RAETINE MAYFLIES FROM FLORIDA
(EPHEMEROPTERA)¹

LEWIS BERNER

Since Nathan Banks described Callibaetis floridanus from Biscayne Bay in South Florida forty years ago (1900), no additional species of Baetinae have been reported from the state. Even Banks’ species has been mentioned only once in the literature, when it was redescribed by Traver in “The Biology of Mayflies” in 1935. During the past three years, I have been studying the Ephemeroptera of Florida, and in the course of this work have found at least fifteen additional species of Baetinae, representing seven genera (including Callibaetis); three of the species are undescribed. Among the sixteen species of this subfamily, six are represented only by nymphs or by nymphs and females, both forms of limited taxonomic value, and because of the uncertainty in identification, such species will not be treated here. The present contribution includes the records and descriptions of those identified Baetine species which are now definitely known to occur in Florida; their ecological distribution will be discussed in a later paper.

The lack of flowing water in South-central and Southeast Florida has kept all lenitic forms out of this region, and here Callibaetis floridanus is the only representative of the Baetinae. Northwest Florida, on the other hand, has numerous, moderately flowing streams in which nymphs of all of the forms described in this paper can be found.

Rearing has been carried out entirely in the laboratory. A small stream of air forced into an aquarium proved to be quite effective for keeping mature, stream-inhabiting, Baetine nymphs alive for several days and allowing many of them to emerge, an act which they seem to perform with difficulty in quiet water. However, some of the species occur in regions from which it is impossible to transport such intolerant nymphs and consequently,

¹Contribution from the Department of Biology, University of Florida.
Fig. 18. Centropotilium viridoculcaria, first gill.
Fig. 19. Centropotilium viridoculcaria, fourth gill.
Fig. 20. Centropotilium viridoculcaria, seventh gill.
Fig. 21. Callicebas florenanes, maxilla of nymph.
Fig. 22. Callicebas florenanes, seventh gill.
Fig. 23. Centropotilium viridoculcaria, labial palp of nymph.
Fig. 24. Pseudodracaon alachua, genitalia of male imago.
Fig. 25. Callicebas floridanus, genitalia of male imago.
Fig. 26. Centropotilium viridoculcaria, genitalia of male imago.
Fig. 27. Baeitia spiethi, genitalia of male imago.
Fig. 28. Acentrelia propinquis, genitalia of male imago.
Fig. 29. Baeitia spiethi, hind wing of male imago.
Fig. 30. Centropotilium viridoculcaria, hind wing of male imago.
Fig. 31. Acentrelia propinquis, hind wing of male imago.
Fig. 32. Callicebas floridanus, hind wing of male imago.
in these instances, the association of adult and nymph has had to be inferred.

I have followed Ide's method of describing immatures, in which the description is not based on a single specimen but on the average of a number of specimens.

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CALLIBAETIS Eaton
Callibaetis floridanus Banks

Male Imago (in alcohol):

**Measurements**: Length of body—5.3-7.0 mm.; fore wing—4.7-6.5 mm.; caudal filaments—9.9-12.6 mm.

**Head**: Light brown; anterior margin of frontal shelf red-brown, remainder whitish-hyaline suffused with brown; median carina white; vertex dark brown between compound eyes. Base of ocelli brown, distal portion white; brown dash under lateral ocelli; brown markings extending from anterior border of each lateral ocellus almost to dorso-proximal margin of median ocellus. Turbinate portion of compound eyes orange dorsally, remainder yellowish-white except for dark-brown line at base on medial side; lower portion of eye black. Basal segment of antenna white ventrally, dusky dorsally, distal margin red; second segment whitish ventrally, dorsally brown; flagellum brownish becoming pale distally. Ventral surface of head yellowish-white.

**Thorax**: Brown marked with tan; freckled with brown (a very small seta arising from each spot). Median line of pronotum light tan; entire pronotum bordered by dark brown line; submedian tan patch on posterior border. Mesonotum predominantly light brown; median line reddish; anterior border with thin dark brown line; submedian brown stripes bounded laterally by tan stripe; lateral and posterior portions of scutum dark brown; face of ridge at posterior border of scutum yellowish-white, this followed by brown; scutellum tan, posterior border dark brown. Metanotum dark brown; mid-portion of anterior margin dark brown, midportion of posterior border tan. Pleura brownish marked with yellow; large brown areas anterior to each coxa; yellow stripe extending downward from root of mesothoracic wing. Prosternum yellowish-white; brown border on anterior and posterior margins, also brown line on medial side of each coxa. Mesosternum yellow marked with brown; anterolateral portion brown, medial part yellow; posterolateral regions brown; dark brown border on posterior and anterior margins and also around coxae. Metasternum predominantly yellowish-brown; brownish in anterior portion, white between coxae, dark brown along caudal border.
Wings: Hyaline, veins not colored; mesothoracic wings with stigmatic areas whitish; this whitish area extending through costal border; intercalaries double near tip of wing, single along outer margin; twenty to twenty-five cross-veins posterior to R_{4}. Several cross-veins of metathoracic wings incomplete (fig. 32).

Legs: Coxa marked with brown; femur with obsolete reddish spots arranged longitudinally on outer side; trochanter, tibia, and tarsus white. Claws brown, blunt claw whitish at tip.

Abdomen: Freckled with obsolete brownish spots (a very small seta arising from each spot). Tergite 1 brown in mid-region, laterally yellowish-brown; 2-6 hyaline whitish; posterior margin in mid-region reddish; faint brownish submedian areas on posterior half of tergites 2-6; 7-10 predominantly brownish; anterior portion of 7 semi-hyaline; longitudinal whitish patches on 7-10; 7 and 8 light brown; 9 and 10 dark brown. Dark brown, lateral streaks on tergites 1-9 in region of spiracles; reddish-brown streak just below this on sternites 2-9. Sternites 1-6 semi-hyaline with suggestion of brown along mid-portion of posterior border; 7 semi-hyaline along anterior border, predominantly white, reddish along posterior border. Sternites 8 and 9 white, red area on mid-region of posterior border.

Genitalia: White; terminal forceps segment short, expanded distally (fig. 25).

Caudal filaments: White, unmarked.

Variations: Femora with reddish spots absent; tarsal joinings brown. Brownish tinge in wings; veins yellow. Tergite 1 entirely brown; tergites 2-7 with faint, median, longitudinal stripe extending onto anterior half of tergite 8; tergites 7-10 mostly brown. Sternites 2-9 with blackish spot at mid-anterior margin, these spots fainter on 8 and 9; a pair of submedian brown dashes near anterior margin of sternites 2-9; reddish streaks absent from sternites. Caudal filaments with faint brown annulations at joinings.

Nymph (in alcohol):

The nymphs of C. floridanus are distinguished from the other Florida species by the relatively long second segment of the maxillary palp and by the absence of a flap on the seventh gill (figs. 21, 22).

Measurements: Length of body—5.8-8.7 mm.; length of caudal filaments—3.4-5.3 mm.

Head: Yellowish-brown; upper portion of compound eyes orange-brown, lower portion black. Lateral ocelli tan, medial side of base dark brown; middle ocellus brownish; dark brown basal area on dorsal side. Antennae yellowish. Segments of maxillary palp subequal.

Thorax: Brown with tan markings. Median area of pronotum tan, lateral to this, a triangular brown area with base along anterior margin; this triangle followed by broad yellowish area; a large brown spot in center of triangle; remainder of pronotum mostly brown. Meso- and metanotum brown. Pleura brown. Sternum yellowish-brown.

Legs: Yellowish-brown, marked with darker brown. Coxa yellowish, brownish on outer side; trochanter yellowish, tinged with brown; femur yellowish-brown, brown band near distal end; tibia, tarsus, and tarsal claw
yellowish-brown. Tibia and tarsus brown at their distal margins. Scutae on legs brown.

Abdomen: Tergites predominantly brown. Tergite 1 mostly yellowish-
brown; posterolateral margins brown; tergites 1-9 with faint submedian
dashes at anterior margins; 7 and 8 with brown dashes in anteromedial
region; 2-8 with yellowish, longitudinal lines extending length of tergites
just medial to gills; anterolateral and posterolateral margins of tergites
2-9 pale, these pale areas separated by brown bar. Sternites yellowish,
usually unmarked; if marked, brown triangle at mid-posterior margin of
sternites 1-9 with base along posterior margin; apex of triangle extends
to about middle of sternite; the base of triangle may spread out on caudal
sternites and form a rather broad, brown, posterior band. In strongly
marked specimens, there may be longitudinal brown dashes near lateral
margins on sternites 1-9. Posterolateral spines on segments 6-9 about
equal in size. Inconspicuous brownish spots (a very small seta arising
from each spot) irregularly scattered over abdomen. Gills brownish-
hyaline; gills 1 and 2 four lobed, 3-6 double and 7 single; tracheae promi-
nent.

Caudal filaments: Yellowish-brown. Hairs yellowish-brown; in region
of long hairs, filaments sometimes brownish but usually not different in
color from remainder of tail. Spines at joints prominent, brown; at base
tails, prominent brown spines on every second segment; distally, to end
of region of long hairs, spines occurring on every fourth segment, produc-
ing an annulate effect. Segments with the prominent spines usually
brownish. Beyond region of long hairs, tails yellowish-brown.

Locality records: Alachua Co., general in Gainesville area
(numerous records of adults and nymphs from April, 1937-
March, 1940); Citrus Co., near Withlacoochee River (nymphs,
March 25, 1938); Collier Co., Pinecrest (adults and nymphs,
August, 1937); Columbia Co., Lake City (nymphs, May 12,
1937); Dade Co., Royal Palm State Park (adults, July 31, 1937),
Pinecrest (adults, August 3, 1937), generally around Miami area
(adults and nymphs, July-November, 1937); Gilchrist Co., Su-
wannee River (adult, April 5, 1938); Highlands Co., Child's
Crossing (adults, August 11, 1938, T. H. Hubbell), Highlands
Hammock State Park (nymphs, May 13, 1939, F. N. Young);
Hillsborough Co., Tampa (nymphs, April, 1937 and 1938), Six-
Mile Creek (nymphs, March, 1938), Little Fish-hawk Creek
(nymphs, March, 1938); Jackson Co., Blue Springs Creek
(adults, July 1, 1939); Lake Co., St. Johns River at Crow's Bluff
(adult, September 12, 1938, J. R. Preer); Lee Co., Bonita
Springs (nymphs, February 8, 1939, A. F. Carr); Levy Co.,
6 miles N. E. Cedar Keys (nymphs April 9, 1937), Otter Creek
(nymphs April 9, 1937), 4 miles S. Bronson (nymphs, November
14, 1937, H. H. Hobbs); Marion Co., Juniper Springs (nymphs,
November 21, 1937), Oklawaha River at Eureka (nymphs, Feb-
uary 12, 1938). Withlacoochee River (nymphs, March 25, 1938); Monroe Co., Pinecrest (adults, July, 1935, and December, 1937, F. N. Young; August 24, 1937), Turner’s River (nymphs, December 25, 1935, F. N. Young); St. Johns Co., near Trout Creek (nymphs, April 28, 1938, F. N. Young); Sumter Co., 1 mile N. Sumter Co. line (nymphs, March 27, 1938); Taylor Co., Perry (nymphs, April 1, 1938, II. H. Hiobbs; February 5, 1938); Volusia Co., Benson Springs (adults, August 30, 1938, J. R. Preer); Polk Co., Polk-Lake Co. line (nymphs, May 13, 1939, F. N. Young); Putnam Co., Welaka (adults, December 29, 1938; July 5, 1939, A. M. Laselle).

**CENTROPTILUM Eaton**

*Centroptilum viridocularis* n. sp.

**Diagnosis:** Abdominal tergites 2-6 of male imago semi-hyaline, yellowish-white; 7-10 ochraceous; width of metathoracic wing equal to one-fourth length; process of hind wing only slightly hooked; penis cover broadly truncate; distal forceps segment small, curved. (Figs. 26, 30.)

**Relationships:** On the basis of a combination of characters (mesothoracic color, red markings on tergites 2-6, color of tergites 7-10, and presence or absence of a projection on inner margin of second forceps segment), *Centroptilum viridocularis* is distinct from other described species. Comparison of Traver’s drawings of the metathoracic wings (1935) of some species of *Centroptilum* with those of *C. viridocularis* leads me to associate the latter with *C. convecum*, *C. conturbatum*, or *C. rufostrigatum*. However, on the basis of Traver’s drawings of genitalia, the relationships would seem to lie with *C. rufostrigatum* or *C. fragile*. Since both wings and genitalia are similar to those of *C. rufostrigatum*, these two species may possibly be the most closely related.

**Description of Holotypic Male Imago** (in alcohol):

**Measurements:** Length of body—4.1 mm.; length of wing—3.7 mm.; length of caudal filaments—6.3 mm.

**Head:** White; reddish-brown mark where anteromedial angle of tubinate eye meets head; brown, submedian dash near base of antenna. Tubinate eyes large, oval, contiguous at base. When viewed from above, eyes completely cover pronotum and anterior portion of mesonotum. Upper portion of tubinate eyes greenish-yellow; a brown line around rim; basal portion grayish-brown; discontinuous dark-brown line separating the grayish-brown from upper greenish portion. Lower part of eye dark gray. Ocelli ringed with dark brown at base. Basal segments of antennae white, tinged with brown; flagellum dusky except at tip.