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NANONEMOURA, A NEW STONEFLY GENUS FROM  
THE COLUMBIA RIVER GORGE, OREGON  
(PLECOPTERA: NEMOURIDAE)

R.W. Baumann<sup>1</sup> and G.R. Fiala<sup>2</sup>

ABSTRACT.—*Nanonemoura*, a new genus of Nearctic Nemouridae, is described to accommodate *Nemoura wahkeena* Jewett. New descriptions and illustrations are provided for the adult male, adult female, and nymph collected at Wahkeena Spring, Columbia River George, Oregon. A diagnosis is furnished to distinguish the new genus from related genera of the subfamily Nemourinae.

*Key words:* Plecoptera, Nemouridae, Nanonemoura, Columbia River Gorge, Oregon.

Nearly 50 years ago Jewett (1954) named a nemourid species from the Columbia River Gorge. He chose the name *Nemoura wahkeena* because he had collected his type series at Wahkeena Falls in 1947. Although he stated that it was distinctive, he tentatively assigned it to the subgenus *Zapada*. In his monograph of the Pacific Northwest stoneflies (Jewett 1959), he added that it was rare and had been recorded only from Wahkeena Falls, but probably had a wider distribution. Illies (1966) in his world catalog listed it in the genus *Zapada*, which he had elevated along with the other subgenera of Nemouridae. Since no additional specimens were available and the generic placement was questionable, Baumann (1975) listed it under *species incertae sedis*. During the intervening 25-year period, it has been included under the genus *Zapada* in the following publications: Stark et al. (1986), Stewart and Stark (1988), and Stark et al. (1998). However, because the true generic identity was questionable, new material was obtained for a detailed study. This remarkable little stonefly seems to be endemic to the Wahkeena Falls springs, and it represents an undescribed genus in the subfamily Nemourinae.

Our search for specimens and additional information on what is often called the Wahkeena stonefly (Federal Register 1991) has been aided by our colleagues. Stan Jewett, before his untimely death in 1991, led the authors and Riley Nelson to his study site at Wahkeena Falls, where we collected a single

nymph of this species. We discovered that the species does not live in the falls or even in the large spring source. Instead, it occupies some large seepage areas along the trail to the upper spring.

Since that day in 1982, we have visited the area several times and have always been able to find specimens at the seeps during the spring months. In addition, repeated attempts have been made to find this stonefly in other localities in the gorge and especially along the trail to, and at, nearby Multnomah Falls. However, it still has not been found anywhere but at the Wahkeena Falls site.

*Nanonemoura*, new genus

TYPE SPECIES.—*Nanonemoura wahkeena*, by monotypy.

ADULTS.—General facies like a small grasshopper nymph (Fig. 1). Body dark brown dorsally, lighter ventrally. Legs yellow, darker at joints, proportionally long, especially hind legs, which are more than twice the length of abdomen. Wings very small, micropterous, and seldom extending beyond thorax, venation reduced to major veins, with few crossveins. Head with large, prominent eyes, antennae long with ca 35 segments. Thorax stout with oversized legs, wings found on dorsolateral margins. Abdomen as long as head and thorax combined, cerci one segmented.

MALE GENITALIA.—Epiroct with large dorsal sclerite extending over entire dorsal

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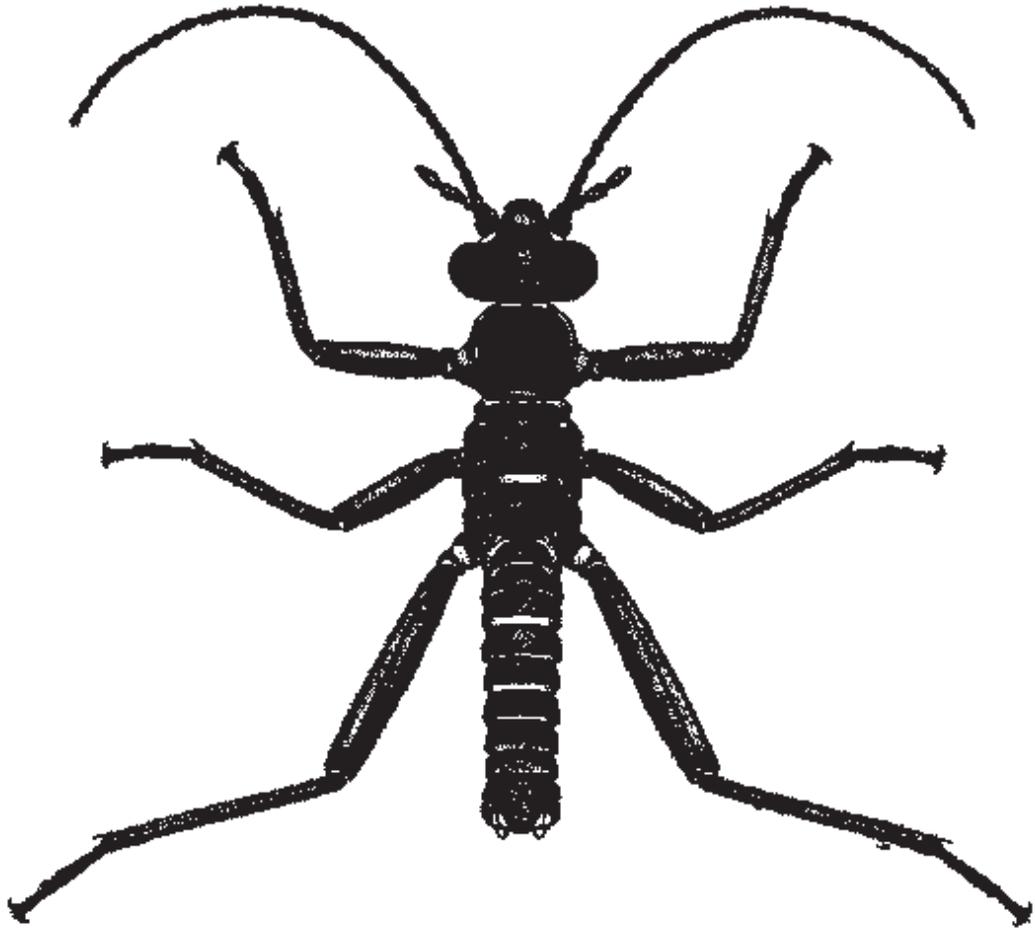
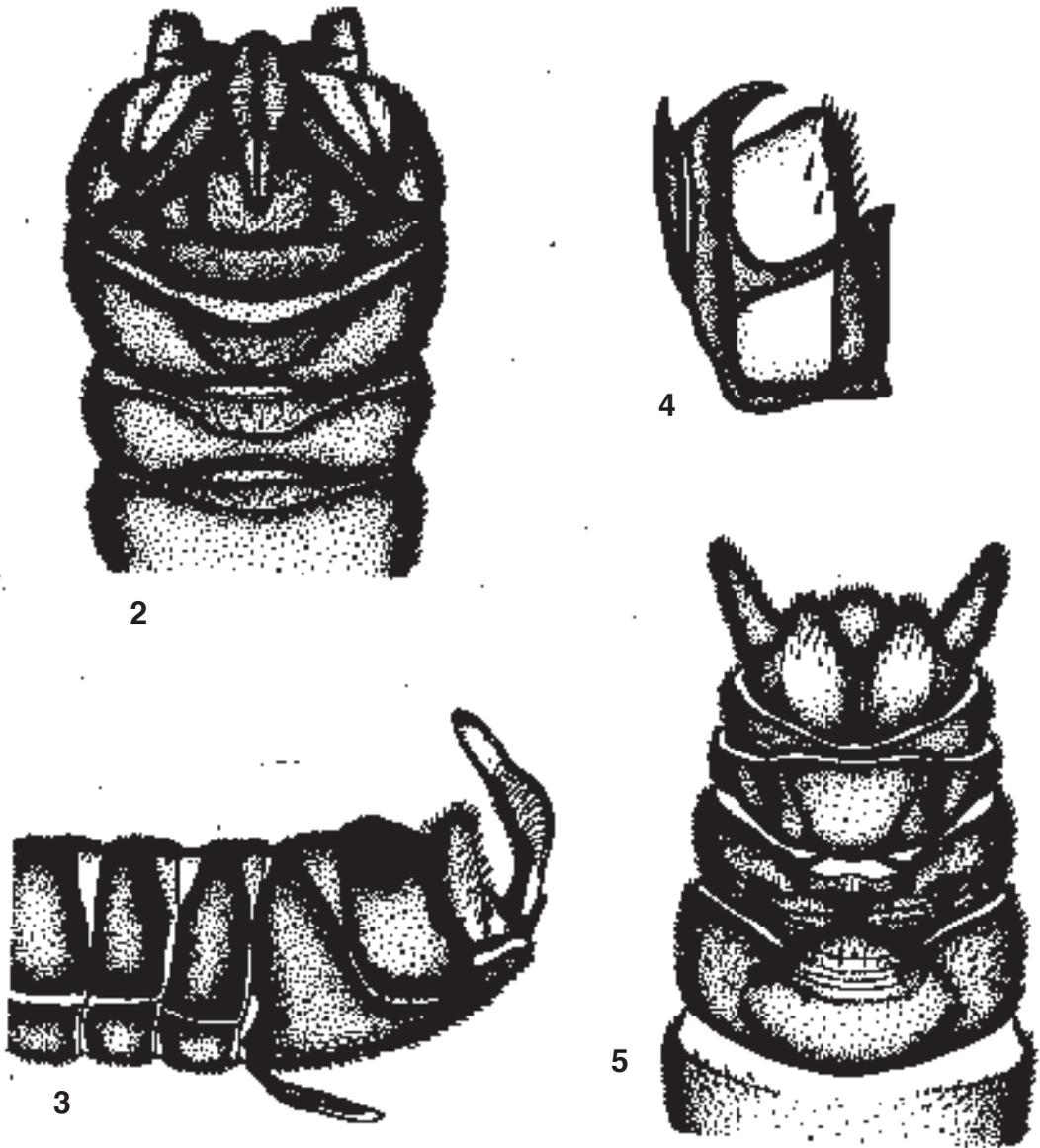


Fig. 1. *Nanonemoura wahkeena* male adult, habitus.

surface (Fig. 7), lightly sclerotized apically and laterally at median expanded areas, covered with numerous rows of small, wartlike processes (Fig. 6); ventral sclerite heavily sclerotized, subequal in area to dorsal sclerite, and bearing ca 30 stout, ventrally directed spines that are randomly spaced over most of ventral surface (Fig. 8). Paraprocts with heavily sclerotized inner lobe that terminates in a sharply bifurcate apex; outer lobe partially membranous, with sclerotized outer margin, bearing ca 25 short stout spines (Fig. 4). Hypoproct broadest at base, anterior 1/3 tapering to truncate apex, bearing a thin, sharp, pointed projection medially; vesicle present, thin and elongate (Fig. 3). Cerci sclerotized dorsolaterally, drawn out into a narrow apex that ends in a hooked tip (Fig. 2).

**FEMALE GENITALIA.**—Seventh sternum enlarged into a pregenital plate, broadly rounded and extending over most of eighth. Eighth sternum more darkly sclerotized, forming small subgenital plate, with narrow, dark sclerotized band over vaginal opening. Cerci membranous but large and long, almost like tiny ears (Fig. 5).

**NYMPH.**—Color uniformly brown, with darker pattern on head and thorax; head covered with numerous tiny hairs, eyes prominent, cerci well developed; thorax bearing many long, darkly sclerotized spines, pronotum completely encircled, meso- and metanotum bearing a pair of long, hairlike spines lateral to midline; legs short and stout, femur bearing 8–10 long spines scattered randomly on lateral margins, tibia with 2 rows of short,

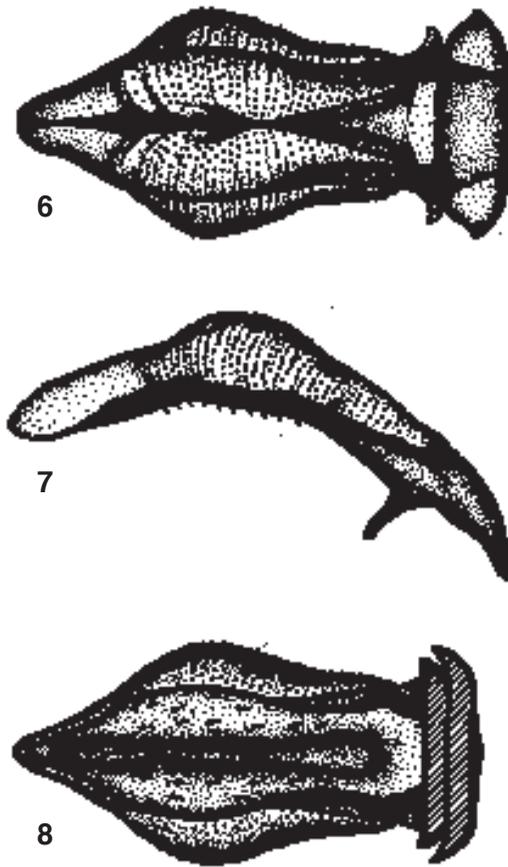


Figs. 2-5. *Nanonemoura wahkeena* adult terminalia: 2, male, dorsal; 3, male, lateral; 4, male, right paraprot; 5, female, ventral.

stout spines, one on each lateral margin, a sparse fringe of long, thin hairs present on ventral margin (Fig. 10); abdomen without setae or spines, except for 2 rows of long, thin spines, one on each side of midline, running entire length of abdomen; cerci with ca 20 segments, intercalary spines present, anterior 2/3 of cercal segments encircled with whorls of long spines (Fig. 9). Two cervical gills present on each side of midline, thin and divided,

3 lobes each, lobes arising from midlength to apex, not from a common stalk (Fig. 11).

DIAGNOSIS.—Adults are easily distinguished from all other Nemourinae by their very long legs, especially those on metathorax, long maxillary palpi, and micropterous wings (Fig. 1). The male epiproct consists of dorsal and ventral sclerites that are large and flat and approximate each other in size, dorsal sclerite with lightly sclerotized, slightly swollen areas medio-



Figs. 6–8. *Nanonemoura wahkeena* male, epiproct: 6, dorsal; 7, lateral; 8, ventral.

laterally, covered by rows of small, wartlike processes, ventral sclerite bearing ca 30 stout, ventrally directed spines scattered over entire ventral surface (Figs. 6–8). Male paraprocts with 2 well-developed lobes, inner lobe darkly sclerotized, narrow, and with bifurcate apex (Fig. 4). Female with well-developed pregenital plate that covers most of next segment, small sclerotized bar over vaginal opening (Fig. 5). Nymph with 2 pairs of cervical gills, each with 3 branches arising linearly and not from a common stalk (Fig. 11), leg setation mostly random on femora (Fig. 10).

*Nanonemoura* can easily be separated from *Zapada* by using the following characters: the male epiproct lacks lateral knobs at the basal corners and consists of only dorsal and ventral sclerites that are distinctly flattened dorsoventrally; male paraprocts are composed of 2 definite lobes, the inner being heavily sclerotized

and terminating in a large bifurcate process; male cerci are sclerotized and modified into long structures with a pointed apex; the female has a small, lightly sclerotized pregenital plate and long, thin cerci; the nymph has 2 pairs of gills with 3 branches each; spines on the femur are sparse and randomly spaced rather than in definite rowlike whorls.

*Nanonemoura* clearly belongs to the subfamily Nemourinae and would fit with the Nearctic genera *Lednia* and *Visoka* in the cladogram in Baumann (1975). Male terminalia of *Nanonemoura* are really quite similar to those of *Lednia* and *Visoka*. The epiprocts of all 3 genera are composed of large, nearly subequal dorsal and ventral sclerites. *Nanonemoura* and *Visoka* both have rows of wartlike structures on their dorsal sclerite, while *Lednia* is covered by small spines. Their paraprocts consist of large, membranous outer lobes and thin, heavily sclerotized inner lobes. The inner lobes of *Lednia* and *Visoka* end in single pointed processes, while those of *Nanonemoura* have a bifurcate apex. *Lednia* lacks a vesicle on the hypoproct, but it is present in the other 2 genera. *Nanonemoura* and *Visoka* exhibit sclerotized, highly modified cerci, but those of *Lednia* are simple and unmodified.

**DISTRIBUTION.**—Known only from tiny spring seeps along Wahkeena Creek in the Wahkeena Falls area of the Columbia River Gorge in northwestern Oregon.

**SPECIMENS EXAMINED.**—Oregon, Multnomah County, Wahkeena Creek near Wahkeena Falls, Columbia River Gorge: 5 April 1945, S.G. Jewett, Jr., holotype ♂, allotype ♀, and 1 ♂, 1 ♀ paratype (CAS, BYU); 16 April 1955, S.G. Jewett, Jr., 2 ♂, 3 ♀ (USNM); 26 April 1955, Jewett & Wilson, 3 ♂, 1 ♀ (ROM); 4 May 1982, Baumann & Jewett, 9 ♂, 4 ♀ (BYU); 29 February 1984, Baumann, Jewett, Nelson, & Fiala, nymph (BYU); 29 March 1984, G.R. Fiala, 1 ♂ (BYU); 17 April 1984, G.R. Fiala, 5 ♂, 10 ♀ (BYU); 6 April 1985, G.R. Fiala, 8 ♂, 5 ♀ (BYU); 9 April 1988, G.R. Fiala, 5 ♂, 8 ♀ (BYU); 8 May 1988, G.R. Fiala, 4 ♂, 4 ♀ (BYU); 23 March 1992, G.R. Fiala, 8 ♂, 2 ♀ (BYU); 23 March 2001, G.R. Fiala, 3 ♂, 7 ♀ (BYU); 28 March 2001, G.R. Fiala, 9 ♂, 11 ♀ (BYU). Most of the specimens are deposited at Brigham Young University (BYU).

**ETYMOLOGY.**—The prefix *nano* is from the Greek and is defined as small. Combining *nano* with *nemoura*, which signifies sylvan,

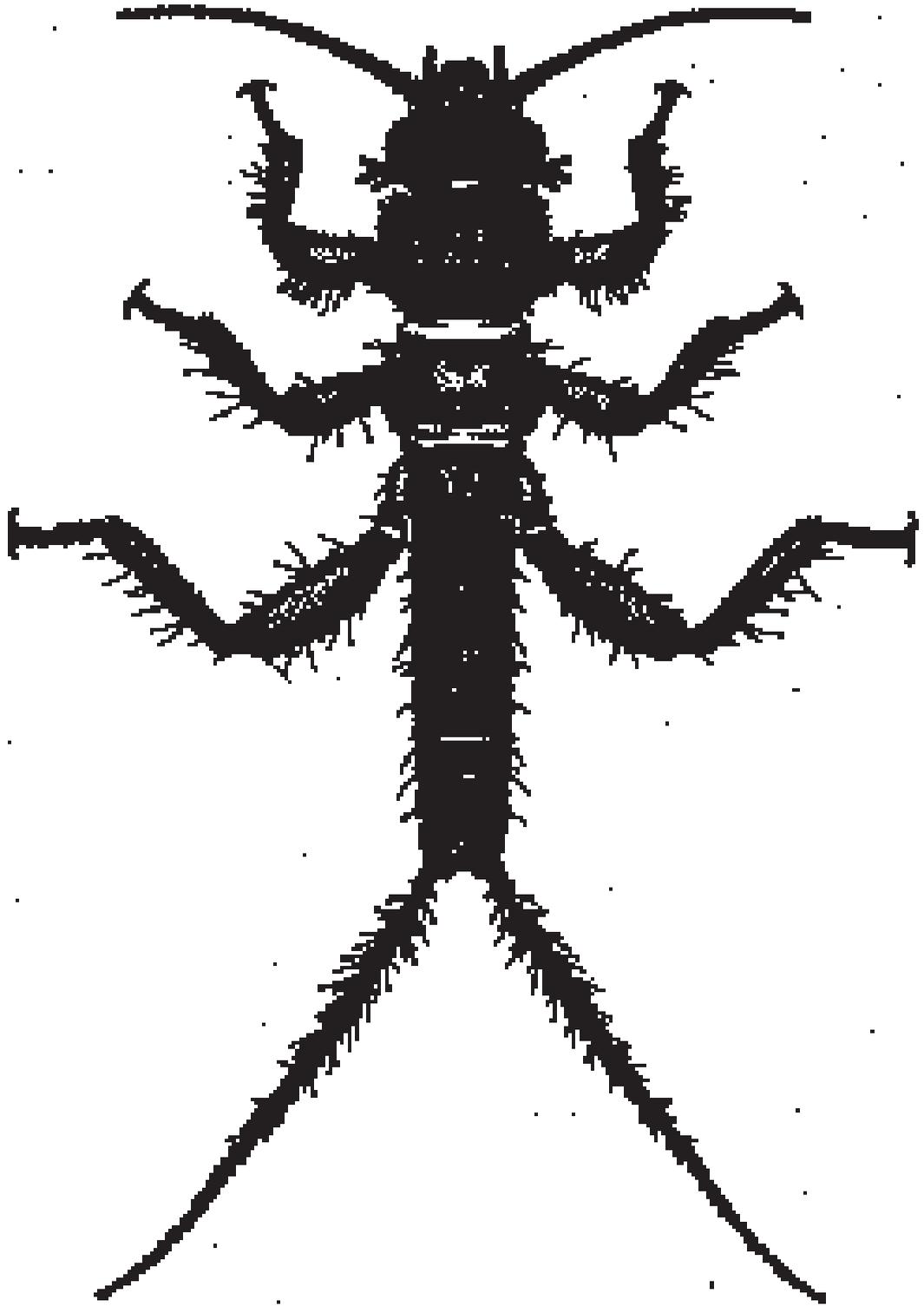


Fig. 9. *Nanonemoura wahkeena* nymph, habitus.



10



11

Figs. 10, 11. *Nanonemoura wahkeena* nymphal structures: 10, right foreleg; 11, cervical area showing prosternum and gills.

results in a feminine name that means small, woodland stonefly.

#### ACKNOWLEDGMENTS

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National Museum (USNM) for the loan of specimens collected in 1955. Glenn Wiggins made his vial of specimens available when he was at the Royal Ontario Museum (ROM). Riley Nelson accompanied us twice when we collected specimens and was along the day we found the nymph. Ken Stewart and Bill Stark are to be thanked for encouraging us to describe this genus so that it could be included in their revision of the North American stonefly nymph book. Finally, the excellent illustrations were made by Jean Stanger Leavitt.

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