

A NEW SPECIES OF *AMELETUS*
(EPHEMEROPTERA: SIPHLONURIDAE) FROM
EASTERN NORTH AMERICA

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Abstract.—Nymphs and reared imagoes of *Ameletus tarteri*, new species, are described. The new species is presently known from West Virginia, Virginia, and New York. Morphological characters of the male imago and nymph of the new species are illustrated and compared with the nominally described eastern Nearctic species and with three western Nearctic species that possess similar male genitalia. Notes on the ecology and habits of the nymph of the new species are included.

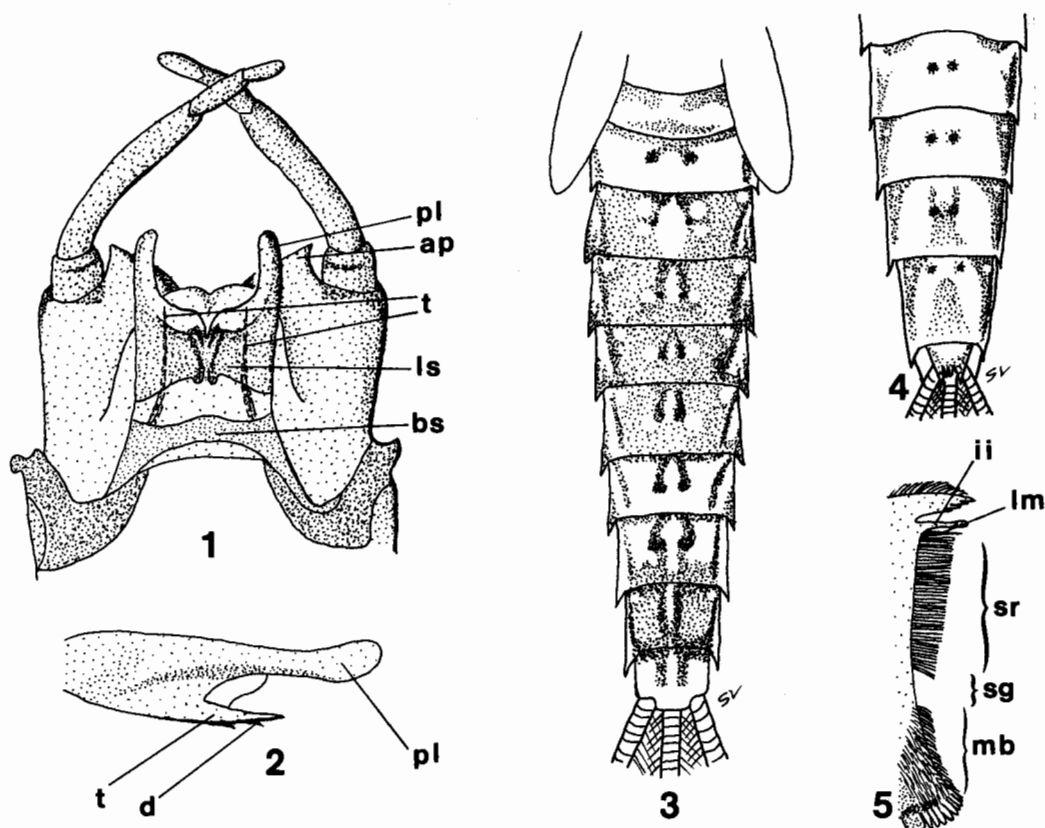
The genus *Ameletus* was established by Eaton (1885). Thirty-two species of *Ameletus* have previously been described from North America including six species from eastern North America (Edmunds et al., 1976; Carle, 1978). During an ecological survey of streams in central West Virginia, nymphs of an apparent new species of *Ameletus* were discovered. Subsequent rearings revealed characters of the male imago that differed from those of the known North American species of *Ameletus*. Since little is known of the biogeography of *Ameletus*, available type specimens of three western species with similar male genitalia, as well as five of the six nominal eastern species, were examined. The male of the eastern species *A. walleyi* Harper has complex genitalia (see Harper, 1970, figs. 1 and 2) quite unlike that of the new species and was not examined; the nymph of *A. walleyi* is undescribed.

Ameletus tarteri Burrows,
NEW SPECIES
Figs. 1-5

Male imago (in alcohol).—Body length 7.5-10.0 mm. Forewing length 8.0-9.5 mm.

Head brown. Scapes and pedicels of antennae tan; flagella light purple. Compound eyes yellow-green dorsally, tan ventrally. Thorax mostly brown with lighter and darker areas and streaks. Legs tan with forelegs darker. Forewings hyaline; costal and subcostal cells suffused with amber; bullae darkly margined. Hind wings hyaline; costal cells suffused with amber. Abdominal tergum 1 brown; terga 2-10 pale, shading to tan at posterior and lateral margins and each with submedian dark marks; sterna pale with dark marks submedian on 2-8 and in ganglionic areas; sternum 9 with gray-brown anterior and lateral margins. Genitalia (Figs. 1 and 2) mostly gray-brown; medial area and anterior margin of subgenital plate lighter, with median apical emargination, and with apex of mesad apical processes attaining apex of first forceps segment; dorsal sclerotization extending mesad from bases of penis lobes and contiguous mesally; dorsal sclerotized bar at fused base of penes; pair of straight, acuminate, laterad titillators with 1-3 denticles along ventral margin of each. Caudal filaments tan.

Female imago (in alcohol).—Body length 8.0-10.5 mm. Forewing length 9.0-11.5



Figs. 1-5. *Ameletus tarteri*. 1, Male genitalia, dorsal, *ap* (mesad apical process), *bs* (sclerotized bar at fused base of penes), *ls* (mesad extension of sclerotization from bases of penis lobes), *pl* (penis lobe), *t* (titilators, hidden). 2, Left penis lobe, lateral, *d* (denticle), *pl* (penis lobe), *t* (titilator). 3, Abdomen of mature nymph, dorsal. 4, Abdomen of mature nymph, ventral. 5, Left mandible of mature nymph, *ii* (inner incisor), *lm* (lacinia mobilis), *mb* (molar brush), *sg* (setal gap), *sr* (setal row).

mm. Head tan with black submedian lines on vertex. Compound eyes olive-brown dorsally, olive ventrally. Abdomen (with eggs) orange except segment 1 brown; sterna with dark marks submedian on 2-7, 9 and in ganglionic areas; subanal plate variable but often with anterior and lateral margins entire. Remainder similar to male imago.

Mature nymph (in alcohol).—Body length 7.0-11.5 mm; caudal filaments about $0.5 \times$ body length. Head gray-brown; lighter areas on frons and mouthparts; female with submedian dark lines on vertex extending to lateral ocelli. Antennae tan, shading distally to purple. Labrum tan, often with median "V" outlined darker. Distal seta of inner

margin of mandibles (Fig. 5) about $1.5 \times$ length of proximal seta of row; length of setal row about $2.8 \times$ length of setal gap; gap between proximal seta of row and molar setal brush about $1.7 \times$ length of proximal seta. Thorax tan with lighter and darker streaks and areas. Legs pale with gray-tan shading; each leg from foreleg progressively lighter; tarsi with apical black band. Abdominal terga (Fig. 3) tan with lighter and darker areas; dark submedian marks on 2-10; spinules on posterior margins of 3 or 4-10; lateral margins of 1 or 2-9 posteriorly produced, spinelike on 2 or 3-9. Gills hyaline with amber tracheae in fresh specimens; sclerotized at ventral margin and near dor-

sal margin. Abdominal sterna (Fig. 4) pale with darker anterior margins; dark median, submedian, and sublateral markings variably on 3–9. Caudal filaments alternately banded light-dark-light-dark from base; proximal dark band dark gray with all articulations similar; distal dark band purple-gray; each light band tan on cerci, white on terminal filament; hairlike setae of proximal half of each filament purple-brown, white in distal half of each.

Holotype.—♂ imago, West Virginia, Greenbrier Co., Hamrick Run at West Virginia Route 39/55 near confluence with North Fork of Cherry River, 900 m el. (38°13'40"N, 80°24'04"W), 15 June 1983, W. L. Burrows.

Paratypes.—4 ♂ imagoes, 3 ♀ imagoes, same data as holotype; 7 nymphs, same data as holotype but 13 July 1985; 2 ♂ imagoes, 3 ♀ imagoes, Greenbrier Co., Carpenter Run at WV Route 39/55 near confluence with North Fork of Cherry River, 750 m upstream from Hamrick Run, 15 June 1983, W. L. Burrows; 2 ♂ imagoes, same data but 9 July 1982; 16 nymphs, same data but 13 July 1985. All material in alcohol; all adults reared with exuviae included. The holotype will be deposited at the U.S. National Museum of Natural History (USNMNH); paratypes will be deposited at USNMNH, Canadian National Collection, West Virginia Benthological Survey (Marshall University), Purdue University, Florida A&M University, and the Academy of Natural Sciences, Philadelphia.

Other material examined.—Nymph, New York, Chemung Co., McCorn Creek, 7 April 1976, Lamb, Cornell University collection; 4 nymphs, Virginia, Giles Co., Stony Creek, above White Rock Branch, 10 March 1985, Burrows, author's collection.

Etymology.—I am pleased to name the new species after Donald C. Tarter, Chairman, Dept. of Biology, Marshall University. His work, as both student and professor, has contributed much to the knowledge of the regional aquatic fauna.

Discussion.—The penes (Figs. 1 and 2) of the male imago of *A. tarteri* resemble those of the western species *A. cooki* McDunnough, *A. imbellis* Day, and *A. vernalis* McDunnough in that each has a pair of straight, acuminate, laterad titilators. The penes of the eastern species *A. cryptostimulus* Carle are somewhat similar, but examination of the genitalia of the holotype reveals that the titilators are not only nearly contiguous as in Carle's (1978) figure, but that they are apparently flattened throughout their lengths. The male imago of *A. tarteri* can be distinguished from all known *Ameletus* from North America by the presence of denticles (Fig. 2) on the ventral margins of the acuminate titilators.

The nymphal tarsi of all species examined have a dark band at both the base and apex except for *A. tarteri* and *A. cryptostimulus*, which have only a dark apical band. Although the maculation of the dorsal abdomen of the nymph of *A. cryptostimulus* is similar to *A. tarteri* (Fig. 3), the following should reliably distinguish the two species: on tergum 7 the dark, submedian, curved marks are followed by a median spot in *A. cryptostimulus* but by submedian spots or, in many cases, by no such posterad spots in *A. tarteri*; on tergum 10 the dark submedian marks are expanded anterolaterally in *A. tarteri*, but not in *A. cryptostimulus*, to form a dark margin extending to the lateral margin of the tergum. The labra of *A. tarteri* and *A. cryptostimulus* are mostly tan, often with a darker median "V" in the former and nearly always with a dark macula reminiscent of the small form of the Greek letter omega in the latter. Spinules occur on the posterior margins of abdominal terga 3 or 4–10 in *A. tarteri*, on 5 or 6–10 in *A. cryptostimulus*, and on 1–10 or 2–10 in the other seven species of *Ameletus* examined. Several characters of the inner mandibular setal row (Fig. 5), including numbers of setae and relative lengths of setae, setal row, and setal gap, are useful for distinguishing *A. tarteri* from the other species examined. For ex-

ample the setal row of the species examined is less than $1.5 \times$ the setal gap except in *A. tarteri* ($2.8 \times$), *A. ludens* Needham ($4.5 \times$), *A. lineatus* Traver ($4.8 \times$), and *A. tertius* McDunnough, whose setal row is continuous to the molar setal brush with no gap.

Ecology and habits.—Nymphs of *A. tarteri* were found in rocky first and second order streams. These streams typically had low pH, low alkalinity, and low specific conductivity. The immature nymphs were often found on horizontal substrate; later instars were typically found on nearly vertical faces of boulders; pre-emergent nymphs, however, were often found congregated on boulder faces angled beyond the perpendicular. The nymphs were most efficiently collected by sweeping those surfaces with a small aquarium net.

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