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## North American Members of the *Hydrellia crassipes* Species Group (Diptera: Ephydridae)

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**Abstract:** The known members of the *Hydrellia crassipes* species group in North America are described or redescribed, including *H. crassipes* Cresson, *H. procteri* Cresson, *H. saltator* Deonier, *H. amplecta* n.sp., *H. bryani* n.sp., *H. ocalae* n.sp., and *H. tibiospica* n.sp. Adults of these species exhibit the following synapomorphies: dilated male metafemur and expanded (and flanged in some) male metatibia and striate (fibrillate) distiphallus. Only a single species (*H. tibiospica* n.sp.) was reared from its host-plant species, *Juncus debilis* Gray, but there are associated habitat data to indicate that the entire species group may have sedges and rushes as host plants.

### Introduction

The genus *Hydrellia* Robineau-Desvoidy, now exceeding 185 described species, is presently the largest in the family Ephydridae. As pointed out elsewhere, this large diversity is probably related to the parasitic (or endophytophagous) life mode of the larvae in plants. Although only a small percentage of the genus is known in the immature stages, Deonier (1971) discussed the overall ecological role of members of this genus.

The *H. crassipes* species group is one of the more readily distinguished in the genus, at least in North America. Adult males exhibit two principal synapomorphies: dilated metafemur along with expanded (and flanged in some) metatibia and striate (fibrillate) distiphallus. Additional distinguishing characters include large, laterally directed postgonite unci and a small, mostly concealed epandrium (syntergum 9+10). No synapomorphic characters have yet been discovered for females. The *H. nobilis* species group, although not well defined, is perhaps closely allied to the *crassipes* group for it shares the striate distiphallus character.

The modification of the male hind leg, based upon extensive field and laboratory observations, is an adaptation for clasping the female during copulation. This clasping works like lock clamps on each side of the female abdomen and, unlike females of most other congeners, she cannot dislodge the completely mounted male. Evolution of this character may theoretically be related to the fact that populations within the *crassipes* species group are most often small and scattered which could offer

selection pressure through reduction of the probability of encountering females. Because no excess of males has been observed in collections, it is not thought that the mechanism of male competition is the sole explanation.

### Methods

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% H<sub>2</sub>O<sub>2</sub> 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 gas bubbles from the abdominal cavity, yielded straw-colored specimens in which all internal structures, e.g., gonad arches, phallapodeme, etc. could be viewed clearly in glycerol 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: **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 ISCC-NBS method. **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 su-

ture, divided by the minimum interocular distance on the face. **Ocular index** = Quotient of the nearly vertical ocular height divided by the subocular height at midpoint on lower eye margin. **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 antecocular distance between median ocellus and ptilinal suture along frontal midline). **Wing length** = Distance between apex of the tegula and the wing tip.

Depositories for type material of new species 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.

### Key to adult males of known species of *H. crassipes* species group

1. Metafemur with median posteroventral setose tubercle or protuberance ..... 2  
Metafemur without median posteroventral setose tubercle or protuberance ..... 3
2. Metatibia with anterior apical process; fused surstyli with wide V-shaped anteromedial notch; postgonite uncus with tip hooked (Figs. 5, 23, 36) ..... *H. tibiospica*, n. sp.  
Metatibia without anterior apical process (but expanded as flange along middle 0.6); fused surstyli with narrow, shallow V-shaped anteromedial notch; postgonite uncus nearly straight (Figs. 9, 21, 37-38) ..... *H. amplecta*, n. sp.
3. Metafemur without distal ventral setal elevation; metatibia not convexly expanded on basal 0.6; fused surstyli variable anteromedially; postgonite uncus tip variable ..... 4  
Metafemur with distal ventral setal elevation; metatibia convexly expanded (flanged) on basal 0.6; fused surstyli with wide U-shaped anteromedial notch; postgonite uncus with tip hooked (Figs. 1, 20) ..... *H. crassipes* Cresson
4. Metatibia expanded only slightly distally and without basal posteroventral cavity and lensoid flange; metafemur about 3X as long as wide; fused surstyli variable ..... 5  
Metatibia expanded distally and with broad basal posteroventral lensoid cavity below similarly shaped tubercular flange; metafemur about 2X as long as wide and with 1.5 ventral rows of spinoid setae on basal 0.7; metafemur about 2X as long as wide and with 1.5 ventral rows of spinoid setae on basal 0.7; fused surstyli triangular (subacute apically) and with narrow, shallow U-shaped anteromedial notch (Figs. 24, 26, 39-40, 42A) ..... *H. ocalae*, n. sp.
5. Metafemur with 1-2 nearly complete ventral (including anteroventral and posteroventral) rows of setae; basiphallus with spinoid rim ..... 6  
Metafemur with only partial row of about 3 long distal ventral setae and 3-4 basal anteroventral or posteroventral setae; metafemur about 4X as long as wide; metatibia widest about 0.6 of length from base; fused surstyli with deep V-shaped anteromedial notch (Figs. 13, 22) ..... *H. saltator* Deonier
6. Metafemur about 3X as long as wide, with 1 complete posteroventral row (several offset) of short, close set black setae and about 3 long distal anteroventral setae; metatibia not (or very little) expanded distally; fused surstyli about 2X as long as wide and broadly, deeply recessed anteriorly (Figs. 19, 31, 41, 42B) .. *H. bryani* n. sp.  
Metafemur about 4X as long as wide, with irregular posteroventral of short setae and nearly complete wideset anteroventral row of longer setae; metatibia expanded distally (about 1.7X .... as wide as narrowest); fused surstyli only slightly longer than wide and broadly, shallowly concave anteriorly (Figs. 15, 25) ..... *H. procteri* Cresson

### *Hydrellia crassipes* Cresson (Figs. 1-4, 20)

*Hydrellia crassipes* Cresson, 1931, p. 107; 1944, pp. 169, 174.—Wirth 1965, p. 744 [catalog listing]—Deonier, 1971 [in part] pp. 27, 51-52.

**Diagnosis:** Maxillary palpus dark yellow, smoothly angular, slightly spatulate; antenna dark brown except antennomere 3 slightly lighter and often with base reddish-brown, antennomere 3 with dense pale brown dorsomedial micropubescence; 6-9 (usually 6-7) dorsal arisal rays; lower 0.5 of face only slightly convex in profile, with very slight median crease or carina, and dull bronzed (light yellowish-brown or yellowish-gray) except lower corners and lunule often silvery pruinose; 5-6 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; postpronotum and mesoscutum, in dorsolateral view, semiglossy dark grayish-brown with reddish-brown or slightly yellowish-brown pruinosity and overtone; scutellum with 1 pair of microsetulae between apical scutellar macrochaetae; pleuron light bluish-gray pruinose except mod-

erate brown anatergite; 1 mesokatepisternal seta (macrochaetous); 1 basal coxal seta; male metafemur noticeably dilated (only 3.25 times as long as wide), with distal ventral setose elevation and 1 closeset ventral row of short setae on middle 0.3 transcending to smaller closeset setae on basal (proximal) 0.3 and with 1 anteroventral row of distally incremented setae; male metatibia smoothly convexly expanded (posteriorly flanged) on basal 0.6. Male length 2.10-2.45 mm; female 2.30-2.55 mm. Male postabdomen as in Figs.1-2; female postabdomen as in Figs.3-4.

**Description: Head** - Face in profile, with lower 0-5 only slightly convex (not bulging) and with no or only slight median carina; face dull bronzed (light yellowish-brown or yellowish-gray) pruinose except lower corners and lunule often nearly silvery pruinose; antennal foveae indistinct; epistoma smoothly and shallowly to moderately concave in anterior view; parafaciale narrow, unilinear, and usually 1 shade lighter than face; 5-6 primary facial setae in 1 row with 1 upper downcurved secondary facial setula; antenna dark brown except antennomere 3 slightly lighter and often with base reddish-brown; antennomere 3 with dense pale brown dorsomedial micropubescence; 6-9 (usually 6-7) dorsal arisal rays; frontal vitta and parafrontale often scarcely differentiated, mostly golden-brown (light yellowish-brown) pruinose, but sometimes with parafrontale dark brown or velvety black or dark brown and vitta semiglossy moderate brown; fronto-orbital area light brown or concolorous with parafrontale; frons moderately sloping; 15-20 postoculars in fairly regular row immediately postocular; total postoculars 40-56; maxillary palpus dark yellow, smoothly angular and slightly spatulate. Epistomal index .5; mesofacial index 1.5-2.2; vertex index 4.0-5.0; ocular index 8.0-15.0; subcranial index 1.5-2.2; head width / head height 1.3-1.4.

**Thorax:** Postpronotum, mesonotal disc, and scutellar disc, in dorsolateral view, semiglossy dark grayish-brown with reddish-brown or slightly yellowish brown pruinosity and overtone; notopleuron somewhat lighter than mesonotal disc; pleuron light bluish-gray pruinose except moderate brown anatergite; 3-4 (1 macrochaetous) antesutural and 2 (1 macrochaetous) postsutural dorsocentral setae; dorsocentral macrochaetae subequal; scutellum with 1 pair of microsetulae between pair of apical scutellar macrochaetae; 1 mesokatepisternal

seta (macrochaetous); 1 basal coxal; legs sparsely light-gray pruinose over dark grayish-brown except dark yellow tarsi; male metafemur noticeably dilated (only 3.25 times as long as wide), with distal ventral setose elevation and 1 closeset ventral row of short setae on middle 0.3 transcending to smaller closeset setae on basal (proximal) 0.3 and with 1 anteroventral row of distally incremented setae; male metatibia smoothly convexly expanded (posteriorly flanged) on basal 0.6. Wing length 2.40-2.60 mm; wing veins light yellowish-brown; 6-10 dorsal and 10-13 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.4; III/IV 2.6-4.0; V/IV 3.3-4.5; Ml+2 index 1.2-1.6.

**Abdomen:** Terga, in posterodorsal view, semiglossy to glossy dark reddish-brown discally with light-gray pruinose wedges laterally on 2-5 and tergum 6 mostly light-gray pruinose; terga light-gray pruinose laterally and ventrally. Male postabdomen: sternum 5 deeply concave, or recessed posteriorly (horseshoe-shaped); anterolateral margin of sternum 5 roundly angulate (about 100°); copulobus acutangular (about 20°) posteriorly, slightly incurved medially, and sparsely setulose mostly along medial and posterior margin; copulobus with more heavily sclerotized ridge along posteromedial and medial margin abruptly angling across and above copulobus at about 0.6 length of copulobus. Pregonite biramous and curved slightly anterolaterad at posterior end of copulobus; postgonite twisted anteromedial with postgonite uncus directed dorsoanterolaterad distiphallus, in ventral view, striate (fibrillate) tapering to rounded or somewhat mucronate apex; distiphallus, in lateral view, striate and tapering only slightly from basiphallus concealed above fused surstyli; phallapodeme, in lateral view, with prominent rounded middorsal process. Fused surstyli, in ventral view, broadly emarginate (U- or wide V-shaped notch) anteriorly, with about 8-9 setulae anterolaterally and about 4 along length of disc of fused surstyli; fused surstyli length: cercus length (ventral view) 4:1. Syntergum 9+10 small and rounded just posterior to cerci. Female postabdomen: sterna 7 and 8 subequal in shape and size, slightly wider anteriorly and about 1.5 times longer than wide; sternum 6 of similar shape, but slightly longer and wider; sterna 3-5 noticeably wider than 6-8; sternum 8 with about 12 pairs of setulae including pair of laterally projecting long hairlike posterolateral setulae; cercus, in lateral view, somewhat roundly pyriform with about 12 marginal and 8-10 discal setulae; cercus about 1.4

times as long as wide. Ventral receptacle cupuliform, about 1.5 times as deep as wide.

### Type

Holotype male, in Ohio State University Collection.

### Type locality

Ohio: Sandusky, Cedar Point (VIII-4-1902, collector unknown).

### Specimens Examined

OHIO: 5 males, 7 females (paratypes) with same data as holotype. MINNESOTA: Chamber's Creek, Itasca St.Pk. (VII-18-1963, taken on *Nymphaea tuberosa*, D. L. Deonier), 1 male, 1 female. ONTARIO: Marmora (7-VIII-1952, J. F. McAlpine), 1 female. QUEBEC: Perkins Mills (25-VIII-1949, G. E. Shewell), 1 male.

### Remarks

This species can be diagnosed from all others of the group by the distal ventral setose elevation on metafemur, broadly, medially expanded metatibia, and the broad U-shaped anteromedial notch of the fused surstyli in the male as well as the moderately setulose pyriform female cercus. The one recorded adult habitat of *Nymphaea* floating leaf is typical for the group.

### *Hydrellia tibiospica* new species (Figs. 5-8, 23, 36)

**Diagnosis:** Maxillary palpus dark yellow, slightly more angular and more distinctly spathulate than in *H. crassipes*; antenna dark brown except antennomere 3 sometimes with light brown areas; antennomere 3 with dense pale brown dorsomedial micropubescence; 6-9 (usually 6-7) dorsal arisal rays; lower 0.5 of face only slightly convex in profile, with no distinct median carina, and dull bronzed (light yellowish-brown or yellowish-gray) pruinose except lower corners and lunule silvery pruinose; 4-7 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; postpronotum and mesonotum as in *H. crassipes* except often with slightly denser golden brown (light yellowish-brown) pruinosity; scutellum without patch of microsetulae

or paired apical microsetulae; pleuron light bluish-gray pruinose except moderate brown anatergite; 1 mesokatepisternal seta (macrochaetous); 1 basal coxal seta; male metafemur noticeably dilated (only about 3.4 times as long as wide), with median posteroventral setose tubercle, or protuberance and 1-2 closeset rows of short setae on basal 0.2-0.3; male metatibia incrementally expanded basad in form of posterior flange along middle 0.6 and with distinct anterior apical spinous process. Male length 2.00-2.60 mm; female 2.30-2.70 mm. Male postabdomen as in Figs. 5-6; female postabdomen as in Figs. 7-8.

**Description: Head** — Face very much as in *H. crassipes*; 4-7 primary facial setae in 1 row with 1 upper secondary facial setula; antenna dark brown except antennomere 3 sometimes with light brown areas; antennomere 3 with dense pale brown dorsomedial micropubescence; 6-9 (usually 6-7) dorsal arisal rays; frontal vitta, parafrontalia, and fronto-orbital areas very much as in *H. crassipes*; frons moderately sloping; postoculars as in *H. crassipes*; maxillary palpus dark yellow, slightly more angular and more distinctly spathulate than in *H. crassipes*. Epistomal index 1.4-2.0; mesofacial index 1.4-2.4; vertex index 4.0-6.0; ocular index 8.0-12.0; subcranial index 1.5-2.2; head width/head height 1.2-1.4.

**Thorax:** Postpronotum and mesonotum as in *H. crassipes* except often with slightly denser golden-brown (light yellowish-brown) pruinosity; notopleuro often slightly lighter than mesonotal disc; pleuron light bluish-gray (sometimes silvery) pruinose except moderate brown anatergite; 3-5 (1-2 macrochaetous) antesutural and 2-3 (1-2 macrochaetous) postsutural dorsocentral setae; dorsocentral macrochaetae often subequal; scutellum without patch of apical microsetulae or paired apical microsetulae; 1 mesokatepisternal seta (macrochaetous); 1 basal coxal seta; leg color as in *H. crassipes*; male metafemur noticeably dilated (only about 3.4 times as long as wide), with median posteroventral setose tubercle, or protuberance and 1-2 closeset rows of short setae on basal 0.2-0.3; male metatibia incrementally expanded basad in form of posterior flange along middle 0.6 and with distinct anterior apical spinous process. Wing length 2.30-2.70 mm; wing veins light yellowish-brown; 7-12 dorsal and 10-16 anterior interfurcular costal setae; costal-section indices: II/I 1.8-2.6; III/IV 2.6-4.0; V/IV 3.6-5.4; M1+2 index 1.2-1.7.

**Abdomen:** Terga, in posterodorsal view, semiglossy to glossy dark-grayish or reddish-brown discally, light-gray pruinose laterally (definite light-gray wedges on 3 and 4 occasionally) and ventrally. Male postabdomen: Similar to *H. crassipes* except anterolateral margin of sternum 5 more or less rounded through 2 flattened zones to lateral obtusangular about (130°) expansion or shoulder; copulobus acutangular (about 20°) and distinctly incurved posteriorly, and somewhat less regularly setulose sclerotized internal ridge abruptly angle across copulobus at about 0.3-0.4 back along length of copulobus. Pregonite biramous and curved slightly anterolaterad at about midlength of copulobus; postgonite twisted anteromedial with postgonite uncus directed dorso-antrolaterad (opposite to orientation in Fig.6) at about midlength of copulobus; distiphallus, in ventral view, much as in *H. crassipes* except narrower and slightly constricted at midlength; distiphallus, in lateral view, similar to, but narrower than *H. crassipes*; phallapodeme, in lateral view, with prominent truncate, or squarely ending middorsal process. Fused surstyli, in ventral view, with anteromedial margin commonly notched in broad V-shape with 4-6 mostly medially directed anterolateral setulae and about 4 along length of disc of fused surstyli; fused surstyli length: cercus length (ventral view) 2.7:1. Syntergum 9+10 small and rounded just posterior to cerci. Female postabdomen: tergum 6, in profile, with prominent elevation at 0.3-0.5 of length and distinctly flared into flange on posterior margin; sternum 8 densely setulose, about same width, but only 0.6 as long as sternum 7 and with concave posterior margin; sternum 6 lanceolate, much wider anteriorly and rounded at both ends; sterna 3-5 subequal in length, but each wider by about 10% incrementally anteriorly; cercus, in lateral view, semicircular and with 7-9 moderately long marginal and 4-6 discal setulae; cercus with narrow clear marginal zone; cercus about as long as wide. Ventral receptacle cupuliform, about 1.4 times as deep as wide.

### Etymology

The specific epithet, *tibiospica*, is used to refer to the differential male character of the anterior apical metatibial spinous process.

**Type:** Holotype male, USNM.

**Type locality:** Iowa: Spring Lake Rec. Reservoir, Greene Co. (IX-19-1961, D. L. Deonier).

**Paratypes:** IOWA: same data as holotype, 5 males, 6 females; Springbrook S.P., Guthrie Co. (VI-23-1961, D. L. Deonier), 1 female; Goose Lake, Hamilton Co. (VII-2-1962, D. L. Deonier), 2 males, 3 females. MINNESOTA: 6.5 mi. E. of Waubun (VIII-18-1963, D. L. Deonier), 1 male. NORTH CAROLINA: Highlands Biol. Sta., Ravenel L. (VI-17-1968, D. L. Deonier), 2 males, 2 females; (VI-19-1968, on *Nymphaea* leaf, D. L. Deonier), 1 male, 6 females; (VI-20-1968, on *Nymphaea* leaf, D. L. Deonier), 10 males, 2 females; Ravenel L. (W. shore) (VII-2-1968, on *Potamogeton* in light rain, D. L. Deonier), 1 male; Ravenel L. (E. Arm) (VIII-27-1968, on *Nymphaea* leaf, D. L. Deonier), 1 female; (IX-1-1968, on *Juncus*, D. L. Deonier), 2 males; Ravenel L. (II-15-1969, in *Juncus*: pupar. isol. IV-4, ad. emerg. IV-16 [Raf 7 & Raf 24], D. L. Deonier), 1 male, 1 female; (pupar. isol. IV-10, ad. emerg. IV-16 [Raf 22]), 1 (pupar. isol. IV-10, ad. emerg. IV-21 [Raf 23]), 1 female; (pupar. isol. IV-19, ad. emerg. IV-23-26 [Raf 19]), 1 female; (pupar. isol. IV-17, ad. emerg. IV-21-23 [Raf 27]), 1 female; (pupar. isol. IV-9, ad. emerg. IV-21-23 [Raf 17]), 1 male; (pupar. isol. IV-8, ad. emerg. IV-19 [Raf 14]), 1 male; (pupar. isol. IV-7, ad. emerg. IV-14 [Raf 13]), 1 male; (pupar. isol. IV-4, ad. emerg. IV-12-14 [Raf 10]), 1 female; (pupar. isol. IV-4, ad. emerg. IV-14 [Raf 8]), 1 female; (pupar. isol. IV-4, ad. emerg. IV-10 [Raf 5]), 1 female; (pupar. isol. III-24, ad. emerg. III-30 [Raf 2]), 1 male; (larva isol. II-25, ad. emerg. III-21 [Raf 1]), 1 male; (ad. emerg. IV-25 [Raf 28]), 1 female; Ravenel L. (II-15-1969, in *Juncus* [Raf ?], D. L. Deonier), 1 male; Ravenel L. (E. Arm) (VII-14-1971, D. L. Deonier, H4 in cop. with H3), 1 male, 1 female; Ravenel L. (N. Arm) (VIII-27-1971, D. L. Deonier, H5 in cop. with H6), 1 male, 1 female; Highlands, Hall's Pond (IX-7-1972, pre-mark sample), 1 female; Ravenel L. (VII-12-1971, D. L. Deonier, Diatom parts in feces), 1 male; Ravenel L. (VII-19-1971, D. L. Deonier), 1 male; (VII-19-1971, D. L. Deonier, Fld. mark. Testor spray VII-7), 1 male; (VII-13-1971, D. L. Deonier, in cop.), 1 female; (VII-20-1972, D. L. Deonier, Fluor. Dust Exp. II: 16 males, 24 hrs.), 2 males; (VIII-4-1972, D. L. Deonier, Fighting mesov. over dead midge), 1 female; (VIII-20-1972, night coll. Potam. stems & inflor.'s, D. L. Deonier), 5 males, 1 female; Macon Co., Horse Cove Ranch (VIII-18-1971, on *Nymphaea* leaf, D. L. Deonier), 14 males, 3 females; Trussel's Pond, Horse Cove (IX-2-1968, on *P. epihydrus*, D. L. Deonier), 1 male, 1 female; High-

lands, Mirror L. (IX-2-1968, on *P. épihydrus* + *Nymphaea*), 1 male, 1 female.

### Remarks

This species is readily distinguished from the other known members of the *H. crassipes* species group by the following combination of characters: male anterior apical metatibial spinous process; female cercus, in lateral view, round (semicircular) with marginal setulae about or less than cercus length; and absence in both sexes of scutellar microsetulae either as discal patch or pair of apical microsetulae.

### Host Plants

The data recorded under this heading for *H. crassipes* in Deonier (1971) pertain only to *H. tibiospica*, n.sp. In the summer of 1968, at the Highlands Biological Station, Highlands, North Carolina, I found eggs deposited on the tips of rushes of *Juncus debilis* Gray growing in very shallow water. Several white larvae were found in these rushes during this time from which 3 adults were reared. From specimens of this same rush species collected at this station, 15 February 1969, I reared 8 males and 8 females. Adults of this species as with others of the species group seem to spend most of their time feeding and mating on floating vegetation such as *Nymphaea*, *Nupl* and *Potamogeton* and visit the rushes and sedges mainly to oviposit. However, because adults were very rarely found on the floating leaves after dark, but instead almost exclusively on sedges and occasionally emergent *Potamogeton* inflorescences, they must have to move many meters daily where the pond lilies grow far out and at depths much too great for rushes and sedge as was the case at Highlands.

*Hydrellia amplecta*, new species  
(Figs. 9-12, 21, 37-38)

**Diagnosis:** Maxillary palpus dark yellow, wider, more angular and distinctly spathulate than in *H. crassipes* and *tibiospica*; antenna very dark brown or black, with pale brown dorsomedial micropubescence on antennomere 3; 6-9 (usually 7) dorsal arisal rays; lower 0.5-0.7 of face, in profile, roundly bulging, or protuberant and with slight median carina; face mostly dull to subshining

bronzed (light yellowish-brown or -gray) pruinose except lunule nearly silvery pruinose in anterodorsal view; 4-7 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; postpronotum and mesonotum mostly as in *H. crassipes*; scutellum with patch of 6-20 microsetulae; pleuron light-gray pruinose except anterior part of mesokatepisternum light bluish-gray pruinose and anatergite moderate brown; 2 mesokatepisternal setae (1 macrochaetous and 1 nearly setulose); 1 basal coxal seta; male metafemur noticeably dilated (only about 3.4 times as long as wide), with median posteroventral setose tubercle, or protuberance, and 1-2 closeset rows of short setae on basal 0.5; male metatibia evenly and convexly expanded in form of posterior flange along middle 0.6, but without anterior apical spinous process. Male length 2.10-2.50 mm; 2.30-2.90 mm. Male postabdomen as in Figs. 9-10; female postabdomen as in Figs. 11-12.

**Description: Head.** Lower 0.5-0.7 of face, in profile, roundly bulging, or protuberant and with slight median carina; antennal foveae distinct; face mostly dull or subshining bronzed (light yellowish-brown or yellowish-gray) pruinose except lunule near silvery pruinose in anterodorsal view; epistoma often very light grayishyellow in contrast to face and shallowly to moderately concave in anterior view; parafaciale narrow, unilinear, and usually 1 shade lighter than face; 4-7 primary facial setae in 1 row with 1 upper secondary facial setula; antenna dark brown or black, with pale brown dorsomedial micropubescence on antennomere 3; 6-9 (usually 7) dorsal arisal rays; frontal vitta, parafrontalia, and fronto-orbital areas very much as in *H. crassipes*; frons moderately sloping; postoculars as in *H. crassipes*; maxillary palpus dark yellow, wider, more angular and distinctly spathulate than in *H. crassipes* and *H. tibiospica*. Epistomal index 1.2-2.2; mesofacial index 1.6-2.6; vertex index 4.0-6.5; ocular index 7.6-12.0; subcranial index 1.7-2.4; head width/head height 1.2-1.4.

**Thorax:** Postpronotum and mesonotum as in *H. crassipes*; pleuron light gray pruinose except anterior part of mesokatepisternum light bluish-gray pruinose and anatergite moderate brown; 3-5 (1 macrochaetous) antesutural and 2-3 (2 macrochaetous) postsutural dorsocentral setae; dorsocentral macrochaetae often subequal; scutellum with small patch of 6-20 pale brown microsetulae mostly between apical scutellar macrochaetae; 2 mesokatepisternal (1 macrochaetous and 1 nearly

setulous) setae; 1 basal coxal seta; leg color as in *H. crassipes*; male metafemur noticeably dilated (only about 3.4 times as long as wide), with median posteroventral setose tubercle, or protuberance, and 1-2 closeset rows of short setae on basal 0.5; male metatibia evenly and convexly expanded in form of posterior flange along middle 0.6, but without anterior apical spinous process as in *H. tibiospica*. Wing length 2.20-2.90 mm; wing veins light yellowish-brown; 7-9 dorsal and 9-12 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.6; III/IV 2.6-3.6; V/IV 3.4-4.6; MI+2 index 1.3-1.6.

**Abdomen:** Terga, in posterodorsal view, semiglossy to glossy dark grayish or reddish-brown discally, light bluish-gray pruinose laterally on 1-2 and light-gray pruinose on 3-5 with indefinite lateral wedges; ventral lobes mostly light-gray pruinose. Male postabdomen: Similar to *H. crassipes* except anterolateral margin of sternum 5 smoothly rounded and flaring into copulobi through angle of about 145° posteriad to slight emargination about midlength of copulobus; copulobus acutangular (about 15°) and only slightly incurved posteriorly, and more or less regularly setulose along medial margin of copulobus; sclerotized internal ridge abruptly angled across copulobus at about 0.5 back along length of copulobus. Pregonite shallowly biramous and curved slightly anterolaterad at about midlength of copulobus; postgonite twisted anteromedial with postgonite uncus directed dorsoanterolaterad (opposite orientation shown in Fig.10) at about midlength of copulobus; distiphallus, in ventral view, much as in *H. crassipes* except narrower, slightly constricted at midlength, and slightly shorter; phallus, in lateral view, with distiphallus more tapering and basiphallus noticeably thicker than in *H. crassipes*; phallapodeme, in lateral view, with prominent, somewhat capitate and rounded middorsal process. Fused surstyli, in ventral view, with anteromedial margin commonly notched in broad V-shape with 4-6 anterolateral setulae and 4-6 setulae along length of disc of fused surstyli; fused surstyli length: cercus length (ventral view) 4.0:1. Syntergum 9+10 small and rounded just posterior and lateral to cerci. Female postabdomen: tergum 6, in profile, without midlength prominence and flared or flanged posterior margin; sternum 8, in ventral view, spatulate, with posterior width about 2 times anterior and with 2 pairs of long, hairlike posterolateral setulae and 6-8 discal and lateral setulae; sternum 7 more or less quadrate, about as wide as widest

part of 8, and with about 3 pairs of long, hairlike posterolateral setulae and about 6 pairs of shorter discal and marginal setulae; sternum 6 slightly wider than 7 and 8 and about 1.5 times wider anteriorly than posteriorly; sterna 2-5 incrementally wider anteriorly by 5-10%; cercus, in lateral view, semicircular and with 6-8 very long, hairlike marginal setulae and 4-6 discal setulae; cercus, in lateral view in dead specimen, usually dark gray or grayish-brown and distinctly "hairy"; cercus about as long as wide. Ventral receptacle cupuliform, about 1.3 times as deep as wide.

### Etymology

The specific epithet, *amplecta*, is used to refer to the grasping, or clasping, function of the dilated and expanded male metafemora and metatibiae in copulation.

**Type:** Holotype male, USNM

**Type locality:** Minnesota: Two Island Lake, Itasca St.Pk., Becker Co. (VI-28-1963, taken in floating vegetation zone, D. L. Deonier).

**Paratypes:** MINNESOTA: same data as holotype, 1 male, 3 females; 1.3 mi. S of main entrance, Itasca St.Pk. (VI-26-1963, *Potamogeton natans*, D. L. Deonier), 2 males; (VI-26-1963, taken on *Nymphaea tuberosa*, D. L. Deonier), 1 female; Squaw Lake, Itasca St.Pk. (VIII-14-1963, *Potamogeton natans*, D. L. Deonier), 2 females.

### Remarks

In addition to the diagnostic characters of the male hind leg, this species can be separated from *H. tibiospica*, *n.sp.* by a much narrower anteromedial notch in the fused surstyli and much longer setulae ("hairy") on the female cercus. The recorded adult habitats of floating leaves of *Nymphaea* and *Potamogeton* seem typical for the group.

*Hydrellia saltator* Deonier  
(Figs.13-14,22)

*Hydrellia saltator* Deonier, 1971, p. 94.

**Diagnosis:** Maxillary palpus dark yellow, smoothly angular and slightly spatulate; antenna velvety very dark brown, with antennomere 3 bearing dense pale brown dorsomedial micropubescence; 5-9 (usually 7) dorsal arisal rays; lower 0.5 of face only slightly convex in profile, with no distinct median carina, and bronzed (light yellowish-brown or yellowish-gray) pruinose centrally, periphery, parafacialia, and lunule nearly silvery pruinose; 6-7 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; postpronotum and mesonotum mostly as in *H. crassipes* except often denser golden-brown (light yellowish-brown) pruinosity; scutellum without patch of microsetulae or paired apical microsetulae; pleuron light bluish-gray pruinose except moderate brown anatergite; 1 mesokatepisternal seta (macrochaetous); 2 basal coxal setae; male metafemur only slightly dilated (about 4.3 times as long as wide), without setose ventral tubercles or protuberances or closeset rows of short setae; male metatibia incrementally expanded distad, with only slight posterior flange on distal 0.5. Male length 2.72 mm; female 3.06 mm. Male postabdomen as in Figs.13-14 ; female postabdomen not illustrated.

**Description: Head.** Lower 0.5 of face only slightly convex in profile, with no distinct median carina, and bronzed (light yellowish-brown or yellowish-gray) pruinose centrally periphery, parafacialia, and lunule nearly silvery pruinose; antennal foveae indistinct; epistoma as in *H. crassipes*; 6-7 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; antenna velvety very dark brown with antennomere 3 bearing dense pale brown dorsomedial micropubescence; 5-9(usually 7) dorsal arisal rays; frons, postoculars, and maxillary palpus as in *H. crassipes*. Epistomal index 1.6-1.9; mesofacial index 1.7-2.0; vertex index 4.5-5.5; ocular index 6.0-7.0; subcranial 1.5-2.0; head width/head height 1.3-1.4.

**Thorax:** Postpronotum and mesonotum mostly as in *H. crassipes* except often with denser golden-brown (light yellowish-brown) pruinosity; pleuron light bluish-gray pruinose except moderate brown anatergite; 3-4 (1 macrochaetous) antesutural and 2 (1 macrochaetous) postsutural dorsocentral setae; scutellum without patch of microsetulae or paired apical microsetulae; 1 mesokatepisternal (macrochaetous) seta; 2 basal coxal setae; male metafemur only slightly dilated (about 4.3 times as

long as wide), without setose ventral tubercles or protuberances or closeset ventral rows of short setae; male metatibia incrementally expanded distad, with only slight posterior flange on distal 0.5. Wing length 2.47-2.98 mm; wing veins light yellowish-brown; 7-10 dorsal and 10-12 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.0; III/IV 3.4-3.9; V/IV 3.5-4.2; M1+2 index 1.4-1.6.

**Abdomen:** Terga, in posterodorsal view, as in *H. crassipes*. Male postabdomen: Similar to *H. crassipes* except anterolateral margin of sternum 5 smoothly rounded (through about 140°); copulobus acutangular (about 15°) posteriorly with tip projecting straight backward or slightly curved laterad; copulobus setulosity similar to *H. crassipes*. Pregonite biramous and curved slightly anterolaterad at about midlength of copulobus; postgonite twisted anteromedial with more or less truncate, postgonite uncus directed laterad (perhaps also somewhat dorsad) at about midlength of copulobus; distiphallus, in ventral view, striate, somewhat carinate, and tapering to more or less mucronate apex, distiphallus, in lateral view, tapering from enlarged basiphallus (concealed in ventral view by fused surstyli) to slightly downcurved malliform apex; phallapodeme, in lateral view, with prominent truncate and slightly striated middorsal process. Fused surstyli, in ventral view, deeply emarginate anteromedially as a V-shaped notch with 4-6 setulae anterolaterally; fused surstyli length: cercus length (ventral view) 4.5:1. Syntergum 9+10 small and roundly triangulate just posterior to cerci. Female postabdomen: not illustrated.

**Type:** Holotype male, CNC 11652.

**Type locality:** Canada: Grand Bend, Ontario (VII-10-1939, G. E. Shewell).

**Paratypes:** 1 female with same data as holotype.

### Remarks

Until additional specimens are collected, even the taxonomic picture of this species will remain obscure. The 1 female paratype could not be located at the type depository.

*Hydrellia procteri* Cresson

(Figs. 15-18, 25)

*Hydrellia proctori* Cresson, 1934, p. 235.*Hydrellia procteri*: Cresson. 1936. p. 257 (emendation of *lapsus calami*); 1944, pp. 169, 174. - Deonier, 1964, p. 116; 1965, pp. 500, 506 [ecology]; 1971, pp. 90-91. - Wirth, 1965, p. 744 [catalog listing].

**Diagnosis:** Maxillary palpus moderate yellow, spathulate; antenna dark brown, with antennomere 3 bearing moderately dense pale gray dorsomedial micropubescence; 6-8 (usually 7) dorsal aristal rays; lower 0.6 of face only slightly convex in profile, medially acarinate, and mostly dull bronzed (light yellowish-gray) except epistoma, very narrow unilinear parafacialia, slight antennal foveae, and lunule often slightly shining golden or silvery pruinose; 4-5 primary facial setae in 1 row with 1 downcurved upper secondary facial setula; postpronotum and mesonotum, in dorsolateral view, semiglossy dark grayish-brown pruinose; pleuron mostly light bluish-gray pruinose except moderate brown anatergite; 1 mesokatepisternal seta (macrochaetous); 1 basal coxal seta; male metafemur somewhat dilated (3.6 times as long as wide), with somewhat irregular closeset posteroventral row (double proximally) of spinoid setae and 1 anteroventral row of slightly distally incremented setae; male metatibia distally expanded (1.7 times as wide as narrowest), but not flanged as in others of *H. crassipes* species group. Male length 1.50-2.04 mm; female 1.70-2.04 mm. Male postabdomen as in Figs. 15-16; female postabdomen as in Figs. 17-18.

**Description: Head.** Lower 0.5 of face only slightly convex in profile, without median carina, and mostly dull bronzed (light yellowish-gray) except epistoma, very narrow unilinear parafacialia, slight antennal foveae, and lunule often slightly shining golden or silvery pruinose; epistoma moderately and smoothly concave; 4-5 primary facial setae in 1 row with 1 upper downcurved secondary facial setula; antenna dark brown, with antennomere 3 bearing moderately dense pale gray dorsomedial micropubescence; 6-8 (usually 7) dorsal aristal rays; frons mostly uniformly golden-brown (light yellowish-brown) pruinose, with parafrontale and fronto-orbital area sometimes dark brown; frons moderately sloping; 13-16 postoculars in fairly regular row immediately postocular in a total of 30-40 postoculars; maxillary

palpus moderate yellow, long, angular, and distinctly spathulate. Epistomal index 1.0-1.4; mesofacial index 2.0-2.5; vertex index 4.0-4.4; ocular index 11.5-14.0; subcranial index 1.8-2.6; head width/head height 1.3-1.4.

**Thorax:** Postpronotum and mesonotum, in dorsolateral view, semiglossy dark grayish-brown pruinose; pleuron light bluish-gray pruinose except light-brown upper edge of mesanepimeron and moderate brown anatergite; 3-4 (1 macrochaetous) antesutural and 2 (1 macrochaetous) postsutural dorsocentral setae; 1 mesokatepisternal (macrochaetous) seta; 1 basal coxal seta; legs light-gray pruinose over dark grayish-brown except light-moderate yellow tarsi (tarsomere 5 light to dark brown); male metafemur somewhat dilated (3.6 times as long as wide), with somewhat irregular closeset posteroventral row (double proximally) of spinoid setae and 1 anteroventral row of slightly distally incremented setae; male metatibia distally expanded (1.7 times as wide as narrowest part), but not flanged as in others of *H. crassipes* species group. Wing length 1.70-2.13 mm; veins light to dark brown; 7-8 dorsal and 10-12 anterior interfractural costals; costal-section indices: II:I 2.0-2.3; III:IV 3.0-3.5; V:IV 3.6-4.2; M1+2 index 1.5-2.0.

**Abdomen:** Terga dark brown medially, light bluish-gray laterally and ventrally. Male postabdomen: sternum 5 deeply concave or recessed posteriorly (horseshoe-shaped); anterolateral margin of sternum 5 roundly angulate (about 100°); copulobus acutangular (about 20°) posteriorly, slightly incurved medially and densely setulose on posterior 0.5; copulobus with slightly-more heavily sclerotized ridge along posteromedial and medial margin abruptly angling across and above copulobus at about midlength. Pregonite with short biramous tip curved slightly anterolaterad at copulobus midlength just medial to postgonite; postgonite twisted anteromedial and then anterior with postgonite uncus directed dorsoanterolaterad; distiphallus, in ventral view, striate (fibrillate) tapering to preapical constriction before rounded apex; distiphallus, in lateral view, striate and tapering sharply to acute apex anterior to shallow carina at distal 0.25; basiphallus separated from distiphallus by heavily sclerotized rim projecting as short spinous processes on each side of anterior end of fused surstyli; phallapodeme, in lateral view, with prominent rounded anterodorsal process. Fused surstyli, in ventral view, broadly and shallowly concave anteromedially with about 10-14

setulae anterolaterally; fused surstyli length: cercus length (ventral view) 4:1. Syntergum 9+10 small and rounded just posterior to cerci. Female postabdomen: sternum 8 concave posteriorly about as wide as 7, but only about 0.5-0.7 as long; sterna 3-6 quasi-quadrate and often slightly longer than wide; sternum 2 about 1.5 times as wide as long; tergal setae noticeably stronger than in others of species group: cercus, in lateral view, somewhat lensoid or semicircular with dorsum convex and venter flat and with no noticeable marginal or discal setulae (only pubescence); cercus about 1.2 times as long as wide. Ventral receptacle cupuliform, about as wide as deep.

**Type:** Holotype male, ANSP 6152.

**Type locality:** Maine: Bar Harbor, Mount Desert Island (V-7-1933, W. Procter).

**Specimens Examined:** 52 (15 males, 37 females) from 11 localities: CONNECTICUT: SW corner of Sleeping Giant St.Pk., near Hamden (VII-30-1961, J. Laffoon), 1 female. ILLINOIS: Chicago (VIII-29-1896, W. Wheeler), 1 female. IOWA: Goose Lake, Hamilton Co. (VII-14-1960, D. L. Deonier), 1 male; Ledges St.Pk., Boone Co. (VIII-16-1960, D. L. Deonier), 1 male; Little Wall Lake, Hamilton Co. (VIII-13-1960, D. L. Deonier), 2 males, 8 females, (VIII-27-1960, D. L. Deonier), 2 females, (IX-22-1962, D. L. Deonier), 1 male, 1 female; Spring Lake, Greene Co. (IX-19-1961, D. L. Deonier), 4 males, 12 females; Springbrook St.Pk., W sec.33, T.81N, R.31W, Guthrie Co. (VII-19-1960, D. L. Deonier), 1 female. KANSAS: Marais des Cygnes Wildlife Refuge, Linn Co. (IX-5-1961, D. L. Deonier), 5 males, 8 females. MAINE: Bar Harbor, Mount Desert Island (VII-15-1933, W. Procter), 1 male; Mount Desert Island (VII-25-1935, W. Procter), 2 males. MICHIGAN: Augusta (X-4-1953, coll. unknown), 1 female.

### Remarks

Although most of the similarities of this species to others of the *crassipes* group are in coloration and male hind-leg modification, there are some in the male and female postabdomina. The distiphallus is striate (fibrillate) and the posteromedial edge of sternum 5 is heavily sclerotized. Adult habitats recorded include leaves of *Potamogeton nodosus*

and *Nelumbo lutea*; limnic wrack, sedge meadow, mud flat, and riffle rocks.

### *Hydrellia ocalae*, new species

(Figs. 24, 26-30, 39-40, 42A)

**Diagnosis:** Maxillary palpus dark yellow, spatulate; antenna mostly dark brown or black except antennomere III occasionally with orange splotching usually 6) dorsal arisal rays; face light grayish-yellow or dull silvery pruinose; 5-7 primary facial setae with 1 upper decurved secondary facial setula; epistomal index 1.5-1.8; mesonotum mostly semiglossy dark brown or dark grayish-brown pruinose in contrast to densely light-gray pruinose pleuron; abdomen, in lateral and posterolateral view, with distinct light-gray or bluish-gray pruinose fasciae ventrally to dorsolaterally on terga 2-5; 1 antesutural and 1 postsutural dorsocentral macrochaeta; tibiae, except yellow apices (distal 0.15-0.20 and femora sparsely light-gray pruinose over dark grayish-brown; male metafemur conspicuously expanded (about 2.0-2.5 X diameter of mesofemur) and with dense posteroventral row of spinoid setae along most of its length; male metatibia expanded apically (distal 0.20) and with posteroventral groove and flange preceded basally by long ovoid posterior cavity capped by broad tubercular expansion of flange (Figs. 24, 40, 42A); female, mesotibia not noticeably expanded at midlength. Male length 1.90-2.40 mm; female 2.10-2.50 mm. Male postabdomen as Figs. 26-27; female postabdomen a in Figs. 28-30.

**Description: Head.** Face and lunule very light grayish-yellow or dull silvery pruinose, flat or only slightly convex in profile and nearly perpendicular (lower 0.5 somewhat protruding in some females); parafaciale only slightly lighter than face; epistoma usually evenly and moderately concave in anterior view; 5-7 (usually 6) primary with 1 upper decurved secondary facial setula above primary row; antenna dark brown or black except antennomere III occasionally with orange splotching; antennomere III with dense, usually dark dorsomedial micropubescence; 6-8 (usually 6) dorsal arisal rays; frontal vitta and parafrontale dark brown with vitta having slightly more light-brown pruinosity; fronto-orbital seta mostly posterolatero-clinate and 1.3-2.0 times as long as anterior seta; 30-40 postocular setae, with 1 fairly regular row of 15-20 setae near orbit; maxillary palpus dark yellow,

spathulate. Epistomal index 1.5-1.8; mesofacial index 1.8-2.6; vertex index 4.5-6.5; ocular index 6.0-11.0; subcranial index 1.5-2.8; head width/head height 1.2-1.5.

**Thorax:** Postpronotum light-brown pruinose except small corner light-gray pruinose; mesoscutum semiglossy moderate grayish-brown pruinose with slight light yellowish-brown overtone in dorsolateral view; scutellum and notopleuron similar but slightly lighter; pleuron, except brown anatergite, densely light-gray pruinose; 3-4 (1 macrochaetous) antesutural and 2 (1 macrochaetous) postsutural dorsocentral setae; 1 mesokatepisternal seta; tibiae, except yellow apices (distal 0.15-0.20), and femora sparsely light-gray pruinose over dark grayish-brown; tarsi light to dark yellow or orange; male metafemur conspicuously expanded (about 2.0-2.5 X diameter of mesofemur) and with dense posteroventral row of black spinoid setae on basal 0.6 aligned with 3-4 stouter conical spinoid setae on distal 0.20; male metatibia expanded apically (distal 0.20) and with posteroventral groove and flange preceded basally by long ovoid posterior cavity capped by broad tubercular expansion of flange (on proximal or basal 0.20 and approximately matching gap between 2 types of spinoid setae in posteroventral femoral row); female mesotibia not noticeably expanded at midlength. Wing length 1.60-2.10 mm; wing veins, except dark brown costa, light yellowish-brown; 6-7 dorsal and 8-10 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.5; III/IV 2.6-3.5; V/IV 3.5-4.3; M1+2 1.3-1.6

**Abdomen:** Terga semiglossy dark-brown pruinose discally in posterodorsal view with light-gray or blue-gray wedge-shaped fasciae covering mainly corners of terga 2-5 in both sexes and all of tergum 6 in female in dorsal view; lateral and ventral parts of terga entirely light-gray pruinose. Male postabdomen: sternum 5 deeply concave posteromedially, forming paired posteriorly directed copulobi connected by narrow anteromedial arch (overlapped by sternum 4); anterolateral margin of sternum 5 roundly obtusangular; copulobus acutangular (about 20°) with inner (posteromedial) oblique margin bearing row of spinoid microsetulae. Pregonite concealed in ventral and lateral views; postgonite, in ventral view, mostly concealed by copulobus, with arm directed anteromedially and postgonite uncus curving directly laterad above copulobus; distiphallus, in ventral view, striate (fibrillate), gradually tapering to slightly asymmetrical roundly acute apex between the copulobi; distiphallus, in lateral view, striate, tapering, but

somewhat constricted at midlength and with expanded, decurved apex; basiphallus, in ventral view, broadly rounded posteriorly; in lateral view, somewhat upcurved ventrally between border with distiphallus and posterior ridge; phallapodeme, in lateral view, tapering at shallow angle posteriorly and at sharp angle anteriorly from elevated anterodorsal process bearing noticeable condyle scar. Fused surstyli, in ventral view, triangular with narrow, shallow anteromedial notch, mostly yellow and with several microsetulae mainly on anterior 0.5; fused surstyli length: cercus length 2.5:1. Syntergum 9+10 (epandrium) rounded posteriorly, but mostly concealed. Female postabdomen: sternum 8 quasiquadrate, subequal in shape and width to 7; sternum 6 widest of sterna and noticeably wider than 7 and 8; sternum 5 slightly longer than 6; cercus, in lateral view, obellipsoidal, rounded posteriorly, and fairly uniformly microsetulose; intercercal lobe more or less circular and uniformly microsetulose, visible ventrally and laterally; cercus about 1.6 times as long as wide. Ventral receptacle cupuliform, about as wide as deep.

### Etymology

The specific epithet, *ocalae*, is used to denote the Ocala National Forest which surrounds the type locality.

**Type:** Holotype male, USNM.

**Type locality:** Florida: Lake Co: L. Yale, SE shore (VII-6-1990, D. L. Deonier, on *Nymph. odor.* in grass).

**Paratypes:** Same data as holotype, 2 males, 1 female; L. Yale, S shore, VII-22-1992, D. L. Deonier, on *Nymphaea* in grass), 2 males, 1 female; Alachua Co: L. Alto, N+E 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), 1 male.

### Remarks

Based upon the striate (fibrillate) distiphallus, large, laterally directed postgonite unci, shape of fused surstyli, mostly concealed syntergum 9+10 (epandrium), and the deplexiform (clasping) hind legs of males as well as habitat type, I have placed this species in the *H. crassipes* species group. The

*H. nobilis* species group is perhaps closely allied, for it shares some of the male genitalic characters, but does not exhibit male metafemora and metatibiae adapted for clasping the female during copulation.

***Hydrellia bryani*, new species**

(Figs. 19, 31-35, 41, 42B)

**Diagnosis:** Maxillary palpus light to dark yellow, angular spathulate; antenna mostly dark brown except antennomere III orange or orange and brown spotted and with dense dorsomedial micropubescence; 7-13 (usually 8-9) dorsal arisal rays; face very light grayish-yellow; 4-10 (usually 6-7) primary facial setae with 1 upper decurved secondary facial setula; epistomal index 1.7-2.0; mesonotum mostly semiglossy dark brown or dark grayish-brown pruinose in contrast to densely lightgray pruinose pleuron; abdomen, in lateral and posterolateral views, with distinct light-gray or bluish-gray pruinose fasciae running from ventral dorso-laterad on terga 2-5; 1 antesutural and 1 postsutural dorsocentral macrochaeta; tibiae mostly light to dark yellow in contrast to dark femora; male metafemur conspicuously expanded (about 2.0 X diameter of mesofemur) and with dense posteroventral row of dark setae along most of its length (Figs. 19, 41, 42B); female mesotibia slightly, but distinctly expanded at midlength. Male length 1.90-2.50 mm; female 2.35-2.85 mm. Male postabdomen as in Figs. 31-32; female postabdomen as in Figs. 33-35.

**Description: Head.** Face and lunule very light grayish-yellow, flat or only slightly convex in profile and nearly perpendicular; parafaciale about 1 shade lighter than face; epistoma usually evenly and moderately concave in anterior view; 4-10 (usually 6-7) primary facial setae with 1 upper decurved secondary facial setula above primary row; antenna dark brown except antennomere II with some orange dorsoapically and antennomere III orange or brown spotted with orange; antennomere III with dense, usually pale dorsomedial micropubescence; 7-13 (usually 8-9) dorsal arisal rays; frons moderately sloping; frontal vitta densely pruinose light brown or light yellowish-brown, contrasting somewhat with darker gray parafrontale; fronto-orbital area light to medium brown and slightly differentiated from parafrontale; posterior fronto-orbital seta mostly posterolateroclinate and 1.3-2.0 times as long as anterior seta; 30-40 postoc-

ular setae, with 1 fairly regular row of 15-20 setae near orbit; maxillary palpus light to dark yellow, angular spathulate. Epistomal index 1.7-2.0; mesofacial index 2.0-3.0; vertex index 5.0-9.0; ocular index 8.0-11.0; subcranial index 1.6-2.5; head width/head height 1.2-1.5.

**Thorax:** Postpronotum dark brown spotted with very dark gray; mesoscutum semiglossy dark-brown pruinose with slight reddish overtone in dorsolateral view; scutellum and notopleuron similar but slightly lighter; pleuron, except brown anatergite, densely light-gray pruinose; 3-4 (1 macrochaetous) antesutural and 2 (1 macrochaetous) postsutural dorsocentral setae; 1 mesokatepisternal seta; femora sparsely light-gray pruinose over dark grayish-brown; tibiae and tarsi light to dark yellow or orange; male metafemur conspicuously expanded (about 2.0X diameter of mesofemur) and with dense posteroventral row of dark setae along most of its length; female mesotibia slightly, but distinctly expanded at midlength. Wing length 1.90-2.60 mm; wing veins, except dark brown costa, light yellowish-brown; 6-9 dorsal and 9-12 anterior interfractural costal setae; costal-section indices: II/I 1.8-2.4; III/IV 2.5-3.6; V/IV 2.9-4.0; M1+2 index 1.2-1.5.

**Abdomen:** Terga semiglossy dark-brown pruinose discally in posterodorsal view with light-gray or blue-gray wedge-shaped fasciae extending dorsomedially from lateral and ventral lobes of terga 2-5 in male and 2-6 in female (covering mainly corners of terga in dorsal view). Male postabdomen: sternum 5 composed of paired, slightly outcurved, posteriorly directed, microsetulose copulobi; anterolateral margin of sternum 5 obtusangular (about 100°); copulobus very acutangular posteriorly, notched slightly midlaterally, and irregularly microsetulose or microspinulose. Pregonite mostly concealed in ventral and lateral views behind larger, exposed postgonite; postgonite, in ventral view, with arm projecting anteriorly parallel and lateral to copulobus to spirally twisted tip bearing anterolaterally directed postgonite uncus; distiphallus, in ventral view, generally tapering to somewhat mucronate apex from sharply flaring heavily sclerotized rim; distiphallus, in lateral view, gradually tapering to slightly decurved apex from broad, anteriorly bowed sclerotized rim; distiphallus, in all views, striate (or fibrillate) and with variably visible membranous endophallus at apex; basiphallus, in ventral view, much narrower than spinous basal rim of distiphallus and composed of 2 arms (fused or partially fused); in lateral view only some-

what narrower than flaring, sclerotized basal rim of distiphallus; phallapodeme, in lateral view, very obliquely angled towards both ends from an inconspicuous middorsal process and condyle. Fused surstyli broadly and shallowly notched anteromedially, with few anteromedioclinate microsetulae; fused surstyli yellow, with 3-5 pairs of microsetulae at midlength and several (10-12 including notch) pairs of microsetulae distally; fused surstyli length: cercus length (ventral view) 3.8:1. Syntergum 9+10 rounded and mostly concealed. Female postabdomen: sternum 8, in ventral view, subequal in length and width to 7, but slightly more triangular; sternum 6 quadrangular and about 1.5 times length of 7 or 8; most visible sterna subequal in width; cercus, in lateral view, broadly pyriform, with posterior border broadly convex, or rounded and fairly densely microsetulose; cercus about 1.3 times as wide as long. Ventral receptacle cupuliform, about 1.2 times as deep as wide.

### Etymology

The specific epithet, *bryani*, is used to honor my son, Mr. Bryan C. Deonier, who, while acting as field assistant, was the first to collect the species.

**Type:** Holotype male, USNM.

**Type locality:** Florida: Lake Co: L. Yale, SE shore (VII-6-1990, B. C. Deonier, on *Nymph. odor.* in grass).

**Paratypes:** FLORIDA: Lake Co: L. Yale, SE shore (VII-6-1990, B. C. Deonier, on *Nymphaea odorata* in grass + sedge), 1 male, 2 females; (VII-6-1990, D. L. Deonier on *Nymphaea odorata* in grass + sedge), 10 males, 11 females; (VII-22-1992 D. L. Deonier, on *Nymphaea* in grass), 12 males, 11 females; Highlands Co: L. Istokpoga, Henderson Cove (VII-13-1990, B. C. Deonier, on *Nuphar* + *Nymph.* 1 female; L. Istokpoga, Istokpoga Canal (VII-13-1990, B. C. Deonier, on *Nuphar*), 1 female; (VII-13-1990, D. L. Deonier, on *Nuphar* + *Pistia*), 3 males, 5 females; (VII-13-1990, D. L. Deonier, on *Nuphar*), 1 female; (VII-13-1990, M. Lillpop, on *Nuphar* in *Pistia*), 2 females; L. Istokpoga, E. shore (VII-13-1990, D. L. Deonier, on *Pontederia*), 1 male; Broward Co: Everglades Holiday Pk., Conserv. Area 3 (VII-20-1990, D. L. Deonier, on sm. *Nymph. odor.* in sparse *Eleocharis*), 5 males, 2 females; (VII-20-1990, W. C. Durden, on sm. *Nymph. odor.* in sparse *Eleocharis*),

1 male; (VII-201990, D. L. Deonier, on *Nuphar* in canals), 2 males; Alachua Co: L. Alto, E + N shores (V-5-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* in grass), 1 male, 1 female; L. Alto, E shore (V-6-1993, D. L. Deonier, on *Nuphar* + *Nymphoides* (in grass) 3 males.

### Remarks

See under *H. ocalae*, n.sp. Because of the striate distiphallus, laterocline postgonite unci, clasping male hind legs, etc., this close relative of *ocalae* is placed in the *H. crassipes* species group. Although more frequently encountered than *ocalae*, this species still fits the scattered small population characterization of the entire species group. As with others of the group, the habitat type leads to a suspicion of a sedge or grass as the principal host-plant species.

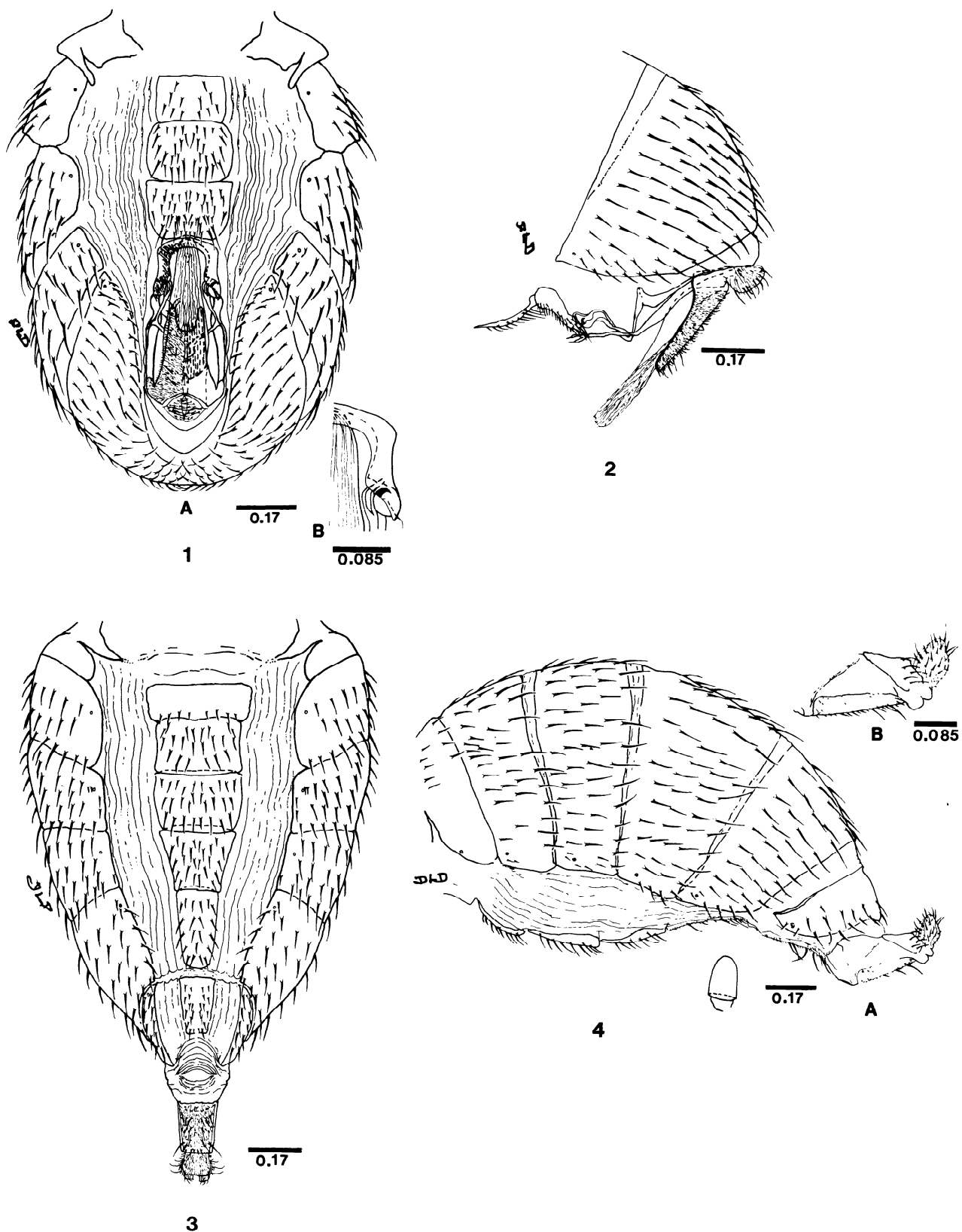
### Acknowledgements

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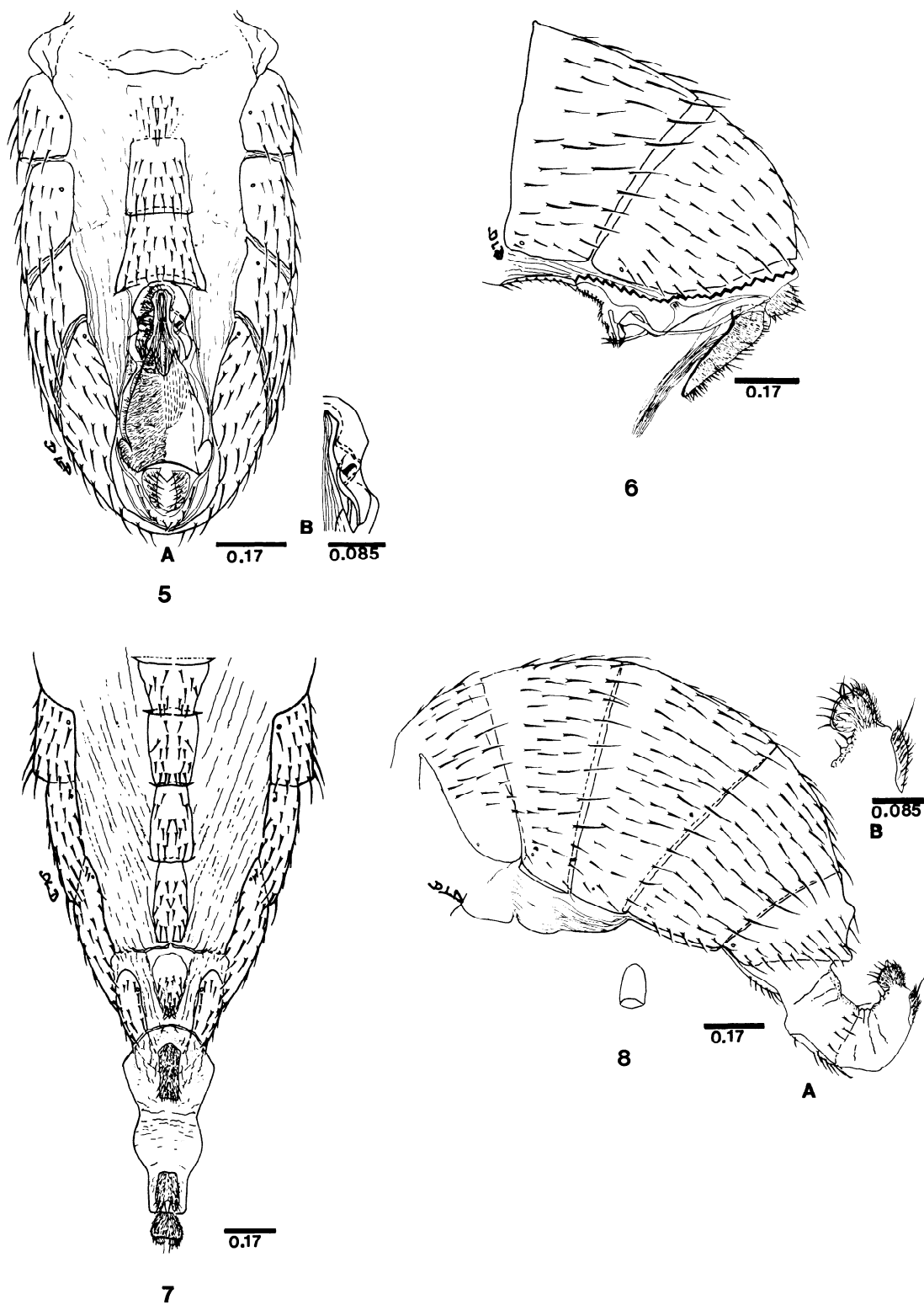
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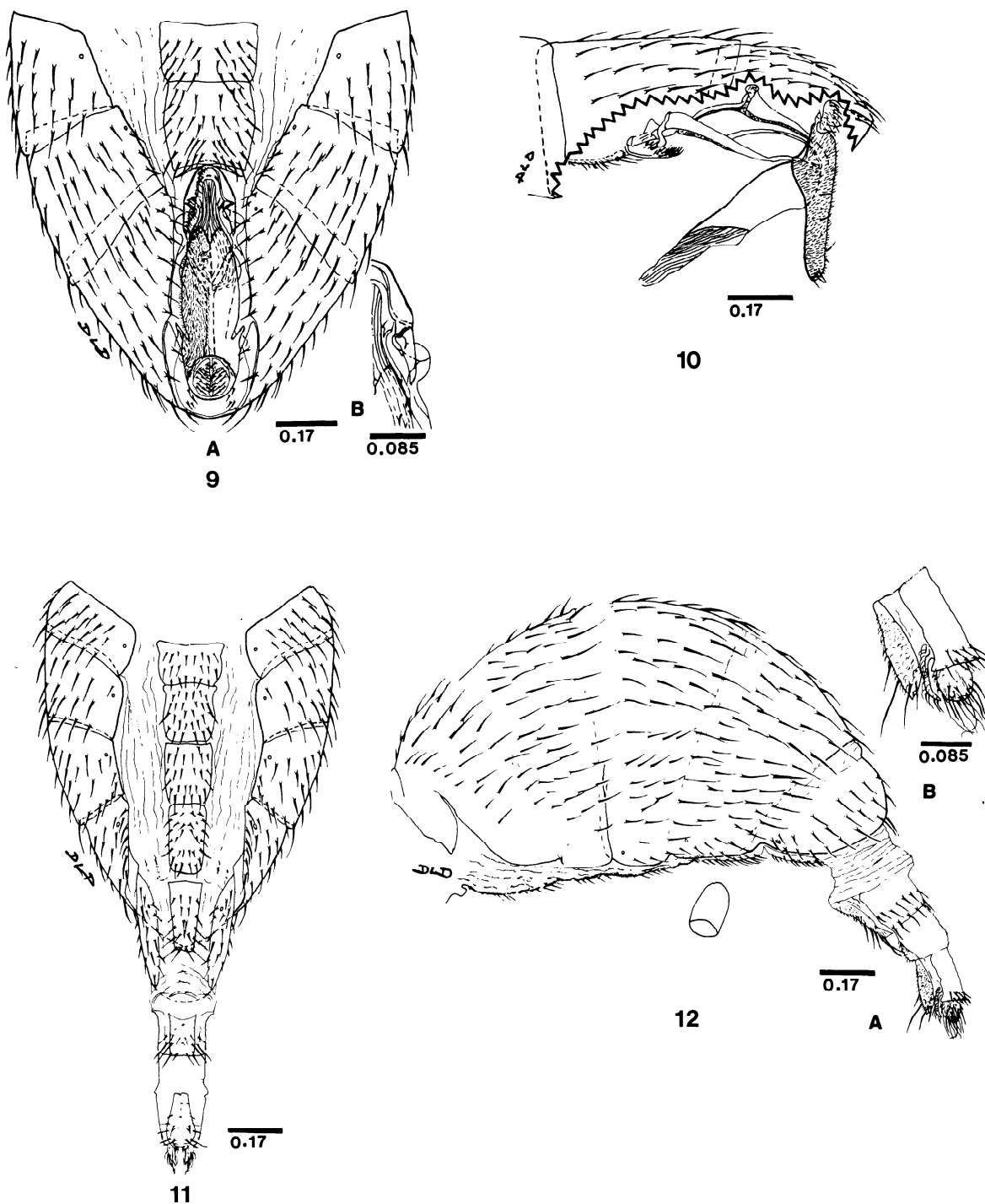
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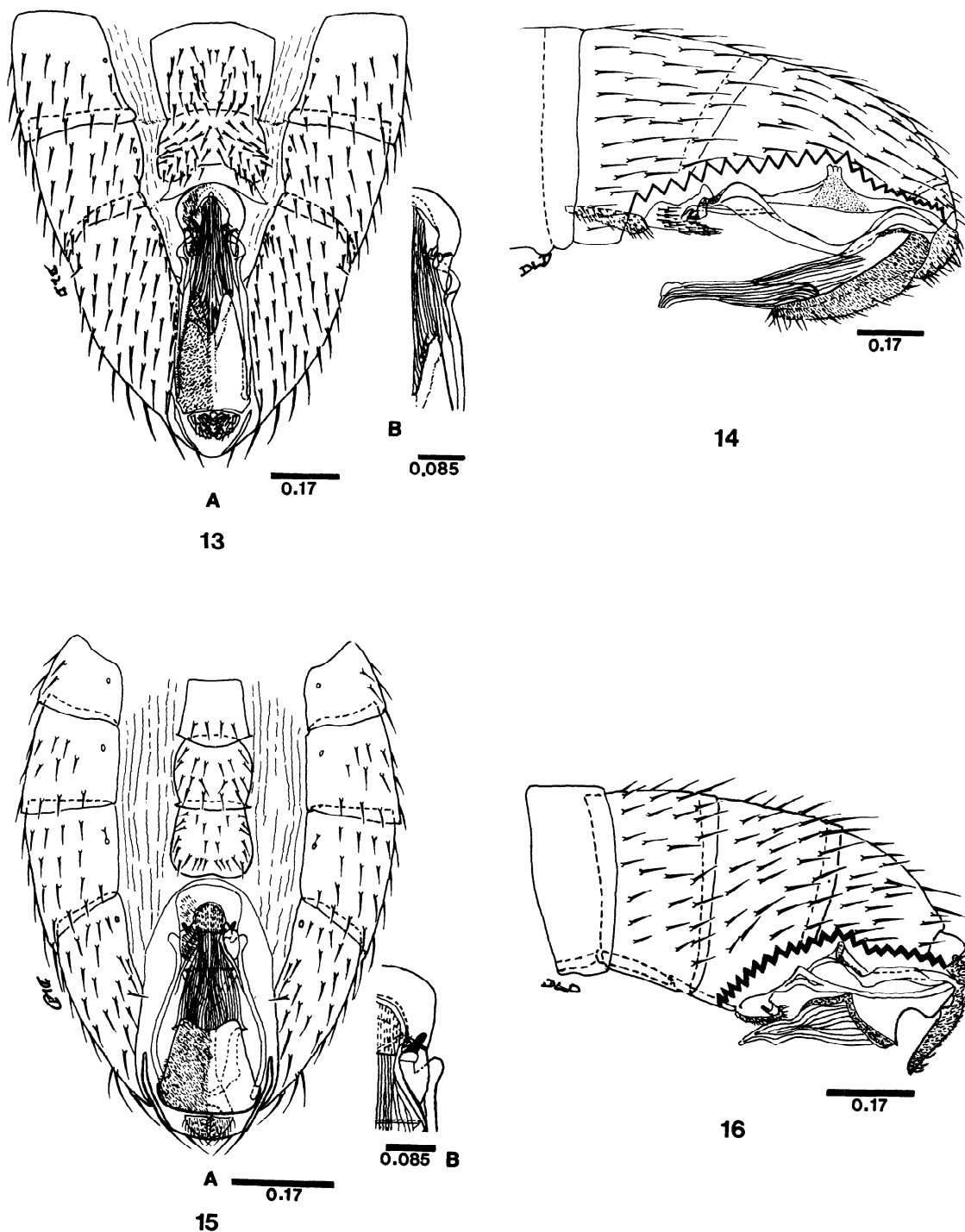
**Figs. 1-4:** *Hydrellia crassipes* Cresson. 1A. male abdomen, ventral view. 1B. copulobus and postgonite, enlarged. 2. male postabdomen, left lateral view. 3. female abdomen, ventral view. 4A. female abdomen, left lateral view. 4B. female cercus, enlarged left lateral view.



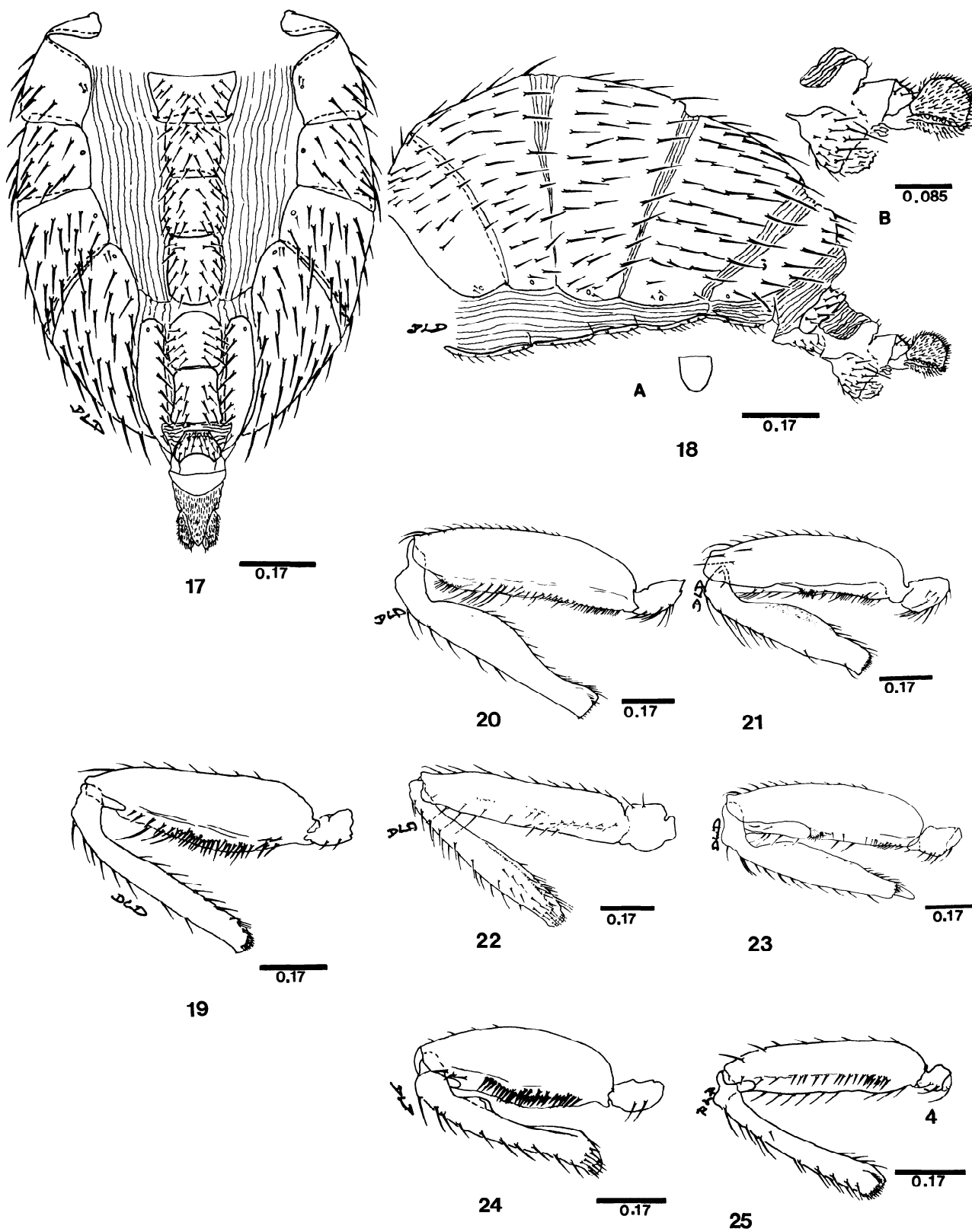
**Figs. 5-8:** *Hydrellia tibiospica*, new species. 5A. male abdomen, ventral view. 5B. copulobus and postgonite, enlarged. 6. male postabdomen, left lateral view. 7. female abdomen, ventral view. 8A. female abdomen, left lateral view. 8B. female cercus, enlarged left lateral view.



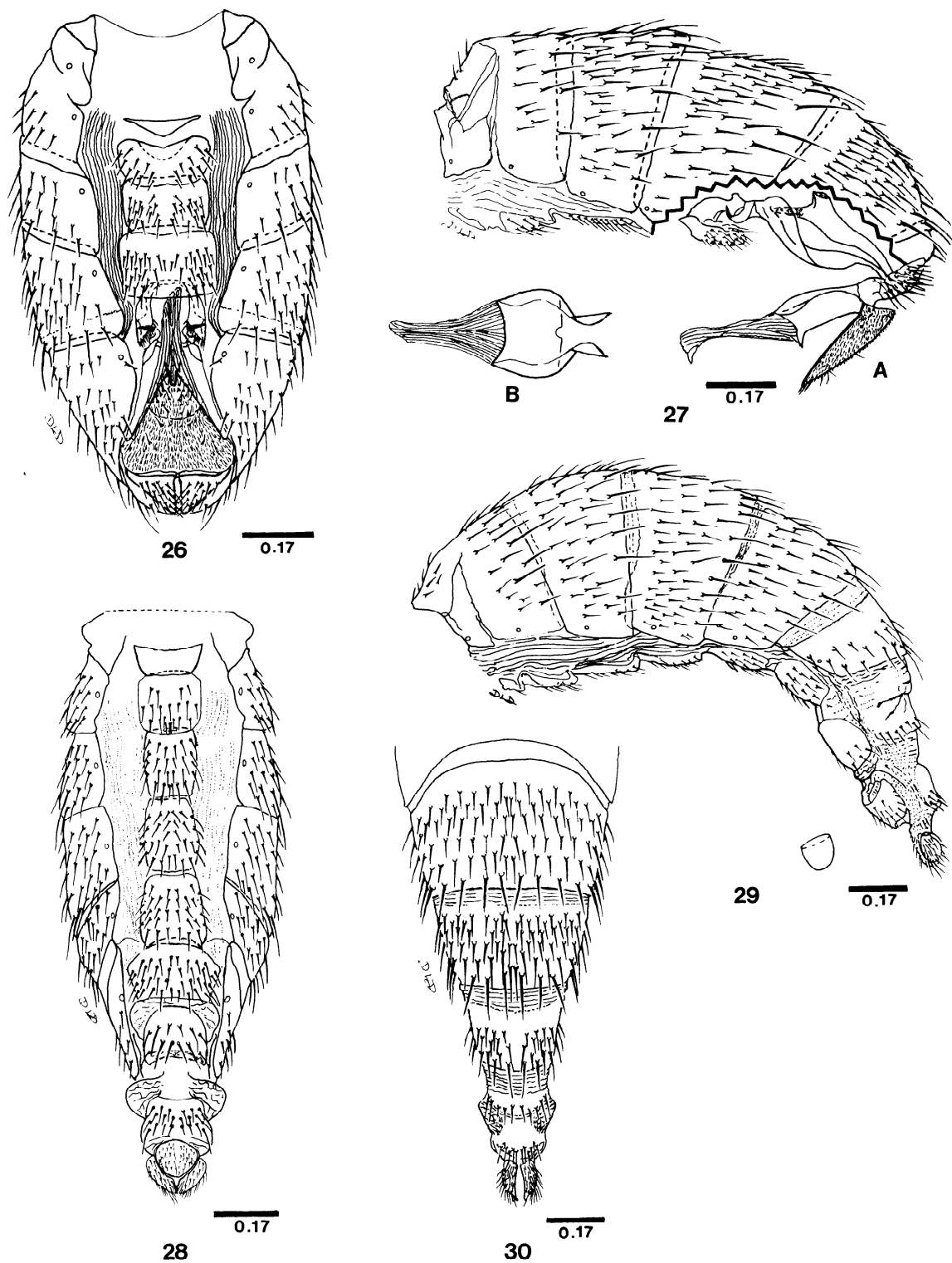
**Figs. 9-12:** *Hydrellia amplecta*, new species. 9A. male abdomen, ventral view. 9B. copulobus and postgonite, enlarged. 10. male postabdomen, left lateral view. 11. female abdomen, ventral view. 12A. female abdomen, left lateral view. 12B. female cercus, enlarged left lateral view.



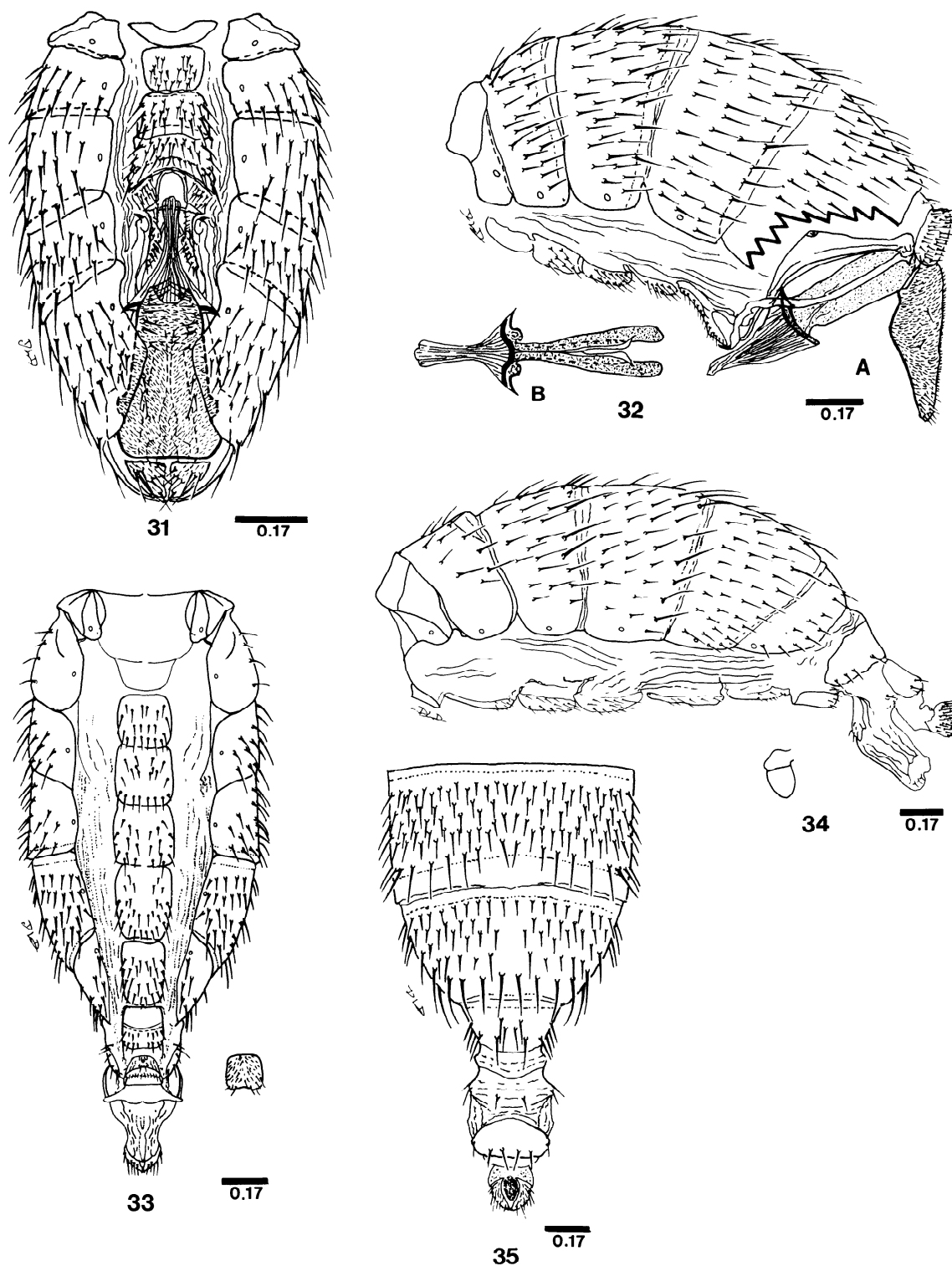
**Figs. 13-16:** *Hydrellia* spp. 13A. *H. saltator* Deonier, male abdomen, ventral view. 13B. *H. saltator* Deonier, copulobus and postgonite, enlarged. 14. *H. saltator* Deonier, male postabdomen, left lateral view. 15A. *H. procteri* Cresson, male abdomen, ventral view. 15B. *H. procteri* Cresson, copulobus and postgonite, enlarged. 16. *H. procteri* Cresson, male postabdomen, left lateral view.



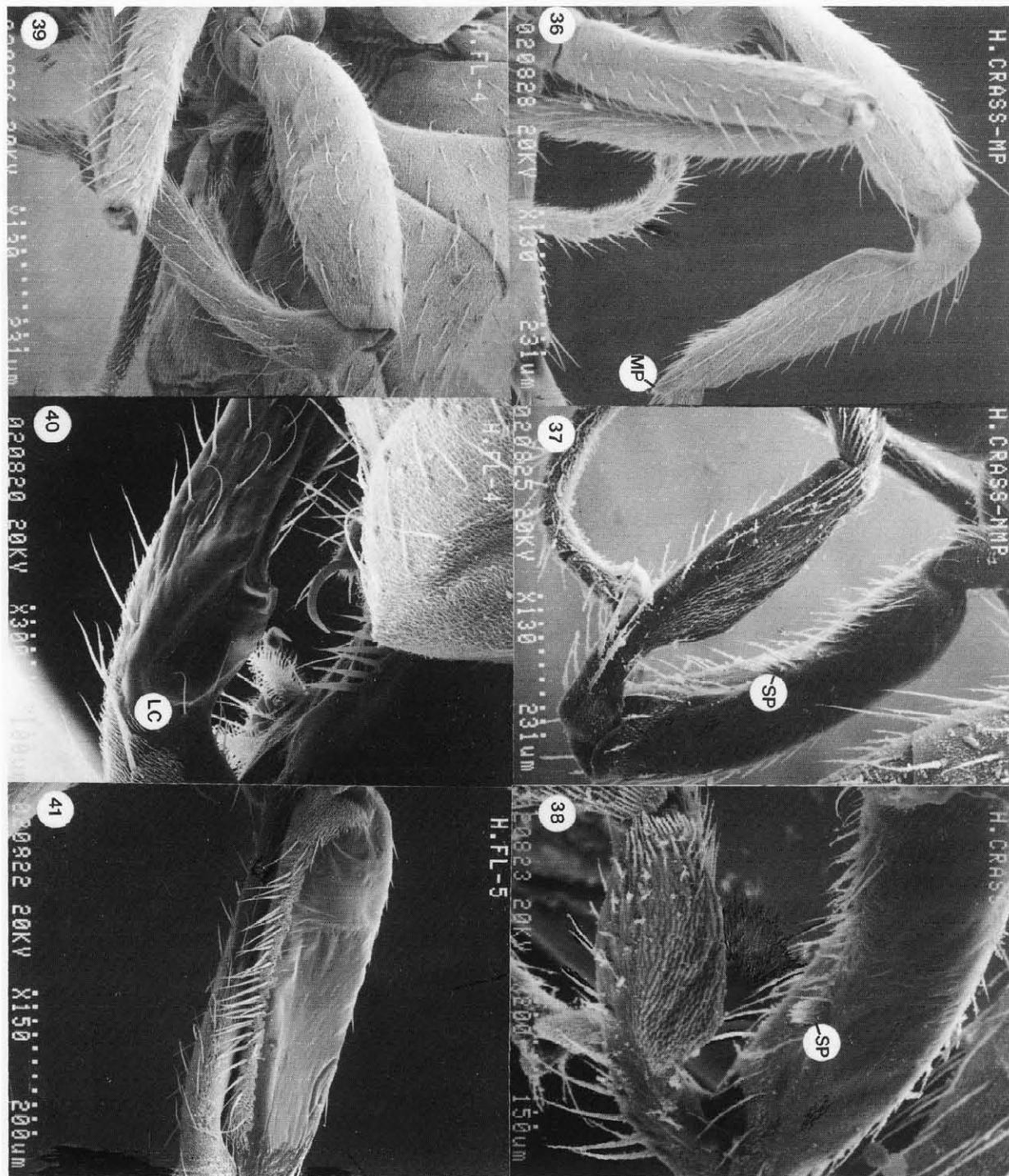
**Figs. 17-25:** *Hydrellia* spp. 17. *H. procteri* Cresson, female abdomen, ventral view. 18A. female abdomen, lateral view. 18B. female cercus, enlarged lateral view. 19-25. male left metafemora. 19. *H. bryani*, new species. 20. *H. crassipes* Cresson. 21. *H. amplexa*, new species. 22. *H. saltator* Deonier. 23. *H. tibiospica*, new species. 24. *H. ocalae*, new species. 25. *H. procteri* Cresson.



**Figs. 26-30:** *H. ocalae*, new species. 26. male abdomen, ventral view. 27A. male abdomen, left lateral view. 27B. phallus, ventral view. 28. Female abdomen, ventral view. 29. female abdomen, left lateral view. 30. female postabdomen, dorsal view.



**Figs. 31-35:** *H. bryani*, new species. 31. male abdomen, ventral view. 32A. male abdomen, left lateral view. 32B. phallus, ventral view. 33. female abdomen, ventral view. 34. female abdomen, left lateral view. 35. female postabdomen, dorsal view.



**Figs. 36-41:** *Hydrellia* spp. metafemora. 36. *H. tibiospica*, new species, left metafemur, anterior view. 37-38. *H. amplecta*, new species, right metafemur, posterior view. 39. *H. ocalae*, new species, left metafemur, anterior view. 40. *H. ocalae*, new species, right metafemur, posterior view. 41. *H. bryani*, new species, right metafemur, posterior view. Abbreviations: LC= lensoid metatibial cavity; MP= anterior apical metatibial process; SP= median posteroventral metafemoral setose tubercle (protuberance).

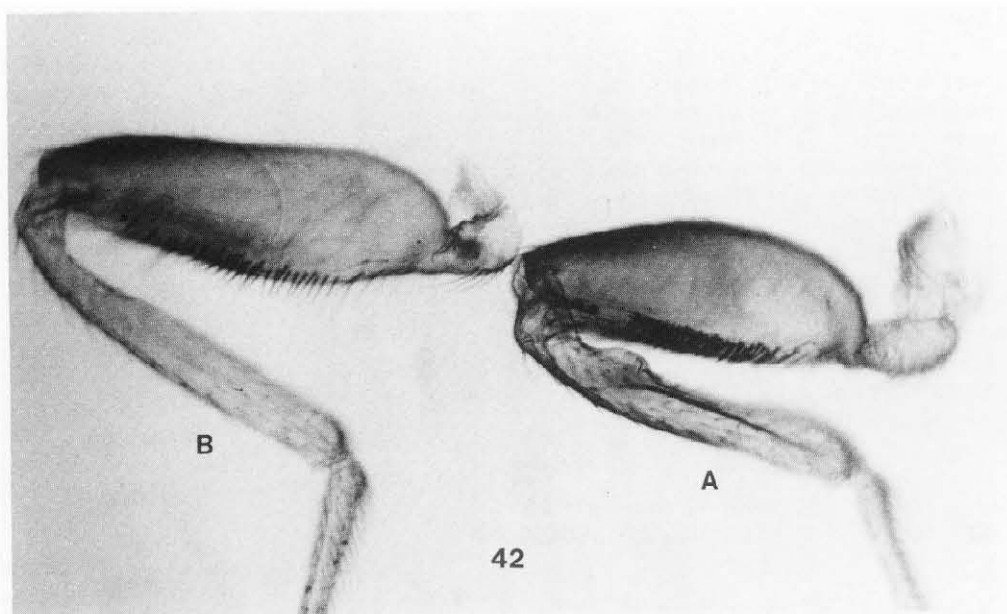


Fig. 42: *Hydrellia* spp. left metafemora. 42A. *H. ocalae*, new species, posterior view. 42B. *H. bryani*, new species, posterior view.