

**THE ADULT OF *DRUNELLA ALLEGHENIENSIS* (EPHEMEROPTERA:  
EPHEMERELLIDAE) WITH BIOLOGICAL NOTES**

BORIS C. KONDRATIEFF, J. REESE VOSHELL, JR., and DOUGLAS A. HOWELL  
Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg,  
Virginia 24061

**Abstract**

*Can. Ent.* 113: 259-261 (1981)

The adult stage of *Drunella allegheniensis* (Traver) is described for the first time. Characters separating it from the closely related *D. tuberculata* (Morgan) are summarized, and the existing taxonomic key to the group is modified to include *D. allegheniensis*. Other species of Ephemeroptera associated with *D. allegheniensis* are reported along with observations on its biology.

**Résumé**

Le stade adulte de *Drunella allegheniensis* (Traver) est décrit pour la première fois. Les caractères qui le distinguent de l'espèce étroitement apparentée *D. tuberculata* (Morgan) sont résumés, et la clé taxonomique existante pour le groupe est modifiée de façon à inclure *D. allegheniensis*. D'autres espèces d'Ephemeroptera associées à *D. allegheniensis* sont mentionnés parmi les observations rapportées sur sa biologie.

The *Ephemerella* subgenus *Drunella* was recently re-elevated to generic status with five new subgenera (Allen 1980). *D. allegheniensis* (Traver) and *D. tuberculata* (Morgan) were assigned to the subgenus *Unirhachella*. Nymphs and adults of *D. tuberculata* were described by Morgan (1911) and McDunnough (1931), respectively, and both stages were included in the keys provided by Allen and Edmunds (1962). *D. allegheniensis* was described by Traver (1934) from nymphs collected in West Virginia and Maryland, but the adult stage has yet to be described. We recently collected the distinctive larvae in southwestern Virginia and reared several mature specimens to the adult stage in the laboratory.

The purpose of this paper is to complete the descriptive taxonomy of the subgenus *Unirhachella* by describing the adults of *D. allegheniensis* and modifying the existing keys. In addition, we report our observations on the biology of the mayfly.

**Male imago** (in alcohol). Body length 8.0-8.5 mm, forewings 7.5-8.0 mm. Head brown; upper portion of compound eye orange, lower portion brown. Thorax dark brown. Tibia and anterior margin of femur of foreleg brown, remainder white. Middle and hind legs white. Wings hyaline with costa, subcosta, and radius brown. Abdominal terga brown with median stripe and submedian and sublateral maculae dark brown (very similar to *D. tuberculata*); sterna white with anterior sublateral oblique dashes brown and two submedian dots brown. Male genitalia as in Fig. 1, dark brown. Caudal filaments brown basally, white distally.

**Female imago** (in alcohol). Body length 8.0-8.5 mm, forewings 7.5-8.0 mm. Maculation paler than male. Abdominal maculae not as pronounced as male. Sterna white with four submedian dots brown.

**MATERIAL EXAMINED.** Little River, County Route 787, Montgomery Co., VA, B.C. Kondratieff, 6 ♂ imagoes and 2 ♀ imagoes (reared), emerged 11 September 1980 from nymphs collected 8 September 1980. All deposited in the VPI & SU collection.

**REMARKS.** *D. allegheniensis* is a cognate species of *D. tuberculata*. The nymphal stages are readily separable using the key in Allen and Edmunds (1962). The male imago of *D. allegheniensis* may be distinguished from *D. tuberculata* by the hind

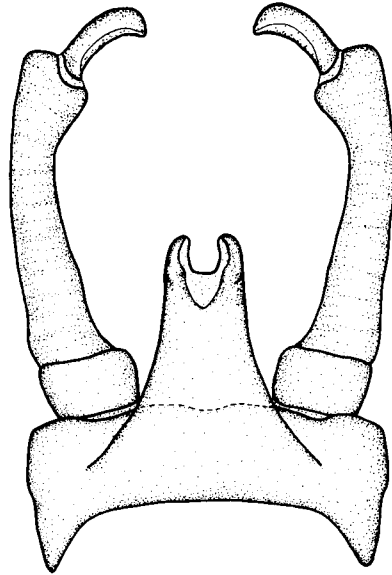


FIG. 1. Dorsal view male genitalia, *D. allegheniensis*.

femora lacking numerous small black dots. Both species have similar male genitalia, but the lanceolate submedian excavation in *D. allegheniensis* is not as deep as *D. tuberculata*. Males of *D. allegheniensis* can be identified using the key on page 151 in Allen and Edmunds (1962), with the following modifications:

- |   |                       |
|---|-----------------------|
| 10 (8). Penes with a short V-shaped submedian excavation; apical portion of penis lobes broadly rounded ..... | <i>cornutella</i>     |
| - Penes with a lanceolate submedian excavation; apical portion of penis lobes elongate .....                  | 11                    |
| 11(10). Abdominal sterna without maculae .....  | <i>walkeri</i>        |
| - Abdominal sterna with two submedian dots and two sublateral oblique dashes .....                            | 12                    |
| 12(11). Hind femora with numerous small black dots .....  | <i>tuberculata</i>    |
| - Hind femora without numerous small black dots .....   | <i>allegheniensis</i> |

**BIOLOGICAL NOTES.** *D. allegheniensis* is univoltine in the Little River, a fifth order stream, with early instar nymphs appearing in late-spring. Emergence occurs in late-summer (late-August to mid-September). In Virginia, *D. allegheniensis* and *D. tuberculata* are apparently seasonally separated, with *D. tuberculata* emerging in the spring (May to mid-June). We observed subimagos of *D. allegheniensis* emerging in late-afternoon (ca. 4:00–6:30 p.m.). The full-grown nymphs floated to the surface in areas of moderate current and emerged instantaneously. They then flew upward to nearby trees. Water temperature at the time of observed emergence was 21°C. Dissolved oxygen concentration was 11.0 ppm, and the pH was 6.6. The duration of the subimago stage was ca. 24 h under laboratory conditions.

No nuptial flights were observed; however, males were seen flying singly (ca. 6:00–8:00 p.m.), but they usually soared up out of sight. We observed nighthawks intensively feeding about 60–70 m directly above the river, indicating that swarming may occur high in the air. At dusk females settled near the water's surface and oviposited by touching the tip of the abdomens to the water surface.

Nymphs were collected from thick mats of *Podostemum ceratophyllum* (Michaux) (riverweed) on rocks in fast riffle areas. The substrate was mostly pebble (16-64 mm), with some cobble (64-256 mm).

Other mayflies that we collected with *D. allegheniensis* were *Serratella serratoides* (McDunnough), *S. deficiens* (Morgan), *Heterocloeon curiosum* (McDunnough), *H. petersi* (Müller-Liebenau), *Baetis intercalaris* (McDunnough), and *Isonychia harperi* Traver.

### References

- Allen, R. K. 1980. Geographic distribution and reclassification of the subfamily Ephemerellinae (Ephemeroptera: Ephemerellidae). pp. 71-91 in J. F. Flannagan and K. E. Marshall (Eds.), *Advances in Ephemeroptera Biology*. Plenum Press, N.Y.
- Allen, R. K. and G. F. Edmunds, Jr. 1962. A revision of the genus *Ephemerella* (Ephemeroptera: Ephemerellidae) V. The subgenus *Drunella* in North America. *Misc. Publ. ent. Soc. Am.* **3**: 147-179.
- McDunnough, J. 1931. The eastern North American species of the genus *Ephemerella* and their nymphs (*Ephemeroptera*). *Can. Ent.* **63**: 187-197, 201-216.
- Morgan, A. H. 1911. Mayflies of Fall Creek. *Ann. ent. Soc. Am.* **4**: 93-119.
- Traver, J. R. 1934. New North American species of mayflies (Ephemerida). *J. Elisha Mitchell scient. Soc.* **50**: 189-254.

(Received 27 October 1980; accepted 29 January 1981)