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**Four New Species of the Genus Baetodes**  
(Ephemeroptera: Baetidae)

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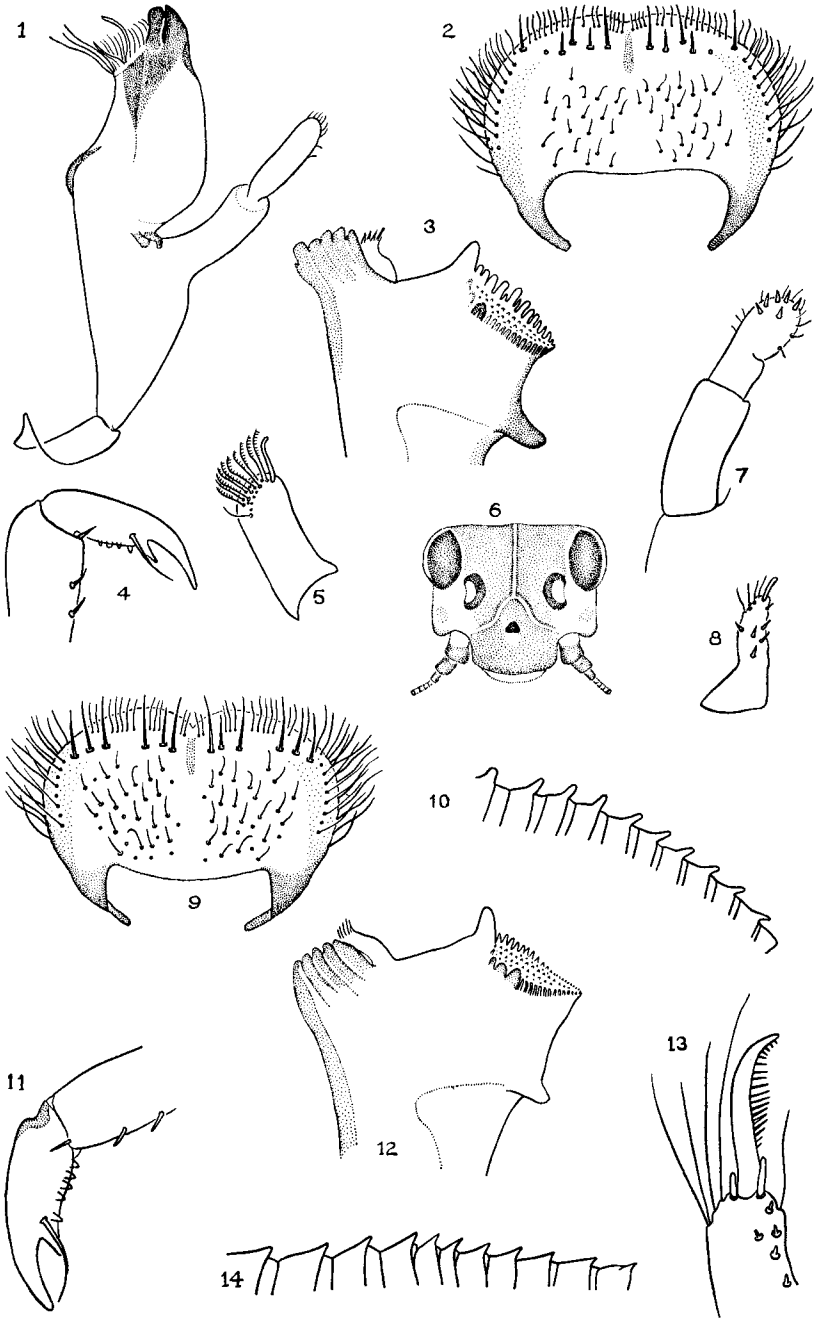
A detailed description and discussion of the generic characteristics of the nymphs of the genus *Baetodes* is presented by Mayo (1972). Herein are described four new species of *Baetodes* from Mexico, Bolivia, and Venezuela. The genus has not previously been described from Bolivia and Venezuela. Koss (1972) described two new species of *Baetodes* from southwestern United States, the first recorded from North America. He proposed some new terms for structures which have previously been described as spines. Those on the dorsal crests of the femora he called clavate setae. Those along the ventral edge of the tibiae and tarsi he designated as spurs and those on the labrum as spine-like setae. These new terms are used in the following descriptions.

***Baetodes proiectus* Mayo, new species**  
(Figs. 1-8, 10)

IMMATURE FEMALE NYMPH.—Body length 6 mm. Caudal filaments broken. *Head*: as in fig. 6; vertex planar between eyes; sides of head planar between eyes and bases of antennae; eyes narrowly rimmed with pale yellow with pale area extending to genae; dark brown between eyes and in fork, on either side of epicranial suture and between antennae; pale spot anterior to small ocellus; labrum dark brown, darker than clypeus; mouthparts as in figs. 1-3, 5, 7, 8; sclerotization along midline behind apical cleft of labrum pronounced; one bladlike seta on tip of each glossa and on tip of each paraglossa, respectively (figs. 8, 5); basal segment of labial palpi longer than other segments combined (fig. 7); two blade-like setae among the slender setae on crowns of maxillae; antennae pale brown. white around bases; intersegmental membranes white. *Thorax*: pronotum dark brown, with few white setae; posterior border elevated at midline forming fairly prominent tubercle; mesonotum dark brown, mottled with yellow laterally and at bases of wing pads; midline white; wing pads brown with pale veins; meta-

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FIGS. 1-8. *Baetodes proiectus*. Fig. 1. Right maxilla. Fig. 2. Labrum. Fig. 3. Left mandible. Fig. 4. Claw. Fig. 5. Left paraglossa. Fig. 6. Head. Fig. 7. Labial palpus. Fig. 8. Left glossa. Fig. 9. Labrum of *B. peniculus*. Fig. 10. Tubercle of metanotum and abdominal tubercles 1-9 of *B. proiectus*. FIGS. 11-14. *B. peniculus*. Fig. 11. Claw. Fig. 12. Left mandible. Fig. 13. Tip of left glossa showing pinnate seta. Fig. 14. Tubercle of metanotum and abdominal tubercles 1-10.



notum pale, washed with pale brown along anterior border, and with prominent white tubercle posteromedially (fig. 10); pleural sclerites brown, narrowly rimmed with reddish brown posteriorly and medially above coxal articulations; coxae and trochanters light brown; dorsal crests of coxae produced; femora light brown with large pale area proximally, rimmed with dark brown distally; six dark reddish brown clavate setae and fringe of white setae along dorsal crests; tibiae light brown with longitudinal white streak, rimmed with dark brown proximally; tarsi light brown medially, dark brown dorsally at tibial articulations and near claws; claws as in fig. 4; segment I of sternum pale yellow; apodemes dark brown; segment II with brown projection from sclerotized rim of apodeme forming an erect round-tipped lobe. *Abdomen*: terga 1-10 brown, darker than mesonotum, paler at bases of gills; prominent tubercles on abdominal terga 1-9 as in fig. 10; all tubercles pale, slightly tinged with pale brown; abdominal gills white; two elongated gills on each coxa; sternum 1 pale yellow, 2-5 pale brown, 6-9 darker brown; 10 brown laterally, white medially; sternum lighter than terga; Cerci yellow on basal third, brown distally; terminal filament yellow.

**MATURE MALE NYMPH.**—Length: body 4 mm; caudal filaments 6 mm. Similar to female except anterior thoracic sterna yellow with reddish brown sclerites as on subimago; sternum III pale brown, finely mottled with light brown; abdominal sterna 1-5 pale brown, with broad light brown band on posterior borders; sterna 6-8 dark brown; sternum 9 dark brown on anterior half and along pleural fold, brown area wider at midline, remainder of segment yellowish; sternum 10 yellow with reddish brown streak half way between midline and lateral border branching to each side of bases of cerci; cerci yellowish brown, encircled with small dark brown spines on each segment to two-thirds of length of cerci, distal third brown with intersegmental membranes white.

**HOLOTYPE** female nymph, L. Pl. 24 KM. W. CORIPATA, BOLIVIA, 2/5 May, 1961, P. and P. Spangler, University of Utah collection, Salt Lake City. 6 female and 3 male paratypes, same data as holotype.

**DISCUSSION.** On sternum II is a brown projection from the rim of the sclerotized area around the apodeme on each side, forming a small, erect, round-tipped lobe on immature specimens. This is unique to the species. On mature specimens this projection is not present, and the sternum is yellow with reddish brown sclerites as in the subimago. The species was named for the projections on immature specimens. On mature male specimens small dark brown spines encircle each segment of the cerci. Mature females are not known. *Baetodes sanctitarinae* Mayo, 1972, has similar spines on the cerci of mature specimens. However there are no abdominal tubercles on *B. sanctitarinae*, while those of *B. proiectus* are prominent.

### ***Baetodes peniculus* Mayo, new species**

(Figs. 9, 11-14)

**MALE NYMPH.**—Length: body 5 mm; caudal filaments broken. Dorsum brown with unsclerotized areas pale yellow; venter pale. *Head*: midline and epicranial suture pale; dark brown laterally and in fork; turbinate eyes dark red; pale

yellow laterad to large ocelli; genae brown, pale yellow anterior to small ocellus, pale around bases of antennae; two basal segments of antennae pale ventrally, brown dorsally; distal segments brown; mouthparts as in figs. 9, 12, 13; pinnate bladeliike seta apically on each glossa (fig. 13); long straight simple seta medially, slightly curved at tip, on each paraglossa; two pointed bladeliike setae among setae on crowns of maxillae. *Thorax*: pronotum amber, midline pale, with two brown stripes on either side of midline and dark brown band along anterior border; mesonotum dark reddish brown laterad of pale midline, amber laterally and on scutellum with paired dark reddish brown spots laterad of midline anterior to scutellum, an elongate dark spot parallel to border of wing pad, and two dark spots anteriorly near bases of wing pads; wing pads amber brown dorsally, yellow ventrally; venation pale yellow; metanotum brown, midline pale with brown tubercle posteriorly (fig. 14); pleural sclerites brown with narrow reddish brown posterior border; coxae and trochanters brown; femora brown with a pale yellow spot near proximal articulation; pale longitudinal stripe and irregular brown border along dorsal crests becoming dark reddish brown at tibial articulations; dorsal crests with six short, barely discernable clavate setae; tibiae brown with distinct white streaks; tarsi brown, darker distally; claw as in fig. 11; sternum white with brown apodemes at leg bases. *Abdomen*: terga 1-3 and 7-10 brown; terga 4-6 yellow dorsally and brown laterally, dark brown along posterior borders; each terga with prominent, pointed, brown tubercle directed posteriorly (fig. 14); abdominal gills oval, white with main tracheole brown at proximal half; few minute setae along margin, especially in basal half; sternum 1 white; sterna 2-9 yellow, anterior and lateral borders washed with brown; sternum 9 darker brown laterally and delicately shaded with brown medially along posterior border; sternum 10 brown laterally, pale yellow medially. Cerci and terminal filament light brown.

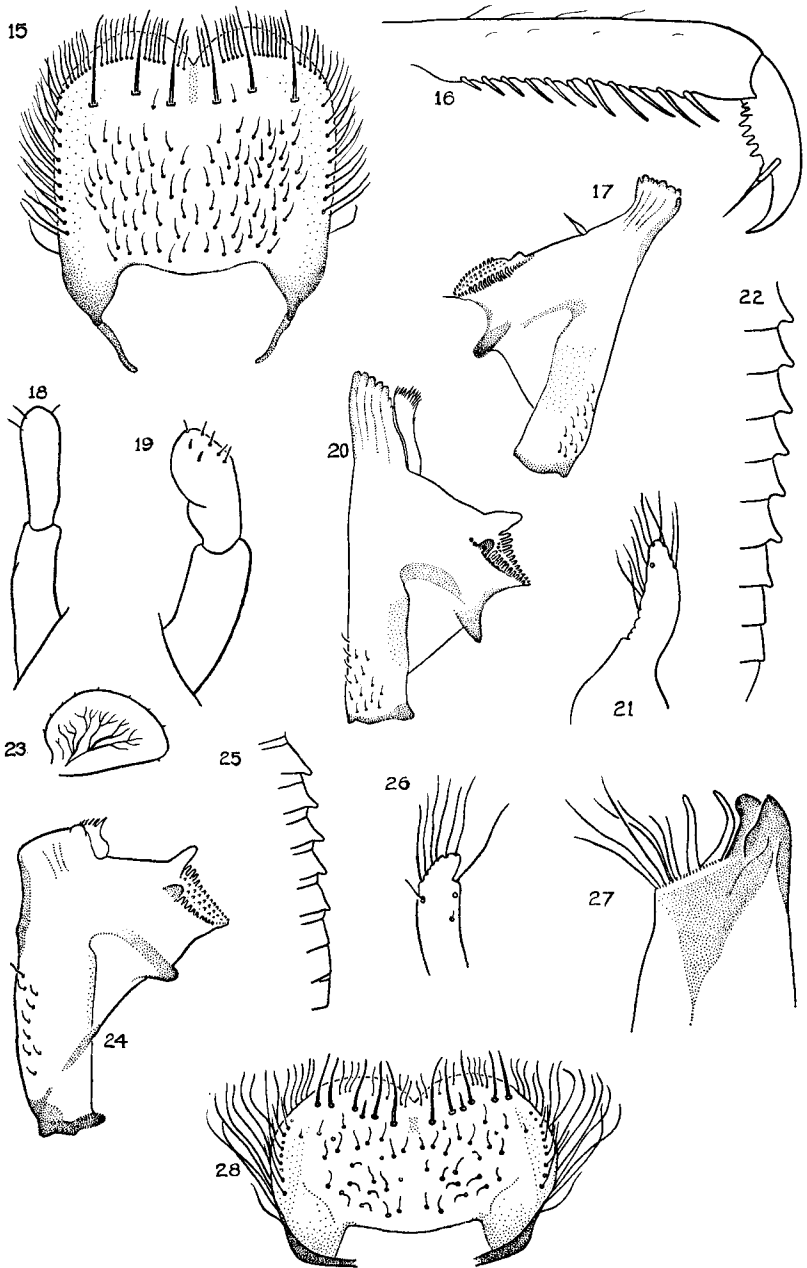
**FEMALE NYMPH.**—Similar to male except for larger size; body length 6 mm. Tubercle on metanotum somewhat larger and tubercle on tergum 1 smaller than in male.

**HOLOTYPE MALE NYMPH**, Mer., 13 KM. E. APARTADEROS, VENEZUELA, 24 February, 1969, P. and P. Spangler. In University of Utah collection, Salt Lake City. Paratypes, 4 nymphs, 2 males and 2 females same data and deposition as holotype.

**DISCUSSION:** *Baetodes peniculus* has a pinnate seta on the tip of each glossa (fig. 13) and one nonpinnate long straight seta medially on each paraglossa as on *Baetodes sancticatarinae* Mayo, 1972. These species can be distinguished by the absence of abdominal tubercles in *B. sancticatarinae* and the absence of spines on the cerci in *B. peniculus*.

### ***Baetodes longus* Mayo, new species** (Figs. 15-23)

**FEMALE NYMPH.**—Length: body 4 mm, cerci 6 mm. Color yellow with brown markings. *Head*: elongate; light brown between eyes and in fork, pale anterior to small ocellus; antennae pale yellow. Mouthparts as in figs. 15, 17-21. Labrum elongate; with 3 long spine-like setae equidistant from cleft and lateral sclerotized area (fig. 15). *Thorax*: pronotum margined anteriorly with light brown band, mottled with light brown laterad of midline; mesonotum margined anteriorly with



FIGS. 15-23. *Baetodes longus*. Fig. 15. Labrum. Fig. 16. Tarsus and claw. Fig. 17. Right mandible. Fig. 18. Maxillary palpus. Fig. 19. Labial palpus.

reddish brown, and with light brown stripes laterad of midline, mottled with light brown laterally; scutellum and wing pads yellow; metanotum brown with median marginal tubercle posteriorly; pleural sclerites yellow, posterior borders narrowly rimmed with reddish brown, coxal articulations dark brown; legs yellow, trochanters reddish brown distally; femora with 10 or more pale brown clavate setae along dorsal crests; tibiae broadly rimmed with reddish brown proximally, very narrowly rimmed with reddish brown distally, set with minute brown spurs ventrally, these longer distally; tarsi yellow, becoming brown dorsally at bases of claws and with single row of long reddish brown spurs ventrally (fig. 16); claws as in fig. 16. Sternum pale yellow except for brown apodemes at leg bases. *Abdomen*: terga 1-8 yellow with reddish brown anteriorly, darker on terga 1-3; terga 1-7 with prominent yellow tubercles (fig. 22); abdominal gills as in fig. 23; two elongate finger-like gills on each coxa. Sternum 1 pale yellow; sterna 2-10 light yellowish brown. Cerci yellow at basal half, light brown distally. Terminal filament yellow.

**MALE NYMPH.**—pronotum paler than mesonotum; brown on thoracic sternum anterior to leg bases II and III; abdomen as in female but terga 4-6 pale yellow dorsally half way to pleural fold.

**HOLOTYPE FEMALE**, RIO FRIO, TAMAULIPAS, MEXICO, 24 December, 1939, L. Berner, in University of Utah collection, Salt Lake City. 78 paratype nymphs, same data and deposition as holotype. 153 paratype nymphs, Rio Guayalejo, Tamaulipas, Mexico, 22 December, 1939, L. Berner. Same deposition as holotype.

**DISCUSSION:** *Baetodes longus* can be distinguished from all other known species of *Baetodes* by the elongated head and mouthparts (figs. 15, 17, 20) and by the long tarsal spurs (fig. 16). It differs from the Mexican species *Baetodes inermis* Cohen and Allen, 1972 by the following characteristics: the general color of *B. inermis* is much darker than that of *B. longus*; the abdominal tubercles on terga 1-7 of *B. inermis* are poorly developed, those of *B. longus* are prominent; Coxal gills are absent on *B. inermis*, they are present on *B. longus*. Intra-specific variation is as follows; abdominal terga 4-8 may be dark reddish brown anteromedially; terga 9-10 may have brown tracheations along the pleural folds.

### ***Baetodes furvus* Mayo, new species**

(Figs. 24-28)

**MATURE FEMALE NYMPH.**—Length: body 4 mm, cerci about 7 mm. Color dark brown with white intersegmental membranes. *Head*: brown with pale yellow midline, narrowly pale yellow around eyes and over small ocellus; mouthparts as

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Fig. 20. Left mandible. Fig. 21. Right glossa. Fig. 22. Abdominal tubercles 1-7. Fig. 23. Gill. FIGS. 24-28. *B. furvus*. Fig. 24. Left mandible. Fig. 25. Abdominal tubercles 3-7. Fig. 26. Tip of left glossa. Fig. 27. Crown of maxilla. Fig. 28. Labrum.

in figs. 24, 26-28; labrum with 2 long, 1 short, 1 long and 2 spine-like setae laterad at midline (fig. 28); crown of one maxillary fringe of hairs bent mesad revealing two blade-like setae (fig. 27). *Thorax*: pronotum and mesonotum amber mottled with reddish brown; anterior margin of mesonotum dark brown, with paired reddish brown streak laterad of midline terminating in a point followed by an elongate spot, laterally mottled with reddish brown; scutellum and wing pads amber; metanotum dark brown with blunt posteromedial tubercle; pleural sclerites dark brown; femora brown with large yellow area proximally and yellow stripe medially, set with numerous reddish brown clavate setae along dorsal crests, narrowly rimmed with dark reddish brown distally; tibiae brown, narrowly rimmed with reddish brown proximally; tarsi brown, becoming dark brown distally; claw with 8 denticles. *Abdomen*: terga dark brown; intersegmental membranes white; terga 1-6 with prominent tubercles, tubercle on tergum 7 reduced (fig. 25); gills white, oval; coxal gills absent; sterna 2-7 brown with median pale streak and broad pale band subadjacent to gills; sterna 7-9 dark brown laterally, pale medially, with pale portion widening posteriorly; sternum 10 pale amber; cerci light brown, terminal filament pale yellow.

HOLOTYPE FEMALE, CULINAVARA, MEXICO, 1 January, 1948, collector unknown, University of Utah collection, Salt Lake City. 9 paratype nymphs same data and deposition as holotype.

DISCUSSION: *Baetodes furvus* resembles *Baetodes fuscipes* Cohen and Allen (1972) but is distinguished by the following characteristics: *B. fuscipes* has a well developed median posterior elevation on the pronotum, there is no posterior elevation on the pronotum of *B. furvus*; the abdominal tubercles on terga 1-6 of *B. fuscipes* are moderate in size, the tubercles of *B. furvus* are prominent; abdominal terga in *B. fuscipes* vary from dark brown on segments 1-3 to light brown on 9-10, in *furvus* the terga are uniformly dark brown; in *fuscipes* the caudal filaments are light brown, in *B. furvus* pale yellow.

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