

Two New Species of the Genus *Baetodes* from Ecuador
(Ephemeroptera : Baetidae)

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While in residence in a mining camp in Macuchi, Ecuador the writer collected a series of mayflies belonging to the genus *Baetodes* Needham and Murphy (1924). The locality is situated on the west side of the Andes about half way between Guayaquil and Quito at an altitude of about 6000 ft. In this series of *Baetodes* are two different species of nymphs which I herein describe as new: *Baetodes spinae* and *Baetodes levis*.

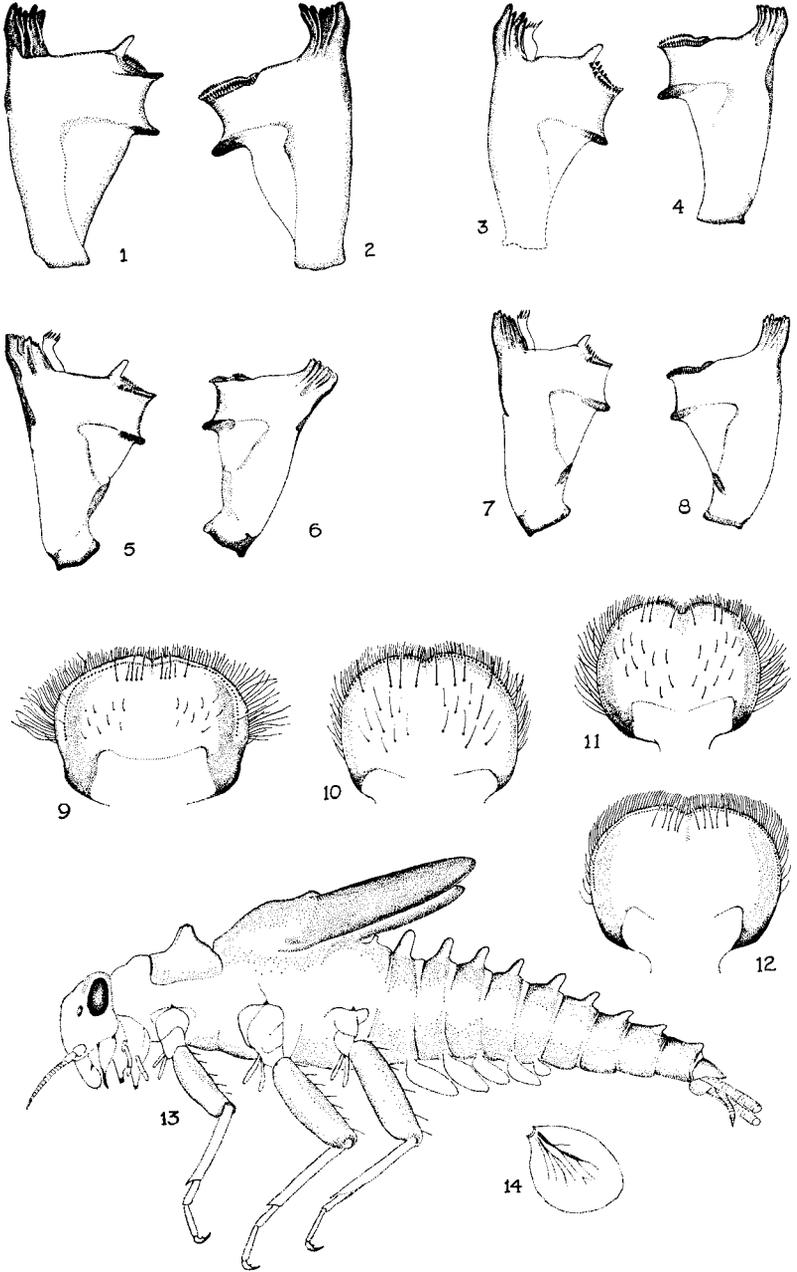
The genus *Baetodes* is at present comprised of one adult from Venezuela, *B. spiniferum* Traver (1943) and three species of nymphs from Brazil. *Baetodes serratus* Needham and Murphy (1924), *Baetodes* species No. 1 Needham and Murphy (1924) and *Baetodes itatiyanus* Demoulin (1955). Needham and Murphy established the genus *Baetodes* in 1924. They summarized the characteristics of the genus as follows: "the nymphs are stiff, long-legged bare tailed concolorous forms, having drooping, simple, oval gills on segments 1-5 only of the abdomen, having stout rather few-jointed antennae, and greatly reduced palpi and glossae. The middle tail is rudimentary. The dorsal crest of the femora bears a single line of long brown spines." Traver (1944) summarizes the generic characters of the nymphs of this genus in Notes on Brazilian Mayflies: "nymphs of this genus are unique among known genera of the subfamily Baetinae in possessing but 5 pairs of gills, all of which turn downward along the sides of the body; and in the total lack of hairs on the tails. The middle tail is a *very short* stub. Hind wings are lacking." Edmunds (1950) summarizes the characteristics of the nymphs of the genus.

The abdominal terga are wider than the sterna so points of attachment of gills to terga near pleural fold are closer to the mid-sternum than to the mid-tergum. Consequently the abdominal gills show up better from the ventral view than from the dorsal.

***Baetodes spinae* Mayo, new species**

(Figs. 1, 2, 11, 13, 14, 15, 25)

NYPH.—Length: body 3-4 mm. General color pale amber. Head pale amber; ocelli grey; turbinate eyes of males show through as orange; antennae pale yellow; mouthparts as in figs. 1, 2, 11, 15, 25; articulations on labrum reddish brown; labrum pale bordered with brown, 4 long spines behind apical margin



on either side of midline, numerous shorter hairs posterior to these; fringe of hairs around margin, short along anterior border and longer on sides; labial and maxillary palpi white; basal segment of labial palpi longer than other two segments together; posterior border of head narrowly rimmed with reddish brown. Intersegmental membranes pale yellow. Pronotum amber, anterior border concave, posterior border with wide hump at midline composed of two spines washed with brown; mesonotum amber with pale midline; mesoscutellum with 2 blunt posterior, sublateral spines; two slightly roughened ridges on mesonotum anterior to spines on mesoscutellum; small spine posteriomediaally on metanotum; wing pads elongated; reddish brown in mature specimen. Coxal articulations with pleuron heavily sclerotized and dark reddish brown; legs long; femora pale yellow except joinings with tibiae reddish brown with 6 or more reddish brown hairs along anterior borders; tibiae and tarsi with minute reddish brown spines along ventral crest; claws reddish brown, with row of subapical denticles. Abdominal terga amber; paler posteriorly; posterior borders of terga 1-8 touched with pale brown; abdominal terga with prominent median spine on each segment; spine on segment 1 stouter and longer than those on 2-10 (fig. 13); gills white; present on abdominal segments 1-5 and two finger-like gills on each coxa; those on abdomen oval (fig. 14) decreasing in size posteriorly. Cerci without hairs, terminal filament short.

Holotype nymph, V. K. Mayo, 30 June 1943, RIO AMAYO, MACUCHI, ECUADOR; in collection University of Utah, Salt Lake City. Paratypes, 7 nymphs same data, same deposition as holotype.

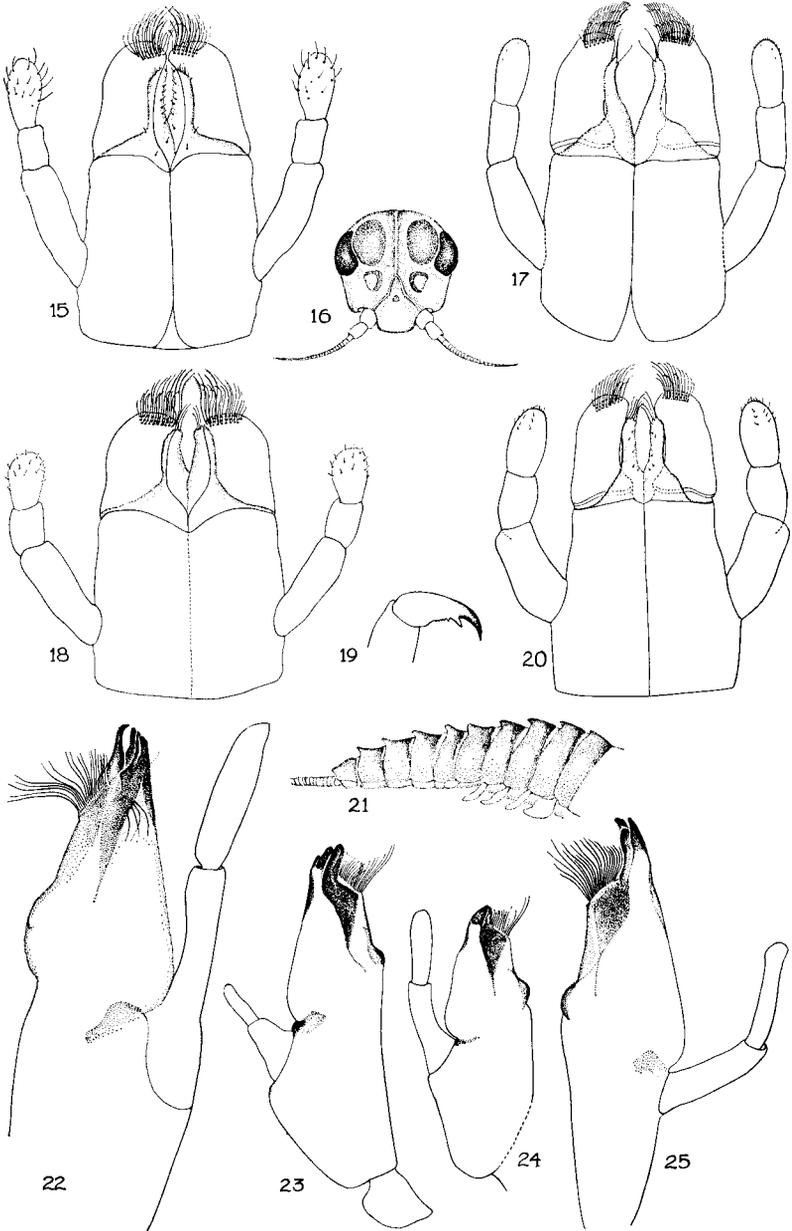
Baetodes levis Mayo, new species

(Figs. 3, 4, 12, 16, 18, 19, 21, 22)

NYMPH.—Length: body 3-4 mm. General color pale reddish brown; intersegmental areas pale yellow; head pale reddish brown on vertex, pale yellow below, midline pale yellow; ocelli grey, larger ones rimmed with black on inner margins (fig. 16); turbinate eyes of males show through as orange; antennae pale yellow; labrum distinctly brown; maxillary and labial palpi white. Mouthparts as in figures 3, 4, 12, 18, 22. Thoracic dorsum pale reddish brown, mottled with pale reddish brown laterally; midline pale yellow; pronotum smooth, without spines, concave along anterior margin and streaked with dark reddish brown laterally; mesonotum suffused with darker reddish brown along anterior margin; small median spine posteriorly on metanotum. Median spines on all abdominal terga, not erect, but directed posteriorly (fig. 21). Gills white; present on abdominal segments 1-5, attached to posterolateral corners of abdominal

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FIG. 1. Left mandible *B. spinae* Mayo. FIG. 2. Right mandible *B. spinae* Mayo. FIG. 3. Left mandible *B. levis* Mayo. FIG. 4. Right mandible *B. levis* Mayo. FIG. 5. Left mandible *B. serratus* N. and M. FIG. 6. Right mandible *B. serratus* N. and M. FIG. 7. Left mandible *B. sp. No. 1* N. and M. FIG. 8. Right mandible *B. sp. No. 1* N. and M. FIG. 9. Labrum *B. serratus* N. and M. FIG. 10. Labrum *B. sp. No. 1* N. and M. FIG. 11. Labrum *B. spinae* Mayo. FIG. 12. Labrum *B. levis* Mayo. FIG. 13. Lateral view of *B. spinae* Mayo. FIG. 14. Gill from *B. spinae* Mayo.



terga near low pleural fold; paired finger-like gills on coxae; coxal articulations with pleuron dark reddish brown. Pleural sclerites and coxae amber narrowly outlined with reddish brown. Legs pale yellow; femora yellow except for dark reddish brown at joinings with tibiae with few dark reddish brown hairs on dorsal crests; distal half of tarsi reddish brown; long claws with row of denticles subapically (fig. 19); all claws similar; minute spines on ventral crests of tibiae and tarsi. Thoracic sterna pale yellow; abdominal sterna amber, paler than terga. Cerci without hairs, outer ones about two thirds length of body, terminal filament short.

Holotype nymph, V. K. Mayo, 30 June 1943, RIO AMAYO, MACUCHI, ECUADOR; in collection University of Utah, Salt Lake City. Paratypes, 6 nymphs same data, same deposition as holotype.

DISCUSSION.—the presence of spines on the pronotum and mesonotum of *B. spinae* separates this species from *B. levis*, on which the pronotum and mesonotum are smooth. There is also a marked difference in the mid-dorsal abdominal spines of the two species; those of *B. spinae* are larger and erect; those of *B. levis* are much less prominent and pointed posteriorly (figs. 13 and 21). The general coloring of *B. levis* is darker than that of *B. spinae*. There are differences in details of the mouthparts: the basal segments of labial palpi of *B. spinae* are longer than those of *B. levis*; hairs on the apical segments are much longer on *B. spinae* than on *B. levis*; there are numerous minute hairs on the glossae of *B. spinae* which are lacking on *B. levis*. Details of the labrum and labium differ in the two species (figs. 11, 12, 15, 18). The thumb on the mandible of *B. spinae* is somewhat longer than that of *B. levis* (figs. 1, 3); the maxillary palpi of *B. spinae* is much shorter than that of *B. levis* (figs. 22, 25). There are some characteristics that are the same on both species; i.e., the ocelli, antennae, legs, claws, pleura and cerci. The paired coxal gills and abdominal gills are the same on both species.

The following is an account of the known species of nymphs of the genus with a comparison of each to the new species, *B. spinae* and *B. levis*: *Baetodes serratus* Needham and Murphy (1924), Tijuca, Rio de Janeiro, Brazil, 17 October 1919, J. C. Bradley. Length: body 7–8 mm; median abdominal spines on each segment all directed posteriorly and pointed; median spine on metascutum, fairly large in relation to

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FIG. 15. Labium *B. spinae* Mayo. FIG. 16. Head *B. levis* Mayo, showing ocelli. FIG. 17. Labium *B. serratus* N. and M. FIG. 18. Labium *B. levis* Mayo. FIG. 19. Claw I *B. levis* Mayo. FIG. 20. Labium *B. sp. No. 1* N. and M. FIG. 21. Lateral view of abdomen *B. levis* Mayo. FIG. 22. Maxilla *B. levis* Mayo. FIG. 23. Maxilla *B. serratus* N. and M. FIG. 24. Maxilla *B. sp. No. 1* N. and M. FIG. 25. Maxilla *B. spinae* Mayo.

abdominal spines; no spines on pro- or mesonota; points of attachment of abdominal gills low on terga; no gills on coxae; general coloring dark brown; overall appearance altogether different as *B. serratus* is twice the length, with dark brown coloring in contrast to the very pale *B. spinae* and *B. levis*; absence of gills on coxae of *B. serratus* separates that species from both *B. spinae* and *B. levis*; abdominal spines of *B. serratus* are altogether different from those of *B. spinae*; not erect, but directed posteriorly and pointed; abdominal spines of *B. levis* are similar to those of *B. serratus*, but more blunt; median spine on metanotum of *B. serratus* is larger in comparison with abdominal spines than that of either *B. spinae* or *B. levis*; no spines on pro- or mesonotum in *B. serratus* as in *B. spinae*; abdominal gills not as low as those on *B. spinae* and *B. levis*; details of mouthparts differ (figs. 5, 6, 9, 17, 23); basal segments of labial palpi of *B. serratus* not as long as those of *B. spinae*; apical segments of *B. serratus* with minute hairs in contrast to the longer hairs on the corresponding segments of *B. spinae* (figs. 15, 17); the glossae of labium of *B. serratus* with fewer hairs than on glossae of *B. spinae*; on labrum row of hairs in back of apical margin of *B. serratus* differs from that of *B. spinae* and *B. levis* (figs. 9, 11, 12).

Baetodes sp. No. 1 Needham and Murphy (1924). Tijuca, Rio de Janeiro, Brazil, 17 October 1919, J. C. Bradley: length: body 4.75 mm. Two finger-like gills on each coxa; no abdominal spines; abdominal gills arise close to low pleural fold; color dark brown; gills on coxae similar to those of both *B. spinae* and *B. levis*. The complete absence of abdominal spines separates this species from both *B. spinae* and *B. levis*; details of mouthparts differ (figs. 7, 8, 10, 20, 24).

Baetodes sp. from Ariranha River, Nova Teutonia, Brazil, February 1962, F. Plaumann: from collection of University of Utah; length: body about 4 mm, only one finger-like gill from each coxa; slight elevation at midline along posterior border of pronotum; median abdominal spines similar to those of *B. spinae*; spine on metascutum larger with relation to abdominal spines than spine on metascutum of *B. spinae* and *B. levis*; pleuron similar to that of *B. spinae* and *B. levis*; 4-6 reddish brown hairs on anterior border of femora as on femora of *B. spinae* and *B. levis*; general coloring darker than *B. spinae* and *B. levis*; resembles *B. spinae* but has only one finger-like gill from each coxa; only a slight elevation at midline along posterior border of pronotum; no spines in that position as in *B. spinae*.

Baetodes itatiyanus Demoulin (1955): Demoulin states that there are no ocelli on *B. itatiyanus*; these are present on *B. spinae* and *B.*

levis (fig. 16) as well as on other known species of the genus; there is no mention of gills on the coxae of *B. itatiyanus*; these are present on both *B. spinae* and *B. levis*; he also states that abdominal gills arise ventrally; in *B. spinae* and *B. levis* the gills arise on the tergum close to the low pleural fold; the basal segment of the labial palp of *B. itatiyanus* is shorter than that of *B. spinae* and *B. levis*.

The writer wishes to acknowledge the help of Dr. Jay R. Traver who has contributed much advice and has loaned the following specimens: *B. serratus* and *B. sp.* No. 1 from the Cornell collection, and *B. sp.* from Ariranha River, Nova Teutonia, Brazil from the collection of the University of Utah.

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