A NEW GENUS AND SPECIES OF HEPTAGENIIDAE (EPHEMEROPTERA) FROM WESTERN CANADA

D.M. LEHMKUHL
Department of Biology, University of Saskatchewan, Saskatoon S7N 0W0

Abstract

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A new genus and species of Heptageniidae (Ephemeroptera) is based on a series of nymphs and reared female adults from the Saskatchewan River, Saskatchewan. Descriptions of female and nymphal *Macdunnoa nipawinia* n. gen., n. sp., of the subfamily Heptageniinae, are given along with notes on the biology. The genus has no close North American relatives, but is allied to heptageniid genera from southeast Asia.

Over the past several years a small series of mayfly nymphs which do not belong to any described genus have been collected by the author and coworkers from the Saskatchewan River. Adult females have been reared from nymphs but unfortunately no males were obtained. Adult wing venation is normal for Heptageniinae; nymphs have a "heptageniid" appearance (Fig. 1b) but the reduced number of gills on the abdomen (5 visible pairs rather than 7, the 6th being hidden), the prominent posterolateral projections of the abdominal segments, and the moderate amount of dorso-ventral flattening of the head and body create a superficial resemblance to *Ephemerella*. Habitat is slow water where nymphs often cling to dead branches. This habit would not select for extreme flattening of the body, and may provide selective pressure for gills that protect respiratory surfaces from silt and debris.

The 3-segmented maxillary palpi of nymphs (Fig. 1a) and 6 rather than 7 pairs of gills readily separate the present genus from any other known from North America. Nymphs key to *Compsoneuria*, a genus known from Java and Sumatra, in Chernova (1976) but differ in the armature of the maxillary crown, the shape of the gills, adult wing venation, and other characters.

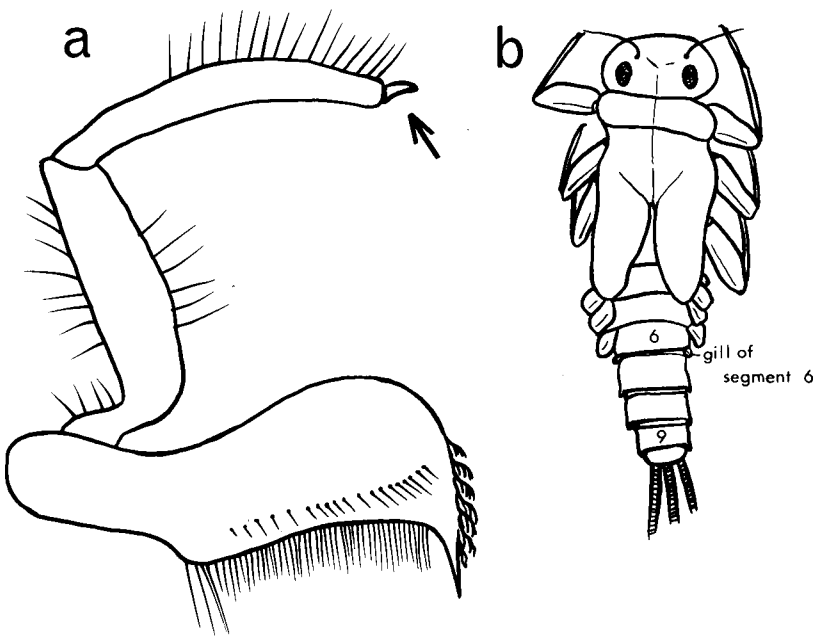

FIG. 1. *Macdunnoa*, semidiagrammatic. a, maxilla and palp with 3rd segment (arrow); b, general appearance of nymph.

The new genus agrees in various details with other Asian genera (Fig. 2), sharing, for example, a 3-segmented maxillary palpus with *Notacanthurus* Chernova (Kazakhstan), *Compsoneuria* Eaton (Java, Sumatra), *Compsoneuriella* Ulmer (Java, Sumatra, and Borneo), and *Ecdyonuroides* Dang (Vietnam). The maxilla also bears some resemblance to *Ecdyonurus werestschagini* (Chernova, 1976), but differs in many details. Plesiomorphic characters of the genus include the relatively unflattened and round head from dorsal view, the armature and shape of the maxilla, the shape of the palp, and the sparsely setaceous caudal filaments. Apomorphic characters are the wide labrum and the reduction in number of gills and the modification of shape of the gills.

Macdunnoa Lehmkuhl n. gen.

MATURE NYMPHS. Lengths: body 8, caudal filaments (broken) about 7 mm. **Head capsule:** (on slide) length:width ratio 5:6, labrum 1/2 width of head capsule; anterior margin of head emarginate (Fig. 3c); head capsule quadrate in intact specimens, distorted to oval in slide preparation; *mandibles* (Fig. 3g, h): inner and outer incisors subequal in length, serrate and with apical teeth; prostheca bristle-like, present on both left and right mandibles;

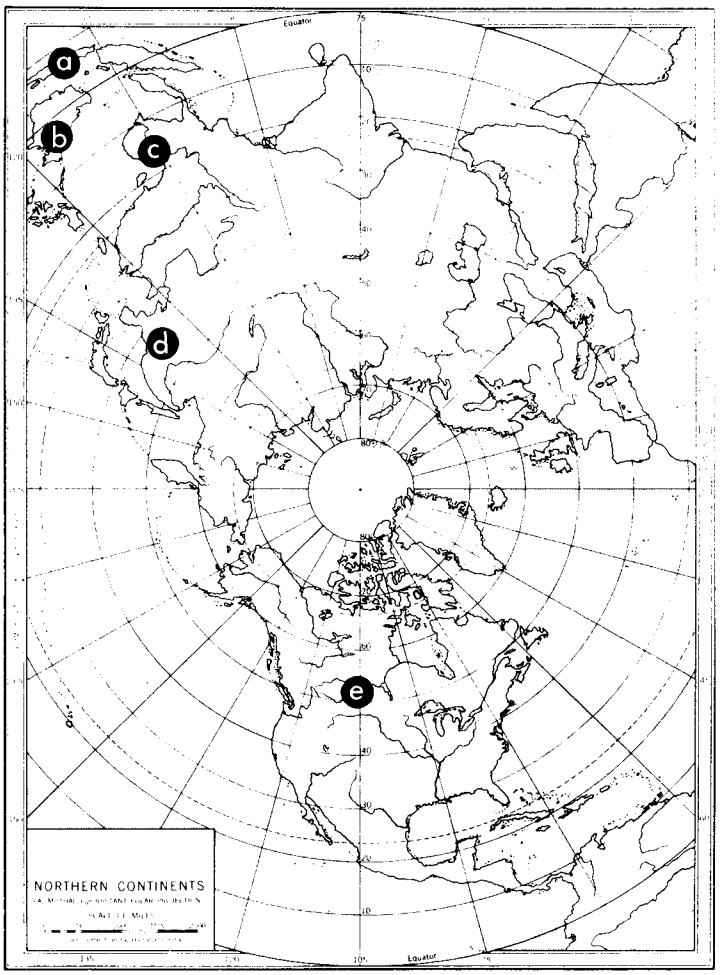

FIG. 2. Distribution of *Macdunnoa*-like mayflies; a, Sumatra *(Compsoneuria* and *Compsoneuriella);* b, Borneo *(Compsoneuriella);* c, Vietnam *(Ecdyonuroides);* d, Amur region *(Ecdyonurus werestschagini);* e, Saskatchewan *(Macdunnoa).*

maxillary palp 3-segmented (Fig. 1a), first and second segments subequal in length, third segment 1/10 length of second and tooth-like in appearance (as in *Ecdyonuroides* Dang and *Compsoneuria* Eaton); maxilla (Figs. 1a, 3i). **Thorax:** prothorax slightly expanded laterally and as wide as head capsule; pterothorax narrower, without lateral flanges; legs and claws (Fig. 3ℓ). **Abdomen:** without dorsal median tubercles; posterolateral projections of each segment distinct (Fig. 3j); *gills:* present on segments 1–6, gills of segments 1–5 subequal in size (Fig. 3e) and consist of a plate-like and filamentous portion; gill of segment 6 (Fig. 3f) half the size of the preceeding gills and covered by gill of segment 5; *caudal filaments:* 3, hairless, with 6–9 short spines at apex of each (or sometimes alternate) segments.

FEMALE ADULT. Wings with normal heptageniid venation (Fig. 3a, b); subanal plate not notched or pointed, but truncate; tarsal claws dissimilar.

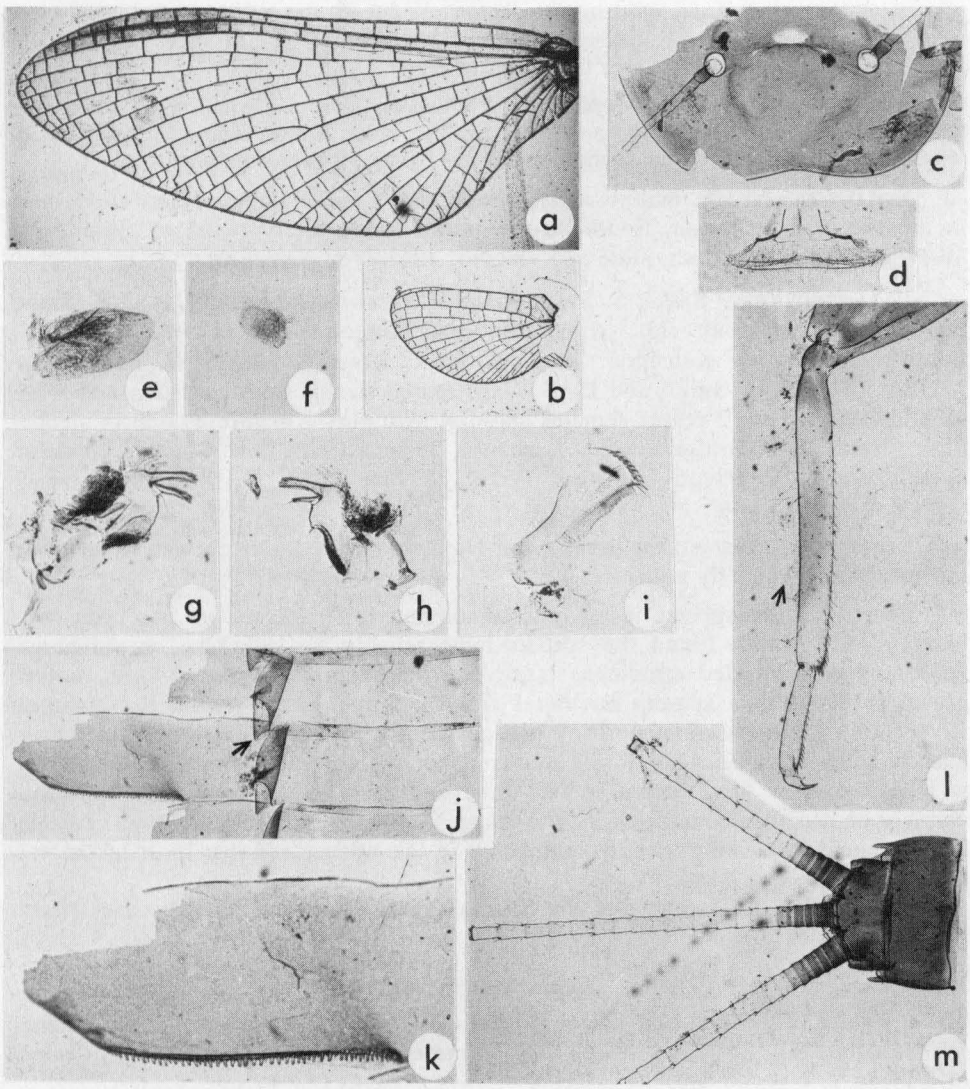

FIG. 3. Features of *Macdunnoa*. Adult female: a, b, front and rear wings. Mature nymph: c, front margin of head of nymph; d, labrum; e, f, fifth and sixth gills; g, h, mandibles; i, maxilla; j, k, abdomen, posterolateral projections (arrow) and toothed posterior margin of tergites; l, tibia, tarsus, and claw; m, caudal filaments.

ETYMOLOGY. Named for a pioneer student of North American, especially Canadian, mayflies, the late James McDunnough of Ottawa.

TYPE-SPECIES. *Macdunnoa nipawinia* Lehmkuhl n. sp.

Macdunnoa nipawinia n. sp.

MATURE NYMPHS. Mature nymph 8 mm body length; caudal filaments 3, equal in length and thickness, about equal to body length. Body of mature nymph almost uniform black but with caudal filaments white (as in Fig. 3m). Young nymphs white and semitransparent in alcohol. In alcohol, dark specimens sometimes fade to tan-brown.

Femur with flattened, scale-like spines as well as elongate spines on the margins; tibia with scattered spines, both femur and tibia margined with fine hair (Fig. 3ℓ, arrow); tarsal claw with a stout tooth at mid-length; posterior margin of abdominal tergites with coarse teeth, the teeth usually being quadrate and about 2½ times as long as wide, but sometimes tapered at the apex (Fig. 3k). Other features as in Fig. 3.

FEMALE IMAGO. Body 6, forewing 7 mm; compound eyes and ocelli black, thorax very light tan; head, legs, abdomen, and cerci hyaline white; wings clear and unpigmented, longitudinal veins without pigmentation, crossveins lightly pigmented with tan.

HOLOTYPE. Nearly mature male nymph, head and mouthparts on slide, body in alcohol. Saskatchewan, South Saskatchewan River, Ferry North of Birch Hills. 18 July 1972, D.H. Smith, slide and vial No. 486 (CNC, Ottawa).

PARATOPOTYPES. Sask., S. Sask. River at Nipawin, 12 July 1974, D.H. Smith, reared female and cast skin, wings and cast skin on slide No. 487 (CNC); the following are in my collection: Sask., S. Sask. River 2 miles S.W. of Nipawin, 12 July 1974, D.H. Smith and L. Dosdall, reared female with cast skin and wings on slide; same data, 2 reared females and cast skin plus 1 mature nymph in alcohol; Sask., Battle River Bridge south of Lashburn, 23 June 1972, D.H. Smith, 1 immature nymph; Sask., S. River, Lemsford Ferry, 25 June 1972, D.H. Smith, 1 nearly mature nymph.

ETYMOLOGY. Named for the town of Nipawin on the Saskatchewan River where the species is frequently collected.

BIOLOGY. The species is not uncommon but for some reason has been overlooked. D.H. Smith found the species most reliably by searching on submerged wood. I have collected specimens (samples subsequently misplaced) from uniform gravel substrate in a smooth but rapid area of current in the North Saskatchewan River north of Lloydminster. They are apparently typical herbivores. Emergence, based on observations made during numerous attempts to obtain material for rearing, is restricted to a short period in late June and early July. Exact time apparently varies with weather conditions in a given year. Small nymphs have been collected in early June, indicating that nymphs hatch in late spring and that most of the year is passed in the egg stage.

The species is known from the Saskatchewan River and its tributaries (Battle River).

Acknowledgments

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Reference

Chernova (Tschernova), O.A. 1976. A nymphal key to the genera of the Heptageniidae (Ephemeroptera) of the Holarctic and Oriental Region. *Ent. Rev.* **55:** 47–56.

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