A New Species of *Tricorythodes* with Notes (Ephemeroptera: Tricorythidae)

RICHARD K. ALLEN

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RICHARD K. ALLEN
California State University, Los Angeles

ABSTRACT

Description and figure are presented for *Tricorythodes* ***curvatus*** Allen, n. sp., and the nymphs of the North and Central American *Tricorythodes* are placed in two species groups, the *albilineatus*-group and the *curvatus*-group.

A collection of nymphal mayflies on loan from the Academy of Natural Sciences of Philadelphia includes an undescribed species of *Tricorythodes, T. curvatus* n. sp., which is closely related to *T. corpulentus* Kilgore & Allen, *T. dimorphus* Allen, and *T. edmundsi* Allen. The nymphs of *Tricorythodes* typically possess triangular-shaped operculate gills that are angulate mesally (Fig. 1), whereas the above mentioned species have subovate operculate gills that are rounded mesally (Figs. 2–5).

The shape of the operculate gills is of taxonomic importance and two groups of related species are recognized for the nymphs of the North and Central American *Tricorythodes*, the *albilineatus*-group and the *curvatus*-group. The *albilineatus*-group is composed of *T. albilineatus* Berner, *T. minutus* Traver (= *fallax* Traver), *T. notatus* Allen & Brusca, *T. sordidus* Allen, and *T. ulmeri* Allen & Brusca. The *curvatus*-group includes *T. corpulentus, T. curvatus, T. dimorphus*, and *T. edmundsi*. The nymphs of *T. allectus* (Needham), *T. atratus* McDunnough, *T. explicatus* (Eaton), *T. fictus* Traver, *T. peridius* Traver, *T. stygiatus* McDunnough, and *T. texanus* Traver are undescribed and unassignable to species-group at this time.

albilineatus-group

Characters that would serve to distinguish the nymphs of the five species now included in the *albilineatus*-group have not been established at this time. Nymphs assignable to this species-group are distributed from Central America to northern British Columbia (53°34′ N. latitude) in western North America and Newfoundland (47°34′ N. latitude) in eastern North America.

curvatus-group

The five species included in this species-group have a restricted latitudinal range and are known only from northern Mexico (*ca.* 23°43′

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N. latitude) to northern Utah in the western United States (*ca.* 40°45′ N. latitude) and to northern Arkansas in the central United States (*ca.* 36°10′ N. latitude).

The following key will serve to distinguish the nymphs of the *curvatus*-group.

KEY TO THE SPECIES

1. Maxillary palpi 1-segmented; femora with sparse irregularly spaced long and short marginal setae (Fig. 7a,b) 2
   Maxillary palpi absent; femora with numerous regularly spaced long marginal setae (Fig. 6a,b) 3

2(1). Tarsal claws with marginal denticles and single subapical denticle near apex; operculate gills with black apical macula (Fig. 2); sexes dimorphic, males with large compound eyes ..... *dimorphus*
   Tarsal claws with marginal denticles, without subapical denticle near apex; operculate gills suffused with black (Fig. 3); sexes not dimorphic, males with small compound eyes ..... *curvatus*

3(1). Tarsal claws with marginal denticles and paired subapical denticles (Fig. 6c); operculate gills suffused with black (Fig. 5); body 5.0–6.0 mm in length ..... *corpulentus*
   Tarsal claws with marginal denticles, without paired subapical denticles (Fig. 8); operculate gills with apical U-shaped macula (Fig. 4); body 3.0–4.0 mm in length ..... *edmundsi*

Tricorythodes ***curvatus*** n. sp.

Nymph. Length: body 5.0–6.0 mm; caudal filaments 4.0–5.0 mm. General color brown with dark markings. Head dark with pale markings; large pale macula below median ocellus, pale around compound eyes; maxillary palpi 1-segmented, without apical seta. Thoracic nota pale with irregular black markings; thoracic nota with moderately long setae; legs yellow with proximal tibial macula; femora marginal setae long and short, sparse, and irregularly spaced as in Fig. 7a,b; twice as long as broad; hind femora 40% longer than fore femora; tarsal claws with 6–8 small marginal denticles, without sub-marginal denticles. Abdominal terga yellow with wide dark transverse band; terga with

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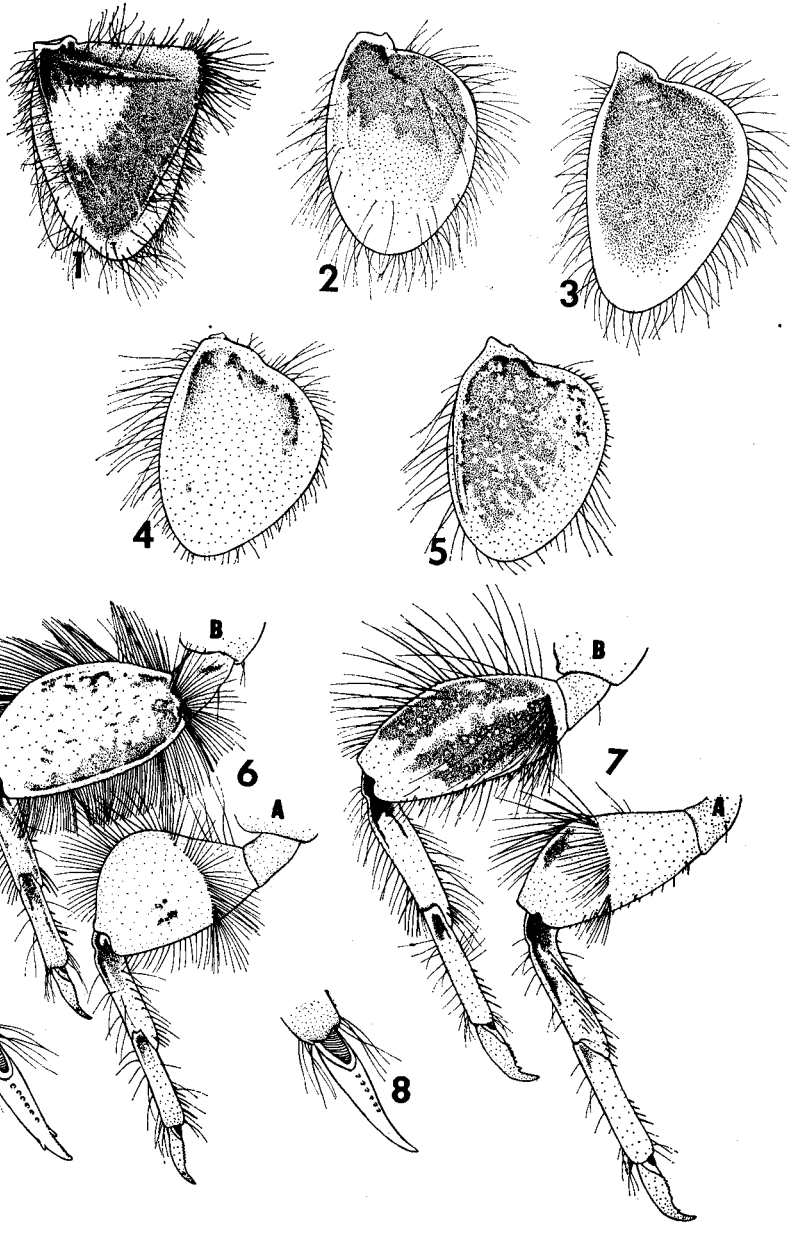
FIGS. 1–8. Nymphal structures of *Tricorythodes*. 1, *T. minutus*, operculate gill; 2, *T. dimorphus*, operculate gill; 3, *T. curvatus*, operculate gill; 4, *T. edmundsi*, operculate gill; 5, *T. corpulentus*, operculate gill; 6, *T. corpulentus*, a, fore leg, b, hind leg, c, tarsal claw; 7, *T. dimorphus*, a, fore leg, b, hind leg; 8, *T. edmundsi*, tarsal claw.


1
2
3
4
5
B
6
A
C
B
7
A
8

long setae; posterolateral projections poorly developed on segments 7–9; operculate gill subovate, rounded mesally (Fig. 3), suffused with black; abdominal sterna pale. Caudal filaments pale.

Types. Holotype: mature nymph, White River, *ca.* 2.8 mi. ENE Salada, Independence Co., Arkansas, 30-31-VII-74, J. W. Richardson, in collection Academy of Natural Sciences of Philadelphia. Paratopotypes: 2 nymphs, same data as holotype, one each in collection Academy of Natural Sciences of Philadelphia and California State University, Los Angeles.

Tricorythodes corpulentus Kilgore & Allen

Tricorythodes corpulentus Kilgore & Allen 1973: 330.

This species was described from a single nymph collected in Catron Co., New Mexico.

Nymph. Length: body 4.5–5.5 mm; caudal filaments 5.0–6.0 mm. General color pale with dark brown and black markings. Head pale to light brown; occiput with dark brown markings; head with long setae; maxillary palpi absent. Thoracic nota yellow with dark brown markings; thoracic nota with moderately long setae; legs yellow with diffuse black markings; fore femora with 2 small maculae; femoral marginal setae long, numerous, and regularly spaced (Fig. 6a,b); fore femora as long as broad; hind femora 35% longer than fore femora; tarsal claws with 5–6 basal marginal denticles and 2 submarginal denticles near apex (Fig. 6c). Abdominal terga yellow with broad dark brown transverse band; terga with long setae; posterolateral projections poorly developed on segments 7–9; operculate gills rounded mesally, with diffuse black markings (Fig. 5). Caudal filaments pale.

Tricorythodes dimorphus Allen

Tricorythodes ? Edmunds, Allen & Peters 1963: 71.
Tricorythodes dimorphus Allen 1967: 372; Kilgore & Allen 1973: 330.

This species was described from a small series of nymphs collected in Arizona and New Mexico, and in 1973, Kilgore & Allen reared and described the male imago from southern California.

Male Nymph. Length: body 2.5–4.5 mm; caudal filaments 2.0–3.5 mm. General color yellow to light brown with black markings. Head yellow to light brown; compound eyes large; maxillary palpi 1-segmented, with apical seta. Thoracic nota yellow to light brown with irregular black markings; legs yellow with black markings; femora with variable black markings; tibiae and tarsi with apical black maculae; femora marginal setae long and short, sparse, and irregularly spaced (Fig. 7a,b); fore femora twice as long as broad; hind femora 35% longer than fore femora; tarsal claws with 6–8 marginal denticles, and single submarginal denticle near apex. Abdominal terga black

with variable yellow to light brown markings; terga with long setae; posterolateral projections poorly developed on segments 7–9; operculate gills rounded mesally, with black apical marking (Fig. 2). Caudal filaments yellow.

Female Nymph. Length: body 4.0–6.5 mm; caudal filaments 3.0–4.0. General color brown. Compound eyes small. Other characters as in male except for usual sexual differences.

Tricorythodes edmundsi Allen

Tricorythodes edmundsi Allen 1967: 370.

The nymphs of this species were described from a small series collected in Utah and northern Mexico.

Nymph. Length: body 3.0–4.0 mm; caudal filaments 1.0–2.0 mm. General color brown with black markings. Head brown; head with long setae; maxillary palpi absent. Thoracic nota brown with variable markings; nota margined with long setae; legs yellow; middle and hind femora with variable markings; tibiae and tarsi with apical black maculae; femoral marginal setae long, numerous, and regularly spaced as in figure 6a,b; fore femora less than twice as long as broad; hind femora 40% longer than fore femora; tarsal claws with 5–7 marginal denticles (Fig. 8). Abdominal terga brown to yellow with dark transverse bands; posterolateral projections poorly developed on segments 7–9; operculate gills rounded mesally, with black U-shaped marking (Fig. 4). Caudal filaments pale.

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