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Review of the *Orthotrichia* (Trichoptera: Hydroptilidae) of Florida, with descriptions of previously unknown females of three species

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Abstract

The genus *Orthotrichia* was last reviewed in 1961 by Kingsolver & Ross, but drawings of the males were primarily restricted to ventral views, and females of only one species was included. The six species comprising the genus in North America are all known from Florida and extensive collecting throughout the state has allowed us to associate the females with the males. With this paper, we provide new drawings and keys of the males and females of the *Orthotrichia* in Florida, which should be applicable to all of North America, and describe the females of *O. curta* Kingsolver & Ross, *O. dentata* Kingsolver & Ross, and *O. instabilis* Denning.

Key words: microcaddisflies, redescriptions, distribution records, identification keys

Introduction

The genus *Orthotrichia* Eaton is widespread and speciose throughout much of the world, but in North America is only represented by six species which are most abundant in the eastern portion. In Florida, with the exception of *Orthotrichia baldufi* Kingsolver and Ross,1961, the members of the genus are widespread and commonly collected.

Larvae of *Orthotrichia* typically occur in submerged beds of aquatic plants along the margins of ponds and lakes or in slow-moving rivers and streams (Wiggins 1996), habitats which are abundant throughout much of Florida. Larvae generally feed on filamentous algae, using the pointed labrum to pierce the plants (Nielsen 1948), although Wells (1992) has reported *O. muscari* Wells, 1983 as parasitic on hydropsychid caddisflies in lotic habitats of Australia.

Orthotrichia adults are characterized by having a spur count of 0,3,4, a rectangular metascutellum, and a lack of ocelli. Males are recognized by the asymmetrical ninth and tenth abdominal segments. Segment VII has a spinose posteroventral process and segment VI a short, acuminate tooth on the posterior margin. The tenth tergite typically bears apical or ventral sclerites and often a subapical, lateral spine. The phallus is very similar in all six species, and internally the ninth segment bears elongate curved processes from the dorsum. Females are recognized by the heavily sclerotized plates of segments VII and VIII, the short ventromesal process from segment VII, the sternal process from segment VIII, and the bilobed bursa copulatrix.

The *Orthotrichia* in North America were last reviewed by Kingsolver and Ross (1961), at which time males of all six species were illustrated, three of which were new to science, and females of *O. baldufi* were described. Previously, the female of *O. instabilis* was described by Blickle and Morse (1957), but based on our associations of *O. instabilis* from Florida, the species illustrated is undoubtedly that of *O. baldufi*. Ross (1944) illustrated the females of *O. aegerfasciella* (Chambers 1873) (as *O. americana* Banks, 1904) and *O. cristata* Morton, 1905. Extensive collecting throughout Florida by Rasmussen and his colleagues have allowed us to associate the previously unknown females of *O. instabilis* Denning, 1948, *O. curta* Kingsolver and Ross, 1961, and *O. dentata* Kingsolver and Ross, 1961. In addition, we have taken the opportunity with this paper to provide new illustrations of the males of all six species of *Orthotrichia* occurring in Florida and the three previously associated females.

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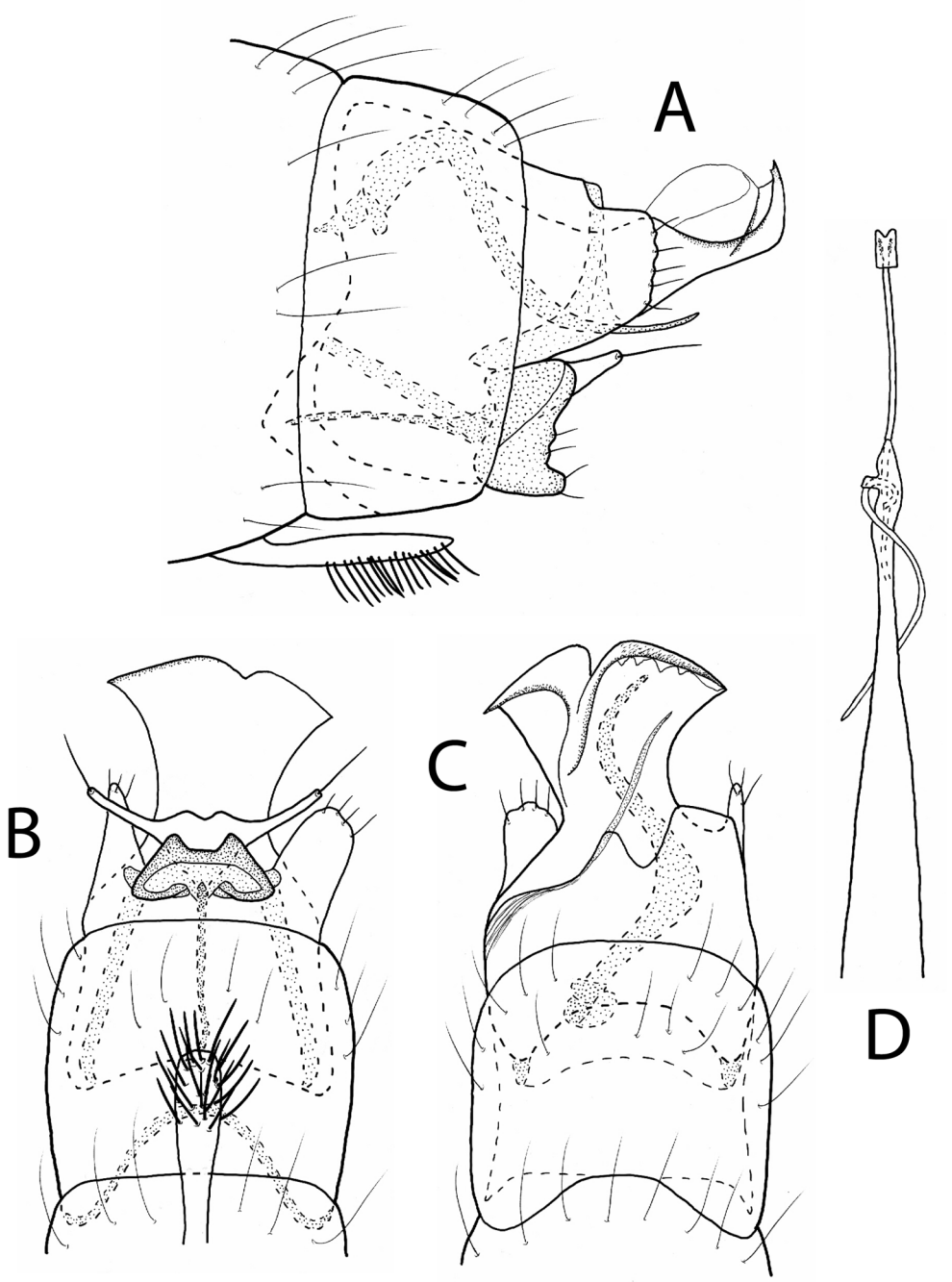

FIGURE 1. *Orthotrichia aegerfasciella*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral.

Materials and methods

The specimens used in this study were primarily collected with UV light traps, augmented by Mercury-vapor lights, or in some instances emergence traps over streams. To prepare drawings, specimens were cleared using concentrated KOH, then washed and mounted on slides for examination under a compound microscope. All material was subsequently stored in 80% alcohol. Terminology follows that of Marshall (1979) and Kingsolver and Ross (1961), with lengths measured from the tip of the head to the wing end. Representative material will be deposited at the National Museum of Natural History, Smithsonian Institution (NMNH), Illinois Natural History Survey (INHS), and Florida A&M University (FAMU).

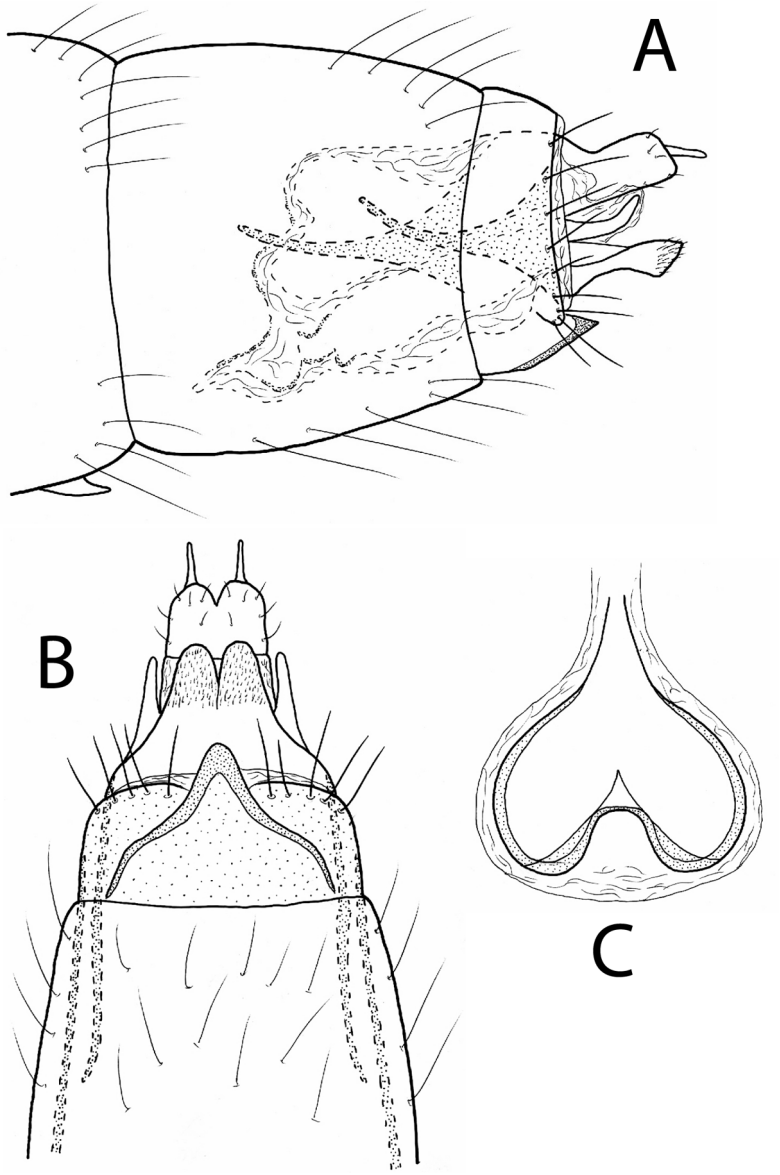

FIGURE 2. *Orthotrichia aegerfasciella*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral.

Results

Orthotrichia aegerfasciella (Chambers, 1873)
Figs. 1, 2.

Orthotrichia aegerfasciella is the most widely occurring species of *Orthotrichia* in North America, with records from as far west as Washington, south to Texas and throughout the eastern United States and Canada (Rasmussen & Morse 2014). We have also seen males of this species from Belize in Central America. In Florida, we have collected *O. aegerfasciella* from nearly every county (Harris *et al.* 2012) often in large numbers.

Males of *O. aegerfasciella* are characterized by the laterally expanded arms of the subgenital plate as seen in ventral view, the lack of any sclerotized bars or plates on tergum X, and the truncate posterolateral extension of segment IX. Females which were nicely illustrated in Ross (1944) (as *O. americana* Banks) are characterized by the sternal process of segment VIII which is elongate and entire apically, wide basally with the margins sclerotized both anteriorly and posteriorly.

Material examined: Florida: Lake County, Duck Pond at NFS 538B near Paisley, N29°12'07", W81°32'38", 12 July 2006, D. Denson, 1 male, 22 females; Leon County, Black Creek at CR 348 (Baum Road), N30°30'03", W84°04'50", 18 March 2015, A. Rasmussen and J. Wang, 53 males, 126 females; Madison County, Withlacoochee River, Twin Rivers State Forest at CR 150, N30°35'51", W83°15'40", 27 May 2007, A. Rasmussen, 4 males, 29 females; Marion County, Lake Eaton, Ocala National Forest, Lake Eaton Recreational Area at boat landing, N29°15'21", W81°51'47", 16 May 2008, D. Denson and A. Rasmussen, 141 males, 129 females; Rainbow River downstream SR 40 bridge, Dunnellon, N29° 02'56.6", W82°26'49.5", 8 June 2007, D. and M. Denson, 9 males, 40 females.

Orthotrichia baldufi Kingsolver & Ross, 1961
Figs. 3, 4.

Orthotrichia baldufi is generally restricted to eastern North America, occurring as far west as Minnesota, north to Quebec, and southwest to Texas (Rasmussen & Morse 2014). The illustrations in Burdick's unpublished Hydroptilidae of California of an *Orthotrichia* labelled *symplotos* n.sp. appear to be this species which would be a significant range extension. Both the curator of the collections at the California Academy of Sciences, where the caddisflies are housed, and Dr. Dave Ruiter (personal communication) has attempted to locate the specimen, but without success. Dr. Ruiter has collected *O. baldufi* from Bonner County in Idaho (personal communication), so its occurrence in California would not be surprising. In Florida, *O. baldufi* is rare with most of the records of this species in Harris *et al.* (2012) being misidentifications of *O. instabilis* by the senior author. Our only records of this species in Florida are historic records of single males from Chattahoochee in Gadsden County and Lake Brooklyn in Bradford County, and one new record, also of a single male, from Upper Sweetwater Creek in Torreya State Park in Liberty County. All of these counties are located in northern Florida. The previously cited records from Alachua, Baker, Calhoun, Highlands, Holmes, Jackson, Lake, Leon, Marion, Okaloosa, Putham, Santa Rosa, Volusia, and Wakulla in Harris *et al.* (2012) are incorrect and where the misidentifications represent new county records for those species, they are included under those species. As well, the records of *O. baldufi* from the Coastal Plain in Alabama (Harris *et al.* 1991) were also misidentifications of *O. instabilis*, although *O. baldufi* does occur sporadically in northern Alabama at sites above the Fall-line.

Males of *O. baldufi* are characterized by a bifid sclerotized plate from the venter of segment X, the shoe-shaped inferior appendages and the subgenital plate bearing an asymmetrical point on the posterior margin as viewed in ventral aspect. The development of this marginal point is somewhat variable, as are the mesal processes of the subgenital plate as seen in the figure 4E in Kingsolver and Ross (1961) which appear as an elongate, acute process in lateral view. We have also noticed some variation in the posterior margin of the subgenital plate which is not always entire, but may be deeply cleft (Fig. 3E). As well, in some specimens the posterior sclerotized plate on segment X may have the inner prong shortened and serrate distally (Fig. 3F), perhaps as a result of being broken off. In one of the specimens from Idaho, the sclerotized plate appears to be fused with segment X (Fig. 3G), but in lateral view it appears no different than a typical *O. baldufi*. As well, a second specimen from the same site matched all of the features of *O. baldufi*. Females of *O. baldufi* were illustrated in Kingsolver and Ross and the specimen of *O. instabilis* described in Blickle and Morse (1957) is clearly this species. We have used the allotype of *O. baldufi* from Minnesota to prepare our drawings as no females were collected in Florida. The species is characterized by the short, trilobed sternal process from segment VIII which has a wide central lobe and lateral lobes which are rounded distally and extensively sclerotized (Fig. 4B). This character is also variable, as a female from Idaho appeared to have a single central lobe, with extensive rounded sclerotization adjacent to the lobe (Fig. 4D). In lateral view the sternal process narrows to an acute apex in both the allotype and the specimen from Idaho. The lobes are soft and depending on the angle when preserved, variation may be the norm in the *Orthotrichia*.

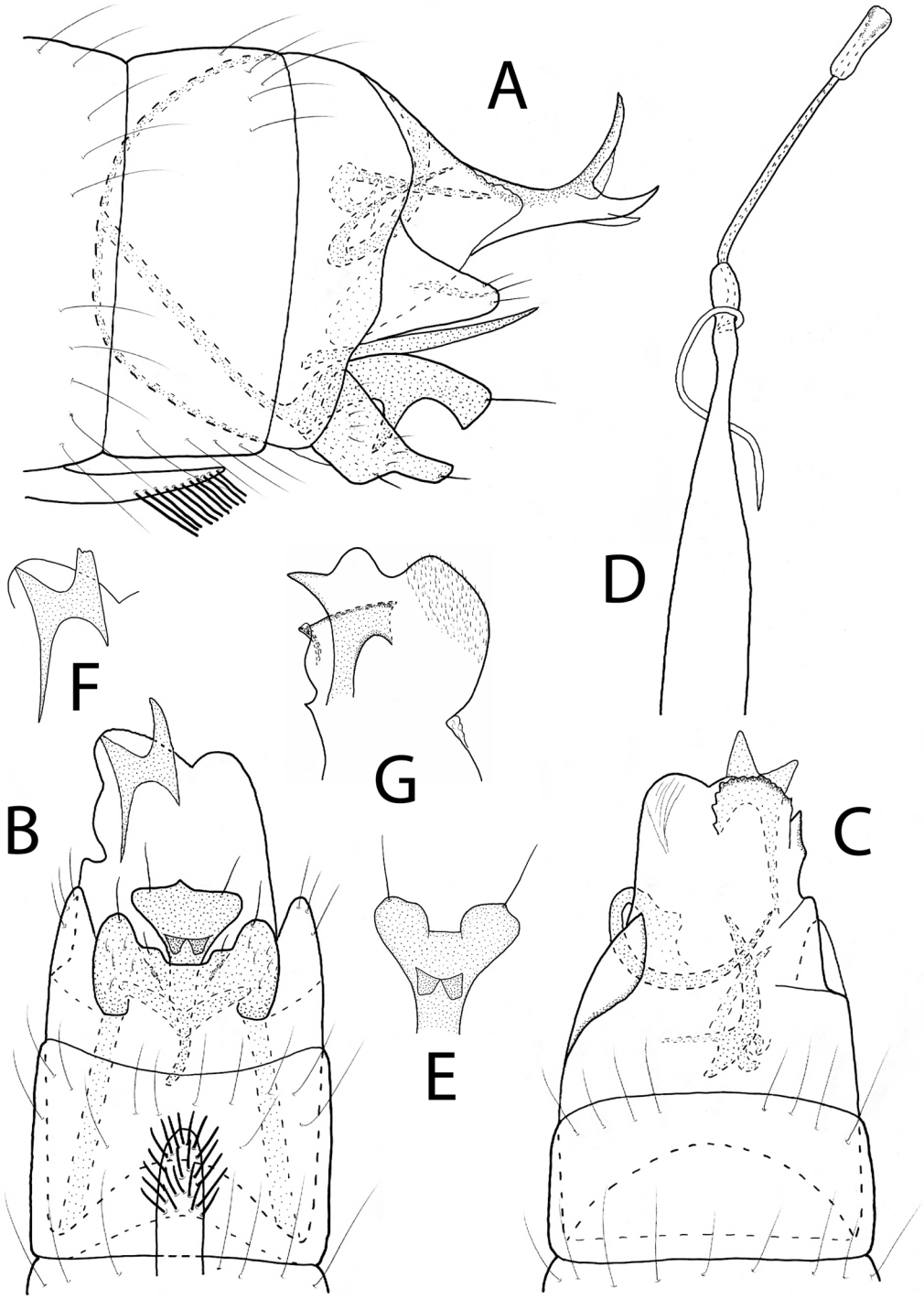

FIGURE 3. *Orthotrichia baldufi*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral; E, variation in subgenital plate, ventral; F, variation in sclerite of segment; X, ventral; G , variation in segment X, ventral.

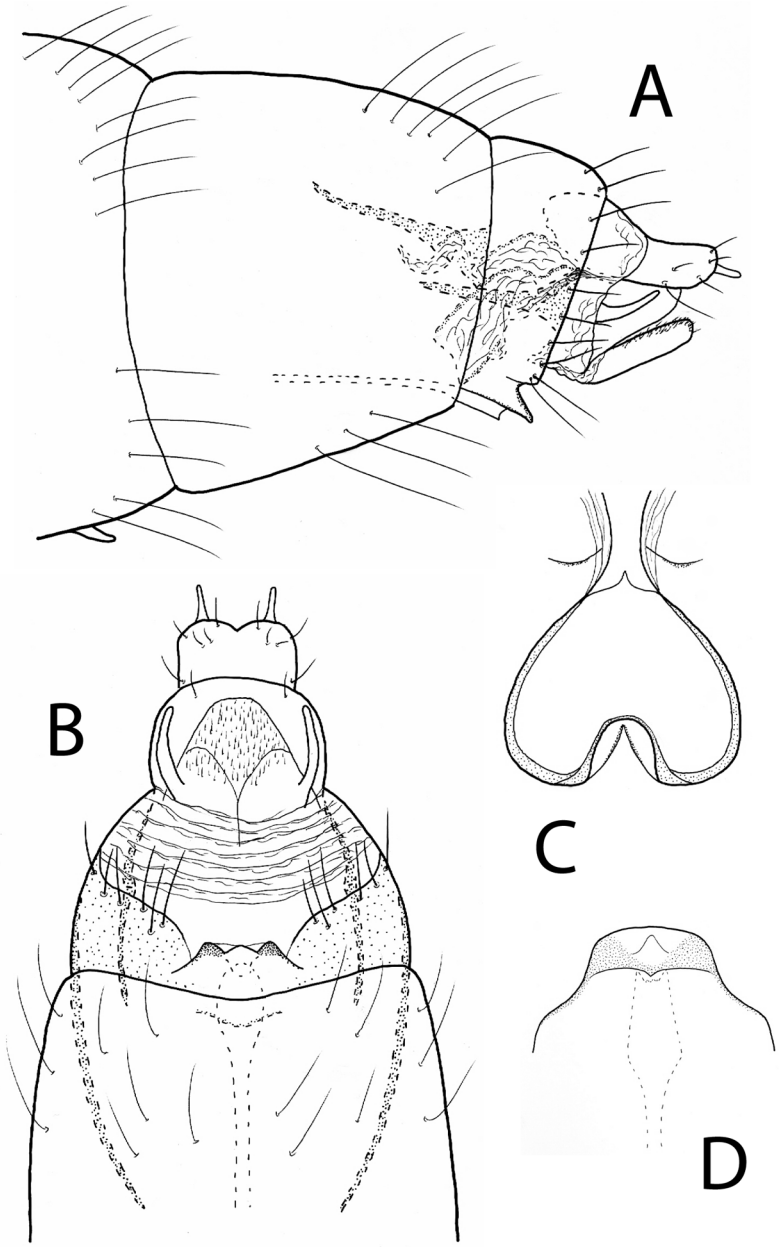

FIGURE 4. *Orthotrichia baldufi*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral; D. variation in sternal process of segment VIII.

Material examined: Florida: Liberty County, Upper Sweetwater Creek, Torreya State Park, Sweetwater Tract, N30°31'22.2", W84°55'56.0",7 June 2012, A. Heupel, A. Rasmussen, and B. Richard, 1 male; Bradford County, Lake Brooklyn, internal basin station margin, 10 August 1953, W. Beck, Jr. 1 male; Gadsden County, Chattahoochee, 19 June 1957, R. Blickle, 1 male. **Alabama:** Lauderdale County, Manbone Creek at Lauderdale Management Area, 22 June 1985, S. Harris, 1 male; Lawrence County, Thompson Creek at Forest Rd. 208, Bankhead National Forest, 28 May 1985, S. Harris and A. Woods, 1 male; Tuscaloosa County, Tyro Creek at bridge, T17S, R10W, S15, 25 July 1983, S. Harris and P. O'Neil, 1 male. **Maine:** Washington County, Tomah Stream at floodplain, 21–22 July 1997, A. Huryn, 1 male; same, but 1–2 August 1997, 1 male; Tomah Stream at Beaver Branch, 12 July 1999, A. Huryn, 10 males. **Minnesota:** Clearwater County, Mary Lake CR1, Lake Itasca State Park, 12 July 1995, B. Armitage, 3 males; St. Louis County, Eagles Nest Lake, 24 July 1953, W. Balduf, 18 males, 2 females (paratypes). **Idaho:** Bonner County, Cocolalla Lake, N48.13829°, W116.60178°, 8 July 2013, C. Kerst, 2 males, 1 female.

Orthotrichia cristata Morton, 1905
Figs. 5, 6.

Orthotrichia cristata is nearly as widespread in North America as is *O. aegerfasciella* occurring as far west as British Columbia, south to Texas, and throughout the eastern United States and Canada (Rasmussen & Morse 2014). In Florida, it has a widespread distribution, but is less commonly collected than is *O. aegerfasciella* (Harris *et al.* 2012).

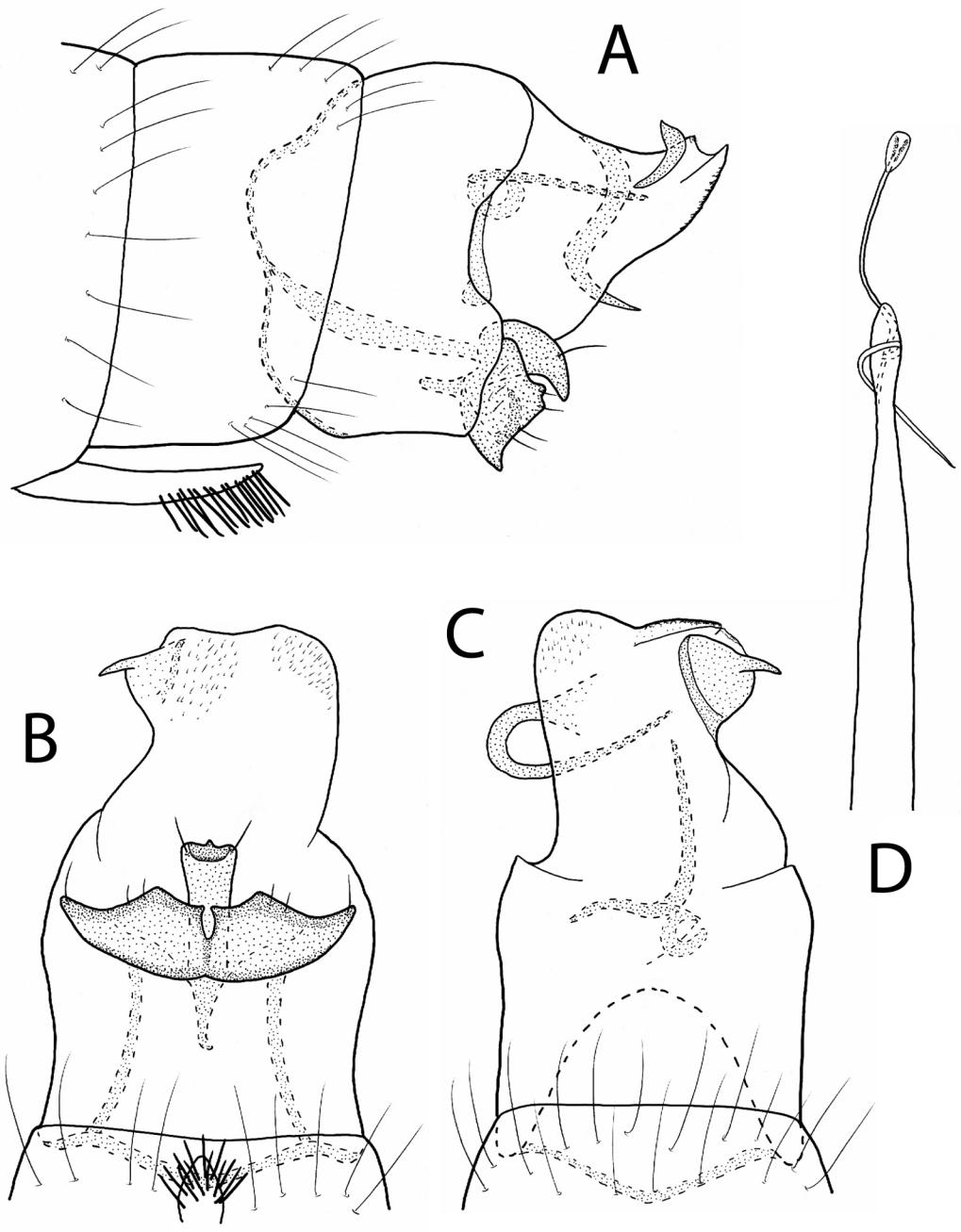

FIGURE 5. *Orthotrichia cristata*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral.

Males of *O. cristata* are characterized by the narrow subgenital plate and laterally expanded inferior appendages as seen in ventral view, the absence of any posterolateral extension of segment IX, and the tenth tergum which bears a subapical lateral spike, but no conspicuous sclerotized plates or bars. Females, which were illustrated in Ross (1944), are characterized by the short sternal process of segment VIII which is rounded apically and sclerotized on the margins; in lateral view, this process is acute and sclerotized.

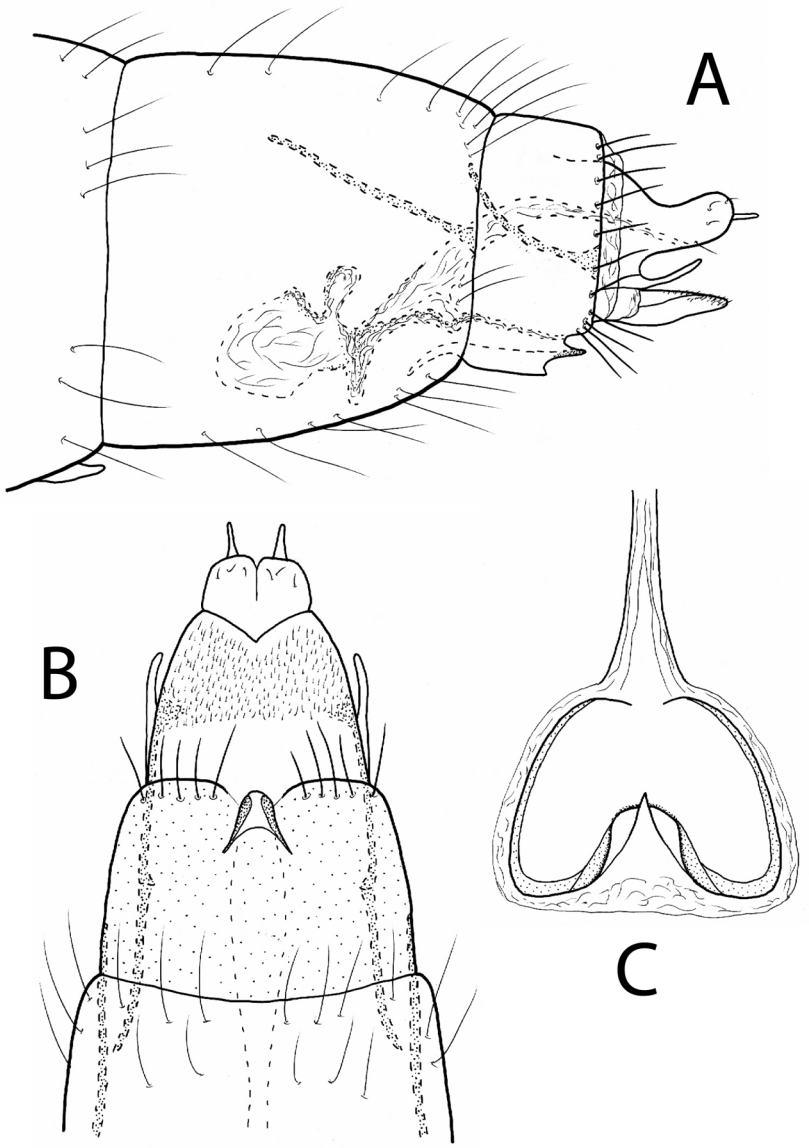

FIGURE 6. *Orthotrichia cristata*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral.

Material examined: Florida: Calhoun County, Chipola River at old Hwy. 71 roadbed, N30°17'13.60", W85°84'2.99", 19 May 2010, D. Denson and A. Rasmussen, 1 male, 12 females; Gadsden County, Crooked Creek at CR 270, 10 km W Greensboro, N30°34'58", W84°53'02", 30 March 2006, M. Pescador, A. Rasmussen, and B. Richard, 1 male, 11 females; Jackson County, Cowarts Creek at New Bridge Road, N30°58'39.03", W85°14'58.18", 9 August 2012, D. Denson, 5 males, 7 females; Monroe County, Blue Hole at Key Deer Boulevard, National Key Deer Refuge, N24° 42'21.92", W81°22'51.90", 2 June 2009, D. Denson, 115 males, 21 females; Orange County, TECO pond near RC 13B, N28°30'4.48", W81°57'8.14", 14 April 2009, D. Denson, 47 males, 27 females.

Orthotrichia curta Kingsolver & Ross, 1961
Figs. 7, 8.

Orthotrichia curta in North America has a general distribution in eastern North America which is similar to that of *O. baldufi* (Rasmussen & Morse 2014). In Florida, the species is widely occurring in both lotic and lentic habitats, and is particularly abundant in the prairie ponds of peninsular Florida.

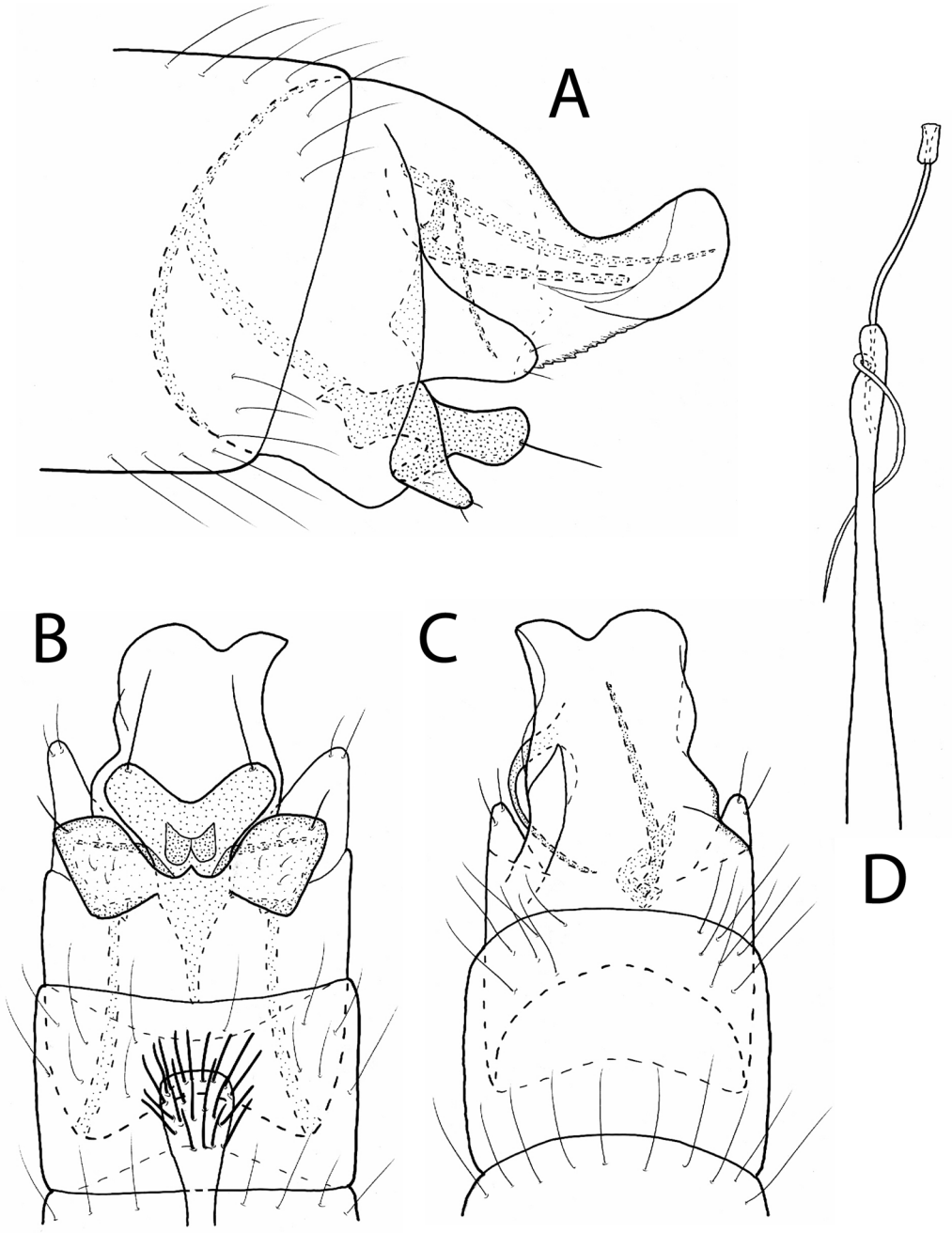

FIGURE 7. *Orthotrichia curta*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral.

Males of *O. curta* are characterized by the membranous tergum X which lacks any sclerotized bars or plates and the squarish inferior appendages as seen in ventral view. The female is newly associated below.

Female description. Length 2.0–2.5 mm, 22 antennal segments, brown in alcohol. Abdominal segment VI annular with short, posteroventral process. Segment VII annular with elongate lateral apodeme from posterior margin. Segment VIII thin and annular with sclerotized plates on the dorsum and venter; sternal process narrowing posteriorly to thin bilobed apex, mesal margin sclerotized giving entire process the appearance of being thin and parallel-sided, in lateral view this process is wide, with extensive ventral sclerotization. Segment IX membranous and indistinct with elongate apodeme from lateral margin; in ventral view setose and bilobed, with lateral finger-like processes. Segment X in ventral view slightly incised posteriorly with pair of apical papillae. Bursa copulatrix in ventral view bilobed anteriorly with sclerotized margins folded and mesal acute process; in lateral view thin with numerous folds, some of which are thickened.

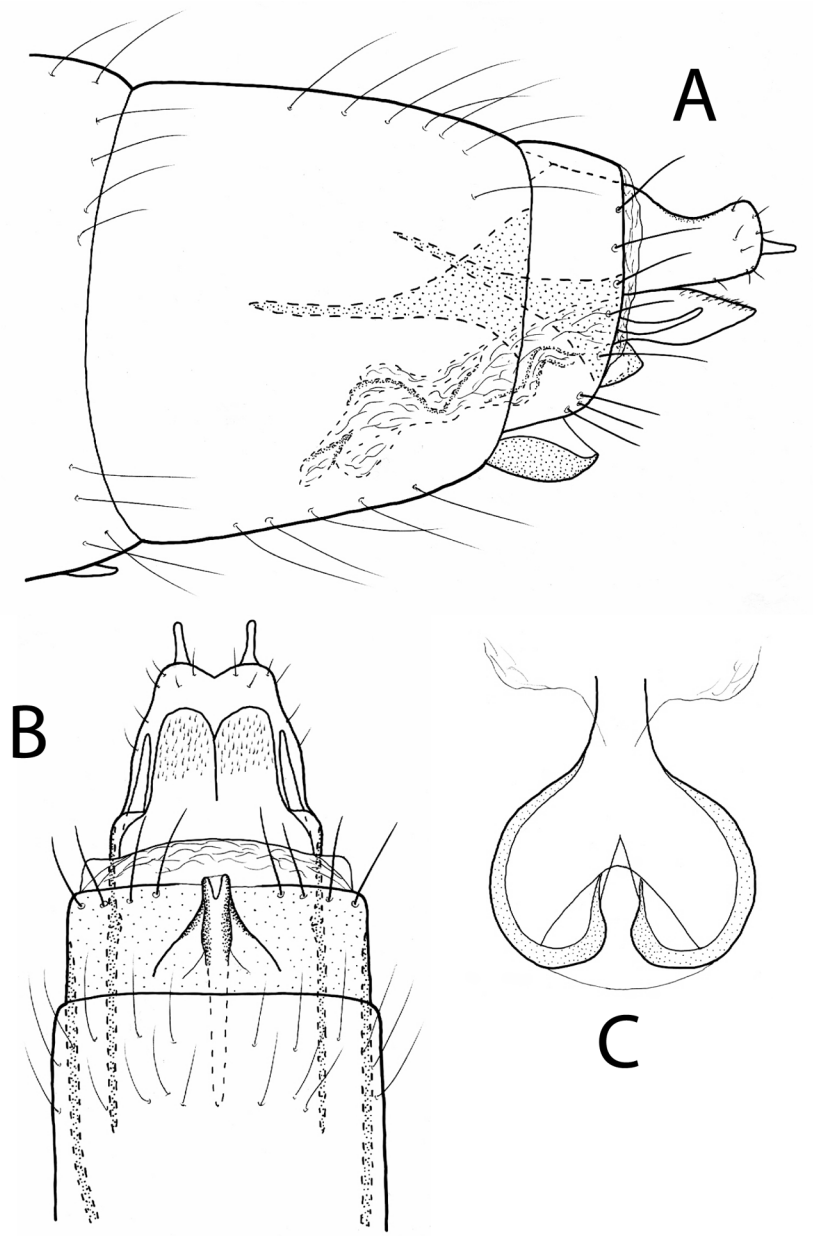

FIGURE 8. *Orthotrichia curta*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral.

Material examined: Florida: Jackson County, Mill Creek at Hasty Pond Road, N30º35'15.91", W85º13'33.11", 20 May 2010, D. Denson and A. Rasmussen, 3 males, 6 females; Leon County, Unnamed pond, Apalachicola National Forest, FR 322 (L.L. Wallace Road), 1.4 mi W US 319, N30º32'27.8", W84º35'1.12", 14 May 2010, A. Rasmussen and J. Wang, 3 males, 59 females; Liberty County, Kelley Branch Dam (KD), TNC Bluffs and Ravines, N30º27'32.1", W84º58'49.7", 2 May 2012, A. Heupel and A. Rasmussen, 1 male, 2 females; Marion County, Unnamed pond, W side of FR 579, Ocala National Forest, N29º4'25.04", W81º48'46.27", 17 May 2008, D. Denson and A. Rasmussen, 113 males, 97 females; Fore Lake, Fore Lake Recreational Area, Ocala National Forest, N29º16'17", W81º55'03", 16 May 2008, D. Denson and A. Rasmussen, 9 males, 71 females; Unnamed pond at FR 86 S of Hopkins Prairie, N29º16'8.9", W81º42'34.8", 20 October 2007, A. Rasmussen, D. and M. Denson, 3 males, 1 female.

Orthotrichia dentata Kingsolver & Ross, 1961
Figs. 9, 10.

Orthotrichia dentata is endemic to the southeastern United States with records from FL, MS, SC, and VA (Rasmussen & Morse 2014). In Florida, we have collected the species from scattered localities in the northern half of the state, most abundantly in the Rainbow and Silver Rivers in Marion County. The species was originally described from specimens collected from Temple Terrace, but our collections from this area failed to find any specimens.

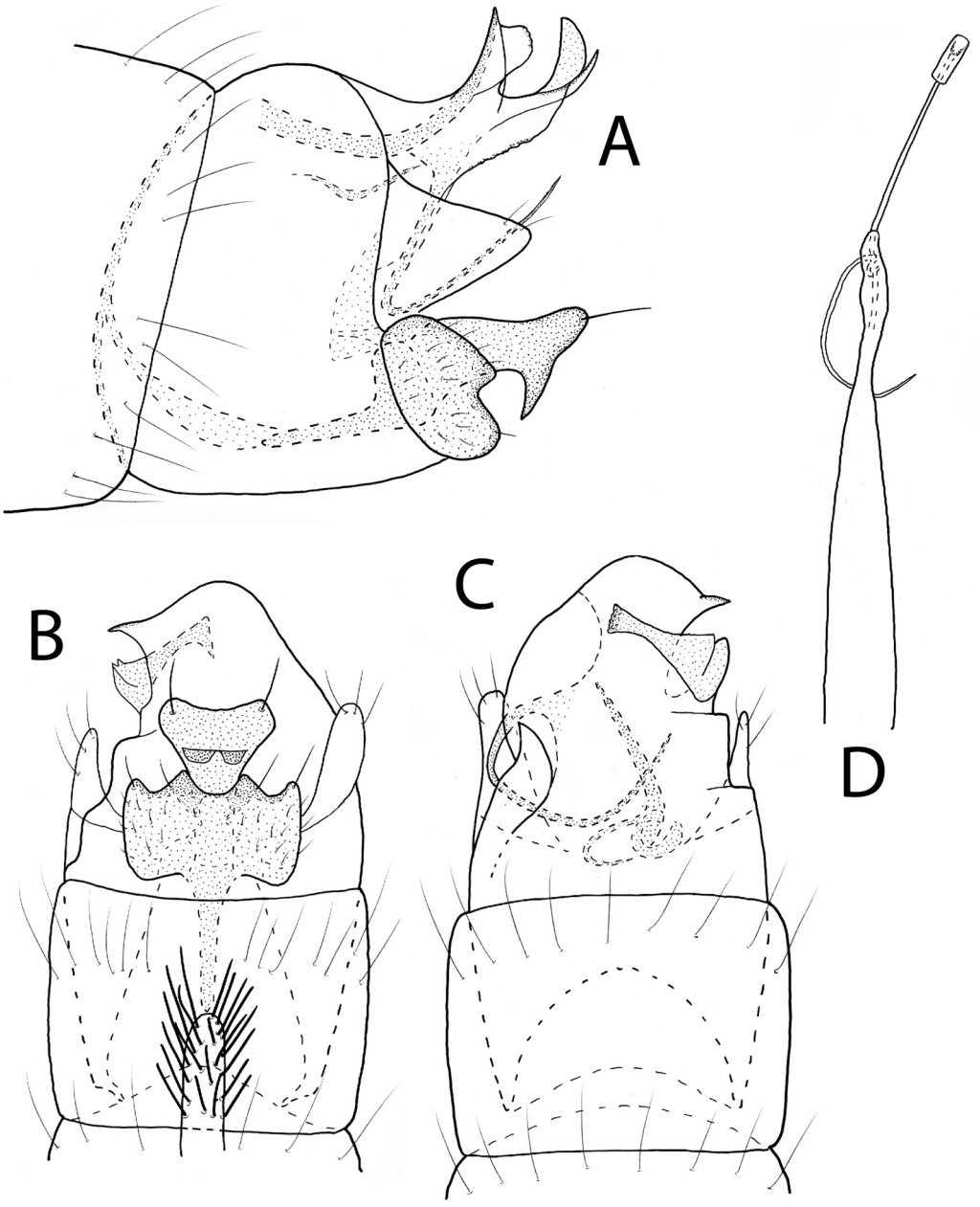

FIGURE 9. *Orthotrichia dentata*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral.

Males of *O. dentata* are characterized by having inferior appendages incised on the posterior margins in ventral view, subgenital plate with a pair of mesal processes which are acutely elongate in lateral view and tergum X with a bar-shaped sclerite anterior of a subapical, lateral spike, which in lateral view is reflected in a complex arrangement of apicodorsal processes. The female is newly associated below.

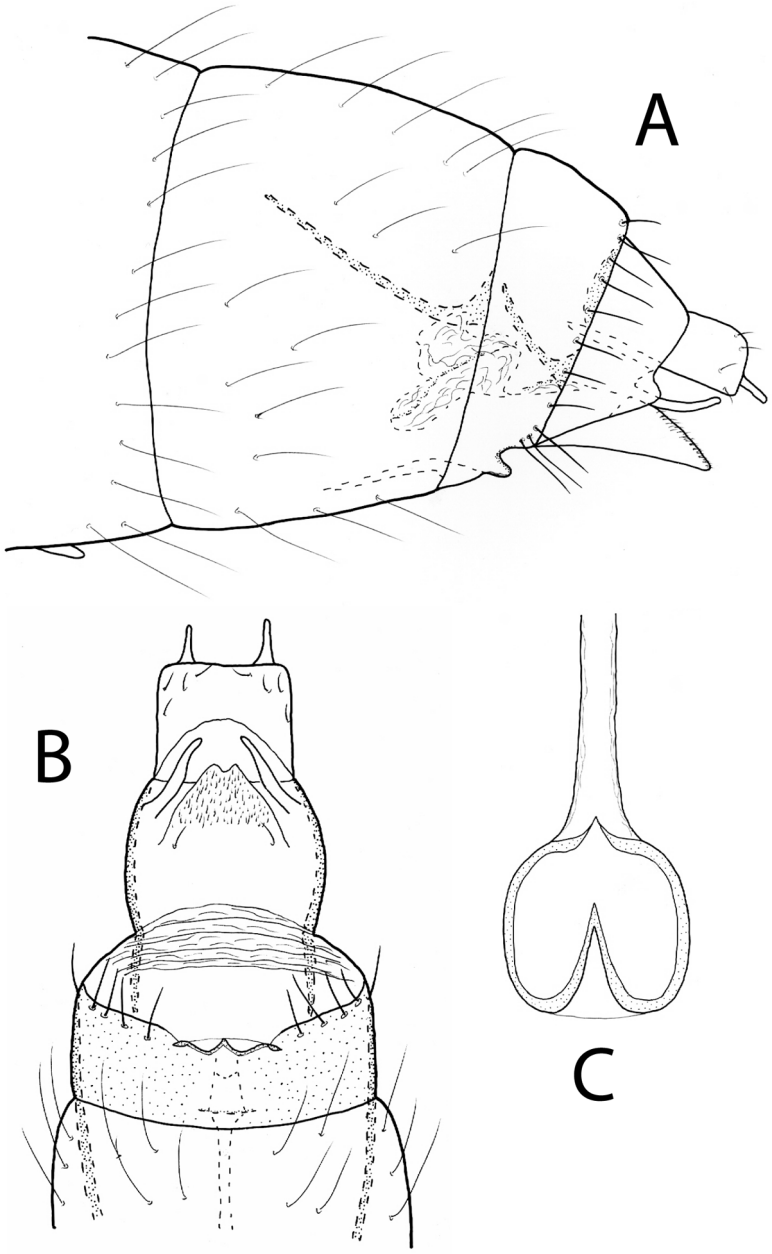

FIGURE 10. *Orthotrichia dentata*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral.

Female description. Length 3.0–3.5 mm, 24 antennal segments, brown in alcohol. Abdominal segment VI annular with short, posteroventral process. Segment VII annular with elongate lateral apodeme from posterior margin. Segment VIII narrow and annular with sclerotized plates on the dorsum and venter; sternal process short and trilobed, central lobe acute and lateral lobes thin and lightly sclerotized, in lateral view this process narrows to a rounded apex. Segment IX membranous and indistinct with elongate apodeme from lateral margin; in ventral view with setose lobe which narrows to emarginated apex, with lateral finger-like processes. Segment X square ventrally with pair of apical papillae. Bursa copulatrix in ventral view bilobed anteriorly with acute mesal process posteriorly and anteriorly; in lateral view thin with numerous folds, some of which are thickened.

Material examined: Florida: Columbia County, Mill Pond Spring Run, Ichetucknee River State Park, N29.966386°, W82.760452°, 5 June 2013, D. Denson, 3 males, 180 females; Marion County, Rainbow River, downstream of SR 40 bridge, N29°02’56.6”, W82°26’49.5”, 6 August 2007, D. and M. Denson, 34 males, 60 females; Orange County, Reedy Lake at West boat ramp RCD, N28.24536148°, W81.3713963°, 14 June 2010,

D. Denson, 28 males, 42 females; Suwannee County, Santa Fe River at Lemmon Park, N29.912389°, W82.859922°, 12 May 2013, D. and E. Denson, 5 males, 8 females.

Orthotrichia instabilis Denning, 1948
Figs. 11, 12.

Orthotrichia instabilis is widespread in the eastern United States from Texas to New Hampshire and into Florida (Rasmussen & Morse 2014). This species is more common in Florida than previously suspected (Harris *et al.* 2012) owing to being confused with *O. baldufi*. County records from Florida are as follows: Alachua, Baker, Bradford, Calhoun, Gadsden, Highlands, Holmes, Jackson, Lake, Leon, Liberty, Marion, Okaloosa, Orange, Putnam, Santa Rosa, Volusia, and Wakulla. The species was originally described from specimens collected from Winter Park, Florida.

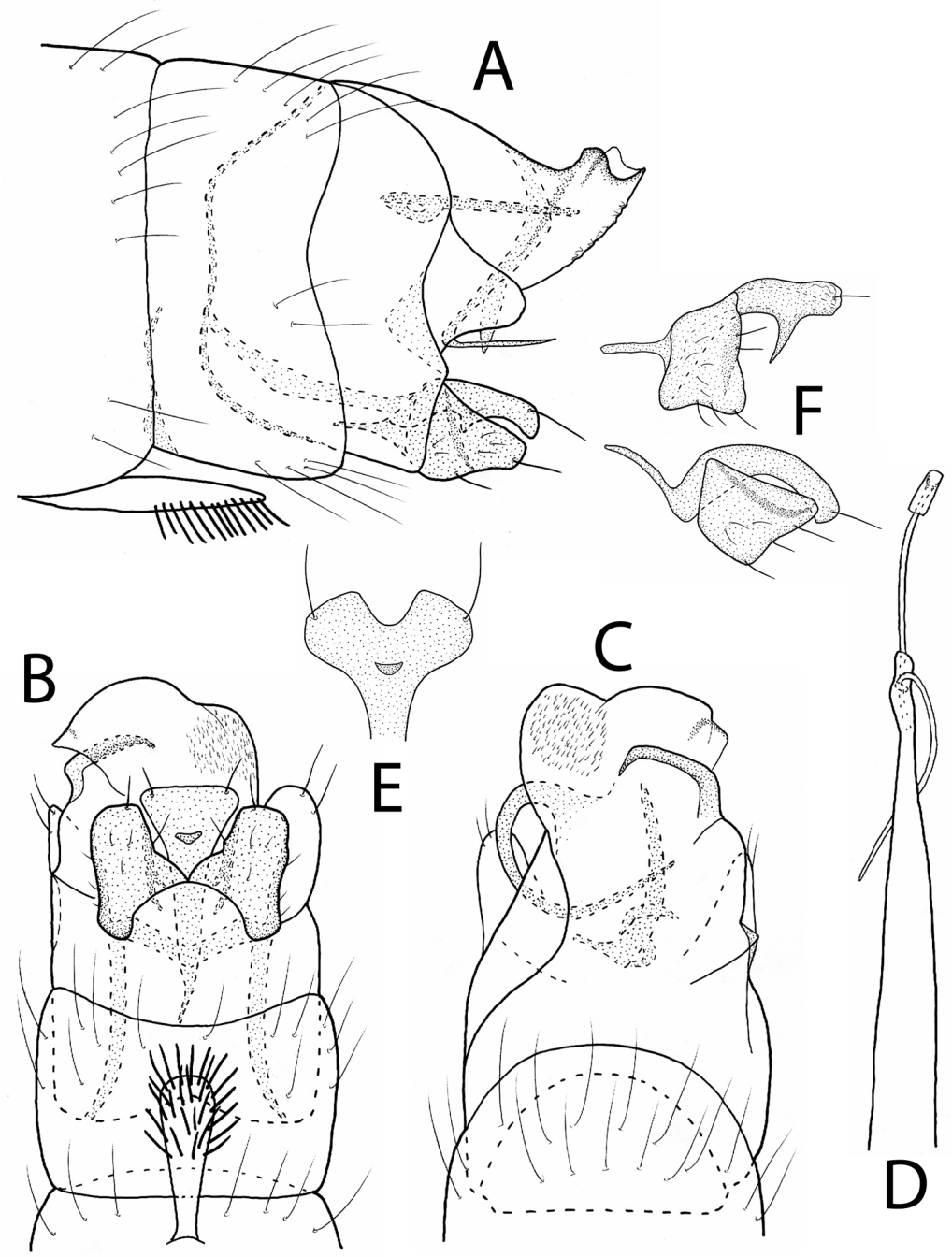

FIGURE 11. *Orthotrichia instabilis*. Male genitalia: A, lateral; B, ventral; C, dorsal; D, phallus, ventral; E, variation in subgenital plate, ventral; F, variations in inferior appendages and subgenital plate, lateral.

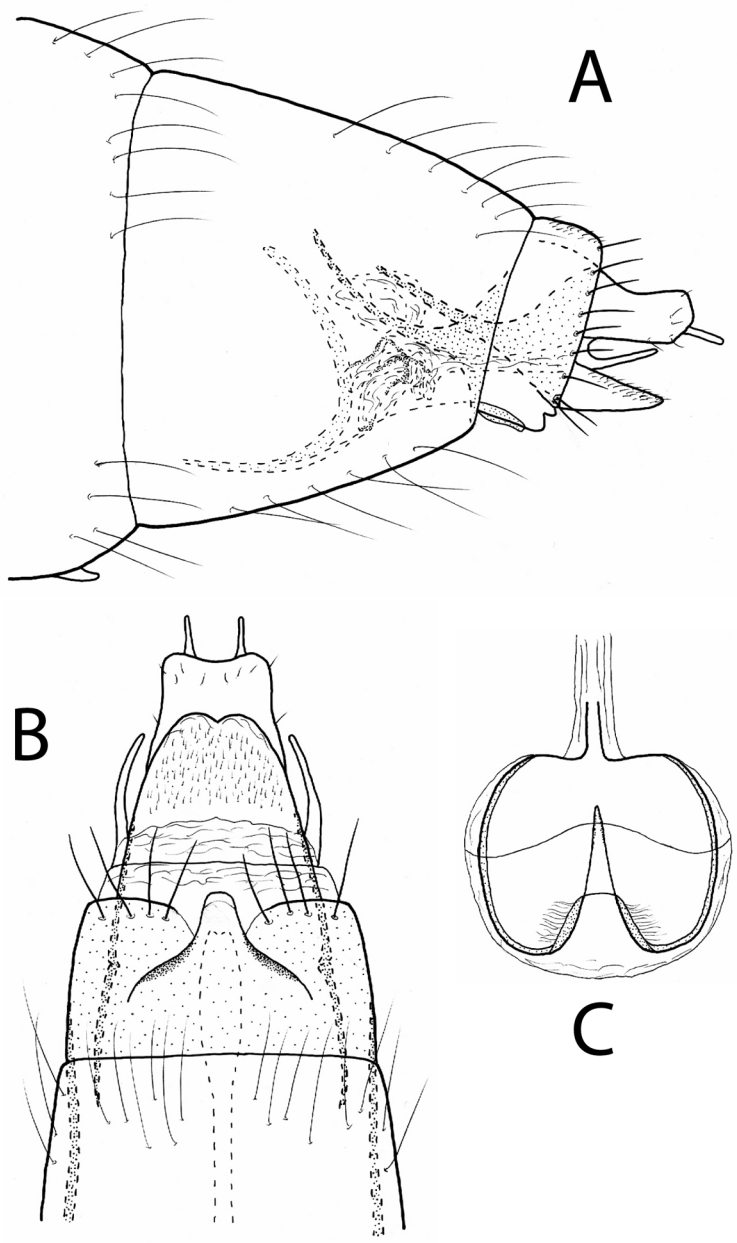

FIGURE 12. *Orthotrichia instabilis*. Female genitalia: A, lateral; B, ventral; C, bursa copulatrix, ventral.

Males of *O. instabilis* are characterized by having shoe-shaped inferior appendages which are entire on the posterior margins, with mesal processes fused; in lateral view short and anterior in position. Typically the subgenital plate is entire on the posterior margin, but we have seen specimens with this margin deeply emarginate. There is also considerable variation in the inferior appendages and subgenital plate in lateral view; the inferior appendages vary from being triangular (Fig. 11A), to trapezoidal, to rectangular (Fig. 11F) and the mesal processes of the subgenital plate can be absent to acutely elongate and posterior in position (Fig. 11F). Tergum X has a bar-shaped sclerite anterior of a subapical, lateral spike, which in lateral view is reflected in a series of rounded apicodorsal processes. The female is newly associated below.

Female description. Length 2.2–2.7 mm, 32 antennal segments, brown in alcohol. Abdominal segment VI annular with short, posteroventral process. Segment VII annular with elongate lateral apodeme from posterior margin. Segment VIII thin and annular with sclerotized plates on the dorsum and venter; sternal process elongate and rounded apically, wide anteriorly with lateral sclerotization confined to anterolateral margins, in lateral view short and rounded apically, scletization in a narrow anterior band. Segment IX membranous and

indistinct with elongate apodeme from lateral margin; in ventral view with setose lobe which narrows to emarginated apex, with lateral finger-like processes. Segment X square ventrally, slightly emarginated posteriorly with pair of apical papillae. Bursa copulatrix in ventral view bilobed anteriorly with anterior margins folded and elongate, acute mesal extensions anteriorly; in lateral view thin with numerous folds, some of which are thickened, crescent-shaped sclerite anteriorly.

Material examined: Florida: Calhoun County, Hasty Pond at Hasty Pond Road, N30º35'19.40", W85º12'32.30", 19 May 2010, D. Denson and A. Rasmussen, 1 male, 44 females; Paige Pond at Paige Pond Assembly of God, N30º32'20.8", W85º11'51.17", 7 May 2014, D. Denson, 1 male, 17 females; Lake County, Lake Sellers, SE lobe near canoe launch, N29º6'28.9", W81º37'39.2", 28 April 2007, D. Denson and A. Rasmussen, 29 males, 36 females; Marion County, Lake Delancy at campground NW corner, N29º25'44.4", W82º47'08.3", 27 April 2007, D. Denson and A. Rasmussen, 7 males, 3 females; Fore Lake, Fore Lake Recreation Area, Ocala National Forest, N29º16'17", W81º55'03", 16 May 2008, D. Denson and A. Rasmussen, 25 males, 9 females.

Key to the *Orthotrichia* males of Florida

1 Subgenital plate in ventral view with elongate, slender, lateral processes bearing stout apical seta (Fig. 1B) ..... *O. aegerfasciella*
- Subgenital plate in ventral view without elongate, slender, lateral processes bearing stout apical seta (Figs. 3B, 5B, 9B) 2
2 Inferior appendages in ventral view tapering laterally to acute apices (Fig. 5B); subgenital plate in ventral view narrow over length, ventromesal processes absent (Fig. 5B) ..... *O. cristata*
- Inferior appendages in ventral view not tapering laterally to acute apices (Figs. 3B, 7B, 9B, 11B); subgenital plate in ventral view widening distally, ventromesal process present (Figs. 3B, 11B) 3
3 Segment X entirely membranous, lacking sclerotized bars or plates (Fig. 7B, C) ..... *O. curta*
- Segment X with sclerotized bars or plates (Figs. 3B, 9C, 11C) 4
4 Segment X with sclerotized, bifid apical plate from venter (Fig. 3B, F); subgenital plate in ventral view typically with small tooth along posterior margin (Fig. 3B), rarely without small tooth and with posterior margin incised (Fig. 3E) ..... *O. baldufi*
- Segment X without sclerotized bifid plate from venter, although there are sclerotized bars on the dorsum (Figs. 9C, 11C); subgenital plate in ventral view without small tooth along posterior margin (Figs. 9B, 11B) 5
5 Inferior appendages in ventral view with posterior margins incised (Fig. 9B); subgenital plate with pair of ventromesal processes (Fig. 9B) which in lateral view are elongate and acute apically (Fig. 9A); segment X in lateral view with pair of elongate, acute apical processes projecting dorsally (Fig. 9A) ..... *O. dentata*
- Inferior appendages in ventral view with posterior margins entire (Fig. 11B); subgenital plate with single ventromesal process (Fig. 11B, E) which in lateral view is typically short and rounded (Fig. 11A), but rarely is absent or elongate and acute (Fig. 11F); segment X in lateral view with apical processes short and rounded (Fig. 11A) ..... *O. instabilis*

Key to the *Orthotrichia* females of Florida

1 Sternal process of segment VIII short and trilobed distally (Figs. 4B, 10B) 2
- Sternal process of segment VIII elongate, entire or bilobed distally (Figs. 2B, 8B) 3
2 Sternal process of segment VIII with central lobe wide and lateral lobes rounded distally and extensively sclerotized (Fig. 4B), in lateral view sternal process narrowing to acute apex (Fig. 4A); bursa copulatrix in ventral view with anterior margin rounded mesally (Fig. 4C) ..... *O. baldufi*
- Sternal process of segment VIII with central lobe narrow and lateral lobes thin and lightly sclerotized (Fig. 10B), in lateral view narrowing to rounded apex (Fig. 10A); bursa copulatrix in ventral view with anterior margin acute mesally (Fig. 10C) ..... *O. dentata*
3 Sternal process of segment VIII in ventral view narrowing to bilobed apex with sclerotization on mesal margins (Fig. 8B) ..... *O. curta*
- Sternal process of segment VIII in ventral view narrowing posteriorly to rounded, undivided apex, with sclerotization on lateral margins (Figs. 2B, 6B) 4
4 Sternal process of segment VIII short posteriorly and narrow anteriorly (Fig. 6B) ..... *O. cristata*

- Sternal process of segment VIII elongate posteriorly and wide anteriorly (Figs. 2B, 12B)..... 5

5 Sternal process of segment VIII with lateral sclerotization continuous from anterior to posterior (Fig. 2B); no crescent-shaped sclerite associated with the bursa copulatrix anterolaterally (Fig. 2A)..... *O. aegerfasciella*

- Sternal process of segment VIII with sclerotization limited to anterolateral margins (Fig. 12B); crescent-shaped sclerite associated with the bursa copulatrix anterolaterally (Fig. 12A)..... *O. instabilis*

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