

## A New Species of *Caenis* (Ephemeroptera: Caenidae) from Montana, U.S.A.

by

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*Caenis youngi* sp. n. has been found inhabiting lakes and ponds of southern mountainous Montana and also in northern Wyoming in Yellowstone National Park. The unique feature of this species is a process which stands erect from the center of the second abdominal tergite. This structure, the function of which is unknown, is present on males, females and nymphs.

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### INTRODUCTION

The mayfly family Caenidae occurs over most of the earth. Two of the eleven genera of this family, *Brachycercus* and *Caenis*, are found in North America. Both genera are abundant in Montana at elevations below 1000 m. Their preferred habitat, warm rivers, streams, and lakes are found mainly in the prairie areas of the state. We have now found an additional species which is morphologically and ecologically different from the other known species.

#### *Caenis youngi* sp. n.

*Male*: length 4.2 mm, wing 4 mm. Figure 1.

Head: Antenna light except for basal portion of third segment which is dark, eyes black, ocelli white with black bases. Back of head dark with black reticulate lines extending forward to halfway between bases of ocelli. Vertex ahead of this line uniformly dark shaded except for black median triangle with black lines extending laterally to anterior corners of ocelli. Dark spot at base of each antenna with dark medial extension. Cervix with lateral dark areas shading to light medially.

Thorax: Pronotum twice as long laterally as in the central portion. Edges black fading to light centrally. Median scutal area of thorax dark brown anteriorly

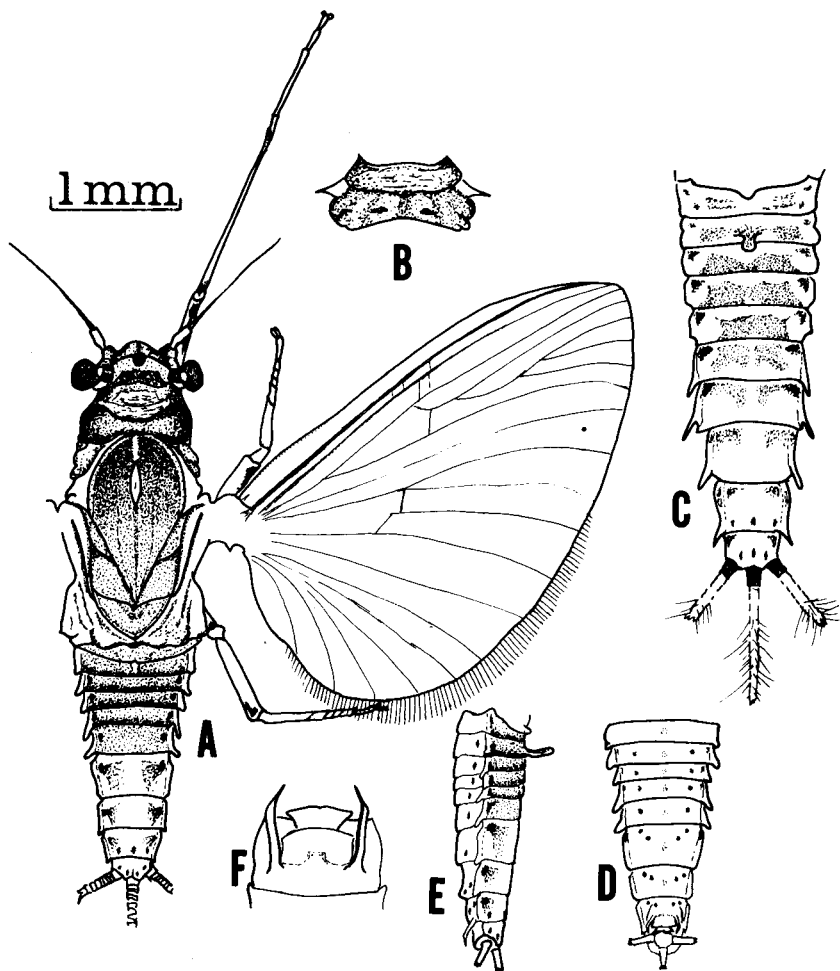


Fig. 1. *Caenis youngi* sp. n. Adults. A. Dorsal aspect of male. B. Dorsal aspect of female pronotum. C. Dorsal aspect of female abdomen. D. Ventral aspect of male abdomen. E. Lateral aspect of male abdomen. F. Ventral view of male genitalia - (approx. 3X scale).

fading to medium brown at the back. Lateral scutal areas light brown. Pleural sclerites darker below than above. Legs light-colored with markings as follows; Front femur generally dusky with streak of black along superior surface, dark smudge at base and tip of tibia. Middle leg with dark streak on distal superior surface. Hind leg the same. Front tibia less than twice length of front femur. Wings hyaline with veins and shape characteristic of the genus.

Abdomen: Dorsal surface: Segments 1-5 dark on posterior edge fading to light anteriorly. Segment 2 with elongate protuberance from mid-dorsal surface - this

structure about equal in length to radius of abdomen and gradually enlarged at the distal half. Segments 6-10 with diffuse pigment decreasing at the posterior margins of the segments and at the midline. Segments 3-9 with stigmatal spots. In addition, three maculations on the tergite of segment 9 and four on segment 10. Ventral surface: Maculation pattern as follows. Segments 2-6 with single spots on each side of midline, 7-10 with pair of spots on each side. Faint ganglionic markings visible. Genitalia as shown, claspers long and narrow with abrupt bend near end. Both proximal and distal portions tend to concavity on lateral margins. Penes typical of the genus. Caudal filaments all light in color, more than 3X body length and not haired.

*Female*: length 6.2 mm, wing 5.0 mm. Figure 1.

General: Larger but much like male with following exceptions; abdomen proportionately longer and heavier than male, coloration lighter as shown, stigmata and maculations as shown, lateral spines present on prothorax. Subgenital plate moderately extended and smoothly convex. Caudal filaments with dark basal segment, haired on all sides in terminal 4/5 and total length of caudal filaments less than body length.

*Nymph*: length 6 mm. Figure 2.

Although we do not have a positive association between this nymph and adult *C. youngi*, the nymphs of all other known species of *Caenis* in this area are known and this one is entirely different. The diagnostic characteristics of the nymph are the large projection on A-2 and the distinctive shape of the pronotum. Figure 2 indicates the difference between this species and *C. simulans* its closest relative.

## DISCUSSION

Diagnosis of this species is based on the following characters. The presence of the large median projection on A-2 in both the nymphal and adult stages. All *Caenis* species have a projection on A-2 but none are as large as in this species and none are known to occur in the adult stage (Provonsha, pers. comm.). Other characteristics which set it apart are its large size, its characteristic maculation pattern, genitalic structures and ecological occurrence. *C. youngi* occupies habitats at a higher elevation than other species of *Caenis* described. Our collection sites are between 1900 m and 2000 m MSL.

In Needham's key (1935) this species will key to *C. simulans*. *Youngi* differs from that species in that *simulans* does not have the prominent abdominal protuberance, has stigmatal spots on segments 1-7 only, has a black mid-dorsal line on segments 1-3 and has the forceps more gently curved. Dr. A. Provonsha of Purdue University is now in the process of reviewing this genus in North America. He has examined our specimens and has stated that, although *youngi* is closely related to *simulans* and probably descended from that line, it is indeed a new species.

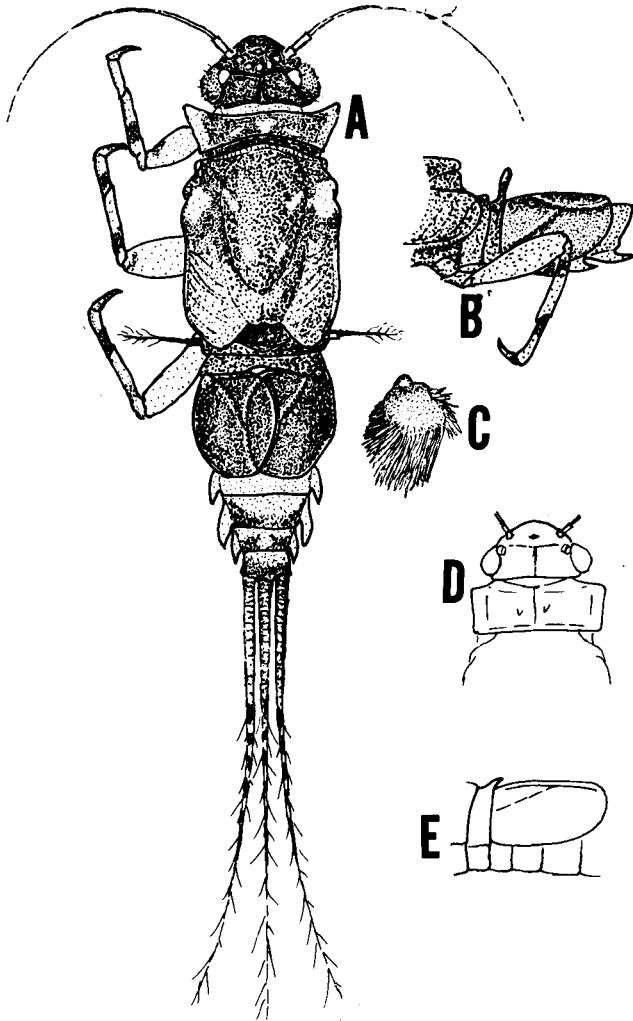


Fig. 2. *Caenis youngi* sp. n. (A-C) and *C. simulans* (D, E). Nymphs. A. Dorsal aspect of nymph. B. Lateral view of anterior abdomen. C. Gill. D. Dorsal view of head and thorax, compare pronotum with A. E. Lateral view of bare of abdomen, compare with B. (D and E after Provonsha, unpublished).

Holotype: ♂, Madison Arm of Hebgen Lake, Gallatin County, Montana, 22 July 81, Coll. Vincent Young - in U.S. National Museum.

Paratypes: ♀, same data, same deposition as preceding. 1 ♂ and 1 ♀, same collection data, University of Utah collection. Two ♀♀, Hidden Lake, Madison County, Montana, 5 Jul 79, coll.

Vincent Young - Montana State University collection. Other specimens are in the Purdue University Collection. One nymph, presumably of this species, was taken in a backwater of Slough Creek, Yellowstone National Park, Wyoming 6 July 82 - Coll. George Roemhild.

This species is named for Vincent Young who, as an amateur student of Ephemeroptera, has contributed much to our knowledge of the mayflies in this area. My thanks to Dr. George Edmunds for his review of the manuscript. A special thanks to Dr. Arwin Provonsha of Purdue University for his very perceptive help.

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