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### *Caenis nishinoae*, a New Species of the Family Caenidae from Japan (Insecta: Ephemeroptera)

By Peter Malzacher, Ludwigsburg

With 3 figures

Summary

A new *Caenis*-species from Lake Biwa (Honshu Island, Japan) is described. *Caenis nishinoae* **spec. nov.**, of which all developmental stages are known, is closely related to the *pseudorivulorum-pusilla*-group.

#### Zusammenfassung

Vom Biwa-See (Insel Honshu, Japan) wird eine neue *Caenis*-Art beschrieben. *Caenis nishinoae* **spec. nov.** ist nahe verwandt mit den Arten der *pseudorivulorum-pusilla*-Gruppe. Alle Entwicklungsstadien der neuen Art sind bekannt.

#### 1. Introduction

We know little about the Caenidae of Japan. GOSE (1970) mentioned *Brachicercus japonica* but this species does not appear in the revision of the genus by SOLDAN (1986). From the genus *Caenis* there are only two different forms of larvae described but not named. Neither of them is identical with the presently described species from Lake Biwa.

#### 2. Description of *Caenis nishinoae* **spec. nov.**

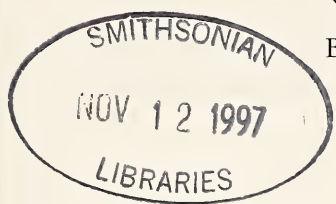
##### Material

Holotype ♂ (micro-slide): Japan, Lake Biwa, 13. IX. 1986; leg. M. NISHINO (Natural History Museum London).

Further material: 40 ♂♂, 4 ♀♀ and 20 larvae of different stages, Japan, Lake Biwa, 1986; leg. M. NISHINO (author's collection).

##### Male

Body length: 2.3–2.8 mm; wing length: 1.9–2.3 mm; length of fore leg: 1.9–2.2 mm. Ratio of fore femur : fore tibia = 0.46–0.59; ratio of fore tibia : fore tarsus = 1.31–1.74 (very variable: specimens with long tibiae have short tarsi and vice



versa); ratio of fore leg : hind leg = 1.80–2.02; ratio of first segment of the fore tarsus : 2nd : 3rd : 4th : 5th = 4.5–5.3 : 2.2–2.7 : 1.6–1.7 : 1.0–1.3; the segments 1+2 are longer than the segments 3+4+5; the segment 2 nearly as long as the segments 3+4+5, sometimes a little longer. Cerci  $\pm 2.2$  and terminal filament  $\pm 3.2$  as long as the body.

Coloration of chitinous layers: head, fore femora, meso- and metathorax light brownish yellow; scutellum and anterior parts of the mesopleura a little darker. Other parts light yellow or white.

Epidermal pigmentation as in fig. 2 but variable. Besides the spots on the vertex, the margin of the pronotum and the pattern of abdominal segments 1 and 2 the pigmentation is sparse.

Base of the antennal bristle dilated; dilated part as long as or a little longer and about a third the width of the pedicellus (fig. 1d). Apical ends of the segments 2–4 of the fore tarsus ventrally widened and densely covered with fine-bristles. Sclerotized triangle of the prosternum with concave sides, frontally open (fig. 1e). Lateral filaments of the abdominal segments short or very short, often invisible.

Genitalia as in fig. 1a, b; penis with short, rounded lobes and a deep ventral furrow, basally with a sacshaped structure of condensed tissue. Caudal part of the styliger sometimes prolonged backwards (fig. 1b). Forceps as in fig. 1c, with an apical spine consisting of bristles almost completely joined together. Forceps and genital-sclerites pale.

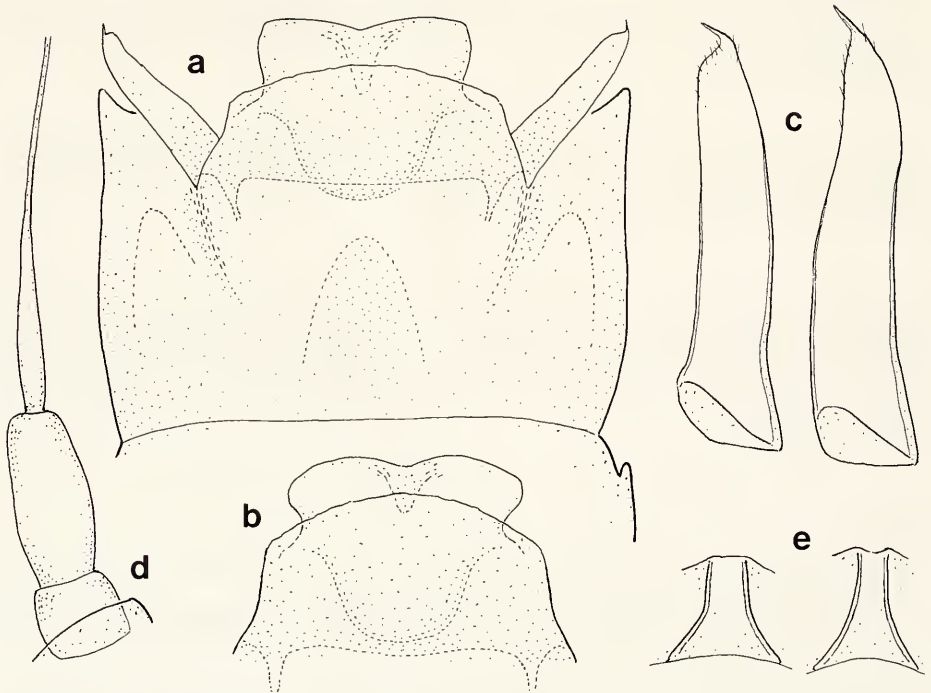


Fig. 1. *Caenis nishinoae* spec. nov.; male. – a. 9th sternite with genitalia; – b. genitalia of another specimen; – c. forceps; two different shapes; – d. antenna: scape, pedicel and base of flagellum; – e. sternal triangle; two different shapes.

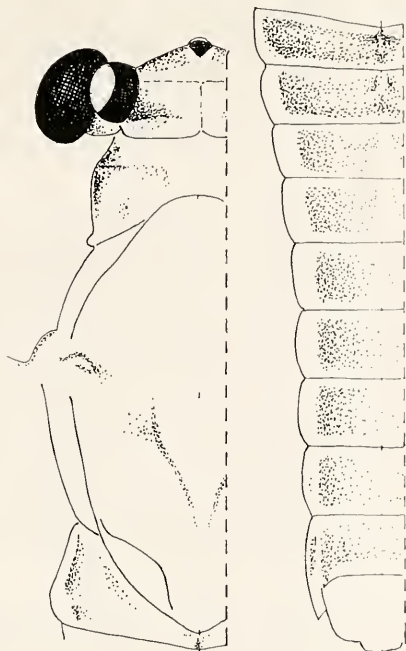


Fig. 2. *Caenis nishinoae* spec. nov.; male; pattern of the epidermal pigmentation; left half of head, thorax and abdomen.

#### Female

Body length: 3.0–3.5 mm; wing length: 2.4–2.8 mm.

The coloration is similar to that of the males. The epidermal pigmentation is more intense, however, especially that of the abdominal tergites that has a homogenous dark color, as a rule without median lightening.

Base of the antennal bristle is a little dilated. Prosternal triangle broader than in the males, with very thin lateral borders.

#### Eggs

Only one flat epithema with large terminal knobs. The micropyle is quite short and broad, a little widened at its open end. Surface of the chorion with a fine and dense granulation.

#### Nymph

Body length of male: 2.8–3.4 mm. Body length of female:  $\pm$  4.5 mm.

Coloration of the chitinous layers light brown with pale spots and lines: a pale line between the lateral ocelli, a median longitudinal spot on the vertex and a round one in front of the frontal ocellus; two spots on each side of the pronotum that may run together; two irregular lightenings in front of the wingbases and two interrupted longitudinal lines between them shaped like exclamation marks. Legs pale with distal brown areas, fore tibiae brown.

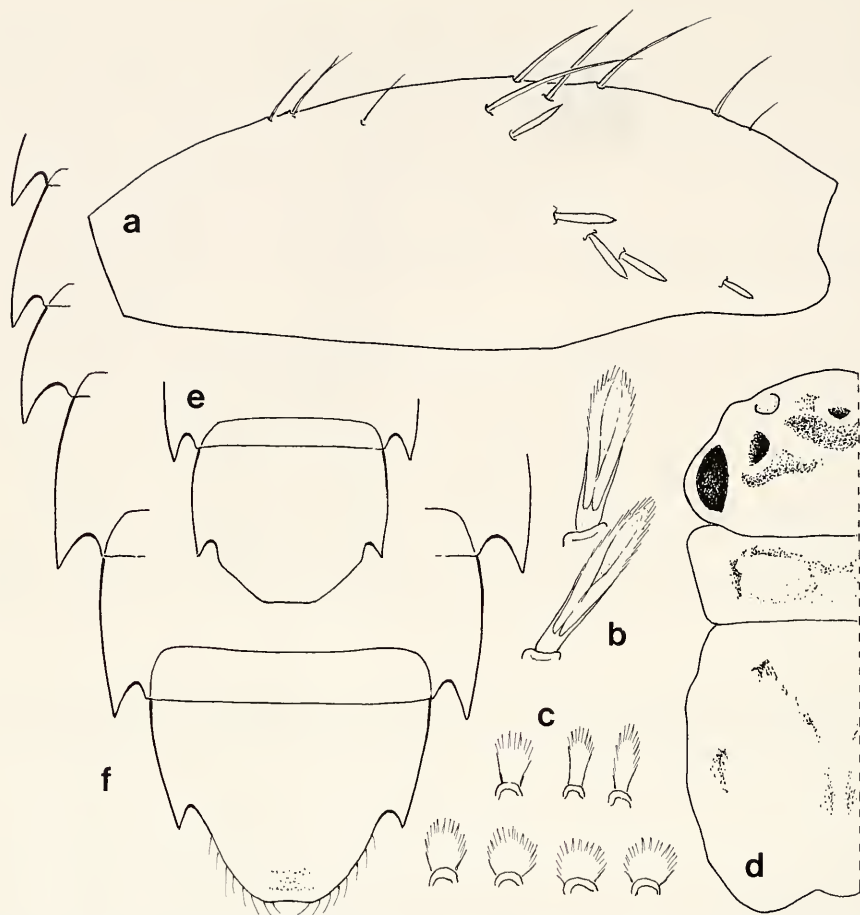


Fig. 3. *Caenis nishinoae* spec. nov.; nymph. – a. Arrangement of the spines on the fore femur; – b. spines from the transversal row running across the fore femur; – c. microtrichia from the underside of the second gill; *lower row*: from the median part; *upper row*: from the apical part; – d. epidermal pigmentation of a young larva: head and thorax; – e. shape of the 9th sternite of a male nymph; – f. outline of the abdomen of a female nymph, shape of the 9th sternite.

Epidermal pigments sparse; in young larvae clearer, as in fig. 3d, with large diffuse spots on each side of the abdominal tergites.

Second segment of the labial palpus measured along the central line one and a half to one and three quarters times the length of the third. Sides of the pronotum more or less diverging to the front, straight or very slightly concave. A row of five to seven spines divided into two groups runs diagonally across the fore femur (fig. 3a). The inner group consists of short and broad spines (fig. 3b), the outer one of longer and pointed spines. In some cases, especially in female nymphs, the short spines are slenderer than in the figure. Claws of fore and middle legs on the inner basal margin with small teeth, claws of the hind legs with a line of micro-teeth. Fore and middle tarsus with one row of spines on the inner margin; hind tarsus with two rows of different length, the spines of the shorter one with many sharp projections. Outline of

the abdomen as in fig. 3f. 9th sternite caudally truncate with hind margin straight or a little concave (fig. 3e, f) and a broad shagreen field consisting of irregular rows of small teeth or tubercles. The row of microtrichia on the underside of the second gill (gillcover) consists of round microtrichia in its middle part that become smaller and broader to the base and longer and narrower to the apical end (fig. 3c).

### 3. Relationships

There are close relationships to the species of the *pseudorivulorum* and the *pusilla*-group based on the following characters: male forceps with a spine consisting of small bristles almost completely joined together as in *C. pusilla* and the eastern Palearctic species *C. jungi*, *C. amurensis* and *C. macronyx*; penis lobes short and more or less rounded as in the latter two species and in *C. pseudorivulorum* and *C. beskidensis*. – Eggs with only one epithema. There are only a few *Caenis* species with this feature e. g. *C. pusilla*, *C. pseudorivulorum* and *C. beskidensis*. (As far as I know the eggs of the eastern Palearctic species are undescribed.) – Nymph: 9th sternite truncate with hind margin straight or more or less convex, as in all above mentioned species. These groups are distributed all over the Palearctic region.

### 4. Acknowledgments

I wish to thank Dr. MACHIKO NISHINO from the Lake Biwa Research Institute (Otsu) and Dr. NORIO KOBAYASHI (Tokyo) for placing the material for this study and some Japanese publications at my disposal.

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Anschrift des Verfassers:

Dr. PETER MALZACHER, Friedrich-Ebert-Str. 63, D-71638 Ludwigsburg.

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Autor(en)/Author(s): Malzacher Peter

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