

A NEW OAK-MINING ERIOCRANIID MOTH FROM
SOUTHEASTERN UNITED STATES
(LEPIDOPTERA: ERIOCRANIIDAE)

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Abstract.—Adult and larval stages of *Eriocraniella* (*Disfurcula*) ***mediabulla*** Davis, new species, are described and illustrated. Adult moths have been collected in northern Georgia, northern Florida, southern Louisiana, and northeast Texas. The larva mines new leaves of *Quercus nigra* L. and *Q. falcata* Michx. and probably also *Q. alba* L., *Q. hemisphaerica* Bartr., and *Q. virginiana* Mill.

Recent fieldwork in southeastern United States by several collaborators has revealed the presence of a new species of Eriocraniidae. The discovery marks the first record of the endemic North American genus *Eriocraniella* from southeastern United States and only the second species of this genus found east of the Great Plains. It is also the first eastern North American record of the subgenus *Disfurcula*.

The plant hosts of all members of *Eriocraniella* whose larval biology is known are restricted to *Quercus* (Davis, 1978). *Eriocraniella mediabulla*, new species, appears to feed on a rather broad range of *Quercus*. It is known to feed on black oak (*Q. nigra*) and is suspected to feed on other oaks of both the red and white groups.

Deposition of specimens referred to in this paper are: ECK for Collection of Edward C. Knudson, Bellaire, Texas; JBH, Collection of John B. Heppner, Gainesville, Florida; UCB, University of California, Berkeley, California; USNM, National Museum of Natural History (formerly United States National Museum), Smithsonian Institution, Washington, D.C.; and VAB, Collection of Vernon A. Brou, Edgard, Louisiana.

***Eriocraniella* (*Disfurcula*) *mediabulla* Davis, NEW SPECIES**

Figs. 1-24

Adult (Fig. 1).—*Length of forewing*: ♂, 3.8–4.1 mm; ♀, 3.3–3.7 mm. Small moths with shiny black to dark fuscous wings; forewings with a golden to bluish luster; hindwings slightly paler, more purplish.

Head: Sparsely covered with mostly white to light buff piliform scales intermixed slightly with fuscous hairs particularly along occipital ridge (from chaetosemata). Antennae approximately 0.5 the length of forewing, 29–34 segmented; scape dark fuscous to black with numerous scattered pecten; flagellum uniformly black except for few whitish setae at apex. Maxillary palpi mostly fuscous, suffused

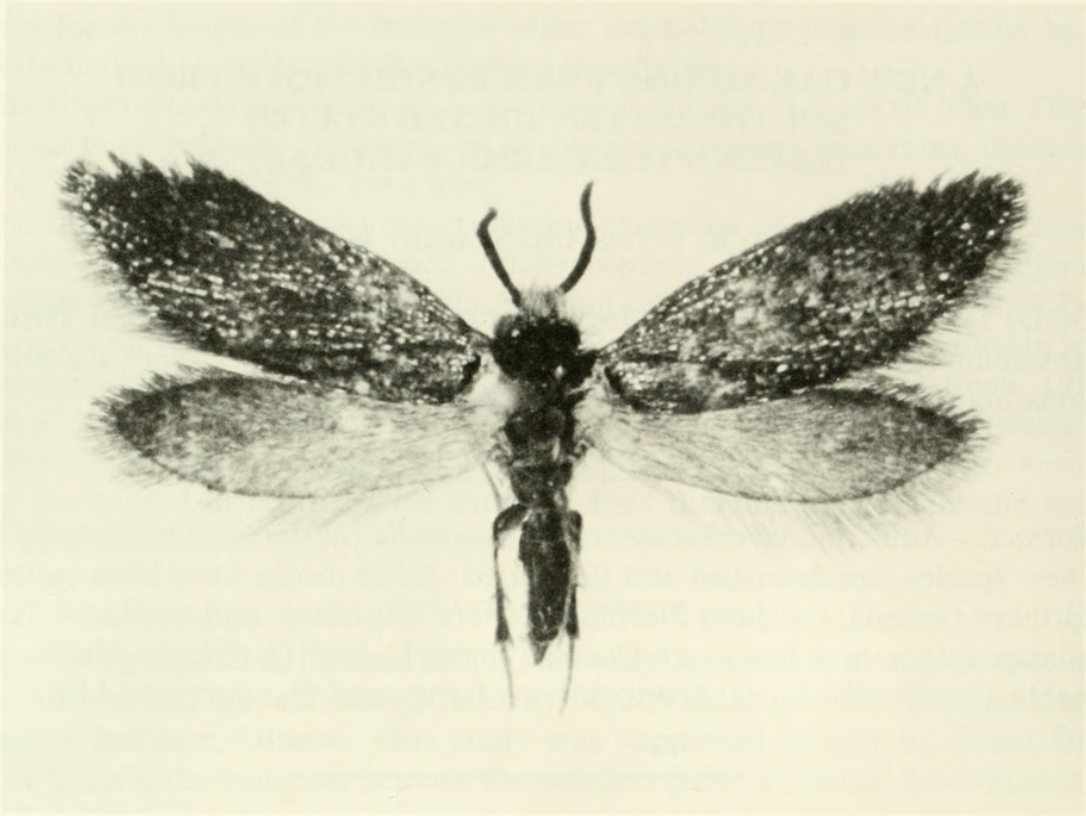
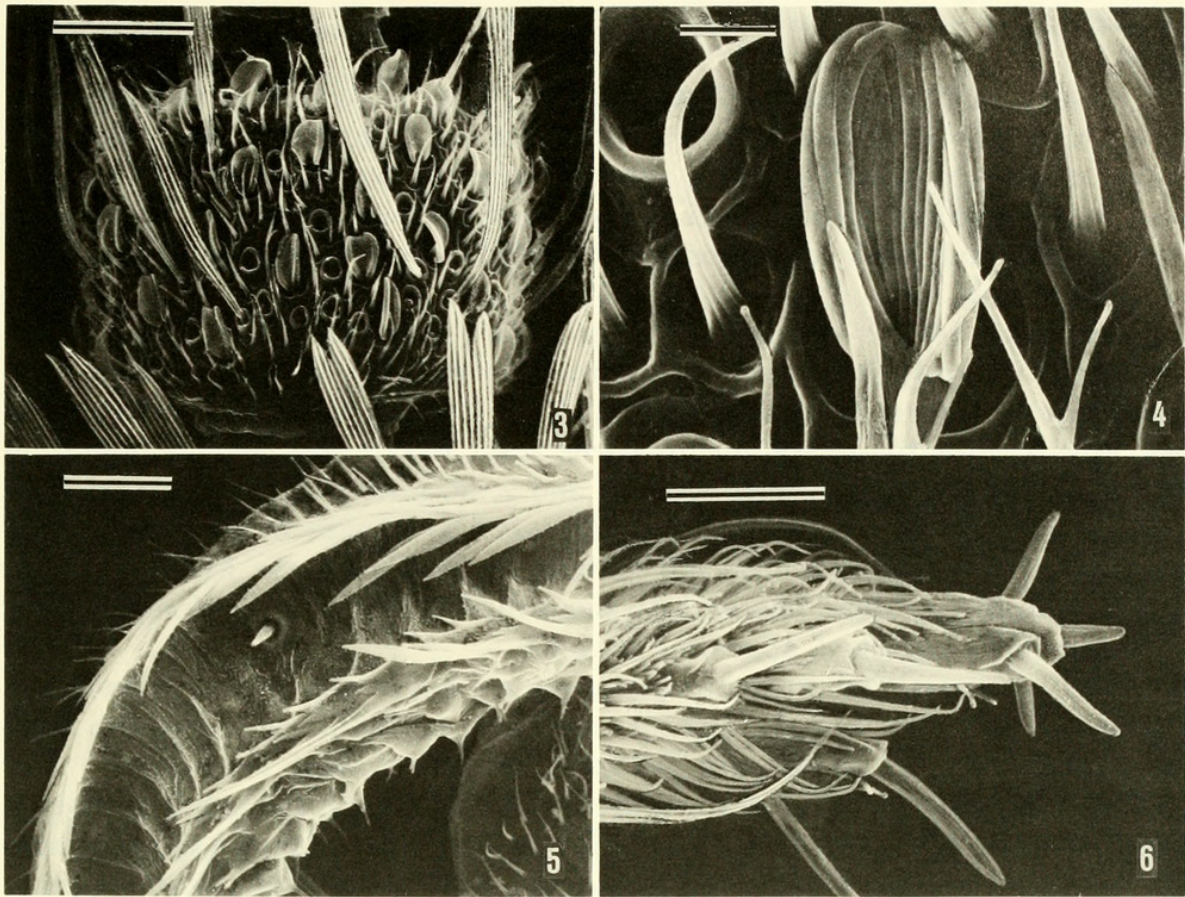


Fig. 1. *Eriocraniella mediabulla*, ♀ paratype, length of forewing 3.8 mm.



Fig. 2. Distribution of *Eriocraniella mediabulla*.



Figs. 3–6. *Eriocraniella mediabulla*, adult structure. 3, Antennal segment (scale = 20 μm). 4, Detail of sensillum auricillicum in Fig. 3 (scale = 2 μm). 5, Haustellum, inner surface of food channel (scale = 10 μm). 6, Maxillary palpus, apex of fifth segment (scale = 10 μm).

with grayish white mesally; apex with a relatively large lobe bearing four stout setae and two pairs of smaller, subapical lobes each bearing a single large seta. Labial palpi sparsely covered with grayish white scales and relatively dense brush of fuscous, piliform scales.

Thorax: Pronotum shiny black to dark fuscous. Venter sparsely covered with buff to grayish white scales. Forewings uniformly black with a distinct golden to sometimes bluish luster. Hindwings slightly paler, fuscous with a distinct purplish luster along costal half. All legs rather uniformly fuscous without distinct markings or annulations. Forelegs with epiphysis absent.

Abdomen: Sparsely covered with fuscous to buff, piliform scales. Fourth sternite of female with relatively large oval fenestrae approximately 0.4 the width of sternite; male without fenestrae. Sternal tubercles present on fifth sternite of both sexes. Eighth sternite with a conspicuous circular fenestra to left side.

Male genitalia: As shown in Figs. 8–10. Uncus shallowly bilobed; lobes rounded. Anal tube completely membranous, basal sclerites absent. Socii present, consisting of a single, relatively large seta. Caudal margin of vinculum produced to form a short, rounded medial knob with a broad base. Anterior apophyses relatively short and broad, ca. 0.3 the length of undivided vinculum. Base of aedoeagus bulbous; ventral phallic branch slightly curved and stout, nearly the diameter of

dorsal branch; base of ventral branch moderately swollen, apex with a triangular lobe.

Female genitalia: As shown in Figs. 11–13. Apex of ovipositor broadly acute as in *Eriocraniella variegata* Davis; lateral edges serrulate with 9–10 minute teeth. Bursa copulatrix moderately long, greatly exceeding cephalic apices of anterior apophyses. Walls of corpus bursa entirely membranous. Vaginal sclerite darkly sclerotized, moderately long (greatest width ca. 0.33 the length) and depressed, without median keel.

Larva (Figs. 14–24).—Length of largest larva 9 mm; diameter 1.5 mm.

Head: Uniformly light brown to stramineous with frontal sutures darkly outlined. Greatest width 0.7 mm; length 0.85. P1 reduced, approximately equal to A2, usually closer to ecdysial line than to A2. A1 and O1 absent. O2 remote from S03, closely associated instead with G1 and 2. S0 series widely separated from one another. Labrum similar to *E. xanthocara* Davis, with all setae simple and acute; anterior margin of pilifers and epipharynx densely spinose. M3 much closer to M2 than to L3. Mandibles with an inner median tuft of 8–10 elongate setae; each seta finely branched, appearing serrated.

Thorax: Pronotal and prosternal plates present but inconspicuous in preserved mature larvae (in alcohol). L2 and L3 variable in position, one sometimes more dorsal than other; L1 far forward. All three SV setae present. Legs absent.

Abdomen: Integument milky white in color. L1 present on all segments, situated relatively high above SD1 and spiracles on A1–8. SV2 absent on A1 and 8, present on A2–7. A9 similar to *Dyseriocrania griseocapitella* (Wlsm.) in possessing a complete set of 10 pairs of primary setae; both SD2 and SV2 are present and well developed. Anal plate with 2 pair of setae; bar-like sclerite (BS) present, very irregular in outline.

Holotype.—♂. Archer Road Lab, 3 mi [4.8 km] SW Gainesville, Alachua Co., Florida; 8 Mar. 1976, coll. at blacklight J. Heppner, USNM 100672.

Paratypes.—FLORIDA: Alachua Co: 1 ♀, same data as holotype (JBH); 2 mi [3.2 km] NW Gainesville: 1 ♂, 10 Mar. 1974, J. Heppner (JBH). Leon Co: Tall Timbers Research Station, 12 mi [19.2 km] N. Tallahassee: 3 ♂, 1 ♀, 17 Feb. 1978, P. Opler (USNM); 15 mi [24 km] N. Tallahassee: 1 ♂, 1 ♀, 19 Mar. 1978, E. Conner, sweeping *Quercus nigra* (USNM); 4 larvae (slides USNM 22453, 23553), 11 Apr. 1979, 1 larva, 12 Apr. 1979, ex. *Quercus falcata*, S. Faeth (USNM). GEORGIA: Franklin Co: Royston: 1 ♀, 11 Apr. 1981, Brown & Ashworth (USNM). LOUISIANA: St. Tammany Par: 4.2 mi [6.7 km] NE Abita Springs, Sec. 24, T6 SR 12E: 1 ♂, 29 Mar. 1984, V. Brou, UV trap (VAB). TEXAS: Hunt Co: Wind Point Park, lake Tawakoni: 1 ♂, 12 Mar. 1985, E. Knudson (ECK).

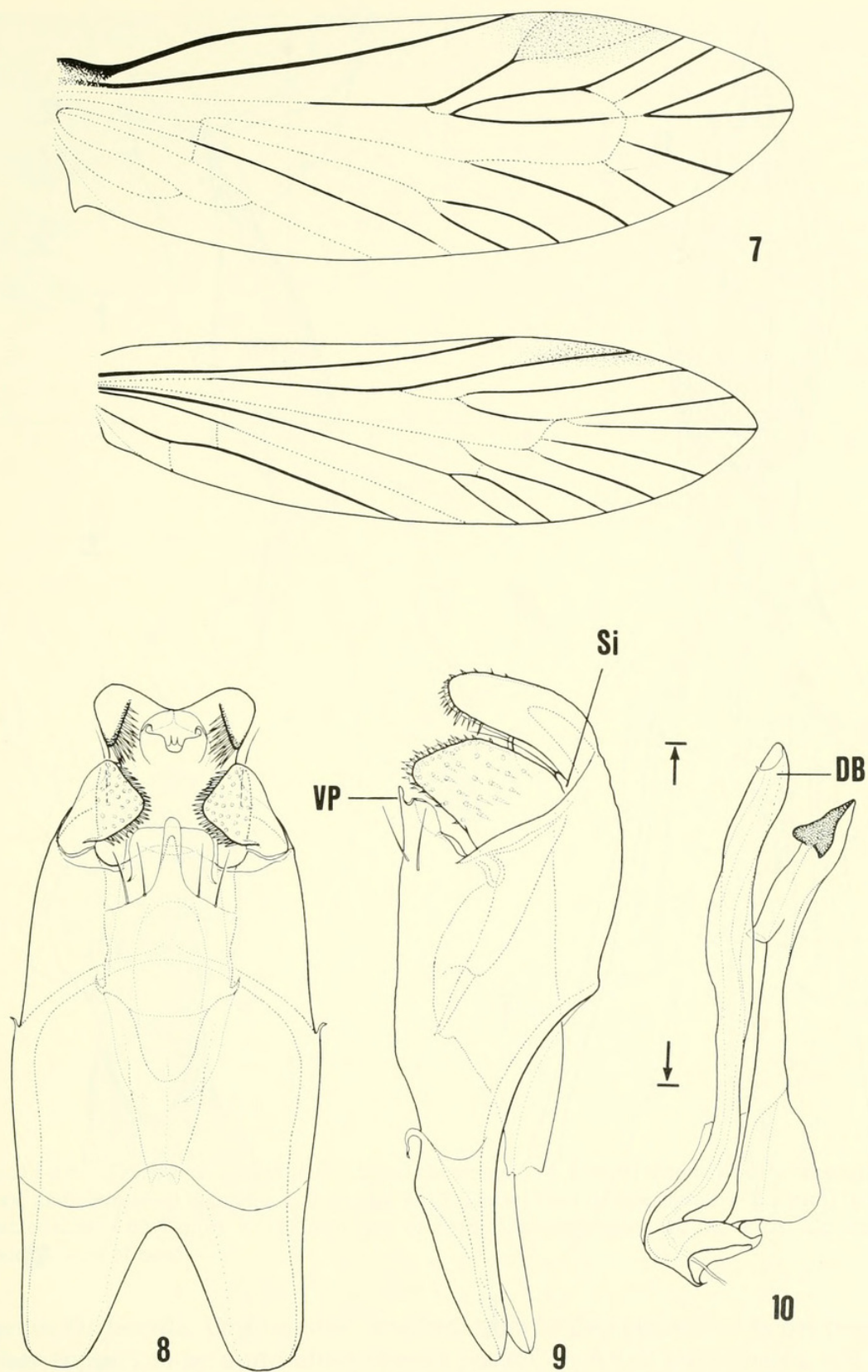
Hosts.—*Quercus nigra* L. and most probably *Quercus falcata* Michx.

Flight period.—Early March to mid April; univoltine.

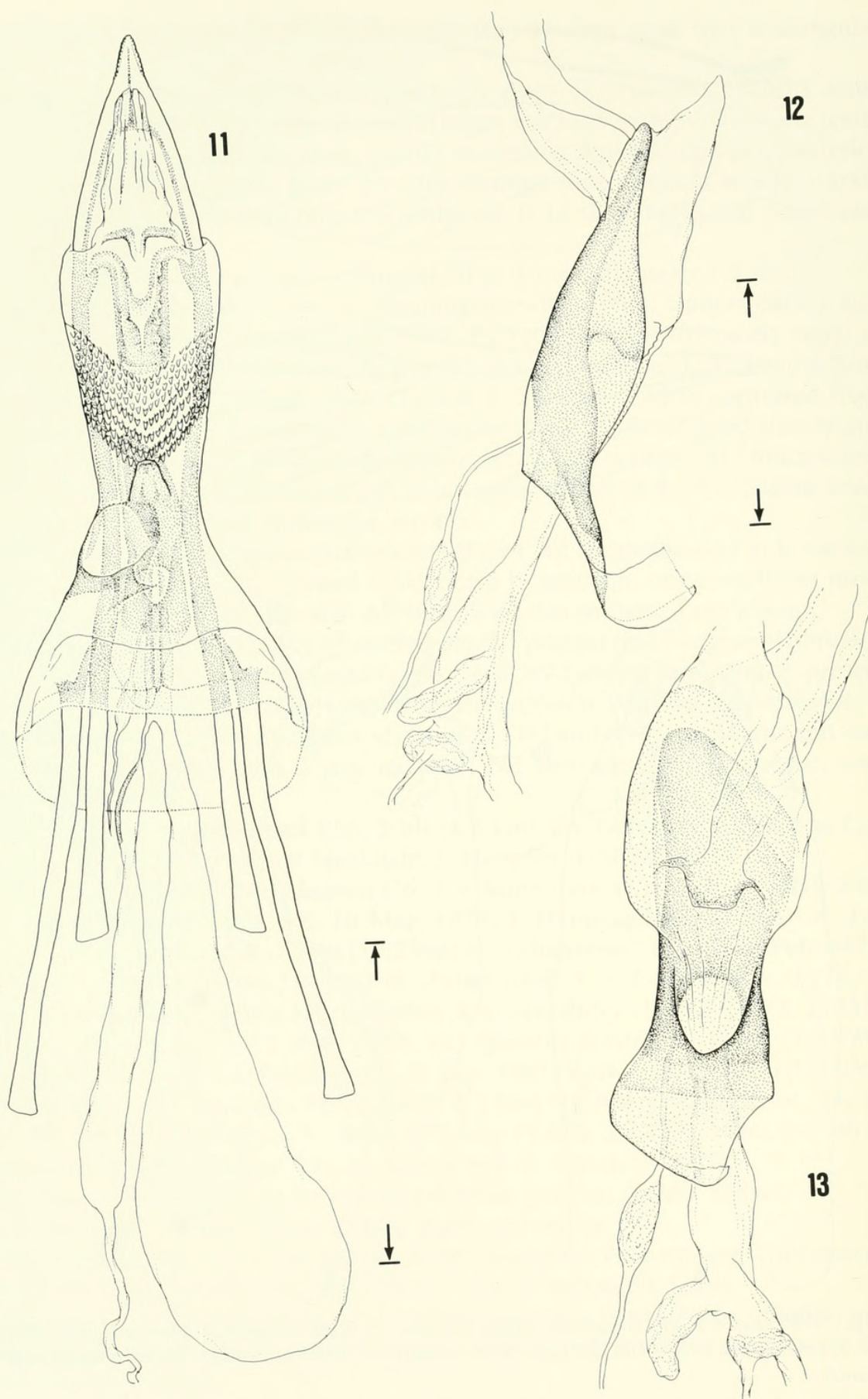
Distribution (Fig. 2).—This species ranges along the Atlantic and Gulf coastal plain from northern Georgia and Florida, west to northeast Texas.

Etymology.—The specific name is derived from the Latin *media* (middle) and *bull*a (knob) in reference to the diagnostic midventral, knoblike process on the vinculum of the male.

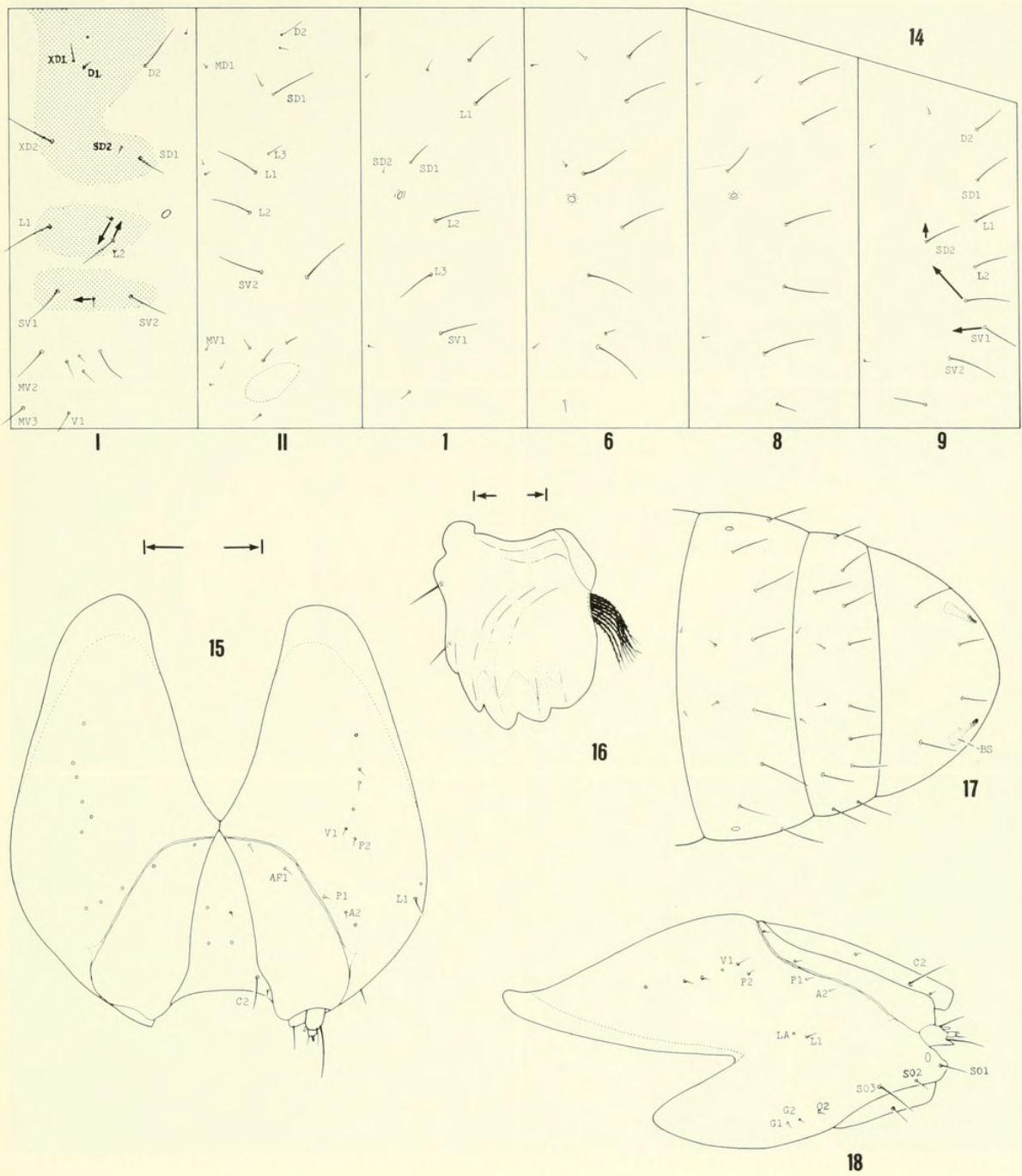
Discussion.—Both venational and maxillary palpal structures clearly indicate the generic placement of *Eriocraniella mediabulla*. Its subgeneric relationships are not so clear, although male genital morphology most strongly suggests the



Figs. 7–10. *Eriocraniella mediabulla*, adult structure. 7, Wing venation. 8, Male genitalia, ventral view. 9, Lateral view (VP = vincular process; Si = socii). 10, Aedoeagus (DB = dorsal branch; scale = 0.5 mm).



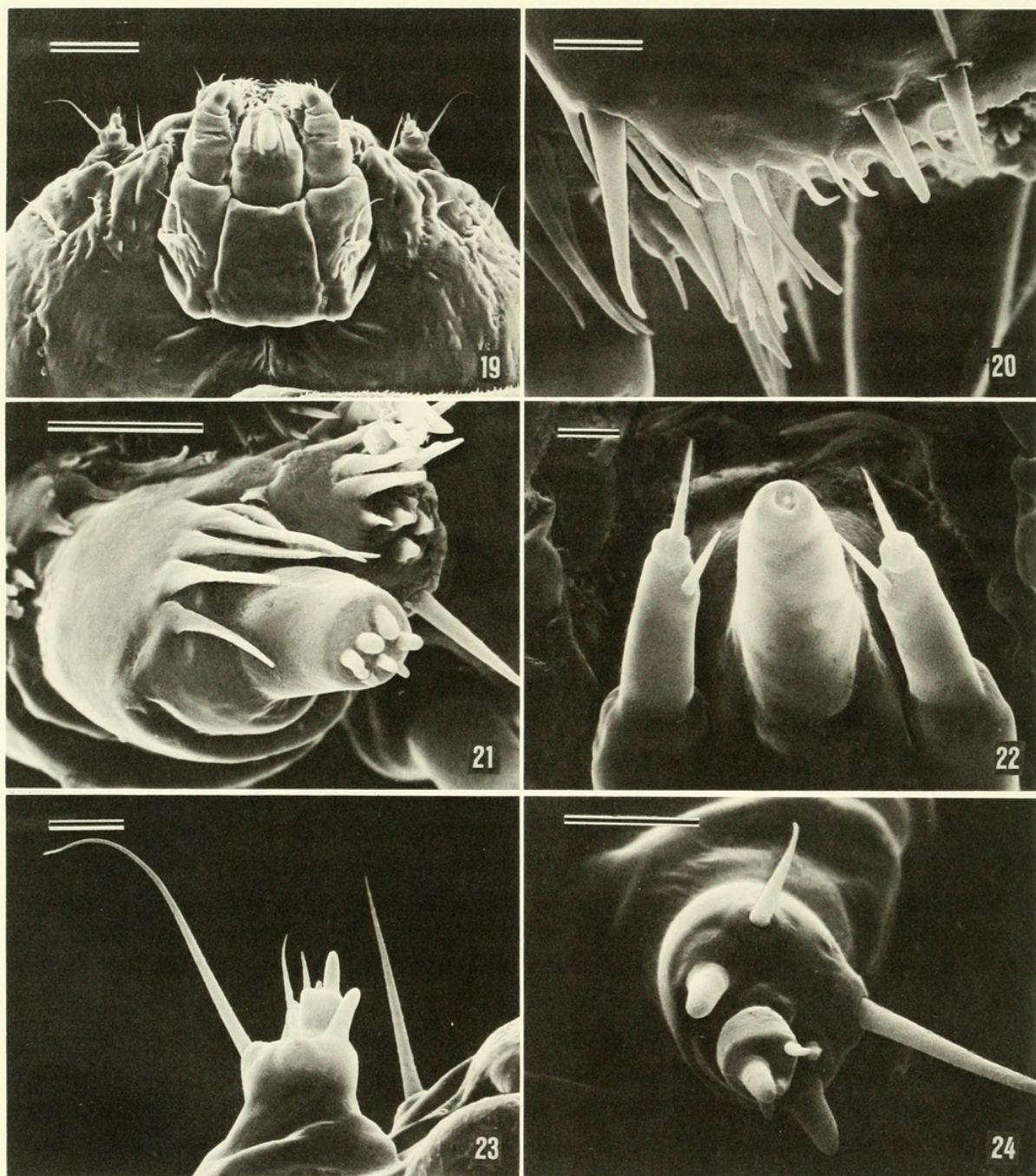
Figs. 11-13. *Eriocraniella mediabulla*, female genitalia. 11, Ventral view (scale = 0.5 mm). 12, Lateral view of vaginal sclerite (scale = 0.2 mm). 13, Ventral view of vaginal sclerite.



Figs. 14–18. *Eriocraniella mediabulla*, larval chaetotaxy. 14, Lateral schematic of prothorax, mesothorax, and abdominal segments 1, 6, 8, and 9. 15, Dorsal view of head (scale = 0.2 mm). 16, Left mandible (scale = 0.05 mm). 17, Dorsal view of abdominal segments 8–10 (BS = Bar like sclerite). 18, Lateral view of head.

subgenus *Disfurfcula*. One possible contradiction to this placement is the presence of what appears to be a modified ventral pocket on A9 of the females, which in the subgenus *Eriocraniella* is lined with small spines (Davis, 1978: 27). *Eriocraniella mediabulla* differs from all other members of *Disfurfcula* in lacking an epiphysis (as does *Dyseriocrania* and *Eriocrania*) and a ventral keel on the vaginal sclerite.

Although adults have yet to be reared from *Quercus falcata*, the larvae collected on this oak and figured in this paper are believed to represent *E. mediabulla*. The



Figs. 19–24. *Eriocraniella mediabulla*, larval structure. 19, Ventral view of head (scale = 10 μ m). 20, Anterior margin of right half of labrum (scale = 10 μ m). 21, Maxilla (scale = 20 μ m). 22, Spinneret and labial palpi (scale = 10 μ m). 23, Antenna, dorsal view (scale = 20 μ m). 24, Antenna, apical view (scale = 20 μ m).

most diagnostic features of the larva are the absence of the cranial setae 01 and A1 and the presence of an entire complement of 10 primary setae on the ninth abdominal segment. This species is the only eriocraniid known to have lost 01, with A1 absent also in *D. griseocapitella* (Wlsm.) and *Eriocraniella xanthocara* Davis. *Dyseriocrania griseocapitella* is the only other eriocraniid known to possess 10 primary setae on A9. The peculiar mandibular setal tuft of *E. mediabulla* also occurs in *D. griseocapitella*, *D. auricyanea* (Wlsm.), and *E. xanthocara*.

Biological observations.—Biology of this species is based upon observations of larvae and adults in the field. It has been reared from *Quercus nigra* and, on the

basis of leaf mine collections, probably also feeds on *Q. hemisphaerica*, *Q. falcata*, *Q. alba*, and *Q. virginiana* in north Florida. Eggs are inserted near the edge of leaves of *Q. nigra*, usually beyond the distal half, and only in leaves of newly emerging buds approximately in mid-March. Although *Q. nigra* and other likely host oaks in northern Florida can produce secondary flushes of new leaves in late summer, this species has not been found on secondary flushes, suggesting it is strictly univoltine, as are all other Eriocraniidae. Eggs hatch in 7–10 days.

The larva begins a serpentine mine in the upper epidermis of the leaf, proceeding along the leaf edge to the apical portion of the leaf where a full-depth, blotch-shaped mine is produced. The mines of *E. mediabulla* differ in mine development from those of *D. griseocapitella*, the only other sympatric species of Eriocraniidae. Due to inherent differences in preferred oviposition sites, the mines of *E. mediabulla* begin more distad on the leaf than do those of *D. griseocapitella*. In the latter, the mine commences near the lower one third of the leaf and continues along the leaf edge as a serpentine mine to the distal half. In both species the serpentine mine abruptly broadens to form a large blotch near the leaf apex. Another prevalent difference between the mines of these two species is that no opening forms at the oviposition site of *E. mediabulla*. In many eriocraniids, including *D. griseocapitella*, a small, oval hole, approximately 1.5–2.0 mm in length, normally develops around the egg scar as the leaf expands. Frass is deposited in semi-circles within the blotch mine. There are probably four instars. When disturbed, the larva wriggles violently. The larva completes development rapidly, within 7–10 days, then cuts a crescent-shaped hole in the lower leaf surface, and drops to the soil surface. It then burrows into the soil and spins a cocoon. It is not known if the larva diapauses within the cocoon or immediately forms a pupa. The insect remains in the soil as either a diapaused larva or a pupa until the following spring.

Little is known of the pupal stage, except pupation occurs in the soil. Other eriocraniids on oak are known to pupate only after several months or more of larval diapause (Opler, 1974). Adults have been collected at the time of bud burst on buds or catkins of *Q. nigra*. The latter observation suggests the adult may feed on pollen (Opler, pers. comm.).

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