

New species of *Hydrellia*
(Diptera: Ephydriidae)
from the southern United States

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Abstract

Five new species of *Hydrellia* Robineau-Desvoidy are described from localities in Alabama, Florida, Louisiana, and Texas. *H. alabamae*, n. sp. was first collected on water primrose in northern Alabama and later in northern Florida on *Nuphar* and *Nymphoides*. At present, there is no indication about potential host-plant species. *H. naiadis*, n. sp. was reared from *Najas guadalupensis* (Spreng) Morong in northern Florida and later collected throughout the state and also in southeastern Texas. *H. apalachee*, n. sp., first collected in northern Florida and later in northern Alabama, is unique among described *Hydrellia* in having a bivittate mesonotum. Thus far, no host-plant species is known for this species. *H. limnobii*, n. sp. was first reared from *Limnobium spongia* (Bosc) Richard (frogbit) in 1986 at the Florida Biological Control Laboratory and has since been collected throughout the state as well as in southern Louisiana and southeastern Texas. The last species, *H. pontederiae*, n. sp., with males 4.00 mm and females 4.80 mm long, is the largest species in the genus as known by me; it has been reared from *Pontederia cordata* Linnaeus, but only one specimen (a female) has been collected in the field.

Introduction

The genus *Hydrellia* Robineau-Desvoidy is presently the largest in the family Ephydriidae. One of the not so obvious reasons for this is the endophytophagous parasite-host plant relationship. In this kind of relationship, the greater intimacy probably presents many more selective factors to both the parasitic insect and the host plant than in most ectophytophagous situations. The ecological role of members of this genus was discussed by Deonier (1971) and although considerable host-plant data has been compiled, the number of species for which the immature stages and complete life histories have been described remains small. Since Cresson's last publication on *Hydrellia* (1948), the following important taxonomic publications have appeared on *Hydrellia*: Palaeartic and Oriental Regions: Dahl (1959, 1964, 1968, and 1972), Canzoneri (1975), Canzoneri and Meneghini (1976 and 1985), Papp (1975, 1979), Deonier (1978, 1993), Miyagi (1977), Fan *et al* (1983), Narchuk (1988), Vitte (1990), and Zatwarnicki (1984 and 1992); Ethiopian Region: Deeming (1977); Australasian Region: Ferino (1968), Bock (1990); Nearctic Re-

gion: Deonier (1971); and Neotropical Region: Lizzaralde de Grosso (1989). Among these, only Deonier (1971) attempted to monograph the taxonomy of adults and immatures and their ecology for a zoogeographic region; most publications covered a small number of new species of *Hydrellia* or consisted of faunal listings. Bock (1990) covered the major Australian collections to describe 10 new species in addition to 5 previously described Australian species. Zatwarnicki (1990) presented a new classification of Ephydriidae based upon his phylogenetic reconstructions. In this, he proposed the subfamily designation Hydrelliinae Robineau-Desvoidy, 1830 to replace Notiphilinae. This priority-based decision is predicated on present indications that Robineau-Desvoidy 1830 with his use of the tribe "Hydrellideae" was the first to use this name for a suprageneric taxon. Becker (1896) proposed the subfamilies Hydrellinae (sic) and Notiphilinae to dissociate several related genera. Zatwarnicki's reconstruction also moves Parydrini into the Ephydrinae, groups *Ochthera* together with Discocerini, Gymnomyzini, Gastropini, Hecamedini, and Lipochaetini in the new subfam-

ily Gymnomyzinae and in general proposes many changes from the classification used by Cresson (1922) and Deonier (1964). This study is the culmination of an intensive 3-year collection and survey effort for the Southeastern and South Central regions of the United States.

Methods

Although the methods used in this study are similar to those in Deonier (1971 and 1978), entire specimens were boiled in 5-10% KOH solution for about 10 minutes to remove soft internal tissues and then cleared by adding several drops of 3% H₂O₂ to hot, but no longer boiling solution. In most cases, this process, after neutralization with glacial acetic acid and boiling in 95% ethanol for about 1 minute to remove all gas bubbles from the abdomen, yielded pale straw-colored specimens in which internal structures such as gonial arches, phallapodeme, etc. could be viewed clearly in a drop of glycerol in a cavity slide under a compound microscope. All illustrations were made with an ocular grid and graph paper under stereoscopic dissecting and compound microscopes. All scales are in parts of 1 mm. The most frequently used measurements and indices are defined as follows: *Body length*= Distance between most prominent part of face and posterior end of abdomen as measured in lateral view and as if head and abdomen were aligned horizontally. *Color*= Descriptions of color apply to views perpendicular to the sclerite concerned unless otherwise stated. Color designations are according to the ISCNBS method. *Wing length*= Distance between apex of the tegula and the wing tip. *Epistomal index*= Quotient of the epistomal width, or breadth, divided by minimum interocular distance on the face. *Mesofacial index*= Quotient of the mesofacial height, as measured from epistoma to ptilinal suture, divided by the minimum interocular distance on the face. *Ocular index*= Quotient of the nearly vertical ocular height divided by the subocular height. *Subcranial index*= Quotient of the subcranial cavity width, or breadth, divided by the width of the anteclypeus (clypeus of some authors). *Vertex index*= Quotient of the vertex width, or breadth, as measured between compound eyes at level of lateral ocelli, divided by the antecellar distance (between median ocellus and ptilinal suture along frontal midline). Depositories for type material are: National Museum of Natural History (USNM) for all holotypes and some paratypes of each species and the Florida State

Collection of Arthropods (FSCA) for all remaining paratypes. A taxonomic key for these species has not been provided, but these species will be keyed in a future generic revision.

Hydrellia alabamiae, n. sp. (Figs. 1-5)

Hydrellia prudens Curran (in part); misident. Deonier, 1971, p. 91: 1 male from Mississippi.

Hydrellia surata Deonier (in part); misident. Deonier 1971, p. 98: 2 females from Florida and 3 males, 28 females from Mississippi.

Diagnosis. Maxillary palpus dark-brown or black, cleaver-shaped; antenna velvety black or dark grayish-brown except light-brown pruinosity dorso-apically on antennomere 2, antennomere 3 with dense brown dorsomedial micropubescence; 5-8 (usually 6) dorsal arisal rays; lower 0.5 of face protuberant and sparsely to densely silvery pruinose in contrast to light-brown pruinose upper face; 4-5 primary facial setae in 1 row and 2-6 in lateral row with usually 1 downcurved upper secondary facial setula; body mostly olive-brown with dense light yellowish-brown (golden brown) or light grayish-brown pruinosity; anterior notopleural inserted about 0.3 notopleuron length posteriad from anterior notopleural angle; male mesotibia expanded or dilated (about 2.5 X diameter of protibia); costal sections II and III subequal. Male length 1.15-1.40 mm; female 1.19-1.60 mm. Male postabdomen as in Figs. 1-2; female postabdomen as in Figs. 3-5.

Description. Head: Face, in anterior view, with lower 0.5 centrally protuberant and sparsely to densely silvery pruinose in contrast to light-brown pruinose upper 0.5 upper 0.5 with median carina blending into lower facial protuberance; antennal foveae fairly distinct; epistoma mostly slightly to distinctly squarely recessed in anterior view; parafaciale narrow, but flaring somewhat ventrally before gena; 4-5 primary facial setae in 1 row and 2-6 primary facial setae in lateral row contiguous to parafaciale with usually 1 decurved secondary facial setula above inner primary row; antenna velvety black or dark grayish-brown except light-brown pruinosity dorso-apically on antennomere 2; antennomere 3 with dense brown dorsomedial micropubescence; 5-8 (usually 6) dorsal arisal rays; frontal vitta and parafrontalia scarcely differentiated, with moderately dense light-brown pruinosity over dark-gray and steeply sloping in profile; fronto-

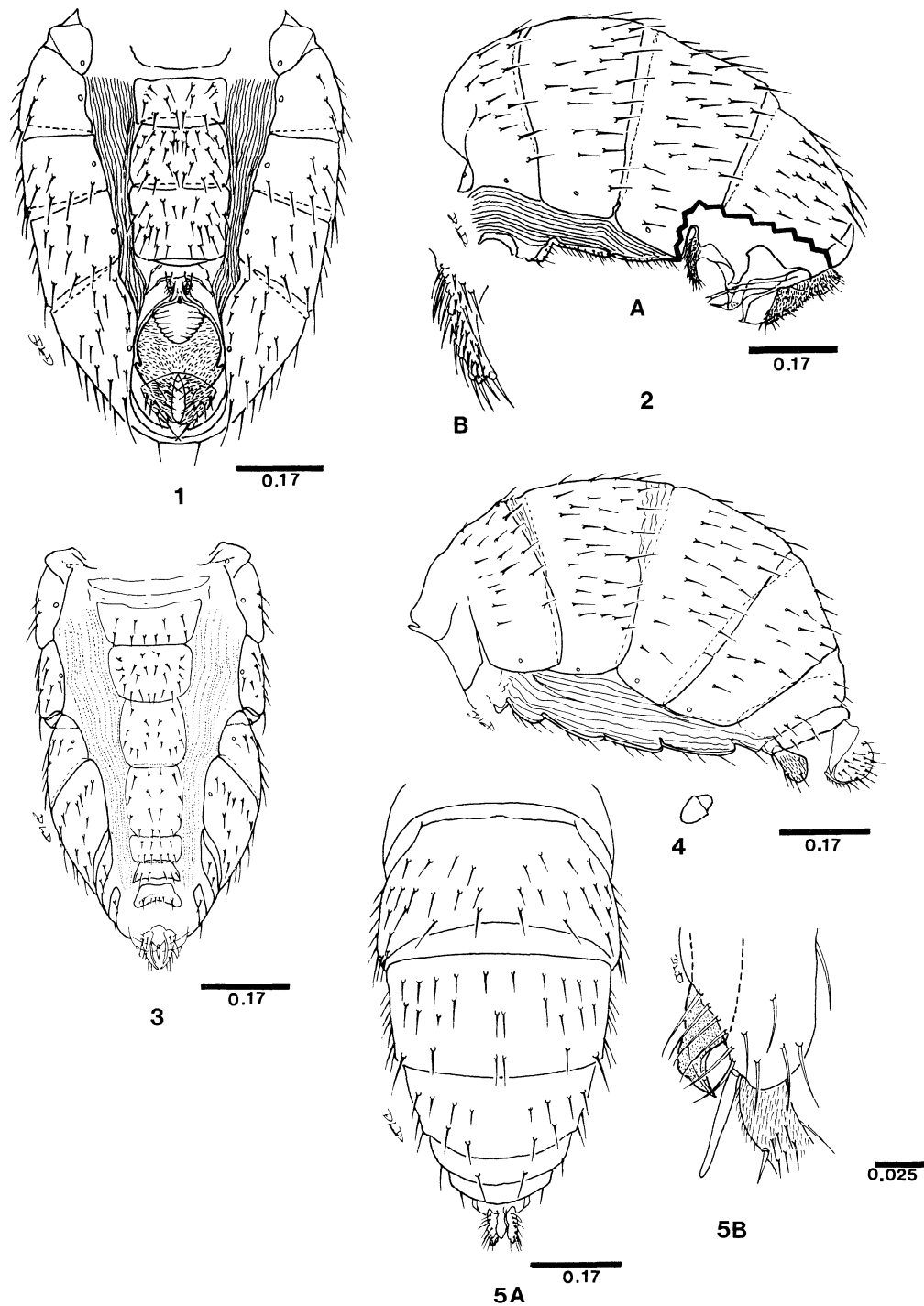


Figure 1-5. *Hydrellia alabamiae*, n.sp. 1. Male abdomen, ventral view. 2A. Same, left lateral view. 2B. Copulobus, enlarged, left lateral view. 3. Female abdomen, ventral view. 4. Same, left lateral view. 5A. Same, dorsal view. 5B. Right male mesotibia with translucent, falciform ventral preapical microcalcarium, or spur, posterior view.

orbital area concolorous with parafrontale and parafaciale; posterior fronto-orbital seta mostly posterolatero-clinate and 1.5-2.0 times as long as anterior seta; 20-30 postocular setae, with 1 fairly regular row near orbit of 12-16 setae; maxillary palpus dark-brown or black, cleaver-shaped. Epistomal index 1.2-1.6; mesofacial index 1.3-1.9; vertex index 4.0-5.5; ocular index 5.0-7.0; subcranial index 1.5-2.7; head width/head height 1.1-1.4.

Thorax: Postpronotum and mesonotum mostly densely light yellowish-brown pruinose over dark grayish-brown (olive brown) with slight reddish overtone (L. Alto, Florida population with light grayish-brown pruinosity) in dorsolateral view, semiglossy in posterodorsal view; pleuron semiglossy light grayish-brown pruinose (slightly lighter than mesonotum; appearing bronzed) 3 antesutural (O macrochaetous) and 2 postsutural (1 macrochaetous) dorsocentral setae; anterior notopleural seta inserted about 0.3 length of notopleuron from anterior notopleural angle; 1 mesokatepisternal seta (macrochaetous); legs except tarsi sparsely light grayish-brown pruinose over dark-brown; tarsi brown or reddish-brown dorsally except yellow tarsomere 1 (basitarsus) of meso and metatarsi; male mesotibia conspicuously expanded or dilated (about 2.5X diameter of protibia) and equipped with translucent falciform ventral preapical microcalcarium, or spur (Fig. 5B). Wing length 1.10-1.55 mm; wing veins light yellowish-brown; 5-7 dorsal and 6-9 anterior interfractural costal setae; costal section indices: II/I 1.4-2.1; III/IV 2.5-3.8; V/IV 3.0-4.2; M_{1+2} index 1.6-1.9.

Abdomen: Terga light-brown pruinose over dark grayish-brown (L. Alto, Florida population more nearly light-gray pruinose); terga semiglossy in posterodorsal view. Male postabdomen: sternum 5 composed of 2 narrowly separated, posteriorly directed microspinulose copulobi; anteromedial part of sternum 5 forming thin connection between copulobi and projecting laterally beyond each copulobus in ventral view. Pregonite mostly concealed in ventral view above larger, exposed postgonite; postgonite arm curved anteromedially with conspicuous, nearly straight, anteriorly directed postgonite uncus very near copulobus; distiphallus scarcely differentiated, bluntly rounded except for short median papilla, not projecting to copulobi in ventral or lateral views; phallapodeme, in lateral view, forming steeply angled finlike process as high as long with small flattened dorsal condyle. Fused surstyli widely and deeply concave anteromedially (to nearly midlength); this concave

margin bearing several inwardly directed microsetulae; fused surstyli length: cercus length 1.5: 1. Syntergum 9+10 rounded posteriorly and mostly concealed. Female postabdomen: sternum 8, in ventral view, subequal in width to sterna 5-7; sternum 8 appearing longer than 7 in lateral view, subequal in length in ventral view; sternum 5 subequal in length to combined lengths of 6, 7, and 8; cercus, in lateral view, obovoid, rounded posteriorly, and about 1.3 times as wide as long. Ventral receptacle cupuliform, about 1.3 times as deep as wide.

Etymology. The specific epithet, *alabamae*, is used to denote the state in which this species was first discovered.

Type. Holotype male, USNM.

Type-locality. Alabama: Marshall Co: L. Guntersville, Stewart Pond (VIII-3-1990, D. L. Deonier, on water primrose).

Paratypes. ALABAMA: Marshall Co: L. Guntersville, Stewart Pond (VIII-3-1990, D. L. Deonier, on water primrose), 6 males, 11 females; (VIII-3-1990, D. Murphy, on water primrose), 1 male, 10 females. FLORIDA: Alachua Co: L. Alto, mainly Santa Fe Canal (VII-7-1992, D. L. Deonier, *Nuphar* and *Nymphoides* in grass by power vac), 14 males, 8 female L. Alto, E.+ N. shores (VII-7-1992, D. L. Deonier, on *Nuphar* and *Nymphoides* in grass), 10 males, 15 females; L. Alto, N.+ W. shores (VII-7-1992, D. L. Deonier, power vac from *Nuphar* and *Nymphoides* in grass), 6 males, 42 females; L. Alto, N.+ E. shores (VII-7-1992, D. L. Deonier, on *Nuphar* and *Nymphoides* in grass), 1 male; L. Alto, E.+ N. shores (V-5-1993, D. L. Deonier, on *Nuphar* and *Nymphoides* in grass), 77 males, 132 females; L. Alto, E. shore (V-6-1993, D. L. Deonier, on *Nuphar* and *Nymphoides* in grass), 153 males, 168 females; L. Alto, Santa Fe Canal (V-6-1993, D. L. Deonier, on *Nuphar* nr. grass), 60 males, 159 females; (V-7-1993, D. L. Deonier, on *Nuphar* nr. grass), 84 males, 100 females; Walton Co: DeFuniak Springs, (VIII-1-1962, D.L. Deonier), 2 females (USNM). MISSISSIPPI: Gravel pit at Hattiesburg (VI-30-1962, D.L. Deonier), 1 male, (VI-30-1962, J. Ainsworth), 11 females (USNM, ISC, and DLD); Lake Shady, Lamar County (VI-29-1962, D.L. Deonier), 2 males, 5 females (USNM); Lake Shelby State Park, Forrest County, 31° 9' N, 89° 14.6' W (VII-24-1962, D.L. Deonier), 1 male, 12 females (USNM).

Remarks. This species is a member of the *H. prudens* speciesgroup and has several characters which appear in shape, measurement, etc. midway between *H. surata* Deonier and *H. columbata*

Deonier. At present, the only clue as to any hostplant species is that this species was originally collected on water primrose (*Ludwigia repens* Forster) and this plant has been present (not necessarily abundant) at all other collection sites. In over 10 field observations, adults of this species exhibited face-touching or antenna-touching behavior first observed in *H. columbata* Deonier (1971). Three specimens infected with Laboulbeniales fungi were collected at Lake Alto, Alachua Co., Florida (V-5 +7-1993).

Hydrellia najadis, n. sp.
(Figs. 6-11)

Diagnosis. Maxillary palpus dark-yellow to orange, somewhat triangular, or spatulate; antenna dark-brown, antennomere 3 with pale micropubescence; 5-7 (usually 6) dorsal arisal rays; mesofacial index 2.4-2.9; face only slightly convex in profile, not roundly bulging on lower 0.3 as in *H. griseola*; tarsi mostly yellowish-brown, except metatarsomeres 2-4 moderate brown to reddish-brown dorsally; costal section II/I 1.8-2.4; abdominal tergal setosity conspicuously glossy black, denser, and more nearly erect than in most other members of *griseola* species group; male abdominal sternum 3 with conspicuous midventral carina (keel) somewhat semicircular in lateral view, sternum 2 often with slight midventral elevation; male abdomen roundly truncate posteriorly. Male length 1.66-2.00 mm; female 1.76-2.40 mm. Male postabdomen as in Figs. 6-8; female postabdomen as in Figs. 9-11.

Description. Head: Face, in anterior view, light-yellow, yellowish-brown, or silvery pruinose; lunule lighter than face, often light (silvery) gray; very shallow antennal foveae and very slight median carina sometimes apparent on upper 0.3 of face; epistoma shallowly concave in anterior view; parafaciale narrow, unilinear, light-gray blending to light-yellow pruinose on upper 0.3; 4-6 primary facial setae; 0-1 secondary facial setula above primary row antenna mostly dark-brown pruinose with antennomere 3 bearing pale dorsomedial micropubescence; 5-7 (usually 6) dorsal arisal rays; frontal vitta moderately sloping with semiglossy dark-brown spots and sparse light brown pruinosity; parafrontale dark-brown or dark-gray pruinose; fronto-orbital area of very narrow light-gray pruinose border between orbit and parafrontale; 24-27

postoculars, often with 1-2 definite rows; maxillary palpus dark-yellow to orange, somewhat triangular, or spatulate. Epistomal index 1.6-1.9; mesofacial index 2.4-2.9; vertex index 5.2-8.8; ocular index 4.2-5.8; subcranial index 1.6-2.5; head width/head height 1.1-1.4.

Thorax: Postpronotum and lateral areas of mesoscutum light-gray pruinose in dorsolateral view; mesonotal disc slightly glossy light-brown to light reddish-brown pruinose; notopleuron light-gray pruinose; scutellar disc light grayish-brown pruinose, often with slight red overtone; pleuron densely light-gray pruinose; 2-3 (1 macrochaetous) antesutural and 2 (1 macrochaetous and nearly sutural) postsutural setae; 1 mesokatepisternal seta (macrochaetous); legs moderately to sparsely light gray pruinose over dark grayish-brown except mostly dark-yellow or light yellowish-brown tarsi; tarsomere 5 on all legs and often meta tarsomeres 2-4 moderate brown to reddish-brown dorsally. Wing length 1.76-2.20 mm; wing veins light yellowish-brown or brown; 6-9 dorsal and 6-11 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.4; III/IV 2.2-3.3; V/IV 2.9-3.8; M_{1-2} index 1.3-1.6.

Abdomen: Terga semiglossy moderate grayish or reddish-brown discally, light gray pruinose laterally and ventrally; setosity, especially in lateral view, conspicuously glossy black, denser, and more nearly erect than in most others of this species group. Male postabdomen: sternum 5 partially overlapped by medially divided sternum 4 and consisting of 2 pairs of posteromedially directed arms, anterior one of which bears a padlike cluster of short spinoid microsetulae distally and the posterior arm bearing 4 short spinoid microsetulae arranged somewhat palmately and directed mainly toward padlike cluster; sternum 3 with conspicuous midventral carina (keel), somewhat semicircular in lateral view; sternum 2 often with slight midventral elevation. Pre- and postgonites concealed above bibrachiate copulobus in ventral view (bisetulate pregonite and unisetulate postgonite barely visible in lateral view with proper cuticle clearing); distiphallus digitiform and membranous, about 0.7 as long as basiphallus; basiphallus pugniform in lateral view with distinct, deep concave indentation middorsally; tip of basiphallus barely visible above anterior margin of fused surstyli; phallopodeme, in lateral view, very obliquely angled toward both ends from slightly prominent middorsal process (condyle scar evident). Fused surstyli rounded anterolaterally to narrow, deep antero-

medial notch 0.3 length of surstyli and with prominent, slightly twisted lateral digitiform lobe diverging at about midlength; fused surstyli length: cercus length (ventral view) 3.7: 1. Syntergum 9+10 (epandrium) roundly truncate posteriorly. Female postabdomen sternum 8 subequal to 7 in length, but only about 0.6 as wide, roundly angled posterolaterally and with chevron-shaped dark verrucule of densely spaced spinoid setulae and microsetulae covering posterior margin and middle; sternum 7 about 0.5 to 0.7 medial length of 6; sternum 6 mostly quadrangular except slightly concave posterior margin and slightly acutangular posterolateral corners; sternum 6 only about 0.5 to 0.7 medial length of sternum 5; sclerotized portion of sternum 5 widest posteriorly; cerci, in lateral view, quasicircular or subcordate to somewhat pyriform, often with very slight apical point and few or no microsetulae and setulae on lower 0.5; intercercal lobe prominent in dorsal and ventral views; cercus, in lateral view, 1.0-1.2 times as long as wide. Ventral receptacle cupuliform, about as deep as wide.

Etymology. The specific epithet, *najadis*, is used to denote the principal (and thus far, sole) host-plant species, *Najas guadalupensis* (Spreng.) Morong of this species.

Type. Holotype male, USNM.

Type locality. Florida: Alachua Co: Santa Fe R., 2 mi. E. of US 441 (VI-29-1990, D. L. Deonier, on *Nuphar* in *Lemna* + grass).

Paratypes. FLORIDA: Alachua Co: Santa Fe R., 2 mi. E. of US 441 (VI-29-1990, D.L. Deonier, on *Nuphar* in *Lemna*+Grass), 19 males, 3 females; (VII-31-1990, D.L. Deonier, on *Nuphar* in *Lemna*+Grass), 15 males, 3 females; (VI-29-1990, S. C. Davis, on *Nuphar* in *Lemna*+Grass), 6 males, 3 females; (VI-29-1990, C. A. Bennett, on *Nuphar* in *Lemna*+Grass), 1 male, 1 female; Alachua Co: Santa Fe R., River Rise St. Pres. (XI-6-1990, G. R. Buckingham + C.A. Bennett, Ex *Najas guadalupensis*), 8 males, 8 females; Alachua Co: D.P.I. USDA Lab colony, F1 (no date, C. A. Bennett), 2 males, 3 females; D.P.I. USDA Lab colony (31-X-1990, C.A. Bennett, Ex *Najas guadalupensis*), 12 males, 2 females; Orange Lake, SW Cove (VII-2-1990, D. L. Deonier, sweep'g *Limnobium*), 1 female; Lake Co: L. George, Juniper Cr. (VII-6-1990, B.C. Deonier, on *Nuphar*), 3 males, 1 female; (VII-6-1990, D. L. Deonier, on *Nuphar*), 1 male, 2 females; (VII-5-1990, D. G. Barber, on *Nuphar*), 4 males, 1 female; Levy Co: Manatee Springs (26-V-1988, G. R. Buckingham + C. A. Bennett, Ex *Najas guadalupensis*), 2 females; (26-VI-1988, G. R.

Buckingham + C. A. Bennett, Ex *Najas guadalupensis*), 1 male, 1 female; (3-V-1990, G. R. Buckingham + C.A. Bennett, Ex *Najas guadalupensis*), 15 males, 2 females; Marion Co: L. George, Salt Springs (VII-6-1990, B. C. Deonier, on *Pistia* + algae), 3 males, 3 females; (VI-16-1990, males, 7 females; (VII-6-1990, D. G. Barber, on *Pistia* + algae), 2 males, 5 females; Volusia Co: L. George, W. shore (VII-6-1990, D. L. Deonier, on *Nymph. mexicana*), 1 male, 1 female; (VII-6-1990, D. G. Barber, on *Nymph. mexicana*), 2 females; Putnam Co: Rodman Resv. (L. Ocklawaha), NW (VII-5-1990, B. C. Deonier, on *Nuphar*), 3 males, 1 female; (VII-5-1990, C. A. Bennett, on *Nuphar*), 1 male, 1 female; (VII-5-1990, D. M. Cooper, on *Nuphar*), 1 male; Glades Co: L. Okeechobee, NW shore (VII-17-1990, D. L. Deonier, on *Nelumbo* in *Pota. illinoensis* + *Hydrilla*), 44 males, 16 females; (VII-17-1990, W.C. Durden, yellow lid in *Nelumbo*+*Hydrilla*), 7 males, 1 female; L. Okeechobee, Harney Pond Canal (VII-17-1990, B. C. Deonier, on *Hydrocotyle* + *Pistia* + *Lemna*), 1 male; L. Hicpochee, Release Area (VII-17-1990, W. Durden, on yellow lid), 1 female; Highlands Co: L. Istokpoga, Istokpoga Canal (VII-13-1990, D. L. Deonier, on *Nuphar*), 1 male, 1 female; L. Istokpoga, Henderson Cove (VII-13-1990, D. L. Deonier, on *Nuphar* + *Nymph. odor.*), 1 male; Polk Co: L. Patrick [L. Lenore nr. Frostproof] (VII-27-1990, D. L. Deonier, on *Nuphar* + *Nymph.* in *Hydrilla*), 1 female; (VII-27-1990, T. K. Sullivan, on *Hydrilla* mat), 1 female; Palm Beach Co: L. Osborne (VII-16-1990, D. L. Deonier, on *Pistia* in coontail + *Hydrilla*), 2 males, 1 female; Broward Co: Ft. Lauderdale, Orangebrook Golf Crse. Pond (VII-18-1990, D. L. Deonier, on *Hydrocotyle* + grass), 1 male, 1 female.

TEXAS: "Belly" of Sheldon Resv. nr. Houston (VI-5-1991, D. L. Deonier, on *Nelumbo* - *Nymphaea* - *Pota.*), 1 male.

Remarks. Based upon characters such as truncate male abdomen, phallus shape, and copulobus as well as setosity and coloration, I have included this species in the *H. griseola* species group. In terms of the copulobus, this species shows similarities with *H. rixator* Deonier. The host-plant species, *Najas guadalupensis*, is somewhat surprising because it is so filamentous and narrow in structure, but the immature stages have certain morphological and behavioral adaptations facilitating its use, perhaps in ways similar to the usual gramineous hosts of this species group.

Hydrellia apalachee, n. sp.
(Figs. 12-17)

Diagnosis. Maxillary palpus moderate or dark-yellow, quasispathulate; antenna mostly velvety dark-brown pruinose; 6-9 (usually 8) dorsal arisal

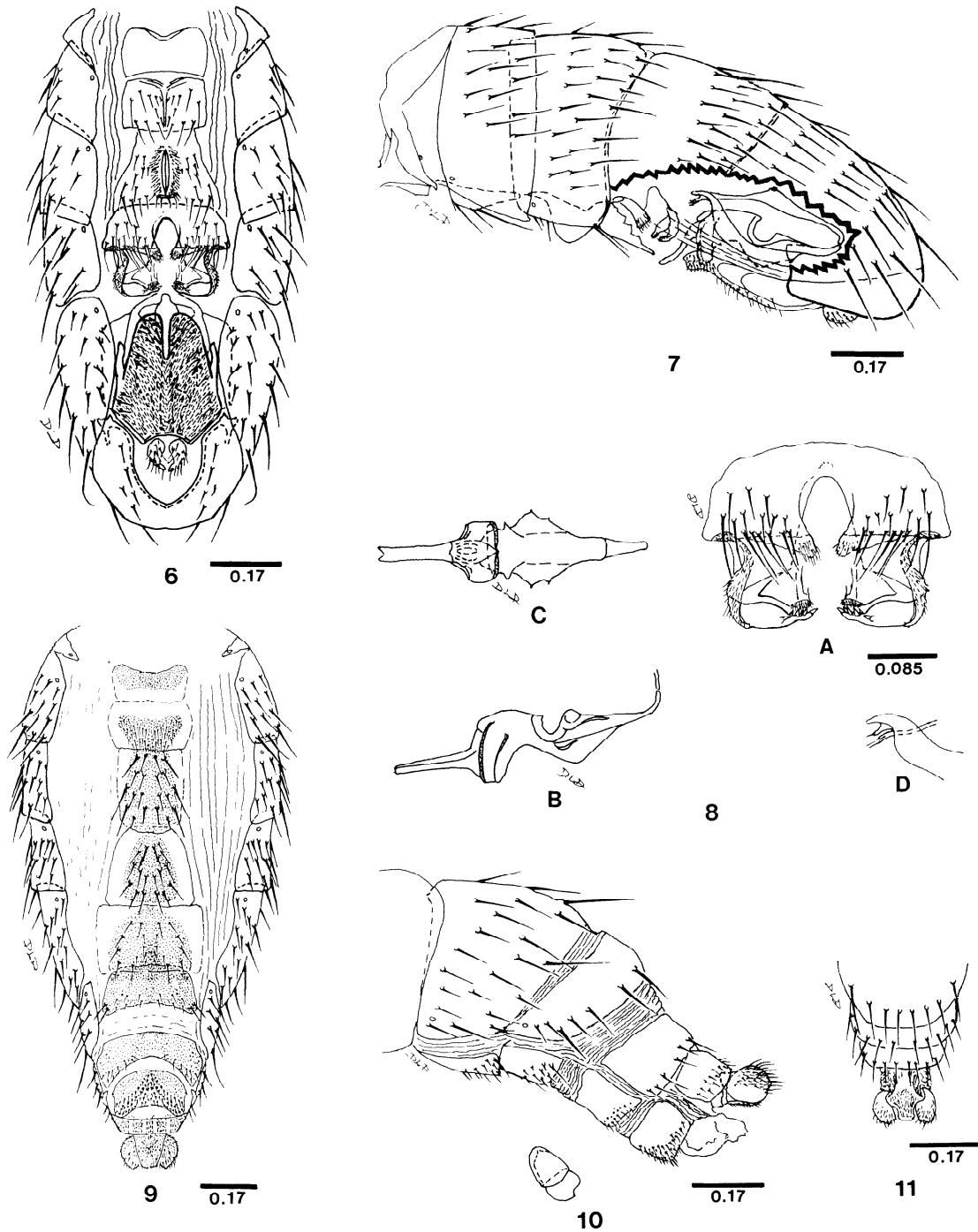


Figure 6-11. *Hydrellia najadis*, n.sp. 6. Male abdomen, ventral view. 7. Male abdomen, left lateral view. 8A. Male sternum 4 + copulobus, enlarged ventral view. 8B. Phallus, left lateral view. 8C. Phallus, ventral view (apex to left). 8D. Junction of gonial arch + anterior end of phallapodeme showing upper unisetulate postgonite and lower bisetulate pregonite, enlarged, left lateral view. 9. Female abdomen, ventral view. 10. Female abdomen, posterior 0.5, left lateral view. 11. Female postabdomen, dorsal view.

rays; parafaciale very narrow, light-gray pruinose; narrow fronto-orbital area concolorous with and continuous with parafaciale, contrasting with velvety dark-brown parafrontale; posterior fronto-orbital 1.5-2.0 times as long as anterior seta; ocular index 7.0-11.0; conspicuous paired light-gray vittae coursing from anterior end of dorsocentral row to basal angle of scutellum; 2-3 antesutural (0 macrochaetous) and 2 postsutural (1 macrochaetous) dorsocentral setae; legs mostly dark-brown or dark grayish-brown except dark yellowish-brown or orange meso- and metatarsi. Male length 1.20-1.65 mm; female 1.30-1.85 mm. Male postabdomen as in Figs. 12-13; female postabdomen as Figs. 14-16.

Description. Head: Face of male, in anterior view, light yellowish-brown sericeous (golden reflections); lunule light-gray pruinose; female face light-gray pruinose; face with shallow antennal foveae and slight median carina to midfacial prominence usually apparent; epistoma mostly smoothly, shallowly concave (flat in 1 female); parafaciale very narrow, unilinear light-gray pruinose; 4-5 primary facial setae; 1-2 secondary facial setulae above primary row; antenna mostly velvety dark-brown pruinose with antennomere 3 bearing dense pale micropubescence anteromedially; 6-9 (usually 8) dorsal arisal rays; frontal vitta light grayish-brown or reddish-brown pruinose contrasting with velvety dark-brown parafrontale; fronto-orbital area concolorous with and continuous with parafaciale; posterior fronto-orbital mostly posterolatero-clinate and 1.5-2.0 times as long as anterior seta, usually with secondary setula between; 20-30 postocular setae (without definite closeset row near orbit); maxillary palpus moderate to dark-yellow, quasispathulate. Epistomal index 1.5-2.2; mesofacial index 2.4-2.8; vertex index 6.4-9.0; ocular index 7.0-11.0; subcranial index 1.7-2.5; head width/head height 1.0-1.3.

Thorax: Mesoscutum with conspicuous paired light-gray pruinose vittae coursing from anterior end of dorsocentral row to basal angle of scutellum; postpronotum, mesoscutal disc, scutellum, and upper 0.3-0.5 of notopleuron densely reddish-brown pruinose in dorsolateral view, slightly glossy in posterodorsal view; lower 0.5-0.7 of notopleuron and pleuron densely light-gray pruinose; 2-3 antesutural (0 macrochaetous) and 2 postsutural (1 macrochaetous) dorsocentral setae; 1 mesokatepisternal seta macrochaetous; legs densely light-gray pruinose over dark grayish-brown except mostly dark yellowish-brown or orange meso-

and metatarsi; protarsus mostly dark-brown. Wing length 1.30-1.75 mm; wing veins light yellowish-brown; 5-8 dorsal and 5-9 anterior interfractural costal setae; costal-section indices: II/I 1.5-2.2; III/IV 2.5-3.7; V/IV 2.0-3.7; M1+2 index 1.3-1.9.

Abdomen: Terga semiglossy moderate grayish or reddish-brown discally, light-gray pruinose laterally and ventrally (male, in dorsal view, with posterolateral corners of 2-5, female with posterolateral corner of tergum 5 and posterior 0.5 of 6 light-gray pruinose). Male postabdomen: median 0.3 of posterior margin of sternum 5 concave and congruent with distiphallus in ventral view; anterolateral margin of sternum 5 acutangular and concavely curving to copulobus; copulobus with incurved posterior arm bearing 1 subapical and 2 or 3 short, apical spinoid setulae and a shorter posteriorly directed medial arm bearing numerous dentiform setulae or spinulae distally; ventral disc of each copulobus bearing 6-10 setulae. Pre- and postgonites inapparent; distiphallus, in ventral and lateral views, digitiform and membranous; basiphallus, in ventral view, expanded distally and, in lateral view, with deep ventral notch or recess at midlength; tip of basiphallus visible above anterior margin of fused surstyli; phallopodeme, in lateral view, very obliquely angled toward both ends from inconspicuous middorsal condyle. Fused surstyli notched narrowly and deeply anteromedially (to midlength) and with moderately deep, narrowly rounded anterolateral notch separating a narrow lateral lobe rounded distally and wider anterolateral lobe slightly emarginate distally; fused surstyli with 10-12 pairs of scattered setulae; fused surstyli length: cercus length (ventral view) 2.0:1.0. Syntergum 9+10 (epandrium) roundly truncate posteriorly. Female postabdomen: sternum 8 subequal in width to overlapping sternum 7, with strongly curved (convex) posterior margin, dense, uniform microsetulosity, and 1 pair of long, incurved posterolateral setae; sternum 7 longer than 8, subequal in shape, length and width to 6; sternum 6 subequal in length and width to 5, but roundly triangular in contrast to quadrangular shape of sterna 2-5; cercus, in lateral view, pyriform to semicircular, acutangular distally, 1.5-1.7 times as long as wide, and tending to pendulous. Ventral receptacle cupuliform, about as deep as wide.

Etymology. The specific epithet, *apalachee*, a noun used in apposition, is used to refer to the original collection of the species by the author in the

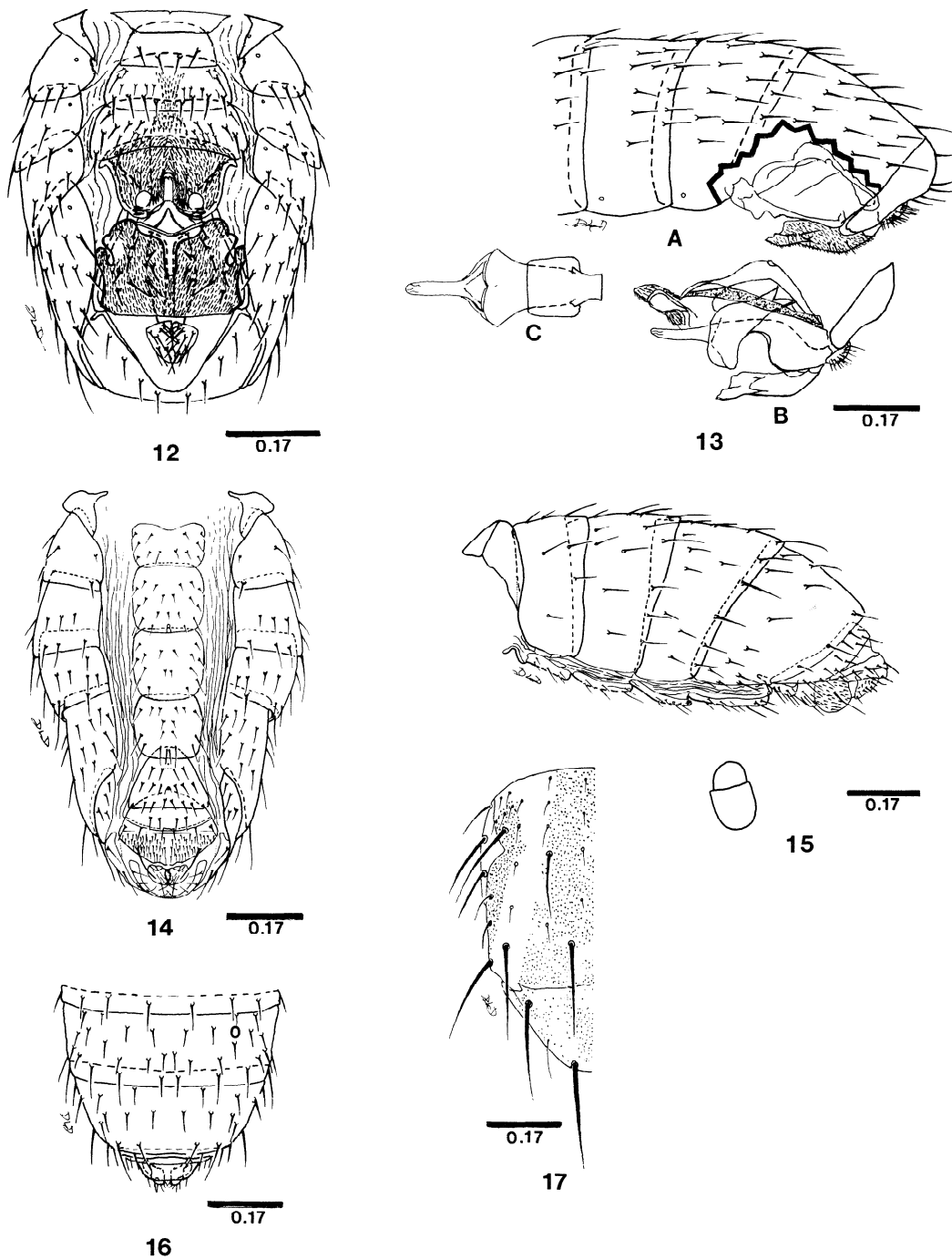


Figure 12-17. *Hydrellia apalachee*, n.sp. 12. Male abdomen, ventral view. 13A. Male abdomen, left lateral view. 13B. Phallus, phallapodeme, copulobus, fused surstyli, and syntergum 9+10 (epandrium), left lateral view. 13C. Phallus, ventral view. 14. Female abdomen, ventral view. 15. Female abdomen, left lateral view. 16. Female postabdomen, dorsal view. 17. Mesonotum, left 0.5 showing pale vitta, dorsal view.

Apalachee Game Management Area, L. Seminole Reservoir, Jackson Co., Florida.

Type. Holotype male, USNM.

Type-locality. Florida: Putnam Co: Rodman Reservoir (12-IV-1990, G. R. Buckingham, adult on *Limnobium*, *Pistia*).

Paratypes. ALABAMA: Marshall Co: L. Gunter'sville S.P., pond nr. Entr. (VIII-22-1992, D. L. Deonier, on *Ludwigia repens*), 1 male. FLORIDA: Highlands Co: L. Annie, Archbold Biol. Sta. (VII-11-1990, D.L. Deonier, on *Nuphar* + *Nymphoides* + *Myriophyllum* in grass), 1 female; Jackson Co: L. Seminole, Apalachee Game Management Area (VI-26-1990, D. L. Deonier, on *Nymphaea*), 1 male; Alachua Co: Santa Fe R., 2.5 mi. E. of US 441 (VI-29-1990, D. L. Deonier, on *Nuphar* + *Hydrocotyle*), 1 male, 3 females; (VI-29-1990, D. L. Deonier, on *Nuphar* in *Lemna*+ grass), 1 female (VI-29-1990, C. A. Bennett, on *Nuphar* in *Lemna*+ grass), 1 female; L. Alto, E + N shores (VII-7-1992, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 1 male; L. Alto, E + N shores (V-5-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 1 male; L. Alto, E shore (V-6-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 3 females.

Remarks. The bivittate mesonotum is a unique character among Nearctic *Hydrellia*, and in fact except for a new, but as yet undescribed species (closely similar and also in *H. griseola* species-group) from 6,200 ft. altitude in Nepal, the bivittate mesonotum is unique for the world. The sizable, sclerotized basiphallus, digitiform, membranous distiphallus, and the 4-cleft fused surstyli as well as the bibrachiate copulobus and truncate male abdomen all compare to a high degree with similar characters in *H. rixator*. Thus far, no host-plant species is known.

Hydrellia limnobii, n. sp.
(Figs. 18-22)

Diagnosis. Maxillary palpus light-yellow to light-orange, quasispathulate; antenna mostly velvety dark-brown except antennomere 2 apically and medially and antennomere 3 light-orange with brown splotching (infuscation); 7-10 (usually 10) dorsal arisal rays; frons nearly unicolorous velvety dark-brown or black; ocellar setae absent; posterior fronto-orbital 2-3 times as long as anterior fronto-orbital seta; eyes very large and subocular gena very narrow; vertex index 8.0-12.0; ocular index 18.0-27.0; thorax with velvety darkbrown vitta

covering postpronotum, notopleuron to and including side of scutellum and onto anatergite; strongly contrasting light-gray pruinose pleuron; only 1 dorsocentral macrochaeta (sutural); legs mostly yellow except dark grayish-brown femoral apices and reddish-brown tarsomere 5 of all tarsi; male abdomen, in dorsal and lateral views, roundly acutangular posteriorly, with light-gray or light bluish-gray pruinose fasciae on terga 3 and 4; male surstyli and phallus asymmetrical; female abdomen with lateral light-gray or light-bluish gray lateral fasciae and with tergum 5 forming glossy dark-brown or black, laterally rugulose saddle bearing a pair of dorsolateral hemispherical tubercles, or knobs. Male length 1.30-1.85 mm; female 1.50-2.00 mm. Male postabdomen as in Figs. 18-19; female postabdomen as in Figs. 20-22.

Description. Head: Face, in profile, perpendicular or occasionally slightly convex, light or dark metallic yellow (golden) or silvery sericeous; lunule white in anterodorsal view; epistoma flat or very slightly concave; parafaciale extremely narrow, unilinear, light-gray pruinose; 5-7 primary facial setae; 0-1 secondary facial setula above primary facial row; eye very large and subocular gena extremely narrow; antennomere 1 and dorsum of 2 velvety dark-brown; apical and medial surfaces of antennomere 2 and all of 3 light-orange with brown splotching (infuscated); micropubescence of antennomere 3 pale, inconspicuous; 7-10 (usually 10) dorsal arisal rays; frons moderately sloping, nearly unicolorous velvety dark-brown or black (vitta, parafrontale, and fronto-orbital area scarcely differentiated); ocellar seta absent; posterior fronto-orbital seta posterolatero-clinate, 2-3 times as long as anterior seta, often with secondary setula between two setae; 24-36 postocular setae (without definite close-set row near orbit); maxillary palpus light-yellow to light-orange, quasispathulate. Epistomal index 1.4-2.6; mesofacial index 2.4-4.7; vertex index 8.0-12.0; ocular index 18.0-27.0; subcranial index 1.6-2.5; head width/head height 1.2-1.5.

Thorax: Velvety dark-brown vitta covering postpronotum, notopleuron, supraalar, postalar, side of scutellum, and anatergite conspicuous in lateral and dorsolateral views; mesoscutal and scutellar discs densely moderate grayish-brown pruinose in dorsolateral view, semiglossy in posterodorsal view; pleuron densely light-gray or light bluish-gray pruinose; 3 antesutural (0 macrochaetous), 1 sutural or nearly sutural

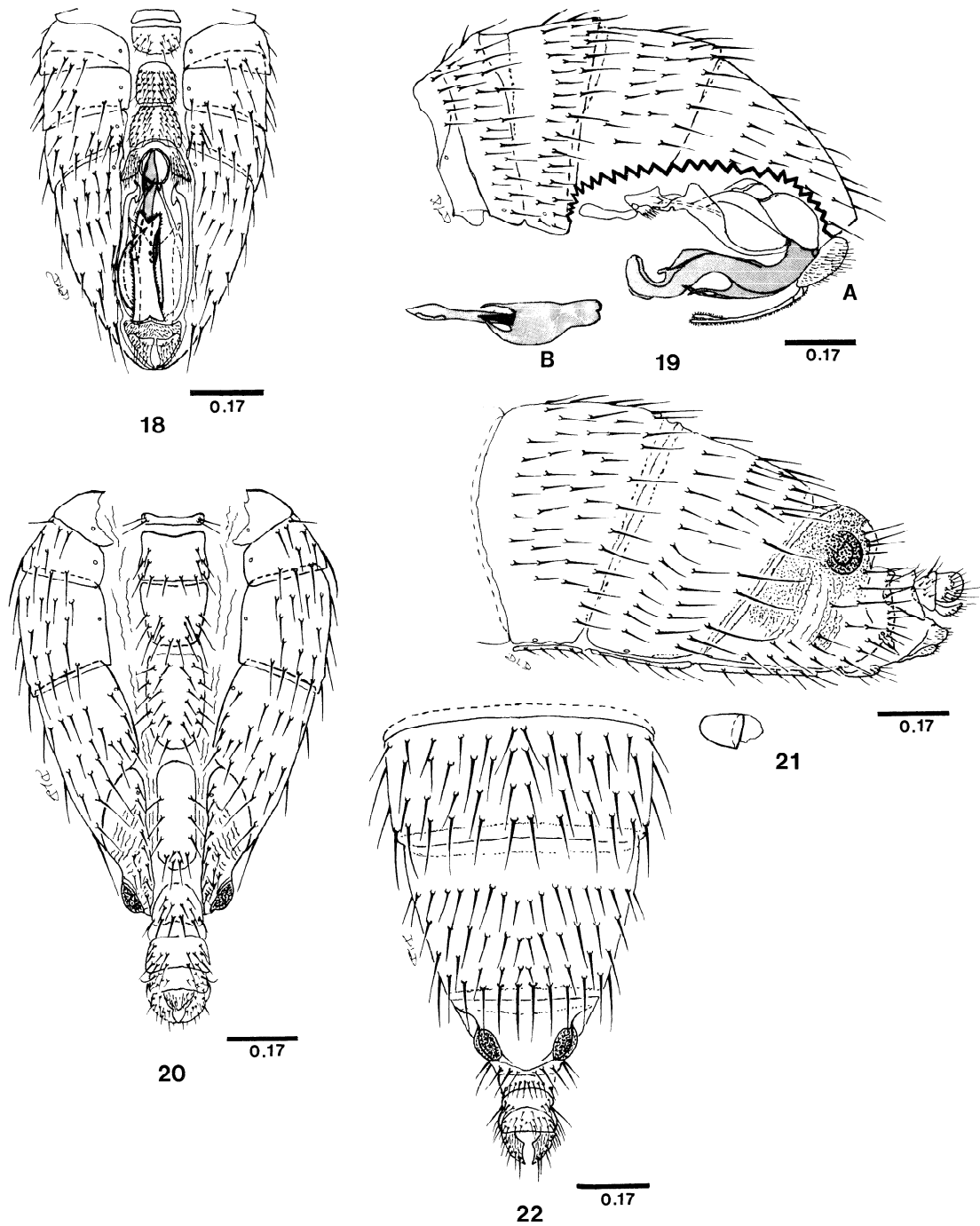


Figure 18-22. *Hydrellia limnobia*, n.sp. 18. Male abdomen, ventral view. 19A. Male abdomen, left lateral view. 19B. Phallus, ventral view. 20. Female abdomen, ventral view. 21. Female abdomen, posterior 0.5, left lateral view. 22. Female postabdomen, dorsal view.

(macrochaetous), and 0 postsutural dorsocentral setae; 1 mesokatepisternal seta; legs mostly light to moderate yellow except distal 0.5-0.7 of femora sparsely light-gray pruinose over dark grayish-brown and tarsomere 5 of all tarsi dark reddish-brown. Wing length 1.40-2.20 mm; wing veins light yellowish-brown or brown; 4-6 dorsal and 5-8 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.6; III/IV 3.0-4.4; V/IV 3.4-4.5; M_{1+2} index 1.4-1.8.

Abdomen: Terga of male semiglossy dark-brown or grayish-brown except densely pruinose light-gray or light bluish-gray (silvery) ventral lobe of 2, lateral and ventral lobes of 3 and 4 (extending dorsomedial), and anterodorsolateral and posteroventral corners of tergum 5; female abdomen semiglossy dark-brown or grayish-brown pruinose except densely pruinose light-gray or light bluish-gray (silvery) ventral lobe of 2, lateral and ventral lobes of 3 and posterior 0.3 of 4 along with light-gray posteroventral fascia on tergum 5; tergum 5 of female sagmariform-tergum forming glossy brown or black, laterally rugulose saddle bearing a pair of dorsolateral hemispherical tubercles, or knobs. **Male postabdomen:** sternum 5 concave posteromedially and roundly obtusangular anterolaterally with each copulobus thereof densely setulose and flaring to acute posterolateral angles, or corners (about 45°). Pre- and postgonites at least partially visible just posterior to sternum 5; postgonite spirally curved mediad and then anteriorly with uncus directed anterolaterad; distiphallus, basiphallus, and fused surstyli, in ventral view, asymmetrical, curving generally left then right; distiphallus, in ventral view, claviform but with papilliform apex; distiphallus, in lateral view, incurved (concave) ventrally and proximally, with apex upcurved beyond anterodorsal digitiform process and median carina; basiphallus, in ventral view, bulging asymmetrically to left with distal spine of that side strongly and asymmetrically curved anteromedial (these paired spines, in lateral view, appear decussate); phallapodeme, in lateral view, doubly arched dorsally, with lateral winglike process. Fused surstyli micropubescent, nonsetulose, and long unilinear with anterior margin deeply, widely notched (or bifurcate); fused surstyli length: cercus length (ventral view) 3.9:1.0. Syntergum 9+10 (epandrium) inapparent. **Female postabdomen:** segments 6-8 much smaller than conspicuous tuberculate segment 5 (into which they telescope); sternum 8 quasiquadrangular, subequal in width and shape to overlapping ster-

num 7; sternum 7 about 0.7 of median length of slightly triangular sternum 6; sternum 5 about as long as combined lengths of 6-8; cercus, in lateral view, roundly truncate distally, narrower basally, and about 1.3 times as long as wide; cercus moderately setulose on posterior 0.5; intercercal lobe setulose, visible ventrally and laterally. Ventral receptacle cupuliform, about 1.2 times as deep as wide.

Etymology. The specific epithet, *limnobia*, is used to denote the sole known host-plant species, *Limnobia spongia* (Bosc) Richard.

Type. Holotype male, USNM.

Type-locality. Florida: Putnam Co: Rodman Reservoir (12-IV-1990, G. R. Buckingham, adults on *Limnobia*, *Pistia*).

Paratypes. FLORIDA: Alachua Co: Gainesville, Pierce's Homestead (16-V-1976, W.H. Pierce, insect flight trap), 1 female; Orange L., M.K. Rawlings Pk. (27-IV-1990, G. R. Buckingham and C. A. Bennett), 4 males, 4 females; nr. Cross Creek, sm. pond along wood (27-IV-1990), 1 male, 3 females; Cross Creek, pond along hwy (27-IV-1990), G. R. Buckingham, Ex *Limnobia spongia*, 2 females; D.P.I.USDA Lab, Gainesville (21-VII + 12-IX-1986, G. R. Buckingham, Ex Frogbit), 2 males, 6 females; (21-IV-1990;HLS 903), 1 female; (12-13-IV-1990;HLS 903), 2 males, 1 female; (15-16-IV-1990; HLS 903), 1 female; (20-IV-1990;HLS 903), 1 male, 1 female; (20-21-IV-1990;HLS 903), 1 male, 1 female; (23-IV-1990;HLS 903), 1 male, 5 females; (29-V-1990;HLS 904, Rep. *Limnobia*), 1 female; D.P.I.USDA Lab, Gainesville (1990-91 *Limnobia* colony), 11 males, 14 females; L. Alto, E+N shores (V-5-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 6 females; E shore (V-6-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 9 males, 11 females; L. Alto, Santa Fe Canal (V-6-1993, D. L. Deonier, on *Nuphar* nr grass), 9 males, 8 females; (V-7-1993, D. L. Deonier, on *Nuphar* nr grass), 8 males, 4 females; (V-7-1993, D. L. Deonier, on grass+ *Azolla* mat), 5 males, 4 females; Levy Co: Manatee Springs (3-V-1990, G. R. Buckingham and C.A. Bennett, *Najas guadalupensis*), 3 females; Putnam Co: Rodman Resv. [L. Ocklawaha] (12-IV-1990, G. R. Buckingham, ads on *Limnobia*, *Pistia*) 4 males, 1 female; Highlands Co: L. Istokpoga, NE shore (VII-13-1990, M. Lillpop, on *Limnobia*), 3 males, 3 females; Glades Co: L. Okeechobee, Harney Pond Canal (VII-17-1990, B. C. Deonier, on *Hydrocotyle* + *Pistia* + *Lemna*), 4 males, 3 females; (VII-17-1990, D. L. Deonier, on *Hydrocotyle* + *Pistia* + *Lemna*), 1 male, 4 females; L. Hicpochee, Caloosahatchee Canal (VII-17-1990, D. L. Deonier, on *Pistia* in *Limnobia*), 1 female; Sarasota Co: L. Myak-

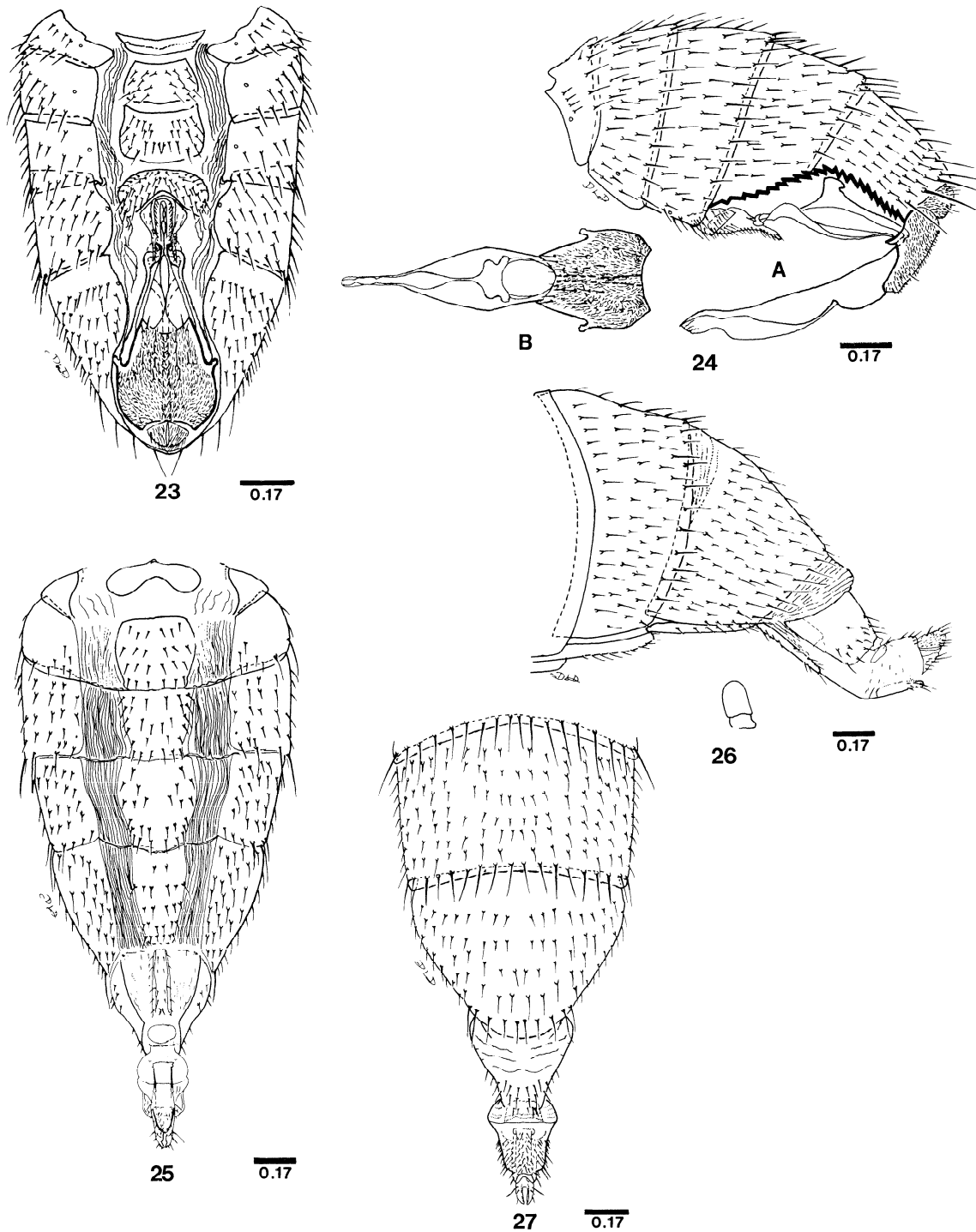


Figure 23-27. *Hydrellia pontederiae* n.sp. 23. Male abdomen, ventral view. 24A. Male abdomen, left lateral view. 24B. phallus and fused surstyli, ventral view. Female abdomen, ventral view. 26. Female postabdomen, left lateral view. 27. Female postabdomen, dorsal view.

ka, Ramp Area (VII-24-1990, W. Durden, on *Nymphaea* in grass), 1 male; (VII-24-1990, D. L. Deonier, on *Limnobium* nr *Hydrilla*), 1 male, 1 female.

LOUISIANA: L. Beouf (VII-2-1991, M. J. Grodowitz, via vacuum), 4 males, 4 females. TEXAS: "Belly" of Sheldon Resv. nr. Houston (VI-6-1991, D. L. Deonier, on canal smartweed, no *Limnobium* visible, Release Area), 12 males, 3 female; "Belly" [S. Canal] of Sheldon Resv. nr. Houston (VI-5-1991, D. L. Deonier sweeping smartweed and grass), 1 female; Brazos Bend S.P., Pilant Lake (VI-6-1991, D. L. Deonier, on *Limnobium*), 7 males, 4 females.

Remarks. The asymmetrical male genitalia and the sagmariform female tergum 5 with its shiny, black, paired lateral knobs are together unique among Nearctic *Hydrellia*. Males of *H. bergi* Cresson have an asymmetrical phallus, fused surstyli, and slightly asymmetrical cerci, but there is no corresponding unique female character comparable to this new species. Except for these specific apomorphies, there are sufficient similarities in antennae (dorsal arisal rays), leg and body coloration, etc. to place this species in the *H. nobilis* species-group. Nearly all of the paratypes were collected in the presence of or reared from frogbit (*Limnobium spongia*); however, I did collect 15 adults at a site in southeastern Texas and 17 males and 18 females at L. Alto, Alachua Co., Florida where there was no frogbit in sight.

Hydrellia pontederiae, n. sp.
(Figs. 23-27)

Diagnosis. Maxillary palpus pubescent reddish-brown, long claviform (clavate); antenna mostly very dark grayish-brown or black; antennomere 2 with 12 apical spinoid setae as long as 0.5 width of antennomere 3 and cluster of about 10 marginal setulae; 12-18 (usually 1-4) dorsal arisal rays (basal 0.3 of arista biradiate); anterior and posterior fronto-orbital setae macrochaetous, subequal, and directly, oppositely inclined (antero- and postero-clinate); ocular index 7.8-12.0; 3-6 antesutural (1 macrochaetous) and 2-4 postsutural (1 macrochaetous) dorsocentral setae; procoxa densely setulose anteriorly; wing fumose with antealular zone (anal, or plical, vein) usually noticeably darker; abdomen with conspicuous light-gray fasciae ventrally, laterally, and dorsolaterally on terga 2-5; adults large. Male length 2.40-4.00 mm; 2.60-4.80

mm. Male postabdomen as in Figs. 23-24; female postabdomen as in Figs. 25-27.

Description. Head: Face light-brown pruinose with faint golden reflections in anterolateral view; lunule slightly lighter than face (often dull light grayish-yellow); epistoma variable, squarely recessed or shallowly concave; parafaciale lighter than face (light yellowish-brown); 6-11 (usually 7-8) primary facial setae, often with uppermost larger and conspicuously dorsoclinate; 0-1 secondary facial setula above primary facial row; antenna mostly very dark grayish-brown or black with antennomere 2 bearing about 10 marginal setulae and 12 spinoid apical setae as long as 0.5 width of antennomere 3; antennomere 3 bearing pale micropubescence antero and dorsomedially; 12-18 (usually 14) dorsal arisal rays (basal 0.3 of arista biradiate, i.e., with double rays); frons nearly flat, mostly very dark grayish-brown with some light-brown pruinose reflections; parafrontale variably differentiated from frontal vitta as velvety dark grayish-brown or black triangle; fronto-orbital area not differentiated; anterior and posterior fronto-orbital setae macrochaetous, subequal, and directly, oppositely inclined (antero- and postero-clinate); fronto-orbitals over 0.5 as long as inner vertical seta and often with 1 secondary setula between them; 28-40 postocular setae (14 in close-set first row near orbit); maxillary palpus pubescent reddish-brown, long claviform (clavate) [not triangularly spatulate as in *bilobifera*]. Epistomal index 1.2-1.5; mesofacial index 1.5-2.0; vertex index 2.8-5.0; ocular index 7.8-12.0; subcranial index 1.7-2.7; head width/ head height 1.2-1.4.

Thorax: Postpronotum dark-brown or very dark grayish-brown pruinose; mesoscutum, notopleuron, and anatergite dark-brown pruinose, often with slight reddish-brown overtones in dorsolateral view; mesoscutal disc barely semiglossy in posterodorsal view; scutellum, in dorsolateral view, contrasting as very light grayish-brown pruinose; pleuron mostly light-gray pruinose; 3-6 antesutural (1 macrochaetous) and 2-4 postsutural (1 macrochaetous) dorsocentral setae; 3-5 antesutural and 3-5 postsutural acrostichal setulae; 1-2 intermediate (subapical) scutellar setae next to large apical scutellar macrochaeta; 1 mesokatepisternal seta (macrochaetous); legs sparsely light-gray pruinose over dark grayish-brown except mostly dark-yellow or light yellowish-brown tarsi (tarsomere 5 of all tarsi dark-brown or reddish-brown); procoxa densely setulose anteriorly and

femora and tibiae appearing darker than mesonotum. Wing length 2.50-4.20 mm; wing membrane fumose with antealar zone (anal, or plical, vein) usually especially dark; tegula conspicuously black, setose; 10-17 dorsal and 11-16 anterior interfractural costals; costal-section indices: III/1.9-2.8; III/IV 2.0-2.8; V/IV 3.2-4.4; M_{1+2} index 1.4-1.7.

Abdomen: Terga dark grayish-brown pruinose with light-gray pruinose fasciae on posterior 0.25-0.50 of terga 2-5 (tergum 2 with fasciae only on ventral and lateral lobes, others extending from ventral dorsomedial, but separated medially, i.e., not continuous across tergum). Male postabdomen: sternum 5 deeply recessed posteriorly, each side, or copulobus narrowly connected anteromedially and roundly angulate anterolaterally (about 100°); copulobus tapered to long point posteriorly, with regular dense rows (2-3) of setulae restricted to medial margin and posterior apex. Pregonite concealed in ventral and lateral views; postgonite, in ventral view, mostly concealed, curved medially and then anteriorly with uncus directed anterolaterad; distiphallus, in ventral view, gradually tapering with barely visible membranous midventral carina formed in 3 places where sclerotized tubular wall meets and, in lateral view, gradually downcurved apically above distal notch, or spreading, of carina; basiphallus (usually concealed by fused surstyli) consisting of a pair of gradually narrowing arms separated by circular space as seen in ventral view; phallopodeme, in lateral view, with malletlike mid-dorsal process (condylar scar inapparent). Fused surstyli tapering distally from small midlateral spurlike process to smoothly concave anterior margin and with 8-10 pairs of setulae on distal 0.5; fused surstyli length: cercus length (ventral view) 4.5:1.0. Syntergum 9+10 (epandrium) mostly membranous, inapparent. **Female postabdomen:** postabdomen, when extended, suddenly tapering from much larger preabdomen; sternum 8 very small, triangular, and fairly uniformly setulose; sterna 6 and 7 long and narrow, sternum 6 4-5 times as long as wide and nearly 3 times as long as 7; sterna 2-5 much wider, more nearly quadrangular, but narrower posteriorly; cercus, in lateral view, long obovate, smoothly rounded distally with 6-9 marginal microsetulae, and 1.5-2.0 times as long as wide. Ventral receptacle deep cupuliform, about 1.3 times deeper than wide, and generally located above sternum 6.

Etymology. The specific epithet, *pontederiae*, is used to refer to the sole known host-plant genus, *Pontederia*.

Type. Holotype male, USNM.

Type-locality. Florida: Putnam Co: Rodman Reservoir (12-IV-1990, G. R. Buckingham, Ex *Pontederia* petiole).

Paratypes. FLORIDA: same data as holotype, 1 female; Alachua Co: 3.5 mi S of Hawthorne, Hwy 301 (V-14-1992, D. L. Deonier, Ex *Pontederia cordata*), 5 males, 5 females; (VI-13-1992, D. L. Deonier, Ex *Pontederia cordata*), 1 female; Newnan L., S Ramp (VI-6-1992, D. L. Deonier, Ex *Pontederia cordata*), 1 female; (VI-13-1992, D. L. Deonier, Ex *Pontederia cordata*), 1 male, 1 female; Univ. Florida, Hull Road Pond (VI-2-1992, D. L. Deonier, Ex *Pontederia cordata*), 1 female; Putnam Co: Rodman Resv. [L. Ocklawaha] (8-X-1991, C. A. Bennett + G. R. Buckingham, Ex puparium in stem *Pontederia cordata*), 4 females; Alachua Co: L. Alto, nr Santa Fe Canal (V-7-1993, D. L. Deonier, on *Pontederia cordata* leaf), 1 female.

Remarks. This largest of all known *Hydrellia* exhibits some similarities with members of the *H. nobilis* species-group, but it may represent an entirely new and hitherto unknown species-group. The adults walk slowly like many *Notiphila* and the large (8-10mm) third-instar larvae are a conspicuous light to moderate yellow when excavated from the petioles of their host-plant species, *Pontederia cordata* Linnaeus. Although infestation rates often seemed high in localized patches (many leaf stalks, or petioles, are often nearly surrounded by numerous blackened feeding mines) with as many as 3-6 larvae found in some petioles, only one adult has ever been captured in the field. Most were reared from petioles contained in the laboratory or in large clear plastic bags kept in outdoor shade. Larvae pupariate more or less perpendicularly to the petiole surface with the operculum (dorsocephalic cap) barely covered by a thin, dead layer of plant epidermis and cuticle.

The specimens reared by Bennett (1968) from *Pontederia cordata* var. *lanceolata* (Nutt.) Griseb. [reported as *P. lanceolata*] in Belize (=British Honduras) are not this species based upon my examination of the genitalia of 1 male among these specimens. It too is a new species, with brightly fasciated abdomen and many other nongenitalic characters ~ identical with those of *H. pontederiae*, n. sp., but with genitalia ~ much closer to those of *H. apalachee*,

n. sp. Additional material is needed so an adequate investigation of this situation can be conducted because Bennett stated that the larvae were yellow and made long, mostly linear mines visible on the sides of the leafstalk. He also reported observing similar mining damage in *Pontederia* near Fort Lauderdale, Florida. It is possible that this undescribed Belize species also occurs in Florida or at least in south Florida. Bennett and Zwolfer (1968) reported rearing a species of *Hydrellia* from *Eichhornia azurea* (Sw.) Kunth. at Piexe Boi, Brazil and noted similar plant damage to this species at Moreru Lake, Guyana. Apparently, voucher specimens of this species along with most of those from the Belize *Pontederia* were deposited in the British Museum at the time or shortly after the studies.

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Literature Cited

- Becker, T.** 1896. Dipterologische Studien IV. Berliner Entomol. Ztschr. 41: 91-276, pls. 47.
- Bennett, F. D.** 1968. Investigations on insects attacking water hyacinth in Florida, British Honduras and Jamaica, 1968. Commonwealth Institute of Biological Control. Rept. Unpubl. 9 pp.
- Bennett, F. D. and H. Zwolfer.** 1968. Exploration for natural enemies the water hyacinth in northern South America and Trinidad. Hyacinth Control J. 7: 44-52.
- Bock, I. R.** 1990. The Australian species of *Hydrellia* Robineau-Desvoidy (Diptera: Ephydriidae). Invertebr. Taxon. 3: 965-993.
- Canzoneri, S.** 1975. Primi dati sulle *Hydrellia* dell' Iran (Diptera Ephydriidae). Atti Soc. Ital. Sci. Nat. Mus. Civ. Stor. Nat. Milano 116:218-222.
- Canzoneri, S. and D. Meneghini.** 1976. Una nova *Hydrellia* del Marocco (Diptera, Ephydriidae). Boll. Mus. Civ. Venezia 28:71-73.
- Canzoneri, S. and D. Meneghini.** 1985. Ricerche condotte dal Prof. A. Giordani Soika al lido di volano: una nuova specie di *Hydrellia* (Diptera, Ephydriidae). Lavori Soc. Veneziana Sci. Nat. 10: 21-22.
- Cresson, E. T., Jr.** 1922. Studies in American Ephydriidae (Diptera). III. A revision of the species of *Gymnopa* and allied genera constituting the subfamily Gymnopinae. Am. Entomol. Soc., Trans. 47: 325-343 and pl. 20.
- Cresson, E. T., Jr.** 1948. A systematic annotated arrangement of the genera and species of the Ethiopian Ephydriidae (Diptera). II. The subfamily Notiphilinae and supplement to Part I on the subfamily Psilopinae. Am. Entomol. Soc., Trans. 74:1-28.
- Dahl, R. G.** 1959. Studies on Scandinavian Ephydriidae (Diptera Brachycera) Opusc. Entomol. Suppl. 15: 12-24, fig. 84.
- Dahl, R. G.** 1964. Revision av Släktet *Hydrellia* R.D. (Dipt. Ephydriidae) i Coll. Stenhammar och Zetterstedt. Opusc. Entomol. 29:179-187.

- Dahl, R. G.** 1968. Zur Kenntnis der Ephyriden (Diptera, Brachycera) von Ostsibirien. *Notulae Entomol.* 48: 35-39.
- Dahl, R. G.** 1972. Beiträge zur Kenntnis der Fauna Afghanistans. Ephyridae, Diptera. *Acta Mus. Moraviae*, 56/57:347-360.
- Deeming, J.C.** 1977. A new species of *Hydrellia* Robineau-Desvoidy (Diptera: Ephyridae) attacking rice in southern Nigeria. *Bull. Entomol. Res.* 67:337-341.
- Deonier, D. L.** 1964. Keys to the shore flies of Iowa (Diptera, Ephyridae). *Iowa State J. Sci.* 39: 103-126.
- Deonier, D. L.** 1971. A systematic and ecological study of Nearctic *Hydrellia* (Diptera: Ephyridae). *Smithson. Contrib. Zool.* 68:1-147.
- Deonier, D. L.** 1978. New species of *Hydrellia* reared from aquatic macrophytes in Pakistan. *Entomol. Scand.* 9:188-197.
- Deonier, D. L.** 1993. A critical taxonomic analysis of the *Hydrellia pakistanae* species group (Diptera: Ephyridae). *Insecta Mundi* 7(3):133-158.
- Fan, Z., L. Qi, and P. Xia.** 1983. Two new species of the genus *Hydrellia* damaging rice and wheat in China (Diptera: Ephyridae). *Entomotaxonomia* 5: 7-11. [In Chinese].
- Ferino, M. P.** 1968. A new species of *Hydrellia* (Ephyridae, Diptera) on rice. *Phillipine Entomol.* 1:3-5.
- Lizzarralde de Grosso, M.** 1989. Ephyrididae de la Republica Argentina (Insecta Diptera). *Univ. Nac. Tucuman Fac. Cienci Nat. Inst. Miguel Lillo. Ser. Monogr. Didact.* No.3 (1989): 1-93.
- Miyagi, I.** 1977. Ephyrididae (Insecta: Diptera). In: *Fauna Japonica*. 113 pp. + pls. Keigaku Puhl. Co. Tokyo.
- Narchuk, E. P.** 1988. 94. Family Ephyridae. In: G. Y. BeiBienko, Ed. *Keys to the Insects of the European Part of the USSR*. Vol. 5, Diptera and Siphonaptera, Part 2. pp. 605-646. Smithsonian Institution Libraries and National Science Foundation. [English translation].
- Papp, L.** 1975. 61. Family: Ephyridae waterflies. In: *Fauna Hungariae*. Vol. 15, Diptera II (6). Budapest. 128 pp.
- Papp, L.** 1979. A contribution to the revision of the Palearctic Ephyrididae (Diptera). *Folia Entomol. Hungarica Rovartani Közlemények (Series Nova)*, 32: 97-104.
- Vitte, B.** 1990. Etude des diptères ephyrides du Maroc, 2. Deux nouvelles especes du genre *Hydrellia* (Diptera, Brachycera). *Nouv. Rev. Entomol.* 6 (1989):259-263.
- Zatwarnicki, T.** 1984. New records of Polish Ephyrididae (Diptera, Acalyptratae). *Bull. Entomol. Pologne* 54:415-419.
- Zatwarnicki, T.** 1992. A new classification of Ephyrididae based on phylogenetic reconstruction (Diptera: Cyclorrhapha). *Genus* 3:65-119.