

NEW SPINY CRAWLERS FROM HEADWATERS OF THE SAVANNAH  
RIVER (EPHEMEROPTERA: EPHEMERELLIDAE)<sup>1</sup>

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*Abstract.*—A highly distinctive new species of ephemerellid mayfly, *Ephemerella floripara* n. sp., is described from larvae from headwater tributaries in the upper Savannah River Basin of Georgia and South Carolina. The new species was taken as mature larvae from four localities in mid-winter, and it possesses a diagnostic and unusual dorsal color pattern along with other diagnostic structural traits. A highly unusual larval specimen of *Drunella* is also characterized, but because of the lack of an adequate series is not named at this time.

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Extensive collections of larval mayflies from several lotic sampling stations in the Savannah River Basin of Georgia, North Carolina, and South Carolina, made by J. Bruce Wallace and his students in 1969, were given to me for analysis. The so-called spiny crawlers, or family Ephemerellidae, constitute one of the few groups of mayflies that can presently be studied comprehensively at the species level in the larval stage. Twenty-two species were taken that had at one time or another been reported from the Savannah Drainage Area (Berner, 1977). Additionally, two previously undescribed forms were taken from headwater tributaries of the Savannah River. One is described here as *Ephemerella floripara* sp. n., and the other is referred to only as *Drunella* sp. because it is known only from an inadequate series of specimens.

The new species of *Ephemerella* is very distinctive, and the only explanation I have for it not having been discovered previously in a historically heavily collected area of Georgia and South Carolina is that it atypically exists as mature larvae in mid-winter. Most known spiny crawlers are collected as mature larvae in warmer months when sampling is more common. Adults possibly emerge in very early spring and thus have also gone unnoticed.

*Ephemerella floripara*, NEW SPECIES

Figs. 1-4

Larva.—Body up to 7.5 mm, dorsum generally light to medium brown with various pale markings, with most conspicuous broad median longitudinal stripe extending length of thorax and abdomen; dense covering of minute, mostly clear spicules rendering somewhat iridescent quality to entire head and body. Head pale on vertex, somewhat mottled posteriorly, with very weakly developed pair of suboccipital tubercles; pair of pale round spots on frons at base of clypeus. No

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tubercles evident on thoracic nota, only weak sculpturing on pronotum; pro- and mesonotum usually with very distinct median pale stripe; venter of thorax entirely pale. Fore legs patterned as in Fig. 1, with medial tarsal, distal tibial, and sub-basal tibial pale bands; patterning not as distinct in some individuals; scattered blunt spines weakly developed mostly in distal half of dorsal face of fore femora; tarsal claws with 6–10 denticles. Dorsal abdomen somewhat darker brown laterally than thorax, with broad longitudinal median pale stripe very distinctive in nearly all individuals, and with tips of posterolateral projections pale; gill plates pale bordered, each with median brown pattern resembling fleur-de-lis design, sometimes also with a pale spot in center of pattern; ventral abdomen generally pale and lacking distinctive markings, with lateral areas of sterna 4–9 (except for tips of posterolateral projections) and distal portion of 9 and sometimes 8 darkening to light to medium brown; posterolateral projections well-developed on segments 5–9, weakly developed on 4; paired dorsal submedian tubercles weakly developed on segments 5–8, most developed on segments 6 and 7, with some slight indication of prominences on segment 4 of some individuals; some spicules darkly pigmented in corresponding dark lateral areas of abdominal terga. Caudal filaments light brown, unicolorous with whorls of spines at segmental margins in basal half, and with fine setae, weaker spines, and some pale banding in distal half.

Material examined.—Holotype larva: Georgia, Rabun Co., Chattooga River at U.S. Rt. 76, J. B. Wallace et al., I-25-1969, deposited in the Purdue Entomological Research Collection, Purdue University, West Lafayette, Ind. Three larval paratypes: same data and deposition as holotype. One larval paratype: Georgia, Rabun Co., Talullah River, 2 miles north of Talullah Falls, J. B. Wallace et al., I-26-1969, same deposition as holotype. Four larval paratypes: Georgia, Stephens Co., Panther Creek 1 mile north of Yonah Dam, J. B. Wallace et al., I-26-69; two larvae deposited with the United States National Museum; two larvae deposited with holotype. Nine larval paratypes: Georgia (Rabun Co.)-South Carolina (Oconee Co.) border, Chattooga River at St. Rd. 28, J. B. Wallace et al., I-18-1969; two larvae deposited in the Florida A&M University Insect Collection, Tallahassee; seven larvae deposited with holotype.

Etymology.—*Floriparus*, Latin, meaning flower bearing, an allusion to the fleur-de-lis patterns occurring on the gills.

Remarks.—*Ephemerella floripara* is so distinctive that it is difficult to discern its affinities within the genus. The maxillary palpi of *E. floripara* are very small but retain three segments. This small palpal size is more typical of the genus *Serratella* (Allen and Edmunds, 1963); however, the caudal filaments become setaceous distally and are thus typical of *Ephemerella* (Allen and Edmunds, 1965). *Ephemerella needhami* McDunnough is another eastern spiny crawler that possesses a broad pale median dorsal stripe for the length of the body. This stripe of *E. needhami* usually contains a dark median line or is modified into two pale submedian lines. The median dorsal stripe of *E. floripara* is not modified as such or subdivided, and the dorsal armature of the two species are fundamentally different, being much more developed in *E. needhami*.

*Ephemerella floripara*, on the basis of the weakly developed armature and general spiculate condition, may be closely related to *Ephemerella crenula* Allen and Edmunds and *Ephemerella simila* Allen and Edmunds. Paired submedian tubercles occur on abdominal terga 3–8 and 2–8 respectively for the latter two

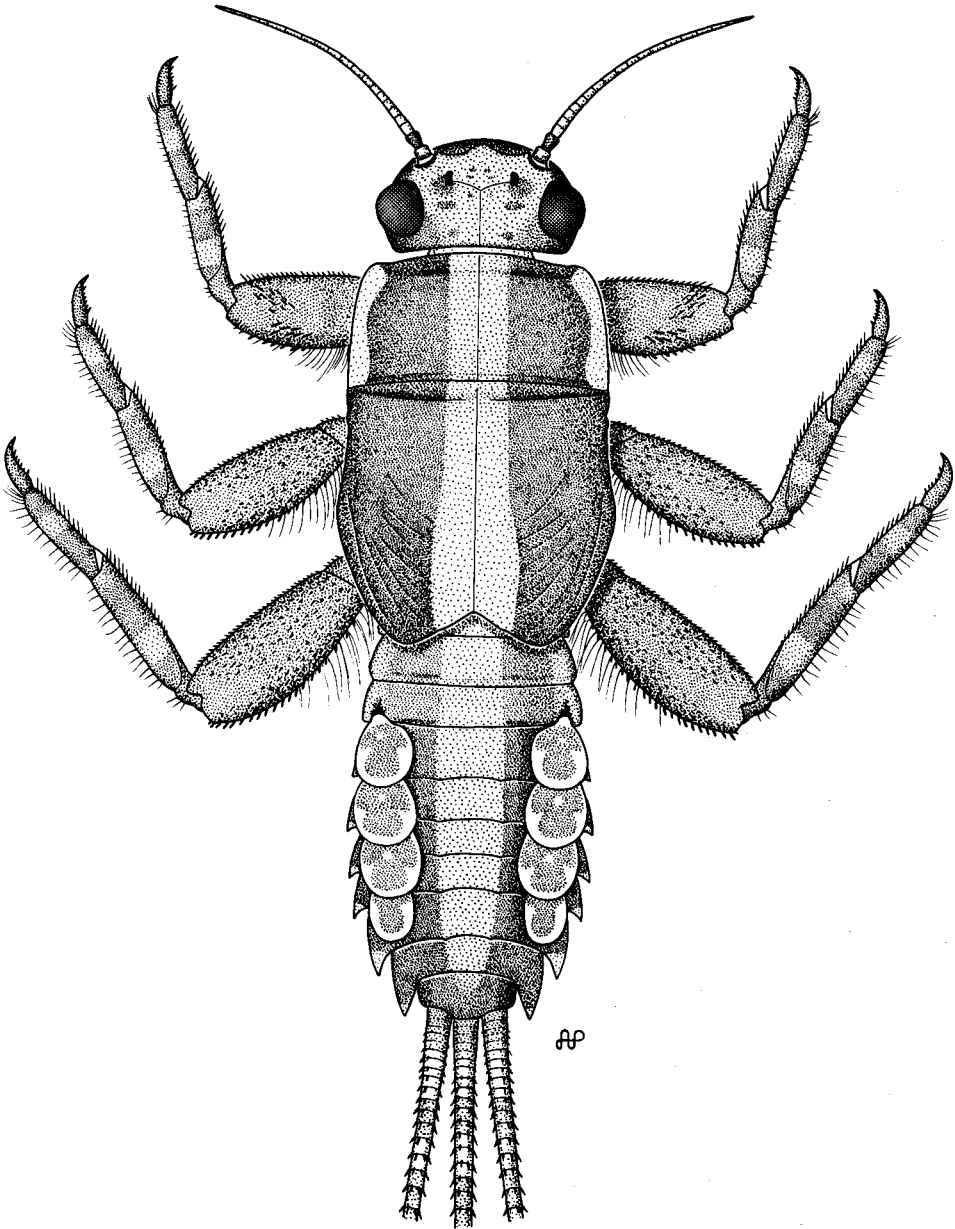
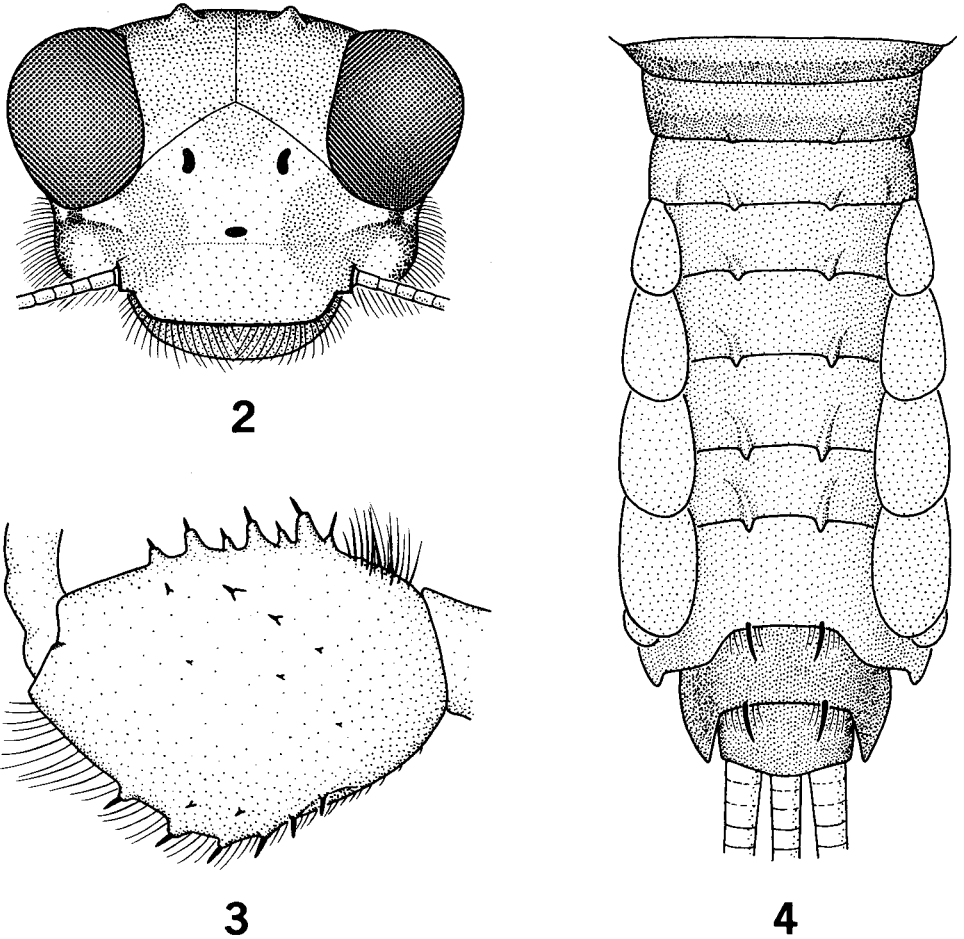


Fig. 1. *Ephemerella floripara* n. sp., dorsal whole larva.

species, whereas *E. floripara* has these tubercles only on terga 5–8 or possibly 4–8. Paired suboccipital tubercles are present in *E. simila*, absent in *E. crenula*, and very weakly developed in *E. floripara*. Both *E. simila* and *E. crenula* possess paired submedian tubercles on the prothorax, but these are absent in *E. floripara*. The color patterns of *E. crenula* and *E. simila* (and all other *Ephemerella* species) are very different than the striking pattern of *E. floripara* (the pattern of *E. needhami* is only superficially similar as discussed above).



Figs. 2-4. *Drunella* sp., larva. 2, Head, frontal view. 3, Fore femur. 4, Dorsal abdomen.

Based on the four sites where *E. floripara* was collected, the species occurs in Piedmont or lower mountain headwater tributaries of the Savannah River between 200 and 800 m elevation. The streams were between 10 and 90 m in width, and all had a mixture of either stones and sand or bedrock and sand substrates with moderate to swift currents. It is not known whether *E. floripara* was taken in pools or riffles at these sites.

***Drunella* sp.**

Figs. 2-4

Larva.—General color very light brown, with head, thoracic nota, and abdominal terga 1, 2, 9, and 10 darker brown. Head (Fig. 2) with pair of small bluntly pointed occipital tubercles and small, somewhat indistinct median ocellar tubercle; frontal shelf well developed with more-or-less truncate margin; frontoclypeal projections small, not acute, and not reaching margin of frontal shelf; genae produced into largely rounded anterolateral projections. Thoracic nota without distinct tubercles; metathoracic nota with pair of small posterior sublateral maculae. Fore

femoral armature as in Fig. 3. All femora with sparse row of black spines along posterior (dorsal) carina, with hind femoral row of spines terminating distally with one or two blunt, black, bristlelike spines. Abdominal terga 1 and 2 with darker posterior margins; entire terga 9 and 10 darker than middle abdominal terga; paired dorsal submedian tubercles (Fig. 4) present on segments 2–7, weakly developed on 2 and becoming progressively more developed on more posterior segments; abdominal terga 8 and 9 with paired submedian, long, dark, and well-developed bristlelike setae rather than tubercles (Fig. 4); posterior margin of tergum 8 deeply emarginate; gills on terga 3–6 becoming progressively larger posteriorly on each segment. Caudal filaments entirely pale.

**Material examined.**—One larva: Georgia, Rabun Co., Branch to Chattooga River on Georgia Rt. 28, 2.8 miles north of Georgia-South Carolina line, J. B. Wallace et al., VI-11-1969, deposited in the Purdue Entomological Research Collection, Purdue University, West Lafayette, IN.

**Remarks.**—This single specimen is unusual and unique for the genus *Drunella*, but I am reluctant to apply a new species name to it until it can be authenticated by a series. I have studied the larvae of most other *Drunella* species from eastern and western North America and have not seen any or read of others treated by Allen and Edmunds (1962) that possess the dorsal abdominal armature of this specimen. The bristlelike setae of segments 8 and 9 are particularly diagnostic. The posterior spination of the femora may also be unique. *Drunella* sp. described here possesses a head somewhat similar (with respect to tubercles, frontal shelf, frontoclypeal projections, and genae) to *Drunella conestee* (Traver) and *Drunella wayah* (Traver). Also, *Drunella walkeri* (Eaton), *D. wayah*, and *D. conestee* lack tubercles on terga 8 and 9 as does the species described here. These former species instead possess a row of fine hairs at the posterior margin of these terga, but lack the bristles.

*Drunella* sp. was collected in a mountain tributary of the Chattooga River at 640 m elevation. The stream was 1 to 3 m wide with some large pools. Riffle areas were swift with mixed stone substrate. No other spiny crawlers were collected with it.

#### ACKNOWLEDGMENT

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