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NEW CAENIDAE (INSECTA, EPHEMEROPTERA) FROM FAR EAST RUSSIA

T. M. Tiunova

*Institute of Biology and Pedology, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, 690022
Russia*

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New Caenidae (Insecta, Ephemeroptera) from Far East Russia. Tiunova T. M. — *Caenis pustula* sp. n. is described from the larvae and reared male imago. Previously unknown males and females of *Caenis miliaria* (Tshernova) and *Caenis maculata* (Tshernova) are described and illustrated, and larvae of the seven species are redescribed and illustrated. Complementary data on the distribution of *C. amurensis* Kluge are presented.

Key words: Ephemeroptera, mayflies, *Caenis*, taxonomy, Asia.

Новые Caenidae (Insecta, Ephemeroptera), с Дальнего Востока России. Тиунова Т. М. — По личинке и выведенному самцу с Дальнего Востока России описывается *Caenis pustula* sp. n. Приводится описание ранее неизвестных самцов и самок *Caenis miliaria* (Tshernova) и *C. maculata* (Tshernova). Переописаны личинки этих видов. Приведены дополнительные сведения по распространению *Caenis amurensis* Kluge.

Ключевые слова: Ephemeroptera, поденки, *Caenis*, таксономия, Азия.

The genus *Caenis* Stephens, 1835 is represented in the Far East Russia by seven species: *C. rivulorum* Eaton, 1884; *C. horaria* (L.), 1758, widespread over Palearctic Region (Malzacher, 1984; Engblom, 1996; Kluge, 1997); *C. miliaria* (Tshernova, 1952), *C. maculata* (Tshernova, 1952), *C. cornuta* (Tshernova, 1952), distributed in Far East Russia (Tshernova, 1952; Kluge, 1997), and *C. amurensis* Kluge, 1987 and *C. macronyx* Kluge, 1987 found in a relatively small area in the Far Eastern region (Kluge, 1987; 1997).

Five species of *Caenis* are known from larvae and the winged stages. *C. maculata* and *C. miliaria* were described by O. A. Tshernova (1952) from larvae and their winged stages were not known until now.

A description of *Caenis pustula* sp. n., and a description of previously unknown males and females of *C. miliaria* and *C. maculata* are given below. Redescriptions of *C. miliaria* and *C. maculata* larvae are provided, as they were described by Tshernova briefly and without illustrations.

The holotype is deposited in the collection of the Institute of Biology and Pedology, the Far East Branch of the Russian Academy of Sciences (Vladivostok).

Caenis pustula Tiunova, sp. n. (fig. 1–4)

Material. Holotype ♂ (reared from nymph): Russia, Khabarovskiy kray, Ussuri riv. Zabaikal'skoye vil., 23.07.1996 (Tiunova). Paratypes: 2 ♂ (reared from nymphs), 16 nymphs, 370 ♂ (light trap), collected with holotype; 17 nymphs, Primorskiy kray, Ussuri riv., 2 km upper Vladykin island, 02.07.1992 (Tiunova).

Male imago (in alcohol). Length (mm): body 1.7–1.9; wings 1.6–1.7; cerci 4.8, terminal filament 7.9.

Head dark brown, with black rounded spot in front. Ocelli pale whitish, with wide black basal ring. Eyes black. Scape light brown; pedicel brown, basal 2/3 darker; flagellum brown and slightly broader at base (fig. 2, 2).

Pronotum light brown, with pair of posterolateral nearly rounded pale spots and paired S-shaped spots in medioposterior region. Meso- and metanotum dark brown; thoracic sterna light brown to yellowish gray. Wings hyaline. Longitudinal veins C, Sc and R brown in basal 2/3, other veins translucent, pale; costal and subcostal area whit-

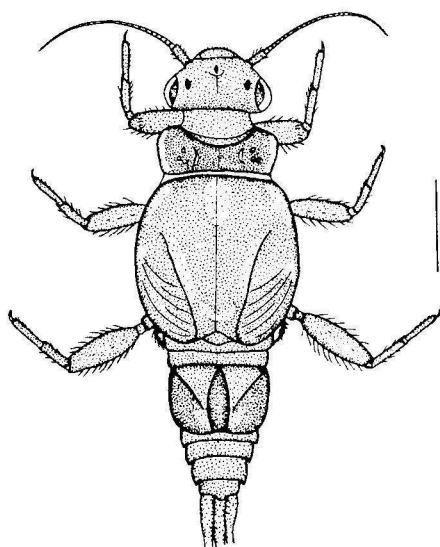


Fig. 1. *Caenis pustula*, habitus of mature larva, scale is 0.5 mm long.

Рис. 1. *Caenis pustula*, общий вид зрелой личинки, шкала 0,5 мм.

ish, semi-hyaline. Fore femora slightly brownish; tibiae and tarsi pale whitish; tarsal joints brown. Mid and hind legs whitish to yellowish. Length of segments of fore legs (mm): femora 0.3, tibiae 0.65, tarsal segments 0.05, 0.20, 0.12, 0.10, 0.05 respectively.

Abdominal terga I–VIII grayish white, translucent, with blackish stippling on each side; terga IX–X brown. Posterolateral spines on terga are absent. Sterna brownish or whitish. Caudal filaments whitish, translucent, with black ring in base.

Genitalia (fig. 2, 1). Subgenital plate brown, with rounded posterolateral corners. Penis brown or dark brown, with wide contrast light middlestripe; twice more broader than long; with pronounced lobes; distal margin slightly concave in middle, nearly the as wide as basal margin; anterolateral corners strongly rounded. Forceps brownish, its apex nearly exceed the distal margin of penis.

Mature nymph (in alcohol). Length (mm): body 2.2–2.8; caudal filaments 1.3–1.5 (fig. 1).

Head light brown to yellowish brown, with dark stippling near posterior margin. Antennae whitish or brownish; segment 3 sharper by 1/2 than pedicel (fig. 2, 4). The second maxillary palpi shorter by 1/3 than third one (fig. 2, 3).

Pronotum brown, with three pairs of light diffuse spots and light lateral margins; nearly 4 times broader than long; lateral margins of pronotum moderately convex, rounded; posterior margin with deeply notched in middle part (fig. 4, 3). Mesonotum brown, with light diffuse markings; with a big pale spot in anterolateral corners; broad transverse band of pale markings through base of wing pads and same of irregular light spots in anterior area (fig. 1). Legs whitish, without markings (fig. 3, 1–3). Fore

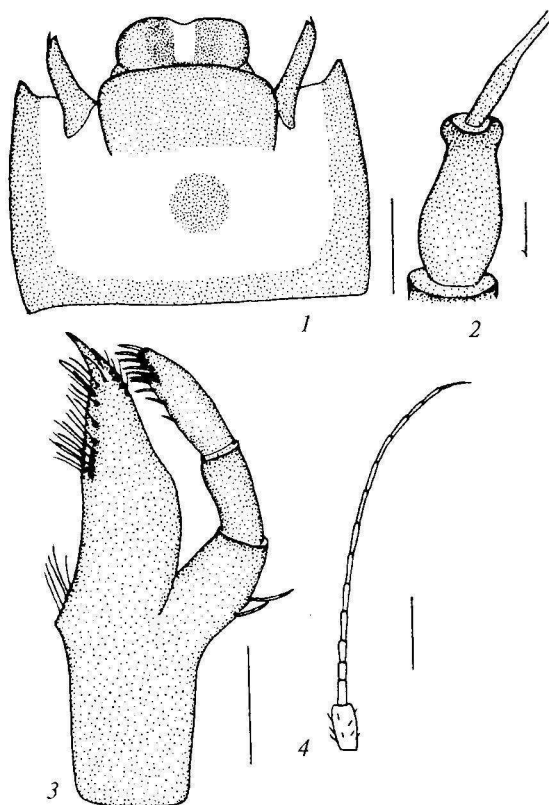


Fig. 2. *Caenis pustula*: 1–2 — structural details of male imago: 1 — genitalia, ventral view; 2 — base of antennae, male, lateral; 3–4 — structural details of larvae: 3 — right maxilla, dorsal view; 4 — antennae, lateral. Scales are 0.05 mm (2), 0.1 mm (1, 3) and 0.25 mm (4).

Рис. 2. *Caenis pustula*: 1–2 — детали строения самца имаго: 1 — гениталии вентрально; 2 — основание антенны самца сбоку; 3–4 — детали строения личинки: 3 — правая максилла дорсально; 4 — антенна с боку. Шкалы: 0,05 мм (2), 0,1 мм (1, 3) и 0,25 мм (4).

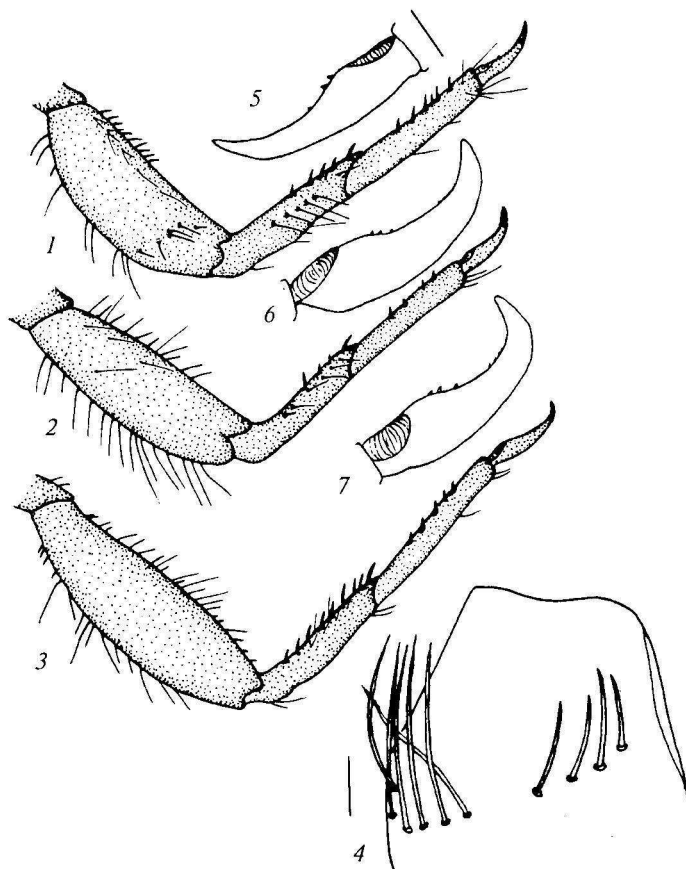


Fig. 3. *Caenis pustula*, structural details of larvae, dorsal views: 1-3 — legs I-III pair; 4 — apical area of fore femora; 5-7 — claws of I-III pair of legs. Scales are 0.05 mm (4-7) and 0.25 mm (1-3).

Рис. 3. *Caenis pustula*, детали строения личинки дорсально: 1-3 — ноги I-III пар; 4 — верхняя часть переднего бедра; 5-7 — коготки I-III пар ног. Шкалы: 0,05 мм (4-7) и 0,25 мм (1-3).

femora with subapical transversal row of 6-7 stout blunt setae; a group of spinelike setae near base on inner margin and long stout hairlike setae on outer margin (fig. 3, 1, 4); mid (fig. 3, 2) and hind (fig. 3, 3) femora with spinelike setae and several stout hairs on inner margins and long stout hairs only on outer margins; tibiae and tarsi all legs with short stout spines on inner margins. Claws of fore and mid legs with three prominent teeth in basal half (fig. 3, 5, 6), hind legs with 2-3 prominent teeth in basal half and same small teeth in distal one (fig. 3, 7). The ratio femora: tibiae: tarsi 0.6:0.5:0.4 for fore legs; 0.7:0.4:0.4 for mid leg; and 0.8:0.4:0.3 for hind legs. Thoracic sterna yellowish or light brownish. Abdominal terga brown or light brown; tergum IX with light medial band; tergum X lighter than other terga. Lateral margins of terga IV-VII with stout spatulate setae (fig. 4, 1, 2); posterior margins of terga I-II, VIII-X with bluntly pointed teeth; posterolateral spines of all terga faintly developed (fig. 4, 1). Abdominal sternum IX slightly prominent, rounded (fig. 4, 6). Lateral margin of gill cover with setae the same as on terga IV-VII (fig. 4, 4, 5). Caudal filaments light yellowish, with short setae in apical half (fig. 4, 7).

Comparison. *C. pustula* can be distinguished from all the known species of *Caenis* by the very small size of imago (1.7-1.9 mm). It resembles the European *C. valentinae* Grandi (Malzacher, 1984) by the genital structures. *C. pustula* can be distinguished by the width of penis, which more than twice broader than long (fig. 2, 1);

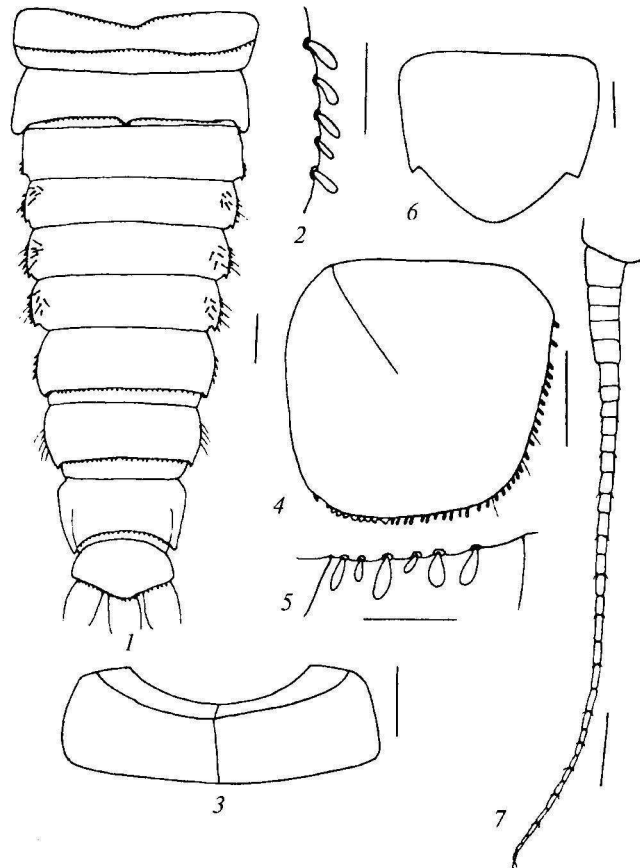


Fig. 4. *Caenis pustula*, structural details of larvae, dorsal views: 1 — abdominal tergita; 2 — lateral setae of tergum VII; 3 — pronotum; 4 — left gill cover; 5 — setae of lateral margin of gill cover; 6 — abdominal sternum IX; 7 — lateral caudal filaments, lateral. Scales are 0.05 mm (2, 5), 0.1 mm (6) and 0.25 mm (1, 3, 4, 7).

Рис. 4. *Caenis pustula*, детали строения личинки дорсально: 1 — тергиты брюшка; 2 — боковые щетинки 7-го тергита; 3 — пронотум; 4 — левая жаберная крышка; 5 — щетинки бокового края жаберной крышки; 6 — 9-й брюшной стернит; 7 — боковая хвостовая нить сбоку. Шкалы: 0,05 мм (2, 5); 0,1 мм (6) и 0,25 мм (1, 3, 4, 7).

in *C. valentinae* the penis more than 7 times broader than long. Also, the distal margin of the subgenital plate nearly the as wide as the basal one (fig. 2, 1), but in *C. valentinae* the distal margin much shorter than the basal margin.

The larva of the new species resembles the European *C. pusilla* Navas, 1913. *C. pustula* can be distinguished by the subapical transversal row of longsetae on the fore femora (fig. 3, 4); in *C. pusilla* the row includes short setae. Also, the abdominal sternum IX slightly prominent and rounded (fig. 4, 6), but in *C. pusilla* the abdominal sternum IX distinctly concaved in the middle.

Etymology. Latin, *pustula*, meaning pimple.

Caenis maculata (Tshernova, 1952) (fig. 5–7)

Ordella maculata Tshernova, 1952 : 287; *Caenis maculata*: Kluge, 1997 : 219, 328–329.

Material. Primorskiy kray, Ussuri riv.: 4 ♂, 4 ♀ (light trap), 1.5 km downstream of Utyos mountain, 18.07.1992; ♂ (reared from nymph), 29 ♂, 4 ♀ (light trap), 3 larvae, the same place, 04.08.1994; 164 ♂, 8 ♀ (light trap), 1 larva near Vladykin island, 02.08.1992; 16 ♂, ♀ (light trap), the same place,

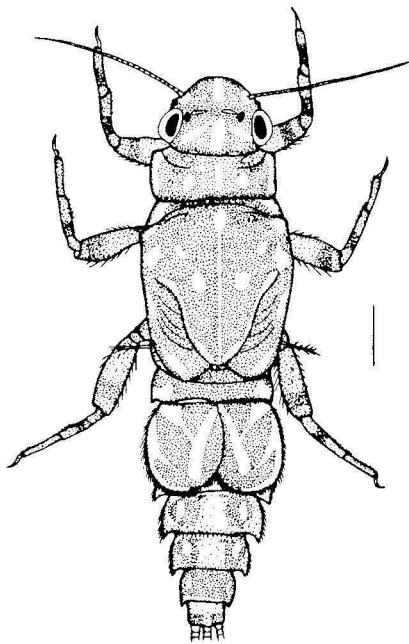


Fig. 5. *Caenis maculata*, habitus of mature larva, scale is 0.5 mm long.

Рис. 5. *Caenis maculata*, общий вид зрелой личинки, шкала 0,5 мм.

05.08.1994; 58 ♂, 3 ♀ (light trap), near Stepanovka vil., 20.07.1991; 3 ♀ (light trap), 1.5 km downstream of Podgornoye vil., 27.07.1991; 105 ♂, 6 ♀ (light trap), the same place, 03.08.1992; 47 ♂, 2 ♀ (light trap), 2 km below Gornye Kluchi vil., 18.07.1996; Bolshaya Ussurka riv.: 162 ♂, 20 ♀ (light trap), 1 km below Zvenigorodka vil., 20.07.1996. Khabarovskiy kray: 33 ♂, 2 ♀ (light trap), 26 larvae, Ussuri riv., Zabaikal'skoye vil., 23.07.1996 (Tiunova)

Male imago (in alcohol).

Length (mm): body 2.8–3.4; wings 2.4–2.8; cerci 6.2–8.1; terminal filament 9.5–10.5.

Head brown to light brown, with dark stippling. Ocelli pale whitish, with wide black basal ring. Scape and pedicel pale, tinged with grayish or brownish; flagellum whitish, slightly broader and darker at base (fig. 6, 2).

Pronotum light brown, tinged grayish, anterior and posterior margins with darkish stippling. Meso- and metanotum light brown; thoracic sterna light brownish to yellowish. Wings pale, hyaline. Longitudinal veins C, Sc, R and Rs₁ with dark stippling; costal and subcostal area semi-hyaline, with slightly dark stippling in middle part. Fore femora brownish; tibiae and tarsi grayish, joints brown; mid and hind legs white. Length of segment of fore legs (mm): femur 0.5, tibia 0.9, tarsal segments: 0.05, 0.25, 0.15, 0.10, 0.05. Abdomen whitish, tinged with yellowish; terga and sterna I–VIII translucent; terga IX–X with brownish posterior margins; posterolateral corners on terga III–IX well developed. Caudal filaments white.

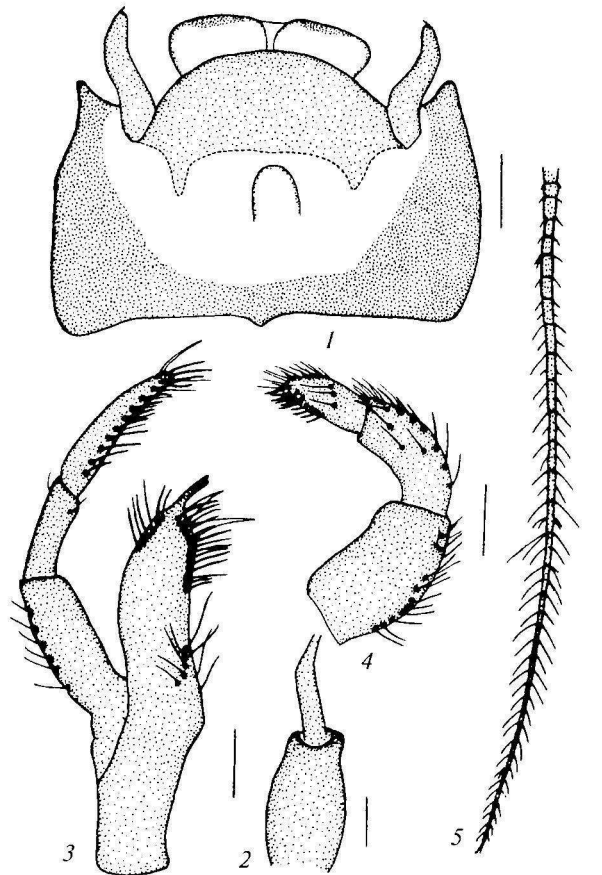


Fig. 6. *Caenis maculata*: 1–2 — structural details of male imago: 1 — genitalia, ventral view; 2 — base of antennae, male, lateral; 3–5 — structural details of larvae, dorsal views: 3 — left maxilla; 4 — right labial palp; 5 — lateral caudal filaments. Scales are 0.05 mm (2), 0.1 mm (1, 3, 4) and 0.5 mm (5).

Рис. 6. *Caenis maculata*: 1–2 — детали строения самца имаго: 1 — гениталии вентрально; 2 — основание антенны самца сбоку; 3–5 — детали строения личинки дорсально: 3 — левая максилла; 4 — правый лабиальный щупик; 5 — боковая хвостовая нить. Шкалы: 0,05 мм (2), 0,1 мм (1, 3, 4) и 0,5 мм (5).

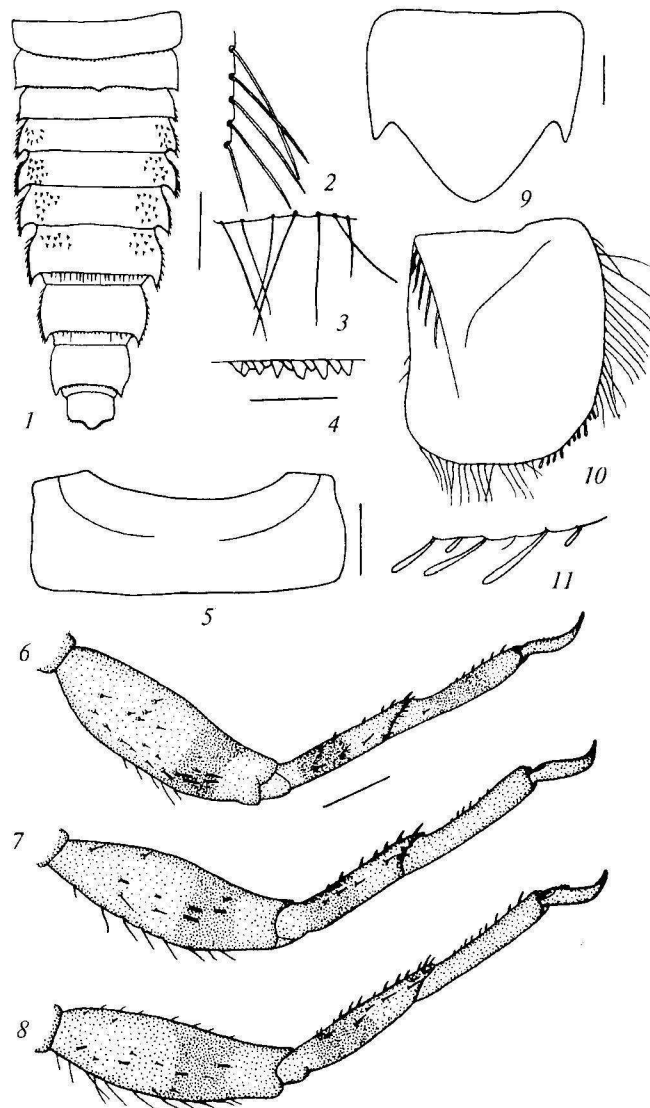


Fig. 7. *Caenis maculata*, structural details of larvae, dorsal views: 1 — abdominal tergita; 2 — lateral setae of tergum VII; 3 — hind margin of tergum VII; 4 — hind margin of tergum IX; 5 — pronotum; 6–8 — legs of I–III pair; 9 — abdominal sternum IX; 10 — right gill cover; 11 — setae of lateral margin of gill cover. Scales are 0.05 mm (2, 3, 4), 0.1 mm (9, 10), 0.25 mm (5–8) and 0.5 mm (1).

Рис. 7. *Caenis maculata*, детали строения личинки дорсально: 1 — брюшные тергиты; 2 — боковые щетинки 7-го тергита; 3 — задний край 7-го тергита; 4 — задний край 9-го тергита; 5 — пронотум; 6–8 — ноги I–III пар; 9 — 9-й брюшной стернит; 10 — правая жаберная крышка; 11 — щетинки бокового края жаберной крышки. Шкалы: 0,05 мм (2, 3, 4), 0,1 мм (9, 10), 0,25 мм (5–8) и 0,5 мм (1).

Genitalia (fig. 6, 1). Subgenital plate, penis and forceps yellowish, tinged with grayish; anterior margin of subgenital plate smoothly prominent; penis broad, about 6 times broader than long, with well pronounced lobes; distal margins of penis lobes brown, well contrasted with light color of penis; distal margin of penis wider than basal one; anterolateral corners rounded; apices of forceps exceed distal margin of penis.

Female imago (in alcohol). Length (mm): body 3.2–3.8; wings 2.8–3.0; caudal filaments 1.7–1.8.

Head brown, with intensive dark stippling, darker than in male. Antennae brown, base lighter. Color of wings same as in male. Pronotum light brown, with dark stippling; anterolateral corners tinged brown; meso- and metanotum brown; thoracic sternum white. Fore legs brown, with faint dark stippling; mid and hind legs yellowish. Abdominal terga I–IX yellowish, with intensive dark stippling and darker posterior margins; tergum X brownish. Sterna yellowish. Caudal filaments white, with long pale hairlike setae.

Mature nymph (in alcohol). Length (mm): body 3.5–4.9; caudal filaments 2.5–3.0 (fig. 5).

Head brown, with contrasted light spots; long white spot reaching the base of labrum in front; a narrow transverse light stripe between lateral ocelli and pair of small spots near posterior margin; occiput with a wide white longitudinal stripe and pair of long oblique spots. Apical segment of maxillar palpi somewhat broader at base, with long stout setae along inner margin (fig. 6, 3). Third segment of labial palpi shorter by 1/2 than second one, with two rows of stout setae in inner margin (fig. 6, 4). Antennae brownish.

Pronotum dark brown, with wide light mid-dorsal stripe; pair of light rounded spots near anterior margin; a pair of big oval spots and two pairs of small spots in medioposterior area; lateral margins light; posterolateral corners rounded, anterolateral corners rectangular (fig. 7, 5). Mesonotum dark brown, with contrasted light markings (fig. 5); a large light rounded spot in medio-anterior and pair of small spots near anterior margins; two pairs of rounded spots in middle area; big spot at base and oval spots in mediolateral margins and in end of wing pads; pair of oval spots between wing pads. Thoracic sternum light brown. Legs yellowish, molted (fig. 6, 6–8); femora and tibiae of all legs and tarsi of fore leg with wide brown transverse band in subapical region; femur of fore leg with short simple setae in basal half; a group of 4–5 moderately long blunt setae in subapical area and long stout hairlike setae at lateral margin (fig. 7, 6); femora of mid and hind legs with longitudinal row of stout spinelike setae in middle area (fig. 7, 7, 8); tibiae of all legs with rows of stout spines at medial and proximal margins. Claws of fore leg with 4–5 teeth and mid leg with small teeth at base; hind legs with 4–5 prominent and some small teeth in basal half. The ratio femora: tibiae: tarsi 1.0:0.7:0.7 for fore legs, 1.0:0.6:0.6 for mid legs and 1.1:0.7:0.7 for hind legs.

Abdominal terga brown or dark brown, with contrasted light marking; tergum I dark brown; tergum II brown, with light posterolateral corners; terga VII–IX with wide light medial stripe, light lateral margins and a big oval spots on each side; tergum X with light anterior margin and medial stripe. Posterolateral spines of terga III–IX well developed (fig. 7, 1); lateral margins of terga V–VIII and posterior margin of tergum VII with long stout hairlike setae (fig. 7, 2, 3); posterior margins of terga I–II, VII–X, with bluntly pointed teeth (fig. 7, 4). Gill cover dark brown, with light outer and posterior margins, light anterolateral corners, long oblique light stripe along outer side, Y-shaped spot near inner margin and several spinelike setae near base (fig. 7, 10); apical half of lateral margin with spatulate setae; outer and posterior margins with simple hairlike setae (fig. 7, 10, 11). Sterna II–VIII brownish, with pair of brown triangular spots in anterior margins; posterior margin of sternum IX strongly prominent, rounded (fig. 7, 9), with pair of small rounded brown spots. Caudal filaments brownish, with stout hairlike setae in basal half and yellowish, with long hairlike setae in distal half (fig. 7, 5).

Comparison. *C. maculata* resembles species of the *pseudorivulorum* group (*C. pseudorivulorum* Keffermüller, 1960 and *C. beskidensis* Sowa, 1973) by the structure of genitalia. *C. maculata* can be distinguished by the strongly rounded anterolateral corners and lateral margins of penis (fig. 6, 1); in *C. beskidensis* the lateral margins distinctly pointed. Also, the maximum width of penis is much smaller than the width

of the distal margin of subgenital plate (fig. 6, 1); but in *C. beskidensis* and *C. pseudorivulorum* the width of penis are considerably larger than the width of the distal margin of subgenital plate.

The larvae of *C. maculata* can be distinguished from the species of the *pseudorivulorum* group by the spatulate setae in the apical half of lateral margin of gill cover (figs. 7, 10, 11); in the species of *pseudorivulorum* group these setae are spine-shaped. Also, the sternum IX is strongly prominent, rounded (fig. 7, 9), but in species of the *pseudorivulorum* group the sternum IX is distinctly concave in the middle. *C. lactea* (Burmeister, 1839) has a strongly prominent sternum IX. But in contrast to *C. maculata*, the apex of sternum in *C. lactea* is bluntly pointed.

Caenis miliaria (Tshernova, 1952) (fig. 8–10)

Ordella miliaria Tshernova, 1952 : 286–287; *Caenis robusta* Eth.: Tshernova O. A. et al. 1986 : 140; *Caenis miliaria*: Kluge, 1997 : 219, 328–329.

Material. Primorskiy kray, Khasanskiy region: 2 ♂ (light trap), small lake near Khasan vil., 24.07.1975 (Vshivkova); ♂ (light trap), Doritseni lake, 24.07.1975 (Vshivkova) 78 ♂, 3 ♀ (light trap), Troitsa Bay, Utinoye lake, 26.08.1996; 3 ♂, 1 ♀ (reared from larvae), 31 ♂ (light trap), 2 larvae, Khanka lake, Khankaiskii reserve, 17.07.1996; Ussuri riv.: 24 ♂, 2 ♀ (light trap), 3 km downstream of Podgornoye vil., 21.07.1991; ♂ (light trap), 1.5 km downstream of Kamenka vil., 27.07.1992; ♂ (light trap), near Varlachovka vil., 28.07.1992; 23 ♂, ♀ (light trap), near Utyos mountain, 01.08.1992; 52 ♂, 3 ♀, the same place, 04.08.1994; 5 ♂ (light trap), near Vladikin island, 02.08.1992; ♂, same place, 08.08.1993; 9 ♂ (light trap), 1.5 km downstream of Podgornoye vil., 03.08.1992; 3 ♂ (light trap), 2 km downstream of Gornye Kluchi vil., 18.07.1996; Bolshaya Ussurka riv.: 1 larvae, 1 km downstream of Zvenigorodka vil., 20.07.1996; 6 ♂ (light trap), 1.5 km downstream of bridge of the highway Vladivostok–Khabarovsk, 04.08.1996 (Tiunova). Khabarovskiy kray: ♂ (light trap), Khor riv., near Kondrat'evka vil., 24.07.1996; ♂ (reared from larvae), Kiya riv., near Ekaterinoslavka vil., 26.07.1996; 3 ♂ (light trap), Kiya riv., 2 km downstream of Petrovichi vil., 03.08.1996 (Tiunova).

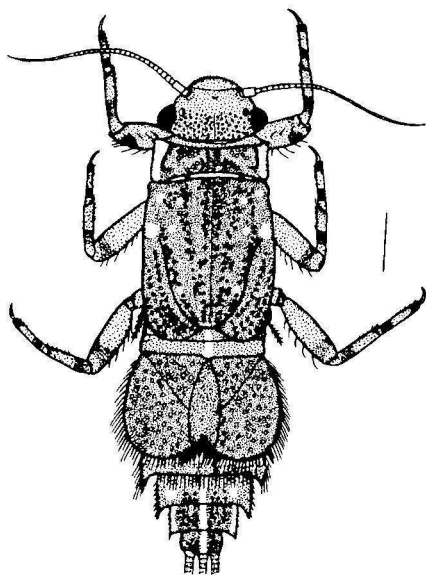


Fig. 8. *Caenis miliaria*, habitus of mature larva, scale is 0.5 mm long.

Рис. 8. *Caenis miliaria*, общий вид зрелой личинки, шкала 0,5 мм.

Male imago (in alcohol). Length (mm): body 4.3–5.3; wings 3.0–3.8; caudal filaments 11.7–13.2.

Head brown, posterior margin darker. Ocelli pale whitish, with wide black basal ring. Scape and pedicel brown, tinged blackish; flagellum pale, broader at base (fig. 9, 2).

Pronotum brown or dark brown, with darkish stippling, margins darker. Meso- and metanotum dark brown, all sutures light brown to yellowish; thoracic sterna brown or light brown. Wings pale, hyaline. Longitudinal veins C, Sc and R brown, with darkish stippling, more intensive color in basal 2/3; other longitudinal veins blackish, in basal 2/3 darker; costal and subcostal area semi-hyaline. Fore femora brown, outer margin darker; tibiae and tarsi white, joints and claws brown; mid and hind legs slightly brownish to white. Length of segment of fore legs (mm): femora 0.6–0.9, tibiae 0.7–1.0, tarsal segments: 0.1, 0.25, 0.15, 0.15, 0.15. Abdomen brown, with white stippling; terga I, IX and X darker than other segments; all terga with dark posterior margins;

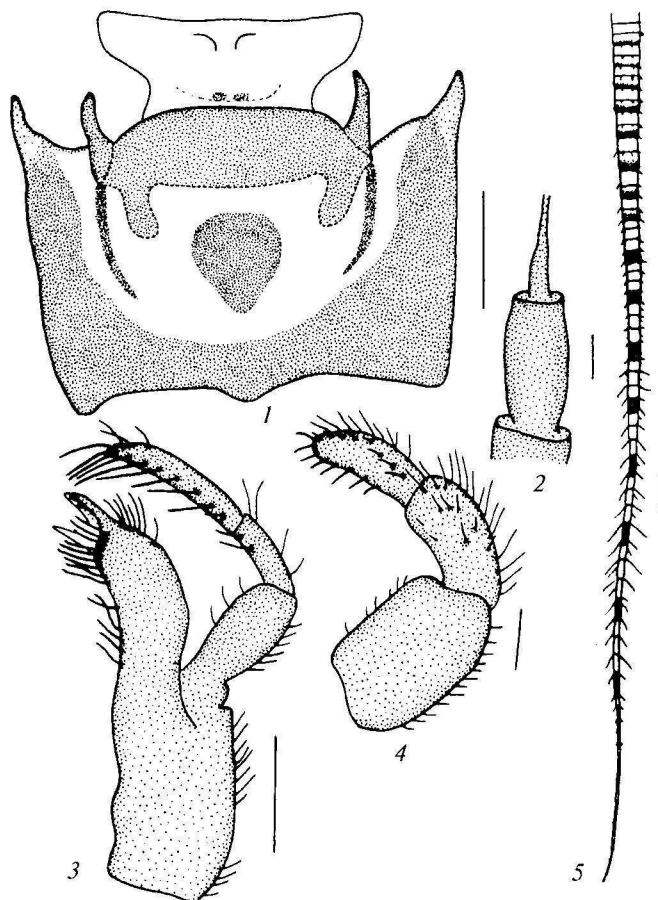


Fig. 9. *Caenis miliaria*: 1-2 — structural details of male imago: 1 — genitalia, ventral view; 2 — base of antennae, male, lateral; 3-5 — structural details of larvae, dorsal views: 3 — right maxilla; 4 — right labial palp; 5 — lateral caudal filaments. Scales are 0.1 mm (2, 4), 0.25 mm (1, 3) and 1 mm (5).

Рис. 9. *Caenis miliaria*: 1-2 — детали строения самца имаго: 1 — гениталии вентрально; 2 — основание антенны самца сбоку; 3-5 — детали строения личинки дорсально: 3 — правая максилла; 4 — правый лабиальный щупик; 5 — боковая хвостовая нить. Шкалы: 0,1 мм (2, 4), 0,25 мм (1, 3) и 1 мм (5).

terga II-IX with white longitudinal stripe and white sides; tergum VII with wide white triangular medial stripe. Sterna brownish or whitish, translucent, with slightly dark margins; sternum X brown; sterna I-V or I-III with pair of small brown spots in anteromedial area. Caudal filaments pale, translucent, with dark joints.

Genitalia (fig. 9, 1). Subgenital plate and forceps brown; stiliger with contrasted brown coloration; a large dark brown rounded spot under subgenital plate and dark brown lateral and posterior margins. Penis anvil-shaped, whitish, tinged yellow, with pair of small brown spots in subbasal area; distal margin of penis brownish, more than 1.5 times broader than basal margin, straight, in some specimens convex at middle; anterolateral corners rounded; apices of forceps exceed the middle of penis; lateral spines turned the apex of forceps.

Female imago (in alcohol). Length (mm): body 4.9-6.4; wings 4.2-5.2; caudal filaments 4.6-5.2.

Head, pronotum, meso- and metanotum of same color as in male. Femora, tibiae and tarsi of fore legs brown; mid and hind legs light brown. Length of segments of fore legs (mm): femora 0.9, tibiae 0.6, tarsal segments: 0.1, 0.1, 0.05, 0.05, 0.2. Abdominal terga brown, with black stippling; light longitudinal stripe diffuse, often unclear; lateral

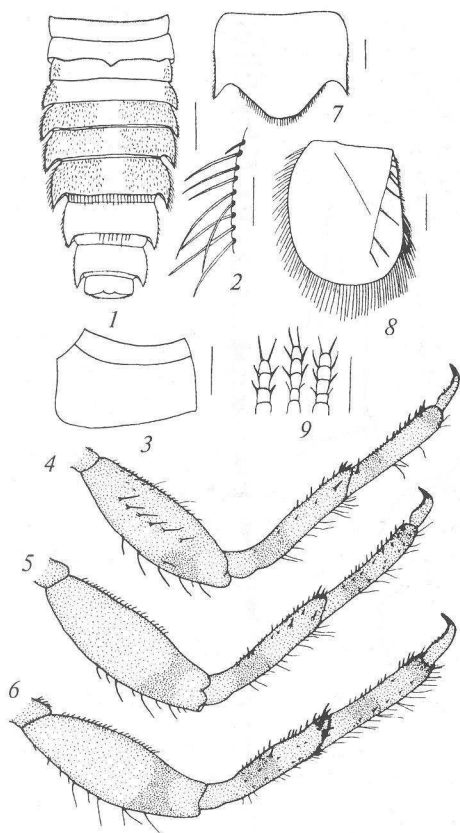


Fig. 10. *Caenis miliaria*, structural details of larvae, dorsal views: 1 — abdominal tergita; 2 — lateral setae of tergum VII; 3 — left part of pronotum; 4–6 — legs of I–III pair; 7 — abdominal sternum IX; 8 — left gill cover; 9 — setae (microtrichia) of gill cover, ventral view. Scales are 0.1 mm (2), 0.25 mm (4–7), 0.5 mm (3, 8, 9) and 1 mm (1).

Рис. 10. *Caenis miliaria*, детали строения личинки дорсально: 1 — брюшные тергиты; 2 — боковые щетинки 7-го тергита; 3 — левая часть пронотума; 4–6 — ноги I–III пар; 7 — 9-й брюшной стернит; 8 — левая жаберная крышка; 9 — щетинки (микротрихии) на вентральной стороне жаберной крышки. Шкалы: 0,1 мм (2), 0,25 мм (4–7), 0,5 мм (3, 8, 9) и 1 мм (1).

0.8:0.5:0.5 for mid legs and 0.9:0.6:0.6 for hind legs. Abdomen brown, tinged with black, with white stippling; terga II, VII–X with moderately wide longitudinal stripe, bordered blackish; terga III–IX with light sides; lateral margins of terga IV–VIII with long hairlike setae (fig. 10, 2); posterolateral spines of terga III–IX well developed (fig. 10, 1); posterior margins of terga VII–VIII with long hairlike setae (fig. 10, 1). Gill cover dark brown, tinged black, with white stippling and with several stout spinelike setae near base; margins with long hairlike setae (fig. 10, 8). Sterna brown or light brown; posterior margin of sternum IX strongly prominent, with long hairlike setae; apex of sternum slightly flattened (fig. 10, 7). Caudal filaments brown, with darkened annulations and short hairlike setae in 2/3 of base (fig. 9, 5).

margins light brown to yellowish; terga V–IX with well developed posterolateral spines. Sterna light brownish to brownish yellow. Caudal filaments pale white, with long setae.

Mature nymph (in alcohol). Length (mm): body 5.8–7.5; caudal filaments 5.5–6.0 (fig. 8).

Head brown, with white stippling; occiput darker than other part of head, with light medial stripe. Antennae light brown to yellow, with dark brown joints of segments; basal segment dark brown (fig. 8). Apical segment of maxillar palp with row of long stout setae along inner margin; second segment by 1/2 shorter than third segment (fig. 9, 3). The third segment of labial palps same shorter than second one only, with row of stout setae along inner and outer margins (fig. 9, 4).

Nota dark brown, with white stippling and light longitudinal stripe. Pronotum with light sides; lateral margins straight to slightly concave; anterolateral corners slightly pointed, posterolateral corners rounded (fig. 10, 3). Mesonotum dark brown, with three pairs of small light spots in medial area and irregular spot in base of wing pads (fig. 8). Metanotum light brown. Legs brown or light brown, marked (fig. 10, 4–6). Fore femora (fig. 10, 4) with dark brown rounded spot in subapical region of outer margin; tibiae all legs dark brown at base; tarsi with brown basal and distal part; femora of middle and hind legs with dark brown transverse band in subapical area (fig. 10, 5, 6); fore femora with longitudinal row of 5–6 stout spinelike setae in middle area; inner margin with numerous short setae; outer margin with moderately long spinelike setae. All tarsal claws strongly hooked and with 7–8 median prominent teeth. The ratio femora: tibiae: tarsi 0.7:0.6:0.5 for fore legs,

Comparison. By the form of penis the species resembles the European *C. robusta* Etn., 1884. *C. miliaria* can be distinguished by the contrasted coloration of stiligerand lateral spines, which turned the apex of forceps (fig. 9, 1); in *C. robusta* stiliger slightly pigmented and lateral spines short, exceed the middle of forceps only. Also, the eggs of *C. robusta* with netlike structure, but eggs of *C. miliaria* without one.

The larvae of *C. miliaria* can be distinguished from larvae of *C. robusta* by the long setae on posterior margin of tergum VIII (fig. 8); in *C. robusta* the posterior margin has small blunt pointed teeth only.

Caenis amurensis Kluge, 1987

C. amurensis was described by Kluge from the lower Amur river and other data devoted to distribution of this species were absent till now. Below, material which was collected in different places are presented. All material was collected by T. Tiunova

Material. Primorskii kray: 2 ♂ (reared from larvae), 120 ♂ (light trap), 15 larvae, Chanka lake, Chankaiskii reserve, 17.07.1996. Khabarovskii kray: 4 larvae, Ussuri riv., Zabaikal'skoye vil., 23.07.1996; ♂ (reared from larvae), 60 ♂ (light trap), 2 larvae, Kiya riv., near Ekaterinoslavka vil., 26.07.1996; ♀ (reared from larvae), 9 larvae, Pir riv., near bridge, 28.07.1996; 2 ♂ (light trap), Gur riv., 100 m lower bridge, 01.08.1996; 56 ♂, 2 larvae, Amur riv., near Troitskoye vil., 02.08.1996.

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