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A REVISION OF THE GENUS *EPHEMERELLA* (Ephemeroptera: Ephemerellidae) III. The Subgenus *Attenuatella*

RICHARD K. ALLEN AND GEORGE F. EDMUNDS, JR.[1]
University of Utah
Salt Lake City, Utah

INTRODUCTION

Part I of this revision, the Subgenus *Timpanoga,* appeared in The Canadian Entomologist (1959: 51-58, 16 Figs.). Part II, the Subgenus *Caudatella,* is in press in the Annals of the Entomological Society of America. In the following species accounts collecions made by the authors are indicated by initials, GFE and/or RKA. Abbreviations for collections in which specimens are deposited are as follows: Canadian National Collection (CNC); University of California (UC); Illinois Natural History Survey (INHS); Oregon State College (OSC); personal collections of Dr. Velma K. Mayo (VKM) and Dr. J. R. Traver (JRT). Specimens without designation are desposited in the collection of the University of Utah.

Subgenus *Attenuatella* Edmunds

Traver. 1935. Biol. Mayflies, 566 (*attenuata*-group).
Edmunds. 1959. Ann. Ent. Soc. Amer., 52:546, 1 fig.

Until recently there has been considerable confusion as to the characterization of the mayfly groups recently named by Edmunds (1959) as the subgenera *Attenuatella* and *Dannella.*

In 1931 McDunnough made note of the similarities existing in the nymphal stages of *Ephemerella simplex* McDunnough, *E. attenuata* McDunnough and *E. margarita* Needham and placed these species in close alliance. Traver (1935) in treating the genus *Ephemerella* placed the adults of *E. simplex* and *E. attenuata* into separate groups, the *simplex*-group and the *attenuata*-group respectively, but placed the nymphal stages of *E. simplex, E. margarita,* and *E. attenuata* all in the *simplex*-group.

Traver *(op. cit.),* in her key to the nymphal stages, used the presence or absence of rudimentary gills on segment one to separate the species she placed in the *simplex*-group (=subgenus *Dannella*) from those she placed in the *bicolor*-group (=subgenus *Eurylophella*). Actually, all of the species of both subgenera, with the exception of *E. delantala* Mayo, may have rudimentary gills on segment one. The vestigial gill may be present on one side of the abdomen and missing on the other side of a single specimen. It is not known whether the missing gill has been broken off or does not develop.

[1] The research on which this report is based was supported by grants from the University of Utah Research Fund and the National Science Foundation (NSF G 2514, 4995, 13329).

The subgenus *Attenuatella* may be characterized in the male adult by the following characters: (1) the terminal segment of the genital forceps is five to six times as long as wide (Fig. 3); (2) the penes are long, narrow, and swollen apically (Fig. 3); and (3) the tibia of the foreleg is longer than the tarsus.

The nymphal stages are characterized by having (1) gills on abdominal segments 4-7 and rudimentary gills usually present on segment one, (2) abdominal segments eight and nine subequal, and (3) tarsal claws with denticles.

The subgenus *Attenuatella* is comprised of four species, *Ephemerella attenuata* McDunnough (=*E. hirsuta* Berner, 1946:70, *new synonymy*), *E. delantala* Mayo, *E. margarita* Needham, and *E. soquele* Day.[2]

Ephemerella hirsuta was described from two nymphs collected in Escambia County, Alabama. Berner *(op. cit.)* named these as new on the basis of the broad discontinuity of distribution with *E. attenuata* and the banding on the legs, which differed from McDunnough's (1931) description of the nymphs of *E. attenuata*. A comparison of several nymphs and one male adult of *E. hirsuta* with some of McDunnough's material of *E. attenuata* from the Canadian National Collection, shows that *"E. hirsuta"* fits well within the limits of variability of *E. attenuata*. Additional collections of *E. attenuata* have largely bridged the distributional gap (15b).[3] It is apparent that *E. hirsuta* is a synonym of *E. attenuata*.

The following keys will serve to distinguish the species of the subgenus *Attenuatella*.

MALE IMAGOES

1. Apex of penes with a V-shaped median notch; lateral margin of penes base forms a gently arching concavity (Fig. 3) ..... *attenuata*
   Apex of penes with a U-shaped median notch; lateral margin of penes base forms a sharply angled concavity (Fig. 4) ..... *margarita*

NYMPHS

1. Paired abdominal tubercles on terga 4-8 well developed and blunt giving posterior margin of each tergum a scalloped effect (Fig. 13); prothorax without paired submedian tubercles or protuberances. .... *delantala*
   Paired abdominal tubercles on terga 4-8 not as above; prothorax with paired submedian tubercles or protuberances 2
2. Paired abdominal tubercles on terga 4-8 well developed and sharp (Fig. 11) ..... *soquele*

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[2] In 1952, Dr. Herman Spieth allowed the junior author to examine an adult male of an undescribed species of *Attenuatella* from China in the American Museum of Natural History. We were unable to locate the specimen in a 1960 visit to the museum.

[3] The collection localities from South Carolina, Georgia, Alabama and Florida indicated on the map are based on unpublished data made available by Dr. Lewis Berner.

Paired abdominal tubercles on terga 4-8 short and blunt (Figs. 1 and 12) 3

3. Prothorax with well developed paired submedian tubercles (Fig. 1); female with paired occipital tubercles (Fig. 2), male variable; lateral margins of all abdominal sterna pale ..... *attenuata*
Prothorax with only small paired submedian protuberances; without paired occipital tubercles; lateral margins of abdominal sterna 4-9 pale, each with a brown transverse band ..... *margarita*

Ephemerella attenuata McDunnough

McDunnough. 1925. Canad. Ent., 57:42.
McDunnough. 1930. Canad. Ent., 62:55.
McDunnough. 1931. Canad. Ent., 63:209, 2 figs. (nymph).
Traver. 1935. Biol. Mayflies, 581, 1 fig.
Berner. 1946. Florida Ent., 28:70 *(hirsuta)*.
Berner. 1950. Univ. Florida Studies, Biol. Sci. Ser., 4: 153, 156, 165, 1 map *(hirsuta)*.
Burks. 1953. Bull. Illinois Nat. Hist. Surv., 26 (1):75, 1 fig.
Edmunds. 1953. Ann. Ent. Soc. Amer., 52: fig. 1.

Male Imago. Length: body 6 mm. forewing 6 mm. General color dark brown. Legs pale yellowish white, forelegs darker; wing and veins hyaline. Abdominal segments dark brown, posterior three segments paler in color. Apex of penes with a V-shaped median notch; lateral margin of penes base gently arched (Fig. 3). Caudal filaments pale with a median brown transverse band.

Female Imago. General color more ruddy brown than male. Head with paired submedian tubercles behind ocelli, and a similar pair, wider apart, on the occiput. Other characters similar to the male except for usual sexual differences.

Mature Nymph. Length: body 6-7 mm.; caudal filaments 2-3 mm. General color light brown. Female with occipital tubercles (Fig. 2), male with or without. Prothorax with well-developed submedian tubercles; mesothorax with a low median anterior and a higher posterior tubercle (Fig. 1); legs pale, femur, tibia and tarsus each with a variable brown transverse band. Abdomen with paired dorsal submedian tubercles on segments 3-8, most distinct on segments 4-7, hind margins of segments 1, 2, and 9 sinuate; distinct postero-lateral projections on segments 3-9 (Fig. 1); lateral margins of abdominal sterna pale. Caudal filaments pale to brown, when pale variable brown bands are present; basal segments with short spines, apical segments with long hair.

Type Locality. Ottawa Golf Club (near Hull), Quebec, Canada.

Type. No. 1277, Canadian National Collection, Ottawa, Canada.

DISTRIBUTION

Ephemerella attenuata is a boreal eastern North American species with a wide latitudinal distribution (Fig. 15b). It is known from Nova Scotia, New Brunswick and Quebec austrad to Alabama and northern Florida. The authors have examined specimens from the following localities.

Florida. Holmes Co., Sandy Creek, I-V-46, L. Berner. *Georgia.* Macon Co., First creek W. Flint River on Ga. Highway 26, 11-IV-54, C. D. Hynes and L. Berner. *Massachusetts.* Berkshire Co., Sheffield, 28-VI-10, A. H. Morgan (JRT). *New Brunswick.* Cocagne River nr. Notre Dame, 17-VII-50, E. L. Bousefield; N. W. Miramichi River, 13-VIII-51, E. L. Bousefield; Louisberg Station, 4-VII-50, E. L. Bousefield. *Pennsylvania.* Lackawana Co., Scranton, VII-45, "Townes" (JRT). *Quebec.* Trinity Bay, 17-VIII-29, W. J. Brown (CNC); Ottawa Golf Club nr. Hull, 22-VII-25, F. P. Ide (CNC); LaPrairie, 21-VII-25, F. P. Ide (CNC); Knowlton, 9-VII-29; G. S. Walley (CNC); Yamaska River, Foster Power Plant, 5-VII-29, J. McDunnough (CNC). *South Carolina.* Edgefield Co., Log Creek at Highway 25, 0.9 mi. S. Turkey Creek, 18-IV-55, C. D. Hynes and L. Berner. *Virginia.* Clark Co., Shenandoah River, Berryville, 12-V-38, E. Surber (JRT).[4]

TAXONOMY

The adult stages of *E. attenuata* are easily distinguished from the adults of the other known species in the subgenus, and the morphological variability in this stage is at a minimum. The nymphal stage, on the other hand, is variable in morphological and color characters.

The general color of the nymph varies from light to dark brown, and some specimens are speckled with pale dots. Most nymphs possess a subapical brown band on the femora; however, this band may be continuous or interrupted, and some specimens may also have an additional interrupted femoral band near the middle. The pale margins of all abdominal sterna is a constant color character.

The paired dorsal abdominal tubercles are variable in sharpness and the degree of development. Most nymphs have discernible tubercles on segments 3-8, while the posterior margins of segments 1, 2, and 9 are only sinuate (Fig. 1). However, an occasional specimen will exhibit small tubercles on segments 1, 2, and 9, while in other specimens the posterior margins of segments 1, 2, 3, and 9 are only sinuate. The tubercles on segments 4-7 are always present, although in some nymphs they are better developed than in others.

Ephemerella delantala Mayo

Mayo. 1952. Pan-Pac. Ent., 28:94, 1 fig.
Day. 1956. Aquatic Insects Calif., p. 98.
Allen and Edmunds. 1956. Proc. Utah Acad. Sci., Arts and Letters, 33:87.

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[4] Since this manuscript was submitted, RKA has been able to examine specimens of *Ephemerella attenuata* McDunnough from eight new localities, some of which are new state records and represent considerable range extensions. The records are as follows: *Indiana.* Pigeon River, Scott, 1-IV-28, H. T. Spieth (AMNH); Trib. Pigeon River, Mongo, 17-VII-29, H. T. Speith (AMNH); Pigeon River, Howe, 26-VI-29, H. T. Spieth (AMNH). *Michigan.* St. Joseph River, Tekonsha, 8-VII-29, H. T. Spieth (AMNH); So. Chippewa River, Mt. Pleasant, 28-VII-29, H. T. Spieth (AMNH). *New York.* East Islip, 6-VII-30, H. T. Spieth (AMNH). *North Carolina.* Jefferson, 4-VII-30, H. T. Spieth (AMNH).

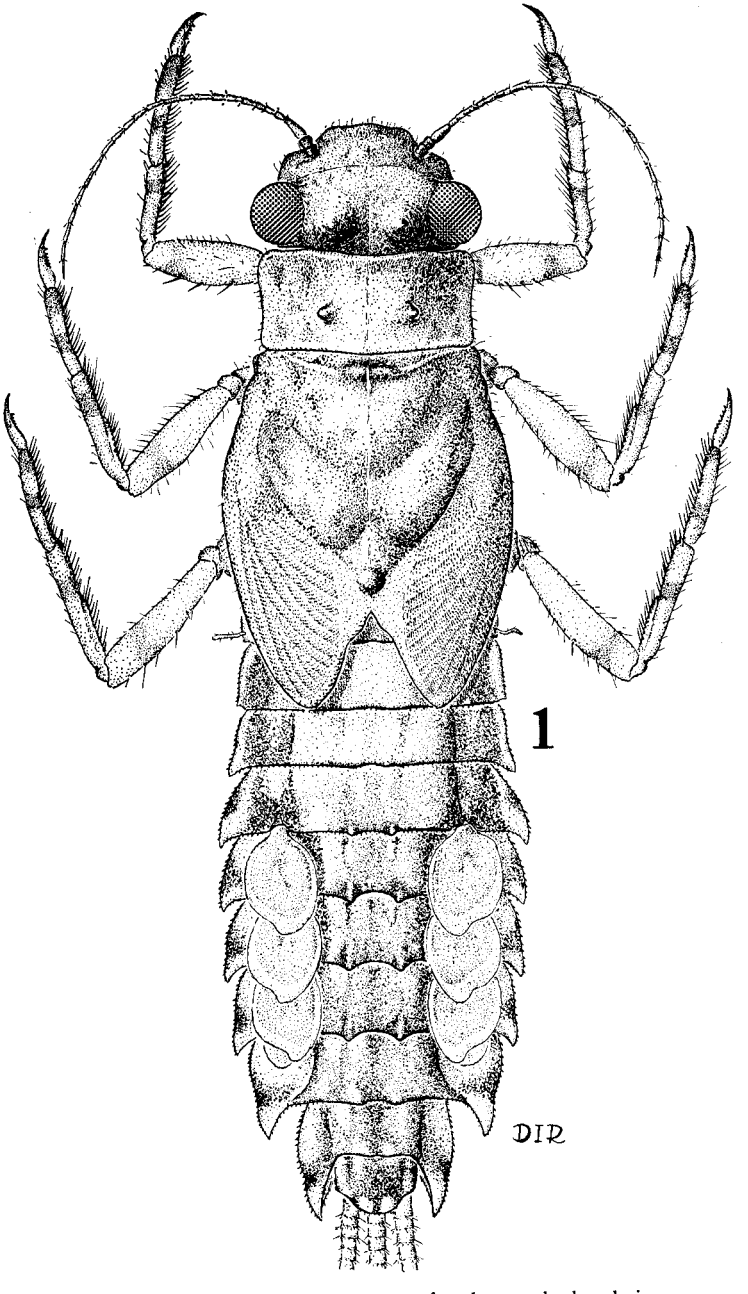


FIG. 1. *Ephemerella attenuata,* mature female nymph, dorsal view.

Ephemerella delantala is known only in the nymphal stage.

Mature Nymph. Length: body 5-6 mm.; caudal filaments 2.5-3 mm. General color yellow with brown markings. Head and thorax without tubercles; legs pale, coxae, trochanters, and basal half of femora brown, tibiae and tarsi with variable smoky transverse bands. Abdomen with paired dorsal submedian tubercles on segments 2-9, tubercles on segments 4-8 well-developed and blunt giving the posterior margins of these terga a scalloped effect (Fig. 13); distinct postero-lateral projections on segments 5-8 which curve upward forming a trough between the lateral margins and the abdominal tubercles; abdominal terga 5-7 pale, parts of terga 4 and 8 often pale; lateral margins of abdominal sterna 5-7 pale. Cavdal filaments usually pale, often with pale smoky basal annulations; basal segments without spines, apical segments with long hair.

Type Locality. Martis Creek near Truckee (6,000 ft.), Placer Co., California.

Type. California Academy of Sciences, San Francisco, California.

DISTRIBUTION

This western species is known only from California, Oregon and Washington (Fig. 15a). The authors have examined specimens from the following localities:

California. Tehama Co., Mill Creek, 5 mi. N. Childs Meadows, 3-VII-59, RKA; Placer Co., Martis Creek nr. Truckee (6,000 ft.), 23-VI-33, P. R. Needham (PARATYPE) (VKM); Mono Co., Green Creek, 6-VIII-52, W. C. Day; Nevada Co., Truckee River on Highway 40, at first crossing E. Donner Summit, 2-VIII-52, R. B. Selander. *Oregon.* Benton Co., Rock Creek, 10-V-41, H. E. Mastin; Corvallis, 29-III-39, "Polson"; Lincoln Co., Five Rivers Area at Maple Camp, 11-V-40, H. N. Walwyn; Yew Creek, 6-IV-40, "Pitney" (OSC); Greasy Creek, 10-V-41, H. E. Mastin (OSC); Mill Creek, 4-V-40, H. N. Walwyn (OSC); Lane Co., McKenzie River, Oregon Highway 126, 15-VI-58, M. L. Johnson. *Washington.* Yakima Co., Naches River, 1 mi. S. Cliffdell, 5-IX-58, GFE and RKA.

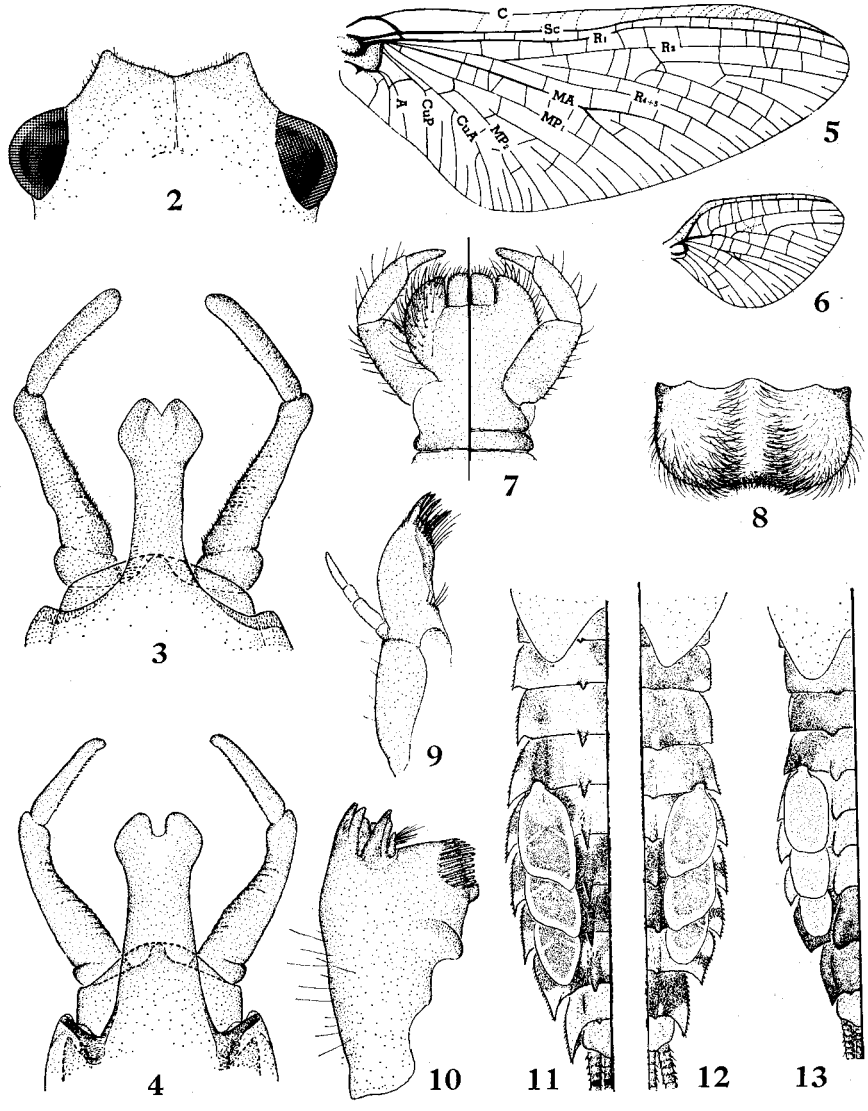
BIOLOGY

This species inhabits clear or lightly silted, rather cool (50-56° F.) moderately flowing streams with rocky bottoms. It is found in the slower moving waters near the shore where it often occurs with *Ephemerella hecuba* Eaton and *E. tibialis* McDunnough.

TAXONOMY

Ephemerella delantala is the only species in the subgenus *Attenuatella* in which a rudimentary gill has not been found on the first abdominal segment of the nymph.

The morphological and color variation is at a minimum in this species. The paired dorsal abdominal tubercles on segments 2 and 9 are found to vary in degree of development and sharpness, but are always discernible.



FIGS. 2-3. *Ephemerella attenuata.* Fig. 2, vertex of head, front view; Fig. 3, male genitalia, dorsal view. FIGS. 4-6. *E. margarita.* Fig. 4, male genitalia, dorsal view; Fig. 5, forewing of male imago; Fig. 6, hindwing of male imago. FIGS. 7-10. *E. attenuata,* nymphal mouthparts. Fig. 7, labium; Fig. 8, labrum; Fig. 9, maxilla; Fig. 10, left mandible. FIGS. 11-13. Subgenus *Attenuatella,* half of abdominal terga of mature nymph. Fig. 11, *E. soquele;* Fig. 12, *E. margarita;* Fig. 13, *E. delantala.*

Terga 4-6 are always pale in color, while the pale markings on terga 3 and 7 vary from specimen to specimen.

Ephemerella margarita Needham

Needham. 1927. Ann. Ent. Soc. Amer., 20:114.
Needham and Christenson. 1927. Utah Agric. Exp. Sta. Bull., 201:9, 1 fig.
Walley. 1930. Canad. Ent., 62:14, 4 figs.
McDunnough. 1931. Canad. Ent., 63:210, 1 fig.
Traver, 1935. Biol. Mayflies, 611.
Edmunds. 1954. Proc. Utah Acad. Sci., Arts and Letters, 31:66.
Allen and Edmunds. 1956. Proc. Utah Acad. Sci., Arts and Letters, 33:87.

Needham (1927) named this species from nymphs collected at several localities in Utah, and Traver (1935) designated a specimen from the Provo River as the lectotype.

McDunnough (1931) tentatively associated imagoes collected in Alberta as the adults of this species. The authors were able to examine these specimens, plus others collected in British Columbia, Wyoming and Montana, and believe McDunnough to be correct in this association. We base this conclusion on subgeneric characters found in the male imago, and *E. margarita* is the only known species of this subgenus which is known to occur in these areas.

McDunnough *(op. cit.)* reported nymphs collected in New Hampshire as *E. margarita* and stated that he could find no morphological difference between these specimens and the western form. The authors have examined material from New Brunswick and Nova Scotia and have also found these widely separated forms to be morphologically the same.

Male Imago. Length: body 6 mm.; forewing 6 mm. Head and antennae dark brown; upper portion of eye orange, lower portion gray. Thorax dark brown; antero-lateral margin paler; sutures pale; legs brown, forelegs darker than middle and hind legs; wings hyaline, costal, subcostal and radial veins light brown, other veins and crossveins pale. Abdomen almost uniformly light brown; segments 1-7 semi-hyaline; 8-10 opaque. Apex of penes with a U-shaped notch; lateral margin of penes base forms a sharply angled concavity as in Fig. 4.

Female Imago. General color similar to that of male, except thorax and legs lighter brown. Other characters similar to those of male except for usual sexual differences.

Mature Nymph. Length: body 6-9.5 mm.; caudal filaments 2-3 mm. General color brown with darker brown markings. Without occipital tubercles. Prothorax with small paired submedian protuberances; mesothorax with small median anterior and posterior protuberances; legs pale with brown transverse bands. Abdomen with paired dorsal submedian tubercles on segments 3-9; distinct postero-lateral projections on segments 4-8 (Fig. 12); abdominal terga brown with part or all of some terga pale; sterna 4-9 with pale lateral margins interrupted by a brown transverse band. Caudal filaments with a brown transverse band near the middle; basal segments with spines, apical segments with long hair.

Type Locality. Provo River, Utah.

Type. Cornell University, Ithaca, New York.

DISTRIBUTION

Ephemerella margarita is a boreal species with two separate populations, one western and one eastern. It appears that this is a monotypic species and future collections may fill in this distributional gap. The eastern population is known from New Brunswick, Nova Scotia and New Hampshire

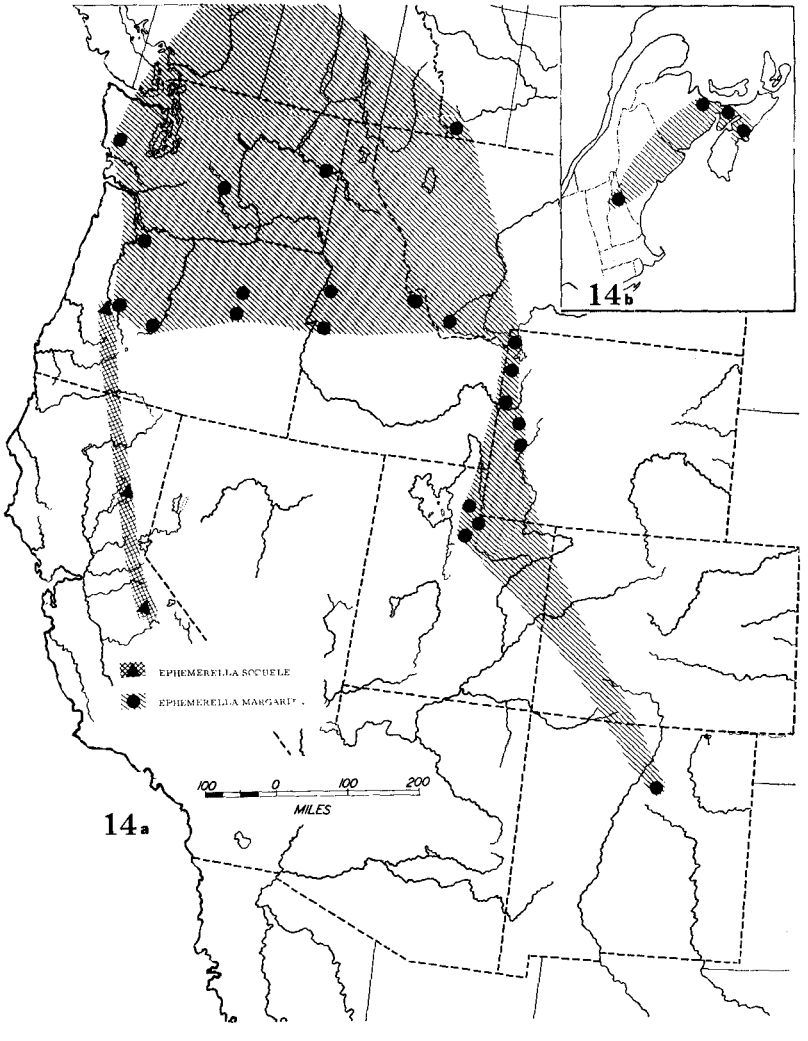


FIG. 14a. Distribution map of *Ephemerella soquele,* and the western population of *E. margarita.* FIG. 14b. Distribution map of the eastern population of *E. margarita.*

(Fig. 14b). The western population is known from British Columbia and Alberta austrad to Utah and New Mexico (Fig. 14a). The authors have examined specimens from the following localities:

Alberta. Old Man River, Lundbreck, 7-VII-30, J. H. Pepper (CNC). *Idaho.* Idaho Co., Rapid River at Jct. with Little Salmon River, 5 mi. N. Pollock, 6-IX-58, GFE and RKA; Biose Co., Payette River, 5 mi. W. Crouch, 6-IX-58, GFE and RKA; Lemhi Co., Middle Fork Salmon River, North Fork, 2-VIII-58, GFE. *Montana.* Beaverhead Co., Dillon, 3-VIII-47, F. C. Harmston; Gallatin Co., Rocky Creek, Bozeman, 10-VIII-28, J. McDunnough (CNC). *New Brunswick.* Stream nr. Salem, 9-VII-50, E. L. Bousefield; Cocagne River nr. Notre Dame, 17-VII-51, E. L. Bousefield. *New Mexico.* San Miguel Co., Pecos River, 10 mi. above Pecos, 30-VII-43 (JRT). *Nova Scotia.* Margaree River, Cape Breton Island, 6-VII-50, E. L. Bousefield; Stream nr. Brooklyn, 22-VI-50, E. L. Bousefield. *Oregon.* Grant Co., Canyon Creek, 5 mi. S. Canyon City, 21-VIII-54, GFE and RKA; Silvies River nr. Bear Valley Rangers Station, 21-VIII-54, GFE and RKA; Klamath Co., Little Deschutes River, Crescent, 23-VIII-54, GFE and RKA; Clackamas Co., Mollala River, 3 mi. E. Mollala, 26-VIII-54, GFE and RKA; Lane Co., VII-57, M. L. Johnson. *Utah.* Duchesne Co., Bridgeland, 22-VII-42, GFE; Duchesne River, 15 mi. N. Duchesne, 20-VII-47, GFE; Summit Co., Weber River at Glendale Ranch, 19-VIII-45, S. Mulaik and GFE. *Washington.* Spokane Co., Little Spokane River, Milan, 26-VI-55, RKA; Yakima Co., Naches River, 1 mi. S. Cliffdell, 5-IX-58, GFE and RKA; Grays Harbor Co., Humptulips River at Humptulips, 2-IX-58, GFE and RKA. *Wyoming.* Lincoln Co., Salt River, 9 mi. N. Afton, 18-VIII-59, GFE and W. L. Peters; Snake River, 7 mi. E. Alpine, 8-IX-57, GFE; Teton Co., Snake River, Hoback, 18-VIII-59, GFE and W. L. Peters; Snake River, 1 mi. S. entrance to Yellowstone National Park, 18-VIII-59, GFE and W. L. Peters; Stream at Jenny Lake, 22-VIII-48, D. G. Denning; Sublette Co., Big Piney, 9-VIII-49, H. Higgins; Green River nr. Daniel, 13-VIII-40, T. H. Frison and T. H. Frison, Jr. (INHS); Yellowstone National Park, Madison River, 3 mi. W. Madison Jct., 10-VII-50, GFE; Firehole River, Upper Geyser Basin, 22-VII-28, J. McDunnough (CNC).

BIOLOGY

This species is commonly found at the margins of rather large sluggish rivers; however, the authors have also collected nymphs in small and medium sized, moderately flowing streams. Specimens collected in Oregon were all from about 3,000 feet elevation, while in Utah, collection records are from 5,500 to 7,500 feet. Adults which have been determined as this species were collected from July to late August.

TAXONOMY

Ephemerella margarita nymphs vary in the degree of development and sharpness of the paired dorsal abdominal tubercles and in the dorsal abdominal color pattern.

The abdominal tubercles on segments 4-9 may vary slightly in degree

of development and sharpness. Tubercles may be present on segments 2 and 3, but in many specimens discernible tubercles are wanting and the posterior margins of these segments are only sinuate. The abdominal terga are brown with part or all of some terga pale. Terga 5; 5 and 8; 5, 8, and 10; or 5, 8, 10 and 4 may be pale in these combinations. The eastern specimens of *E. margarita* all have a pale mesonotum with two dark dots. This color pattern is found only rarely in western specimens.

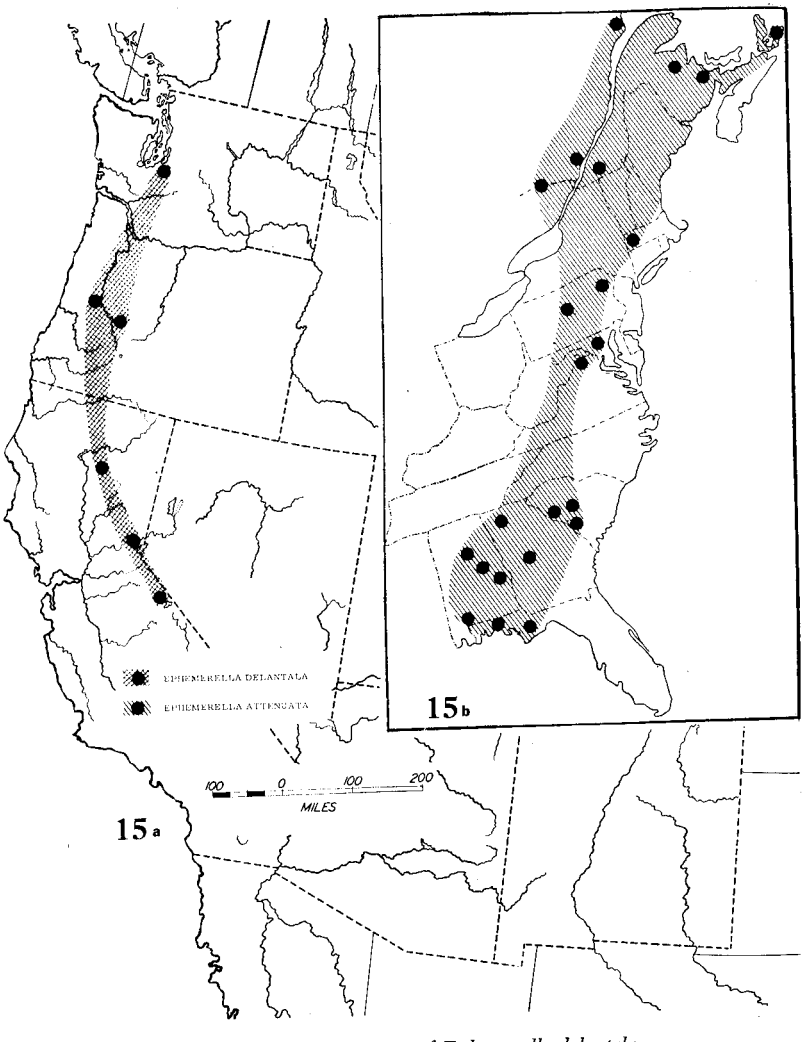


FIG. 15a. Distribution map of *Ephemerella delantala.*
FIG. 15b. Distribution map of *E. attenuata.*

Ephemerella soquele Day

Day. 1954. Pan-Pac. Ent., 30:18, 2 figs.
Day. 1956. Aquatic Insects Calif., p. 98.

Ephemerella soquele is known from nymphs only. Day (1954) reported this species to have paired dorsal abdominal tubercles on segments 2-9. The authors in examining seven paratypes found one of these specimens to bear paired dorsal tubercles on segment one. One other specimen had a tubercle on one side of this segment and not on the other.

Mature Nymph. Length: body 7.5-8 mm.; caudal filaments 3.5 mm. General color brown with pale markings. Without occipital tubercles. Prothorax with paired submedian tubercles; mesothorax with a low anterior and a higher posterior tubercle; legs pale with brown transverse bands. Abdomen with paired dorsal submedian tubercles on segments 1-9 or 2-9; tubercles on segment one, when present, are small; distinct postero-lateral projections on segments 2-9 (Fig. 11); abdominal terga brown, parts of terga 3-5 usually pale; lateral margins of abdominal sterna 4-9 with a pale area. Caudal filaments with brown transverse annulations and with brown tips; basal segments with short spines, apical segments with long hair.

Type Locality. Soquel Meadow, Willow Creek, Madera Co., California.
Type. California Academy of Sciences, San Francisco, California.

DISTRIBUTION

This species is known from the Cascade Mountains of central Oregon to the Sierra Nevada Mountains of central California (Fig. 14a). The authors have examined specimens from the following localities:

California. Madera Co., Soquel Meadow, Willow Creek, 14-VII-51, Helen L. and W. C. Day (PARATYPES); Soquel Public Camp, 14-VII-51, W. C. Day; Pichon ? Meadows, Sierra Nevada Mountains, C. D. Michener (JRT); Plumas Co., North Fork Deer Creek, 12 mi. N. Quincy Jct., 3-VII-59, RKA. *Oregon.* Lane Co., Willamette River nr. Walker, 26-VI-57, M. L. Johnson.

TAXONOMY

The nymph of *E. soquele* varies in the number and the degree of development of the paired dorsal abdominal tubercles. Paratypes were found to possess tubercles on terga 1-9 or 2-9. These tubercles also vary slightly in degree of development, especially those on terga 2 and 3.

ACKNOWLEDGMENTS

The authors would like to thank Mrs. Leonora K. Gloyd and Dr. Herbert H. Ross of the Illinois State Natural History Survey, Mr. G. P. Holland and Mr. J. E. H. Martin of the Canadian National Collection, Dr. Velma K. Mayo and Mr. W. C. Day, Drs. P. O. Ritcher and F. F. Hasbrouck of Oregon State College, and Dr. J. R. Traver of the University of Massachusetts for the loan of specimens. We would especially like to thank

Dr. Lewis Berner of the University of Florida for the gift of valuable specimens, for making available his records from the Southeastern United States, and for helpful suggestions. We are grateful also to E. L. Bousefield, Donald G. Denning, Harold Higgins and M. L. Johnson for the gift of valuable specimens. We are indebted to Mr. David I. Rasmussen and Mr. Steve L. Jensen who prepared most of the figures included in this report.

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A NEW SPECIES OF *TENAGOGONUS* FROM THE FIJI ISLANDS[1] (Gerridae: Heteroptera)

HERBERT B. HUNGERFORD AND RYUICHI MATSUDA

In our key to the *Tenagogonus-Limnometra complex* of the Gerridae [Univ. Kansas Sci. Bull. 39(9):377-378, 1958] this new species runs to *T. fijiensis* Hungerford and Matsuda, but is not that species.

Tenagogonus valentinei n. sp.

Size: Apterous male: 5.7 mm. long; width across mesoacetabula 2.14 mm.; width across head 1.4 mm. Apterous female: 6.93 to 7.89 mm. long; width across mesoacetabula 2.52 to 2.73 mm.; width across head 1.47 to 1.68 mm.

Color: Color pattern of head and thorax about the same as in *T. fijiensis* but general facies darker. Median longitudinal and marginal bands black and broader than in *T. fijiensis*. Metanotum mostly black. First abdominal tergite black with lateral margin yellow in both sexes; second to seventh tergites light brown with black lateral margin in male, and nearly totally black and frosted by gray in female. Connexivum with a median longitudinal dark band in both sexes. Antennae and legs mostly brown. Venter yellow.

Structural characteristics: Proportional lengths of antennal segments, 1st:2nd:3rd:4th::99:67:62:? in male, and 95:68:60:75 in female. Total length of female antenna a little shorter than length of body (6.26 mm. versus 6.93 mm. in one specimen). Beak relatively longer than in *T.*

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