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THE MAYFLY *SIPHLONURUS PHYLLIS* MCDUNNOUGH (EPHEMEROPTERA: SIPHLONURIDAE): ITS DISCOVERY IN MINNESOTA

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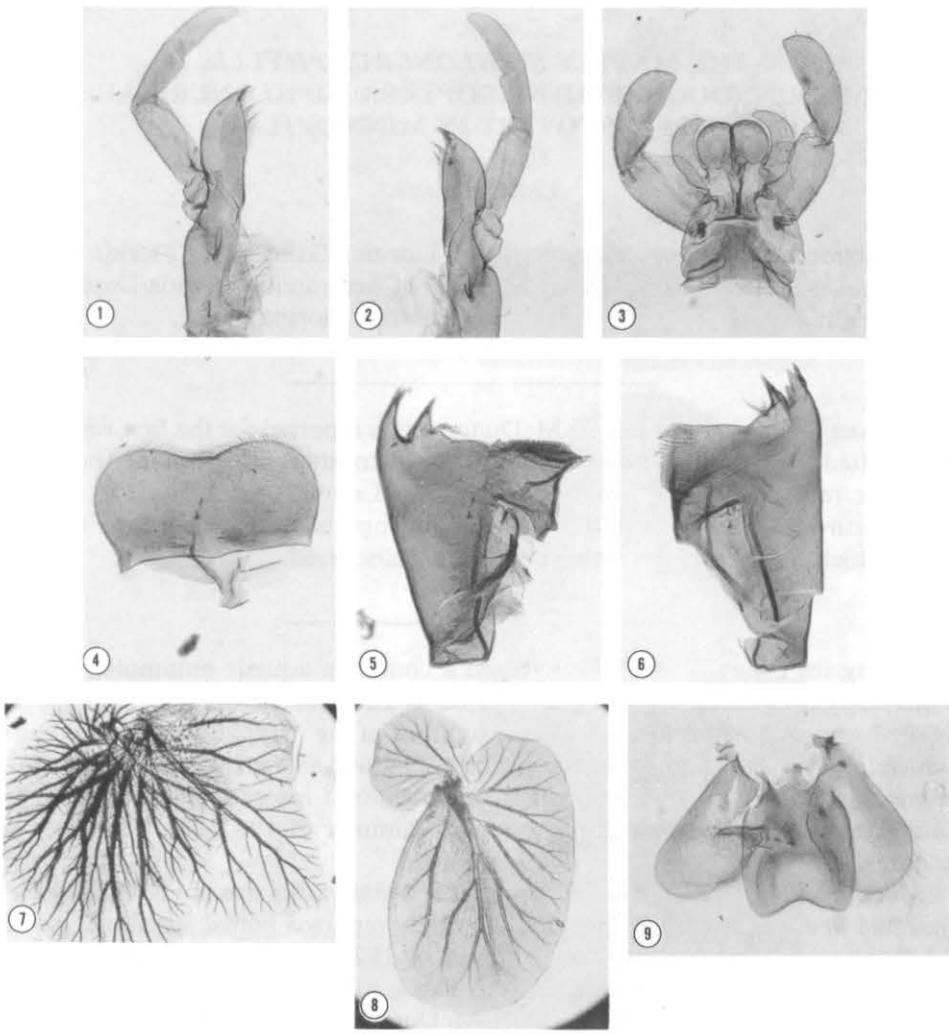
Abstract.—*Siphlonurus phyllis* McDunnough is reported for the first time from the United States. It is known to be widely distributed over Canada, based on sporadic records, ranging from the Gulf of St. Lawrence in the East to Alberta and Northwest Territories in the West. The nymph is described and the habitats from which the immatures were collected are discussed.

During the years 1958–1977, I taught a course in aquatic entomology at the University of Minnesota Biological Station at Lake Itasca. On several occasions while I was with my classes I collected nymphs of the mayfly genus *Siphlonurus*, which I put aside without identifying. In 1969 I found a large population of mature nymphs and reared a few to the adult stage. Again, I reserved the specimens for later identification but it was not until the summer of 1982 that I returned to them.

Much to my surprise, I discovered that the *Siphlonurus* was not *S. quebecensis*, as I had first surmised, but that it is the rarely reported boreal species *S. phyllis* McDunnough. The species was described in 1923 by McDunnough from one adult male and one adult female taken at Banff, Alberta. The next mention of the species was by Criddle (1925) who listed McDunnough's record and added another locality, Douglas, Manitoba. *Siphlonurus phyllis* was again reported by McDunnough (1930) when he mentioned that adults were reared (August 5–10) from nymphs found at Natashquan on the north shore of the Gulf of St. Lawrence. He did not describe the immatures other than to remark (p. 61) that "The nymph is evidently rather closely related to that of *alternatus* Say, possessing double lamellae on all gills, although in the seventh pair one lamella is reduced to a mere flap at the base and is easily overlooked." His paper included a photograph of the nymph, a drawing of the 2nd, 3rd, and 7th gills, and the male genitalia.

Needham et al. (1935) redescribed the species based on McDunnough's account as they had no specimens available to them. In 1981, Harper and Harper reported that adults were taken from late July to early August at Yellowknife, Northwest Territories, and at Churchill, Manitoba. In their 1982 paper, Flannagan and Flannagan listed Criddle's record from Manitoba and Dr. John Flannagan (personal correspondence) informed me of a collection he made of the species from a small, unnamed lake in northwestern Ontario. Because of the scarcity of records

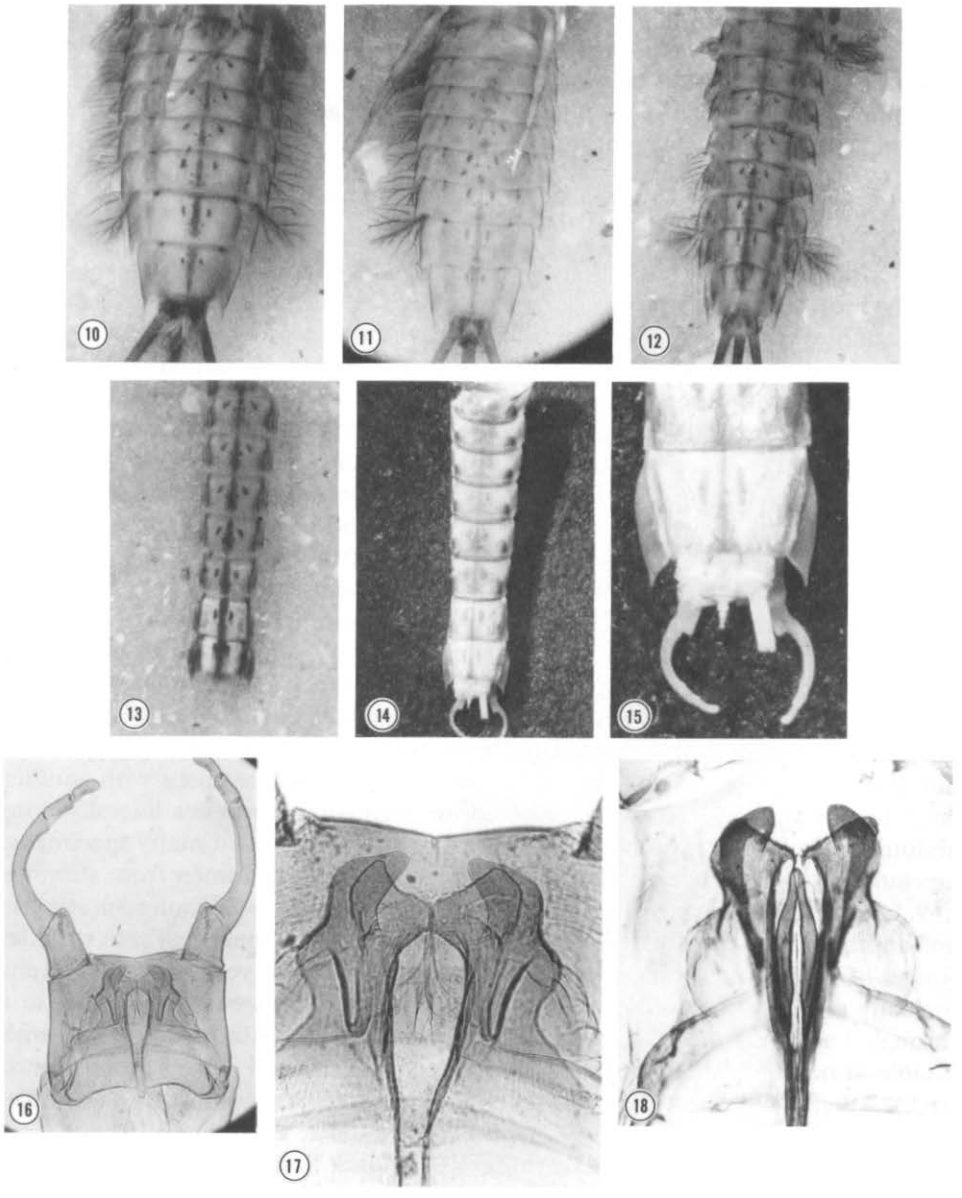


Figs. 1–9. Nymphal parts of *Siphlonurus phyllis*. 1, 2, Maxillae. 3, Labium. 4, Labrum. 5, 6, Mandibles. 7, 4th gill. 8, 7th gill with dorsal lobe turned back. 9, Hypopharynx.

of *S. phyllis,* its apparent disjunct distribution, and the lack of a description of the nymph, I believe that it is valuable to record these collections from Minnesota.

The species appears to be closely related to *S. alternatus,* reported from Minnesota by Daggy (1941), as reflected in the similarity of male genitalia (Figs. 17, 18) and in the similar reflexed lobe on the 7th gill in the nymphs (Fig. 8). Burks' (1953) drawing of *S. alternatus* male genitalia gives an accurate representation of them; however, McDunnough's 1923 drawing of *S. phyllis* genitalia is useful only in that it shows the flanges of the ninth abdominal segment. His 1930 illustration is much more accurate, and Needham et al. (1935) drawing is a reproduction of it.

The truly distinctive feature of the *S. phyllis* male is the strikingly expanded



Figs. 10–18. 10–17, *Siphlonurus phyllis*. 18, *S. alternatus*. 10–12, Ventral views of nymphal abdomen to show variation in color pattern. 13, 14, Ventral and dorsal views of adult abdomen. 15, Dorsal view of 9th segment of adult abdomen to show lateral flanges. 16, 17, Male genitalia. 18, Penes.

lateral margins of the 9th abdominal segment (Fig. 15). When I first observed the characteristic, I immediately related it to that of *Siphlonisca* but the two are very different with the lateral expansions of *phyllis* being confined to segment 9, while those of *Siphlonisca* occur on segments 5–9.

The ventral markings may prove to be useful in distinguishing the various

species of *Siphlonurus* and they have been used in keys in the past. When they are employed, it should be done with some discretion as I have noted considerable variation in the samples I have worked with.

As the nymphal stage of *S. phyllis* has not been adequately described, I am, herewith, presenting a description of the last instar.

Siphlonurus phyllis **McDunnough**

Figs. 1–17

Description.—*Body length:* 14.1–16.8 mm; caudal filaments 8.5–9.0 mm. *Head:* Mostly brown. Mottled-brown, submedian stripes extend over vertex between compound eyes to epicranial suture; occiput without deep brown pigmentation. Mouthparts shown in Figs. 1–6 and 9. *Thorax:* Dorsally patterned with brown. Central portion of mesonotum with a prominent V-shaped brown mark opening anteriorly; large brown areas lateral to base of V extend anterolaterally from wing-pad base to margin of segment. Ventrally some specimens with transverse brown bar between bases of legs. *Legs:* Coxae with prominent brown spot on outer side; trochanters generally without special markings. Femora sometimes with 3 brown bands—one basally, a second in outer ⅔, and a distal one at knee. Tibiae with limited brown markings basally and distally. Tarsi with faint brown marks basally and distally; claws long, only slightly curved. Femora from 1½ to 2× length of tibiae; tibiae and tarsi (less the claw) subequal; claws ½ length of tarsi. *Abdomen:* Prominent posterolateral spines on segments 1-9 but particularly conspicuous on 3–9. Lateral margins compressed; segments strongly flanged, especially 7–9. Dorsally, each segment with submedian brown spots, circular on anterior segments but oblong on more posterior ones. Under large gills, each segment with another large brown spot which, on more posterior segments, continues laterally onto abdominal flanges to form a median brown band. Ventrally, in many specimens, a prominent brown median stripe extends length of the abdomen from sternites 2–9. Lateral to median stripe a pair of oblique brown spots usually on each sternite and another pair of dark brown spots sometimes at anterior margin of each sternite. Range of variation in marking shown in Figs. 10–12. In very mature nymphs virtually ready to emerge a reddish-brown lateral stripe extends from sternite 1 through 9 and underlies anterior spot on these segments. Gills 1–6 large and with double lamellae; a small, reflexed lobe present on 7th gill (Fig. 8, lobe turned back). All gills with brownish tinge with 7 colored most prominently in middle. Caudal filaments with brown bands basally, in middle, and distally.

New records.—Minnesota, Clearwater Co., Itasca State Park, U. Minn. Biol. Sta., Ice-house pond, 17.VI.1959, nymphs; Itasca State Park, Beaver Pond, 1.VII.1960, ♀ adult, 28.VI.1969, nymphs, nymphal exuviae, ♂ and ♀ adults reared. Hubbard Co., LaSalle Creek above beaver dam, 29.VII.1977, nymphs, ♂ adults reared. Mahnomen Co., Prairie Pond near Waubun, 7.VII.1959, nymphs and nymphal exuviae, 17.VI.1962, ♀ adults, 17.VII.1962, ♂ adults.

Known distribution.—Eastern Ontario, western Ontario, Manitoba, Alberta, Northwest Territories, Minnesota.

Remarks.—All nymphs were collected from quiet waters. The most extensive collections were taken from a shallow pond, apparently an overflow from Beaver Pond, where the mature nymphs were concentrated in water about one to two feet deep. Here the bottom was silty and covered with a heavy deposit of dead

leaves. Other nymphs were collected from vegetation near shore at Beaver Pond. The specimens from LaSalle Creek were found in dense vegetation where collecting was very difficult and the nymphs were widely dispersed. None was found in flowing water. Those nymphs taken at Prairie Pond were also found among vegetation in shallow water. Adults were collected by sweeping among the grass in the vicinity of the pond and were taken in the early afternoon.

LITERATURE CITED

Burks, B. D. 1953. The mayflies, or Ephemeroptera, of Illinois. Ill. Nat. Hist. Surv. Bull. 26(1): 1–216.

Criddle, N. 1925. The entomological record, 1924. Ann. Rep. Entomol. Soc. Ont. 55: 89–108.

Daggy, R. H. 1941. Taxonomic and biological investigations on Minnesota mayflies (Ephemeroptera). Ph.D. Thesis, Univ. of Minn.

Flannagan, P. M. and J. F. Flannagan. 1982. Present distribution and the post-glacial origin of the Ephemeroptera, Plecoptera, and Trichoptera of Manitoba. Manit. Dep. Nat. Res., Fish Br. Tech. Rep. 82-1, ii + 79 pp.

Harper, F. and P. P. Harper. 1981. Northern Canadian mayflies (Insecta; Ephemeroptera), records and descriptions. Can. J. Zool. 59(9): 1784–1789.

McDunnough, J. 1923. New Canadian Ephemeridae with notes. Can. Entomol. 55: 39–50.

———. 1930. The Ephemeroptera of the north shore of the Gulf of St. Lawrence. Can. Entomol. 62: 54–62.

Needham, J. G., J. R. Traver, and Yin-Chi Hsu. 1935. The biology of mayflies. Comstock Publ. Co., Ithaca, N. Y. xvi + 759 pp.