

EDMUNDSIOPS INSTIGATUS: A NEW GENUS AND SPECIES OF SMALL MINNOW MAYFLIES (EPHEMEROPTERA: BAETIDAE) FROM AUSTRALIA^{1,2}

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ABSTRACT: *Edmundsiops instigatus* (Ephemeroptera: Baetidae), n. gen. and sp., is described for larvae collected from eastern Australia. The new genus is distinguished by the basally bulbous and apically bifid right protheca, apically acute segment 2 of the maxillary palps, and bulbous segment 3 of the labial palps. The considerable intraspecific variation in body coloration, body size, leg setation, and paraproct spination in larvae of *E. instigatus* is discussed.

As is generally the case throughout the Southern Hemisphere, small minnow mayflies (Ephemeroptera: Baetidae) are poorly known in Australia. Only 16 species in the genera *Baetis* Leach (3 spp.), *Bungona* Harker (1 sp.), *Centropilum* Eaton (2 spp.), *Cloeodes* Traver (2 spp.), *Cloeon* Leach (5 spp.), *Offadens* Lugo-Ortiz and McCafferty (2 spp.), and *Pseudocloeon* Klapálek (1 spp.) have been reported from Australia (Ulmer 1908, 1916, 1920; Tillyard 1936; Harker 1950, 1957; Suter 1986; Lugo-Ortiz and McCafferty 1998 ab). The taxonomic status of those Australian species assigned to *Baetis* and *Pseudocloeon* should be considered provisional because the concepts of both genera have been significantly modified recently as a result of worldwide revisionary studies (e.g., Waltz and McCafferty 1985, 1987 ab, 1997; McCafferty and Waltz 1990, 1995; Waltz et al. 1994). Baetidae have historically been poorly studied and understood mainly because only relatively recently 1) have comparative collections been amassed for study, 2) has it been realized that ultramorphology of larvae holds the key to delineating taxonomic diversity, and 3) has it become clear that a world perspective is necessary to formulate natural generic concepts.

Herein, we describe a new genus and species of Baetidae based on larvae collected from eastern Australia. Except where otherwise noted, the specimens studied are housed in the Purdue Entomological Research Collection, West Lafayette, IN.

***Edmundsiops* Lugo-Ortiz and McCafferty, NEW GENUS**

Larva. Head: Capsule longer than broad. Labrum (Fig. 1) wider than long, broadly rounded anteriorly, with narrow anteromedial emargination. Hypopharynx (Fig. 2) with lingua apically acute and superlinguae apicolaterally narrow. Left mandible (Fig. 3) with

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incisors fused; prosthema robust, apically denticulate. Right mandible (Fig. 4) with incisors apically separated; prosthema basally bulbous, apically bifid. Maxillae (Fig. 5) with four short, blunt denticles on crown of galealaciniae; palps two segmented, reaching apex of galealaciniae; palp segment 2 apically acute. Labium (Fig. 6) not compact; palps three segmented; palp segment 3 bulbous. Thorax: Notula without setae medially. Legs (Fig. 7) robust; femora without villopore; tarsal claws (Fig. 8) with one row of denticles. Abdomen: Slightly dorsoventrally flattened. Terga (Fig. 9) with abundant scale bases and few scales scattered over surface; creases absent; posterior margin with triangular spines. Sterna with anterolateral friction pads. Gills (Figs. 10, 11) on segments 1-7, platelike, relatively broad, marginally with small serrations, well tracheated, held dorsolaterally. Paraprocts (Fig. 12) with marginal spines. Cerci with abundant setae laterally and medially; medial caudal filament 0.95-1.0 x cerci length, with abundant fine, simple setae laterally.

Adult. Unknown.

Included species. *Edmundsiops instigatus* Lugo-Ortiz and McCafferty, new species (type species).

Distribution. Australia: New South Wales, Queensland, Tasmania, Victoria.

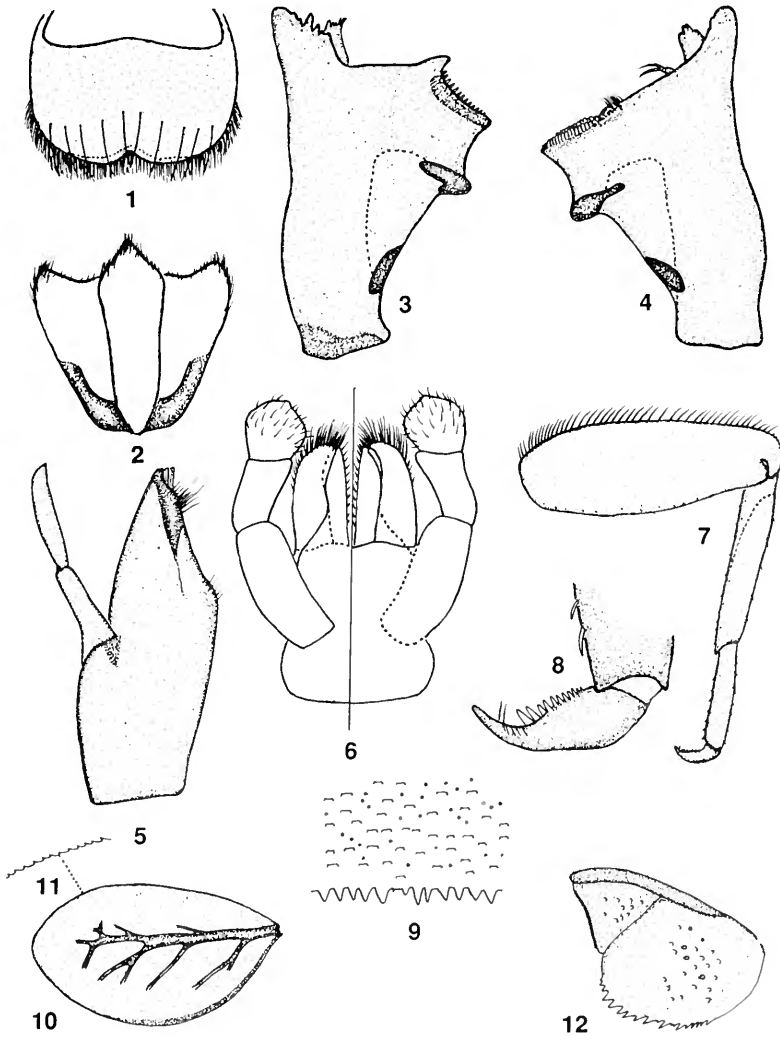
Etymology. The generic name is a combination of letters incorporating the surname of G. F. Edmunds, who collected the type material, and the Greek word *iops* (small fish). The gender is masculine.

Discussion. Larvae of *Edmundsiops* are distinguished from other known Australian and Southeast Asian baetids by the basally bulbous and apically bifid right prosthema (Fig. 4), apically acute segment 2 of the maxillary palps (Fig. 5), and bulbous segment 3 of the labial palps (Fig. 6).

Because the Australian and Southeast Asian baetid faunal composition is so poorly understood, we cannot at this time appropriately ascertain the phylogenetic relationships of *Edmundsiops*. We have not seen any other Australian or Southeast Asian baetids with morphological characteristics similar to those of *Edmundsiops*, and we therefore may assume that *Edmundsiops* represents a taxon with affinities elsewhere in the Southern Hemisphere, or alternatively that it represents an ancient insular lineage.

Edmundsiops instigatus Lugo-Ortiz and McCafferty, NEW SPECIES

Larva. Body length: 4.8-7.5 mm. Caudal filaments length: 2.0-4.0 mm. Head: Coloration pale to medium yellow-brown, without distinct pattern. Antennae approximately 3.0x length of head capsule. Labrum (Fig. 1) dorsally with submedial pair of long, fine, simple setae and anterior submarginal row of 4-5 long, fine, simple setae. Hypopharynx as in Fig. 2. Left mandible (Fig. 3) with incisors with five denticles. Right mandible (Fig. 4) with outer set of incisors consisting of broad, apically blunt denticle, inner set with three small denticles. Maxillae (Fig. 5) with four to five minute, fine, simple setae near medial hump; palp segments equal in length. Labium (Fig. 6) with glossae with abundant short, robust, simple setae medially; paraglossae with abundant long, robust, simple setae apically; palp segment 1 slightly longer than segments 2 and 3 combined; palp segment 2 with minute distomedial projection; palp segment 3 subequal in length to segment 2, with abundant long, robust, simple setae scattered over surface. Thorax: Coloration pale to medium yellow-brown, with medium brown markings. Hindwingpads present. Legs (Fig. 7) pale to medium yellow-brown; femora with row of long, robust, simple setae dorsally and few minute, fine, simple setae ventrally; tibiae with minute, fine, simple setae dorsally (sometimes with subdorsal row of



Figs. 1-12. *Edmundsiops instigatus* Lugo-Ortiz and McCafferty, new genus and species, larva. 1. Labrum (dorsal). 2. Hypopharynx. 3. Left mandible. 4. Right mandible. 5. Right maxilla. 6. Labium (left-ventral; right-dorsal). 7. Left foreleg. 8. Tarsal claw. 9. Detail of tergum 4. 10. Gill 4. 11. Detail of gill margin. 12. Paraproct.

relatively long, robust, simple setae) and few minute, simple setae ventrally; tarsi with few minute, fine, simple setae dorsally (sometimes with subdorsal row of relatively long, robust, simple setae) and row of 4-5 relatively short, robust, simple setae ventrally; tarsal claws (Fig. 8) with 10-11 denticles, increasing in length apically, with subapical pair of minute, fine, simple setae. Abdomen: Coloration pale to medium yellow-brown; tergum 1 with no distinct markings; terga 1-4, 6, and 7 sometimes with large oblong sublateral faint to pale yellow-brown markings; tergum 5 sometimes with faint to pale yellow-brown crownlike marking; terga 8-10 usually paler than other terga, with no distinct markings. Sterna cream to pale yellow-brown. Terga (Fig. 9) with abundant relatively large scale bases; posterior marginal spination irregular. Gills (Figs. 10, 11) with margin usually tinged with brown. Paraprocts (Fig. 12) with 4-15 irregular marginal spines; few scales and scale bases scattered over surface. Caudal filaments pale yellow-brown to medium brown.

Adult. Unknown.

Material examined. Holotype: Larva, AUSTRALIA, New South Wales, Commissioner's Water, 4 mi E of Armidale, 19-II-1966, G. F. Edmunds. Paratypes: AUSTRALIA, New South Wales: Two larvae, Mongarlowe R, nr Monga, Clyde Mtn, 25-I-1966, G. F. Edmunds (National Museum of Natural History, Smithsonian Institution, Washington, D. C.); two larvae, stream at Wilsons Valley, Mt Kosciusko, 10-II-1966, G. F. Edmunds (Australian National Collection, Canberra); three larvae, tributary of Piper Cr, nr jet with Piper Cr, Mt. Kosciusko, 5250 ft, 10-II-1966, G. F. Edmunds (mouthparts, forelegs, tergum 4, gill 4, and paraproct of one larva mounted on slide [medium: Euparal]); two larvae, small stream nr Pt Lookout, New England Natl Pk, 5000 ft, 20-II-1966, G. F. Edmunds; larva, Chandler R, 26 mi E of Armidale, no date, G. F. Edmunds; Tasmania: Three larvae, Derwent R, 4 mi S of Ouse, 27-I-1966, G. F. Edmunds. Additional material: AUSTRALIA, Australian Capital Territory: Five larvae, Lees Spring, nr Canberra, 1200 m, 16-X-1966, J. Illies; New South Wales: Four larvae, Eucumbene R, 4 mi S of Kiandra, 20-I-1966, G. F. Edmunds; two larvae, Alpine Cr, 11 mi E of Kiandra, 20-I-1966, G. F. Edmunds; three larvae, Bobundara Cr, 3 mi N of Maffra, 22-I-1966, G. F. Edmunds; larva, MacLaughlin R, 10 mi SE of Maffra, 22-I-1966, G. F. Edmunds; six larvae, Mongarlowe R, nr Monga, Clyde Mtn, 25-I-1966, G. F. Edmunds; three larvae, Spencers Cr, Mt Kosciusko, 5700 ft, 9-II-1966, G. F. Edmunds; three larvae, tributary of Piper Cr, nr jet with Piper Cr, Mt Kosciusko, 5250 ft, 10-II-1966, G. F. Edmunds; three larvae, Guthrie Cr, at Mt Kosciusko Rd, 10-II-1966, G. F. Edmunds; six larvae [mouthparts, forelegs, tergum 4, and paraproct of one larva mounted on slide (medium: Euparal)], Threbo R, on Mt Kosciusko Rd, 4 mi N of Jindabyne, 11-II-1966, G. F. Edmunds; larva, Serpentine R, New England Natl Pk, 19-II-1966, G. F. Edmunds; six larvae, small stream nr entrance, New England Natl Pk, 20-II-1966, G. F. Edmunds; five larvae, Coult's Water, 15 mi W of Dorrigo, 4150 ft, 22-II-1966, G. F. Edmunds; four larvae, Newell Falls, 5 mi SE of Dorrigo, 22-II-1966, G. F. Edmunds; three larvae, Majors Cr, 4 mi E of Ebor, 4150 ft, 22-II-1966, G. F. Edmunds; six larvae, Bellinger R, at Bellinger, 23-II-1966, G. F. Edmunds; larva, Crakenback R, above mouth, Mt Kosciusko, 1100 m, 23-IX-1966, J. Illies; two larvae, creek, Mt Kosciusko, 1100 m, 23-IX-1966, J. Illies; four larvae, Guy Fawkes R, above Ebor Falls, 1.5 km NW of Ebor, 8-VIII-1975, M. N. Winokur; three larvae, Chandler R, 26 mi E of Armidale, no date, G. F. Edmunds; Queensland: Three larvae, Jourama Falls Natl Pk, 13-VIII-1983, D. A. and J. T. Polhemus; 13 larvae, Emerald Cr, nr Cairns, 800 m, 13-X-1966, J. Illies; Tasmania: Twelve larvae, Derwent R, 4 mi S of Ouse, 27-I-1966, G. F. Edmunds; 34 larvae, Styx R, Bushy Pk, 400 ft, 27-I-1966, G. F. Edmunds; 13 larvae, Clarence Pipeline, spillway into Bronte Lagoon, 31-I-1966, G. F. Edmunds; larva, Clarence R, at highway, 1-II-1966, G. F. Edmunds; larva, Clarence R, below Clarence Lagoon, 1-II-1966, G. F. Edmunds; nine larvae, Tyenna R, nr Mt Field Natl Pk, 3-II-1966, G. F. Edmunds; two larvae, Lake Dobson, Mt Field Natl Pk, 3382 ft, 3-II-1966, G. F. Edmunds; larva, Forth Falls, 26-XI-1966, J. Illies; Victoria: Larva, Ovens R, nr Harrietsville, 2-XII-1966, J. Illies.

Etymology. The specific name is Latin for entice.

Discussion. *Edmundsiops instigatus* shows considerable variation in general body coloration, body size, leg setation, and paraproct spination. Some populations consist of relatively large individuals with faint body markings and numerous paraproct spines, and lack a subdorsal row of robust setae on the tibiae and tarsi. Other populations consist of relatively small individuals with conspicuous body markings, few paraproct spines, and a subdorsal row of robust setae on the tibiae and tarsi. There are, however, some populations that show different combinations of those characteristics, and thus are morphologically intermediate. Consequently the possible recognition of two species, rather than one, based on the two morphological extremes, cannot be justified.

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