ISOPERLA UMPQUA A NEW SPECIES OF WESTERN NEARCTIC STONEFLY (PLECOPTERA: ISOPERLINAE)

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ABSTRACT
Detailed descriptions and illustrations of Isoperla umpqua, a new species of western Nearctic Isoperla including larva, ova and adults are provided. This is a replacement name for Isoperla muir Szczytko and Stewart, nomen nudum.

Keywords: Isoperla, Plecoptera, Perlodidae, new species, Oregon, Pacific Northwest

INTRODUCTION
Szczytko and Stewart (2004) described a new species, Isoperla muir from Muir Creek, Douglas County, Oregon but failed to designate a holotype specimen or indicate a repository, resulting in a “nomen nudum” – (ICZN 1999, Art. 16.4., art. 16.4.2). This paper provides a new name, revised descriptions, illustrations and designation of a holotype for I. umpqua sp. n.

MATERIALS AND METHODS
The description of all life stages of Isoperla umpqua sp. n. were based on material reared in the laboratory from field collected larvae. Larvae were transported in the field in iced Styrofoam chests (Szczytko and Stewart 1979) and airlifted to Texas where they were reared in a Living Stream® at simulated stream temperatures and photoperiod.

Outlines of male and female genitalia and larval habitus drawings were made using a Leica MZ 12-5 stereo dissecting microscope equipped with a camera lucida. Detailed color images were made using the Leica microscope equipped with a JVC TK-107OU color video camera and a Sony Mavigraph UP-1200A thermal color video printer. Habitus drawings were completed using the computer program Corel Photo-Paint Version 10 from the outline drawings made with the camera lucida and referencing the digital images and color prints.

Male and female terminalia were treated for study by the methods of Szczytko and Stewart (1981). The aedeagus was prepared and studied according to the methods described by Szczytko and Stewart (1984). Ova dissected from preserved gravid females were prepared for SEM study as described by Szczytko and Stewart (1979). Scanning electron micrographs of ova were made with a JEOL JSM-5400 scanning electron microscope at the University of Wisconsin-Stevens Point. Eggs were dissected from preserved gravid females. The holotype specimen is deposited in the United States National Museum (USNM).

DESCRIPTION AND DISCUSSION

Isoperla umpqua sp. n.
(Figs. 1-15)


Male. Macropterous. Body length 9.0 – 11.0 mm; forewing length 9.0 – 10.0 mm. General body color medium brown with dark brown markings. Dorsum of head with medium brown “M” bands anterior to median ocellus extending anterior and lateral to near base of antennae; medium brown bands connecting ocelli and extending laterally to near base of antennae with dark brown terminal spots; pale brown median area from anterior ocellus to posterior margin of head (Fig. 1). Antennae pale brown; scape dark brown. Pronotum with wide median pale stripe, disks cream, rugosities, irregular shaped, raised, dark brown, anterior, posterior margins pale, lateral margins with a wide pale band (Fig. 1). Meso- and metanota dark brown, with irregular pale spots. Wings pale, veins medium brown. Legs pale brown, dorsal surface of femora with dark, ovoid, proximal spot, outer surface with a thin incomplete median, longitudinal, brown band. Abdominal terga pale brown with 3 lateral, and 2 mesal longitudinal rows of small dark spots and faint median longitudinal band. Ninth and 10th terga with mesal patch of short stout spinulae. Tenth tergum weakly sclerotized along midline; paraprocts sharply pointed, extending over ½ length of 10th tergum (Fig. 3). Abdominal sterna pale brown with paired dark anteomeidian spots on segments 1-10 and smaller paired posterm median dark spots. Eight and 9th sterna with mesal patch of long setae; 8th sternum with a well developed vesicle, 1.25 times as long as wide, evenly rounded and expanded slightly apically; posterior margin fringed with medium length setae (Fig. 2). Aedeagus mostly membranous with large paired anterodorsal (Fig. 5f) and small paired dorsal (Fig. 5e) lobes; small posterdorsal patch of dense medium stout spinulae (Fig. 5d); wide median band of dense medium stout spinulae (Fig. 5b); proximal area expanded and membranous (Fig. 5a), exposed posterdorsal sclerotized rod, expanded slightly apically, base embedded and bifurcated with wide slender incurving arms (Figs. 5c, 6).

Female. Macropterous. Body length 11.0 mm; forewing length 12.0 mm. Body coloration and morphology similar to male. Eighth sternum with posteromedian dark brown patch and broad medium brown inverted triangular patch. Subgenital plate produced over ½ length of 9th tergum, broadly rounded with slight posterm edial emargination (Fig. 4).

Larva. Body length of mature larvae 11.0 – 14.0 mm. General body color medium brown. Dorsum of head covered with short, blunt, stout spinulae, spinulae absent in pale patches; mostly brown with various pale areas (Figs. 7-8); thin, pale “M” shaped pattern anterior to median ocellus; thin, pale, slanting bars near antennal bases; interocellar area medium brown; ecdysal stem and “Y” arms thin pale lines; posteralateral areas with large pale spots infused with thin dark lines; occiput with sinuous row of stout, medium length setae interrupted medially; labrum mostly medium brown, lighter medially; antennae medium brown (Figs. 7-8). Lacinia triangulate, bidentate; subapical tooth ca. ½ length of apical tooth; 1 axillary seta; 8-10 long, stout marginal setae below subapical tooth; sparse, irregularly spaced row of long, fine submarginal setae below row of stout setae proximal to ¾ length of lacinia (Fig. 9). Mandibles with 6 cusps; large median row of long medium stout setae below outer apical cusp to near mandibular base; inner marginal fringe of 25 – 30 long, stout setae; right mandible with row of short stout acanthae below inner 3rd apical cusp (Figs. 10-15), right mandible with dense brush of medium length, stout setae below inner 3rd apical cusp (Fig. 11). Pronotum mostly medium brown with pale, thin
Fig. 8. *Isoperla umpqua* larval habitus - line = 1.0 mm

rugosities; discs with sparse short, black clothing hairs; margins fringed with dense, short stout setae (Figs. 7-8). Anterior and posterior intersegmental membrane of pronotum with dense band of medium length stout hairs and chloride cells. Meso-metanota with sparse median patches of short stout spinulae and black clothing hairs. Mesonotum with dark brown lateral bands and 2 median dark brown bands; metanotum with wide, dark brown lateral bands and 2 wide, median dark brown bands (Fig. 8). Legs medium brown, outer surface of femora with scattered medium length, stout setae and black clothing hairs; median pale, thin longitudinal band with no setae or clothing hairs; proximal ovoid, pale spot on dorsal surface void of setae or clothing hairs; outer tibia surface with sparse medium length stout setae and clothing hairs. Abdominal terga with wide median pale brown patches that decrease in size posteriorly, forming a broad median longitudinal band, bordered laterally on each side by a dark longitudinal band; posterior margins of terga fringed with very short stout setae and occasional longer setae, lateral margins with more longer setae; dorsal surface with scattered heavy setae and clothing hairs; intersegmental membranes with concentrated chloride epithelia (Fig. 8). Cerci medium brown with posterior whorl of short setae.

**Ovum.** General shape oblong, cross section concave, collar absent (Figs. 12-13). Color pale brown. Length 280 - 295 μm; width 210 - 220 μm. Choronic surface covered with numerous shallow, round follicle cell impressions (FCI's), FCI’s near posterior pole shallower; walls of hexagonal follicle cell impressions faintly visible (Figs. 12-13). Micropyle row subequatorial; orifices small and not elevated (Fig. 14).

**Distribution.** *Isoperla umpqua* is known only from Muir Creek, Douglas County, Oregon. It is surprising that this species has not been collected from other streams in the Cascade Mountain Range since the color pattern of the larvae is distinctive from other western Nearctic *Isoperla* species.

**Etymology.** We honor the people of the Umpqua Native American Tribe which is federally recognized as a Cow Creek Band of the Umpqua Tribe. These native Americans live in south-central Oregon near the type locality of this stonefly.

**Diagnosis.** In the male, the clavate sclerotized posterior process of the aedeagus is most similar to *I. adunca* Jewett, however it is larger and the shape and spinule patterns of the aedeagus easily distinguishes *I. umpqua*. The female subgenital plate with a shallow emargination and rounded lateral margins is similar to *I. pinta* Frison, but lacks the pronotal checkerboard pattern of *I. pinta*. Sandberg (2011) provides a detailed description of the nymph and especially in mouthpart characters is also most similar to *I. adunca,*

but can be separated by the characters of the maxilla. Additionally, *I. umpqua* appears restricted to type locality in south-central Oregon.

**ACKNOWLEDGMENTS**

We thank B.P. Stark and D.D. Ziegler for providing the first larval specimens of *I. umpqua* for study. We also appreciate the assistance of John D. Curtis with the SEM work at the University of Wisconsin and John B. Sandberg for field assistance in 2001, laboratory rearing at the University of North Texas and bringing to the attention of the senior author the nomen nudum. Dr. Frank T. Krell, Commissioner, International Commission on Zoological Nomenclature, Denver Museum of Nature & Science, Colorado is thanked for providing advice.

**REFERENCES**


