, GA = glabrous area, LG = longitudinal groove on pronotum, ML = median longitudinal

margin, 7 closer, 8 almost lateral in position and markedly smaller.

Male external genitalia: Pygophore (Figs. 5, 7, 11) smooth anteriorly, tuberculate posteriorly, usually only tuberculate area visible. Tuberculate area higher than smooth area at junction; anterior border with median notch, bisinuate each side of midline with submedian notch. Elevated, median, longitudinal ridge reaching apex of pygophore, narrower anteriorly, broader posteriorly, divided by longitudinal line that apparently represents junction of medial margins of parandria. Pair of broad submedian grooves, each originating mesad of submedian notch, paralleling median ridge, diverging posteriorly. Pygophore, in lateral view, angulate apically, slightly rounded posteroventrally (Fig. 5); smooth area, dorsally, with large central external opening (Fig. 11) surrounding anal cone (segments 10 + 11) and parameres (Fig. 7); posteriorly, median expansion present with submedian excavation each side (Fig. 11), expansion comprised of two subtriangular plates; small setae present dorsolaterally on outer surface and on rim of external opening. Each paramere inserted in lateral excavation; parameres cover phallus in resting position.

Paramere (Figs. 25–28) with base narrower than peduncle, widening to hypophysis. Base with conspicuous, sharp, longitudinal flange. Peduncle with longitudinal, rugose, wide carina on medial surface, longitudinal fold on posterior surface. Hypophysis trilobate in dorsal view (Fig. 7); lateral lobe low in anterior (Fig. 28) and posterior (Fig. 25) views, rounded in dorsal view (Fig. 7); median lobe subtruncate in posterior view, lower angle acute; anterior lobe most apical, rounded; peduncle with setae on anteromedial surface just below anterior lobe (Figs. 26–28).

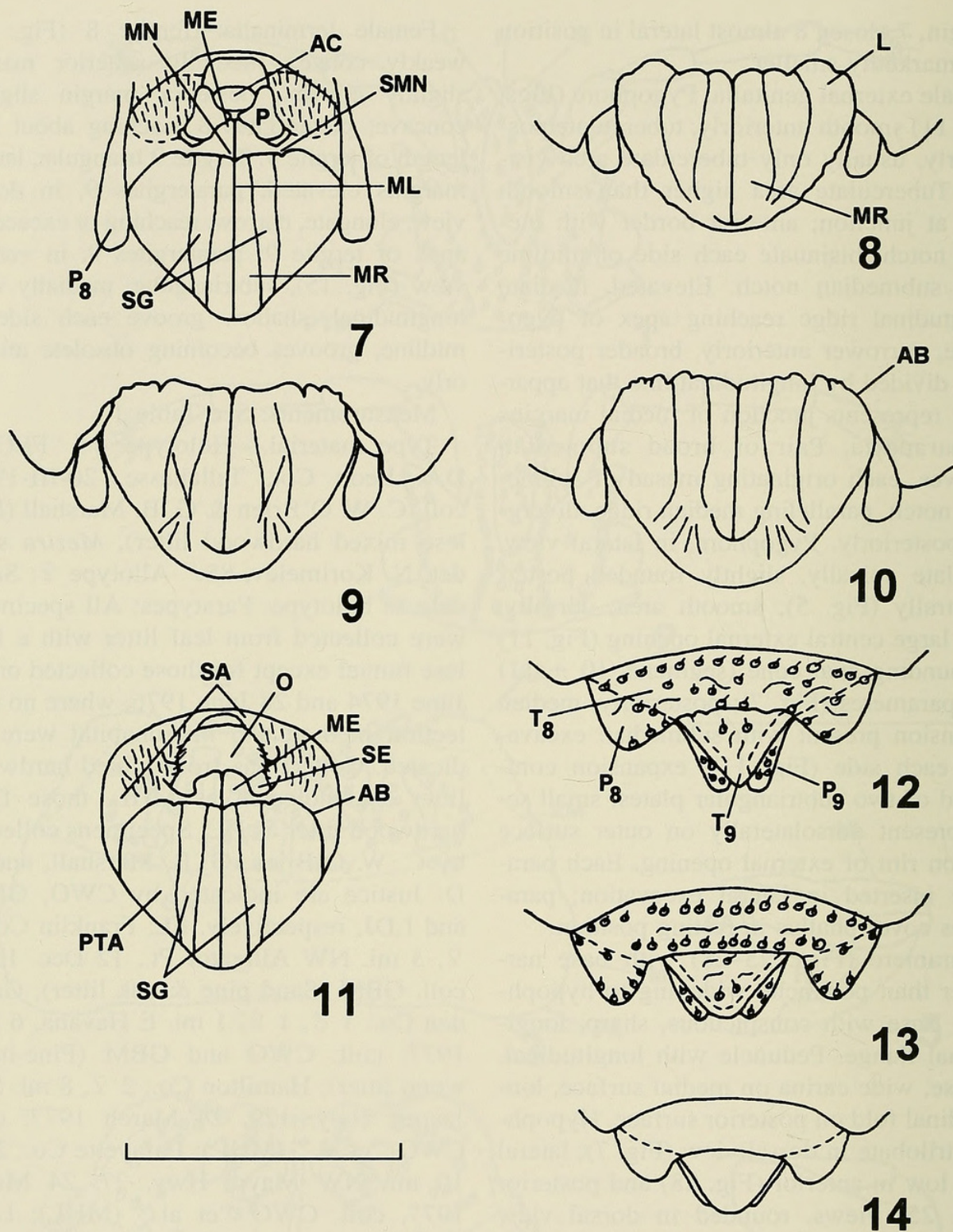
Female terminalia: Tergite 8 (Fig. 12) weakly convex medially, anterior margin slightly convex, posterior margin slightly concave; paratergites 8 reaching about half length of tergite 9. Tergite 9 triangular, lateral margins elevated; paratergites 9, in dorsal view, elongate, narrow, reaching or exceeding apex of tergite 9; paratergites 9, in ventral view (Fig. 15), subtriangular, medially with longitudinal, shallow groove each side of midline, grooves becoming obsolete anteriorly.

Measurements: See Table 1.

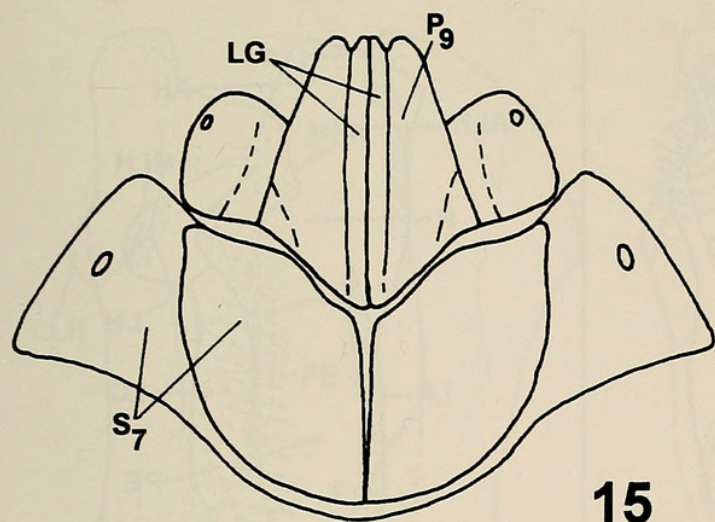
Type material.—Holotype ♂: “FLORIDA: Leon Co., Tallahassee, 20-III-1976, coll. C. W. O’Brien & G. B. Marshall (Berlese mixed hardwood litter), *Mezira* sp.?, det. N. Korimelev, 85.” Allotype ♀: Same data as holotype. Paratypes: All specimens were collected from leaf litter with a Berlese funnel except for those collected on 12 June 1974 and 28 June 1976, where no collection method and microhabitat were indicated. Collections from mixed hardwood litter are indicated as MHL, those from hardwood litter as HL. Specimens collected by C. W. O’Brien, G. B. Marshall, and L. D. Justice are indicated by CWO, GBM, and LDJ, respectively. FL: Franklin Co.: 2 ♀, 3 mi. NW Alligator Pt., 12 Dec. 1975, coll. GBM (Sand pine & oak litter); Gadsden Co.: 1 ♂, 1 ♀, 1 mi. E Havana, 6 Jan. 1977, coll. CWO and GBM (Pine-hardwood litter); Hamilton Co.: 2 ♀, 8 mi. S of Jasper, Hwy. 129, 24 March 1977, coll. CWO “et al.” (MHL); Lafayette Co.: 2 ♀, 10 mi. NW Mayp, Hwy. 27, 24 March 1977, coll. CWO “et al.” (MHL); Leon Co.: Tallahassee: 1 ♂, 4 Feb. 1976, coll. GBM (HL); 1 ♂, 6 ♀, 16 Feb. 1976, coll. CWO (HL); 3 ♀, 4 March 1976, coll. GBM (HL); 1 ♀, 5 March 1976, coll. LDJ (HL); 3 ♂, 1 ♀, 20 March 1976, coll. CWO and

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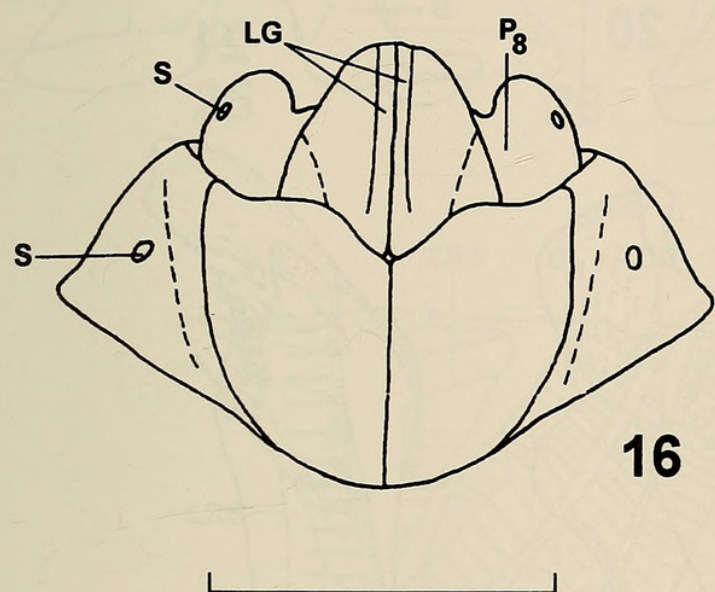
line on pygophore, N = notch, P₈ = paratergite 8, PA = posterolateral angle of pronotum, PM = posterolateral margin of pronotum, PT = postocular tubercle, PTM = posterior margin of postocular tubercle, SA = anterior smooth area of pygophore, TI = transverse impression on pronotum.



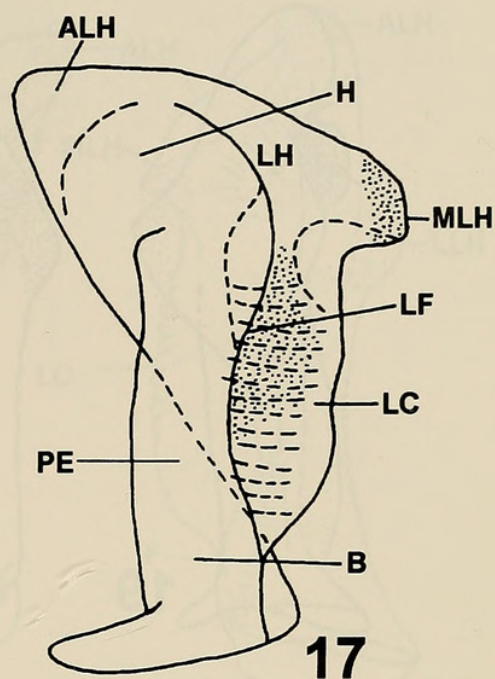
Figs. 7-14. 7, 11, 12, *Mezira froeschneri*. 7, 11, Pygophore, dorsal view. 12, Female terminalia, dorsal view. 8, 14, *M. novella*. 8, Pygophore, dorsal view. 14, Female terminalia, dorsal view. 9, 13, *M. granulata*. 9, Pygophore, dorsal view. 13, Female terminalia, dorsal view. 10, *M. sayi*, pygophore, dorsal view. Scale: 1.0 mm for all figs. Abbreviations: AB = anterior border of tuberculate area of pygophore, AC = anal cone, L = lobe of tuberculate area of pygophore, ME = median expansion of smooth area of pygophore, ML = median longitudinal line on pygophore, MN = median notch of pygophore, MR = median longitudinal ridge on pygophore, O = external opening of pygophore, P₈ = paratergite 8, P₉ = paratergite 9, P = paramere, PTA = posterior tuberculate area of pygophore, SA = anterior smooth area of pygophore, SE = submedian excavation of pygophore, SG = submedian groove on pygophore, SMN = submedian notch of pygophore, T₈ = tergite 8, T₉ = tergite 9.



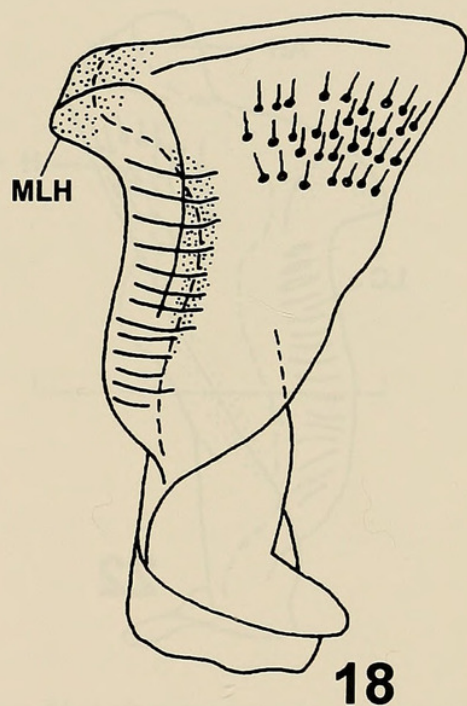
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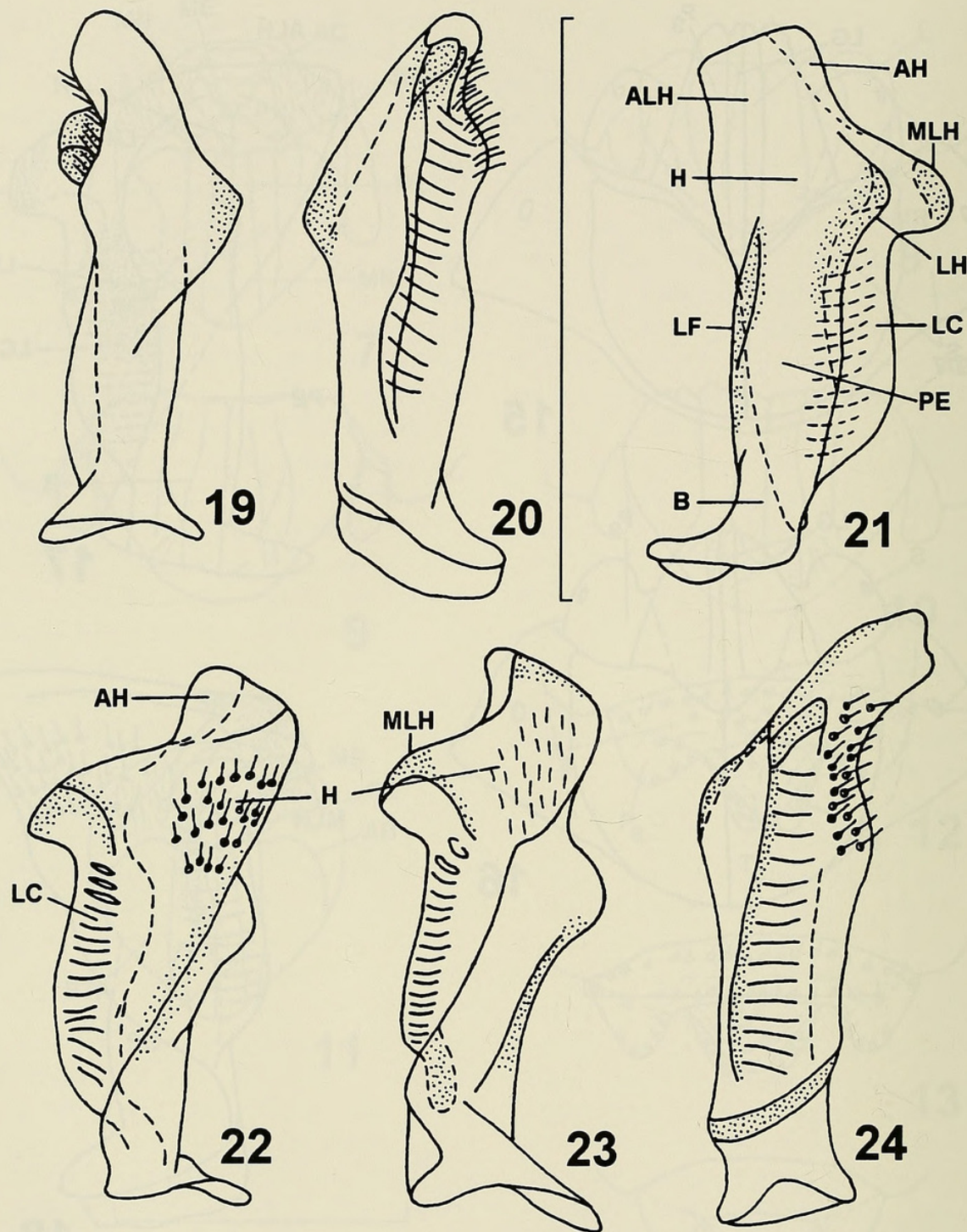
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Figs. 15–18. 15, *Mezira froeschneri*, female terminalia, ventral view. 16–18, *M. granulata*. 16, Female terminalia, ventral view. 17, Left paramere, posterior view. 18, Left paramere, anterior view. Scale: 1.0 mm for Figs. 15, 16; 0.25 mm for Figs. 17, 18. Abbreviations: ALH = apical lobe of hypophysis, B = base, H = hypophysis, LC = longitudinal carina on peduncle, LF = longitudinal fold on peduncle, LG = median longitudinal groove on segment 9, LH = longitudinal fold on hypophysis, MLH = median lobe of hypophysis, P₈ = paratergite 8, P₉ = paratergite 9, PE = peduncle, S₇ = sternite 7, S = spiracle.

GBM (MHL); 6 ♂, 3 ♀, 2 April 1976, coll. CWO and GBM (MHL); 1 ♂, 5 ♀, 20 April 1976, coll. CWO and LDJ (MHL); 5 ♂, 8 ♀, 28 June 1976, coll. GBM and LDJ; 1 ♂,

2 ♀, 27 Oct. 1976, coll. LDJ (MHL); 1 ♂, 2 ♀, 6 Dec. 1976, coll. GBM (MHL).

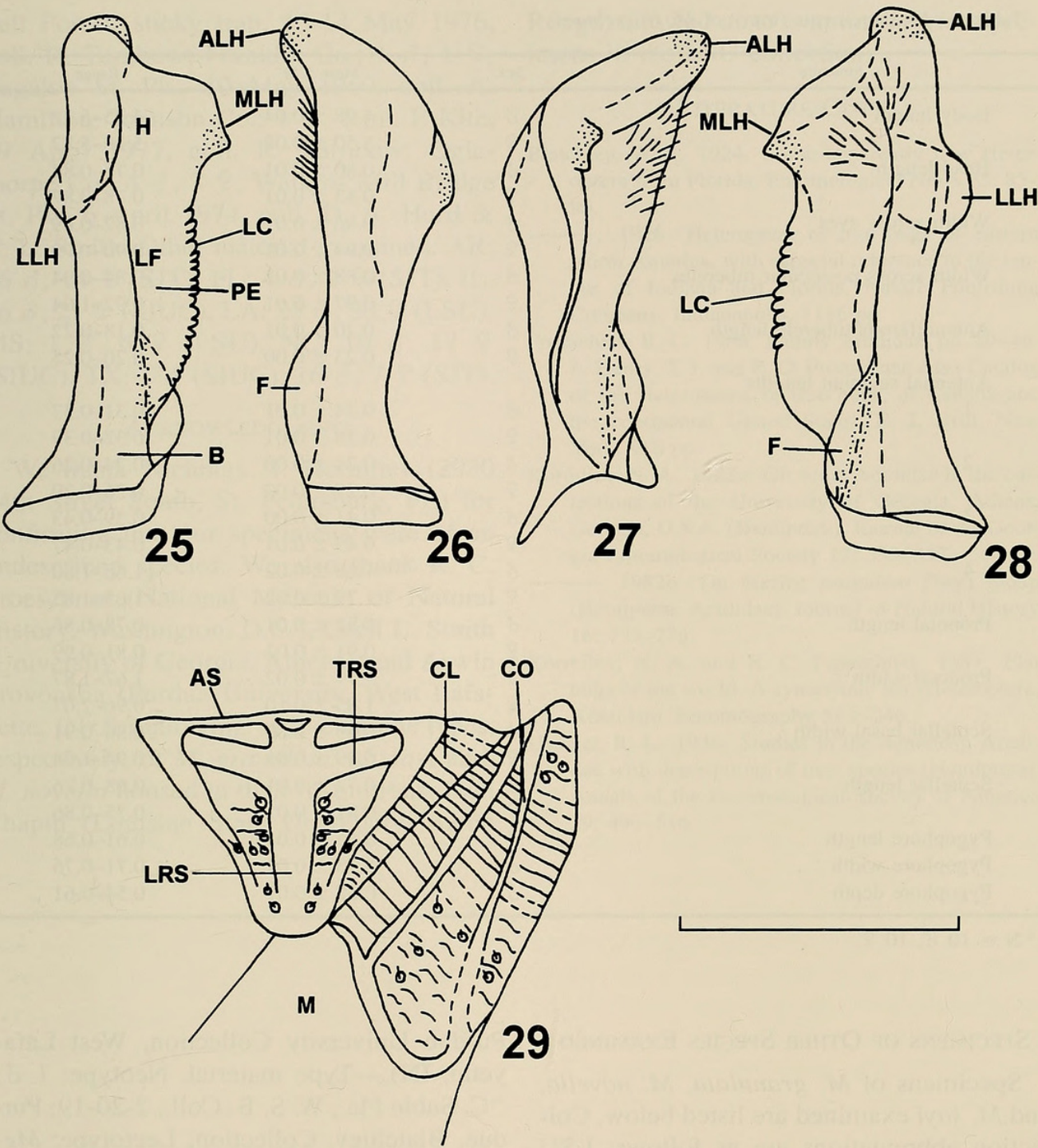
The holotype and allotype will be deposited in the National Museum of Natural



Figs. 19-24. Left parameres. 19, 20, *Mezira granulata*. 19, Anterolateral view. 20, Posteromedial view. 21-24, *M. sayi*. 21, Posterior view. 22, Anterior view. 23, Anterolateral view. 24, Posteromedial view. Scale: 0.5 mm for all figs. Abbreviations: AH = lightly pigmented area of hypophysis, ALH = apical lobe of hypophysis, B = base, H = hypophysis, LC = longitudinal carina on peduncle, LF = longitudinal fold on peduncle, LH = longitudinal fold on hypophysis, MLH = median lobe of hypophysis, PE = peduncle.

History, Washington, DC (NMNH). Paratypes will be deposited in the NMNH; Department of Entomology Museum, University of Georgia, Athens; Florida State Collection of Arthropods, Gainesville; Purdue Entomological Research Collection, Purdue

University, West Lafayette, Indiana; Snow Entomological Museum, University of Kansas, Lawrence; Louisiana State University Insect Collection, Louisiana State University, Baton Rouge; Department of Entomology, California Academy of Sciences,



Figs. 25–29. *Mezira froeschneri*. 25, Left paramere, posterior view. 26, Left paramere, anterolateral view. 27, Left paramere, posteromedial view. 28, Left paramere, anterior view. 29, Scutellum and base of wing. Scale: 1.0 mm for Fig. 29; 0.25 mm for Figs. 25–28. Abbreviations: ALH = apical lobe of hypophysis, AS = anterior margin of scutellum, B = base, CL = clavus, CO = corium, F = flange of base, H = hypophysis, LC = longitudinal carina on peduncle, LF = longitudinal fold on peduncle, LLH = lateral lobe of hypophysis, LRS = longitudinal ridge on scutellum, M = membrane, MLH = median lobe of hypophysis, PE = peduncle, TRS = transverse ridge on scutellum.

San Francisco; and the Entomology Collection, Southern Illinois University at Carbondale.

Other material examined.—FL: Santa Rosa Co.: 1 ♀ (originally as a paratype of

M. sayi), 10.5 mi. NW Holt, Big Juniper River, 12 June 1974, coll. D. A. Hurd.

Etymology.—This species is named in honor of the American heteropterist, R. C. Froeschner.



Vilímová, Jitka, Taylor, Steven J., and Mcpherson, J E. 1996. "A new species of *mezira amyot* and *serville* (heteroptera: aradidae) from Florida, with a key to the small *mezira* species of america north of Mexico." *Proceedings of the Entomological Society of Washington* 98, 630–639.

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