ЧТЕНИЯ ПАМЯТИ ВЛАДИМИРА ЯКОВЛЕВИЧА ЛЕВАНИДОВА

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CADDISFLIES OF THE FAMILY ECNOMIDAE MACLACHLAN (INSECTA: TRICHOPTERA) OF THE RUSSIAN FAR EAST

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Descriptions for males and females of three species of the genus *Ecnomus* (*E. tenellus* Rambur, 1842; *E. tsudai* Kumanski, 1992 and *E. yamashironis* Tsuda, 1942) occurring in the Russian Far East are presented. Distribution data and a key for determination of males and females are provided.

Key words: Ecnomidae, *Ecnomus*, Russian Far East.

РУЧЕЙНИКИ СЕМЕЙСТВА ECNOMIDAE MACLACHLAN (INSECTA: TRICHOPTERA) ДАЛЬНЕГО ВОСТОКА РОССИИ

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Приводятся описания, данные по распространению и определительные таблицы для самцов и самок трех видов рода *Ecnomus* (*E. tenellus* Rambur, 1842; *E. tsudai* Kumanski, 1992 и *E. yamashironis* Tsuda, 1942), обитающих на Дальнем Востоке России.

Introduction

The family Ecnomidae is a small family of Trichoptera distributed mainly in the Afrotropical, Oriental and Australasian Regions, with several species in the East and West Palaearctic Regions, and none known from the Nearctic and Neotropical Regions. The family is comprised of five genera, *Austrotinodes* Schmid, *Ecnomina* Kimmins, *Ecnomus* MacLachlan, *Parecnomina* Kimmins, and *Psychomyiellodes* Mosely, whose relationships were briefly presented by Flint (1973). Li and Morse (1997) described 22 new species of the genus *Ecnomus* from China, inferred a phylogeny of the Chinese species of *Ecnomus* and established four monophyletic species groups within the genus. According to Li and Morse (1997), the genus *Ecnomus* includes 221 species.

The genus *Ecnomus* is represented in the Russian Far East by three species. S.G. Lepneva (1964) firstly recorded *E. tenellus* Rambur, 1842 for the region. *Ecnomus yamashironis* Tsuda, 1942 was reported for the first time from Khabarovsk and Nikolayevsk vicinities (Arefina et al., 1996). T.S. Vshivkova (1995) recorded *E. tsudai* Kumanski, 1992 from Primorye Territory. Only males of two species (*E. tenellus* and *E. yamashironis*) were included and illustrated in Key to the Insects of Russian Far East (Arefina, 1997). In the present paper males and females of all three species are illustrated. New distribution data and a key for determination of males and females are provided.

The material examined during present study is held in the collections of the Institute of Biology and Soil Science, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia. Genitalia were drawn from specimens macerated in KOH, cleared and transferred to glycerol. Terminology used follows that of Li and Morse (1997).

Ecnomus MacLachlan, 1864

Ecnomus MacLachlan, 1864: 30; Cartwright, 1990: 2; Arefina, 1997: 77.
Type species: *Philopotamus tenellus* Rambur, 1842 (original designation).

Body: Length of forewing: 4.2-6.3 mm. Body yellowish brown to brown and hairy.

Head: Ocelli absent, warts present on vertex and frons. Antennae shorter that fore wings. Maxillary palpi 5-segmented, basal segment shorter than others, segments 2, 3 and 4 slightly longer than preceding segment, segment 5 about as long as all other segments together, segment 3 positioned apically on segment 2. Labial palpi 3-segmented; basal segment longer than segment 2 and shorter than apical segment.

Thorax: Pronotum transverse, with two pairs of lateral and medial warts; mesonotum with pair of round scutal warts at midlength and pair of semi-circular scutellar warts.

Wings: Forewings with R1 forked; apical forks 1, 2, 3, 4, and 5 present; discoidal median and thyridial cells present. Hindwings slightly narrower than forewings; forks 2 and 5 present; discoidal cell absent. Tibial spur 3.4.4.

Male genitalia: Segment IX consists of tergum IX and very broad sternum IX. Sternum IX very broad, with or without longitudinal medial line. Segment X small, withdrawn inside segment IX, with pair of posterior ventral projections. Superior appendages rather long and slender, each with small mesal or ventral projection at base. Inferior appendages consist of one segment, independent at base from each other in ventral view. Phallus with one of two types of basic structure: (1) simple sclerotized tube, with membranous apex; parameres absent. (2) Mostly bulbous, acute at apex, membranous dorsally at least at base; parameres long, fused to each other at base or separated; dorsobasal lobe connected with parameres or distinct.

Female genitalia: Segment VII with sclerotized tergum and sternum separated. Segment VIII with tergal plate covering top and sides of segment, sternum VIII with pair of broad ventral plates. Segment IX absent. Segment X with sclerotized tergum bearing row of long setae. Segment XI short, with small lateral sclerite, each with cercus and pair of upper and lower papillae.

Key to males and females of Far Eastern *Ecnomus* MacLachlan

1. Males 2
- Females 4
2. Sternum IX with longitudinal median line (Figs 1,C, 3,C). Superior appendages triangular (Figs 1,A, 3,A) 3
- Sternum IX without longitudinal median line (Fig. 5,C). Superior appendages long, ... parallel-sided (Fig. 5,A) ..... *E. tsudai* Kumanski
3. Inferior appendages with small rounded dorso-medial process (Fig. 1A, C) .... *E. tenellus* Rambur
- Inferior appendages without dorso-medial process (Fig. 3,A, C) ..... *E. yamashironis* Tsuda
4. Ventromesal plate of segment VII present (Figs. 2, 4) 5
- Ventromesal plate of segment VII absent (Fig. 6). Ventral plates of segment VIII mitten-shaped (Fig. 6,B) ..... *E. tsudai* Kumanski
5. Ventromesal plate of segment VII quadrate with deep anterior notch and shallow posterior excision. Ventral plates of segment VIII subquadrate (Fig. 2) ..... *E. tenellus* Rambur
- Ventromesal plate of segment VII crown-shaped. Ventral plates of segment VIII elongate, triangular apically (Fig. 4) ..... *E. yamashironis* Tsuda

Ecnomus tenellus Group Li and Morse, 1997

Ecnomus tenellus (Rambur), 1842
Figures 1, 2

Philopotamus tenellus Rambur, 1842: 503, type locality: France.

Ecnomus tenellus (Rambur), MacLachlan, 1864: 30; Levanidova et al., 1995: 7; Li and Morse, 1997: 96-97, figs. 4-7, 12-13, 22, 25-26; Arefina, 1997: 77-78, fig. 5.

Material examined: PRIMORYE TERRITORY: 3 males, 3 females, Khankaisky Region, Khanka Lake at Vostochny Vil., 17 July 1996 (T. Arefina); 20 males, 18 females, Khankaisky Region, Khanka Lake at Novonikolayevka Vil., 27 July 2002 (V. Lubaretz); 1 male, Khankaisky Region, Sungacha River (Khanka Lake Basin), 3 May 2002 (E. Barabantshikov); 1 female, Chernigovsky Region, Dmitrievka Vil., 30 July 1989 (T. Arefina); 1 male, 15 females, Ussuriisky Region, Peishula River, 16 August 2001 (V. Lubaretz); 59 males, 27 females, Khasansky Region, Utinoye Lake at Troitsa Bay, 26 August 1996 (T. Tiunova); 4 males, Khasansky Region, Ptichye Lake, 23 May 1998 (V. Teslenko); 8 males, 12 females, Khasansky Region, Lebedinoye Lake, 17 August 2002 (V. Lubaretz). SAKHALIN: 2 males, 1 female, Svobodninskoye Lake at Mordvinova Bay, 17 July 2002 (V. Teslenko); 1 male, Russkoye Lake at Mordvinova Bay, 17 July 2002 (V. Teslenko); 61 males, 7 females, Vavaiskoye Lake, 18 July 2002 (V. Teslenko). KURILS: 1 male, Kunashir Isl., Aliger Lake at Yuzhno-Kurilsk Town, 31 August 1994 (V. Teslenko); 2 males, Kunashir Isl., Peschanoye Lake, 17 August 1999 (V. Teslenko); 77 males, 8 females, Iturup Isl., Lesozavodskoye Lake at Dobroye Nachalo Bay, 14 August 1999 (V. Teslenko).

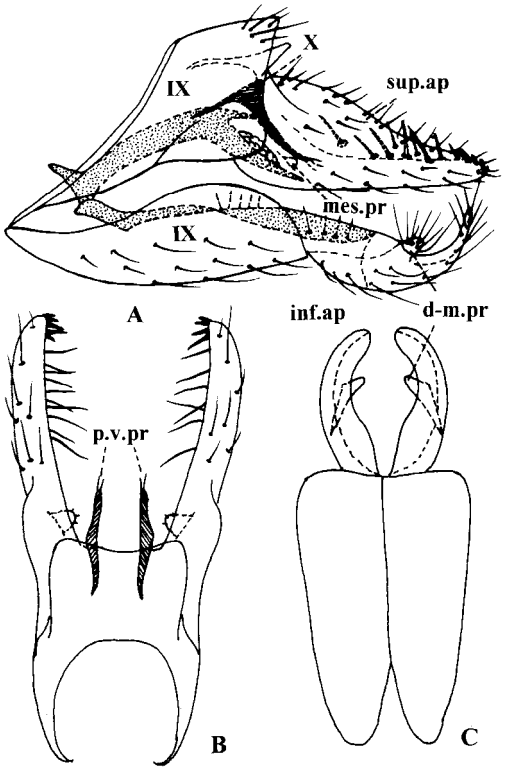

Figure 1. *Ecnomus tenellus* Rambur, male genitalia in lateral (A), dorsal (B) and ventral (C) views. Abbreviations: d-m.pr – dorso-medial process of inferior appendage; inf.ap – inferior appendages; mes.pr – mesal process of superior appendage; p.v.pr – posterior ventral projection of segment X; sup.ap – superior appendage; IX – sternum IX; X – segment X

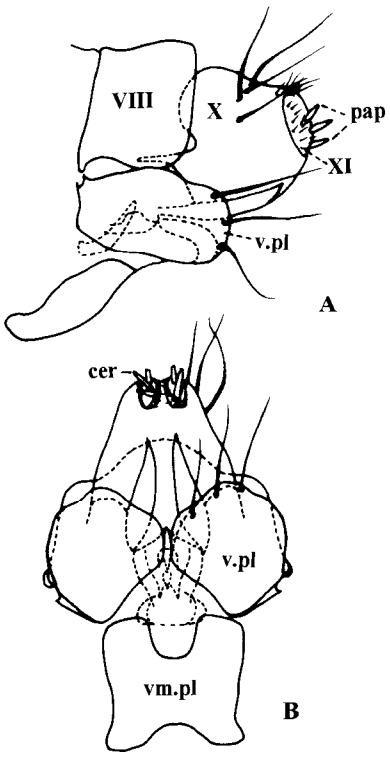

Figure 2. *Ecnomus tenellus* Rambur, female genitalia in lateral (A) and ventral (B) views. Abbreviations: cer – cercus; pap – papillae; v.pl – ventral plate of sternum VIII; vm.pl – ventromesal plate of segment VII; VIII – sternum VIII; X – segment X; XI – segment XI

Description: Length of forewings: males – 4.2-5.2 mm, females – 4.6-6.3 mm.

Male genitalia: Sternum IX with longitudinal median line, anterior margin of sternum with deep triangular incision, posterior margin straight in ventral view. Segment X with posterior ventral projection straight in lateral view. Superior appendages broad basally, tapering to rounded apex, each with tiny mesal process at base and several long and stout spines on mesal surface near middle and apex. Inferior appendages slightly shorter than superior appendages, each with short and rounded dorso-medial process. Phallus tubular, apex with small finger-like process at dorsal margin.

Female genitalia: Ventromesal plate of segment VII well sclerotized, quadrate with deep anterior notch and shallow posterior excision. Ventral plates of segment VIII subquadrate with long setae along apical margin. Segment X with transverse row of long setae. Segment XI small, setose.

Distribution: The species is widely distributed over three Biogeographic Regions: Afrotropical, Oriental and Palaearctic). In the Russian Far East it is known from the Primorye Territory, Sakhalin, Kurils (Kunashir).

Ecnomus yamashironis Tsuda, 1942
Figures 3, 4

Ecnomus yamashironis Tsuda, 1942: 267-268, figs. 25-26, type locality: Japan; Botosaneanu, 1970: 302-303, pl. 28, fig. 3 (doubtful identification); Arefina et al., 1996: 10; Arefina, 1997: 77-78, fig. 6.

Material examined: KHABAROVSK TERRITORY: 1 male, Nikolayevsk Vicinity, 29 July 1959 (I. Levanidova); 2 males, 2 females, Amur River at Sarapulskoye Vil., 27 July 1996 (T. Arefina); 1 male, 3 females, the same location, 11 July 2000 (T. Tiunova); 1 male, 1 female, Amur River at Slavyanka Vil., 18 August 1997 (T. Arefina); 1 male, 7 females, Ussuri

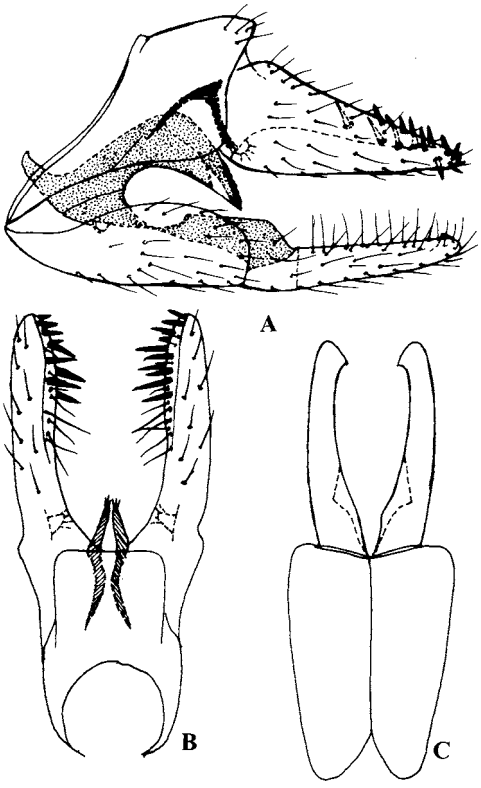

Figure 3. *Ecnomus yamashironis* Tsuda, male genitalia in lateral (A), dorsal (B) and ventral (C) views

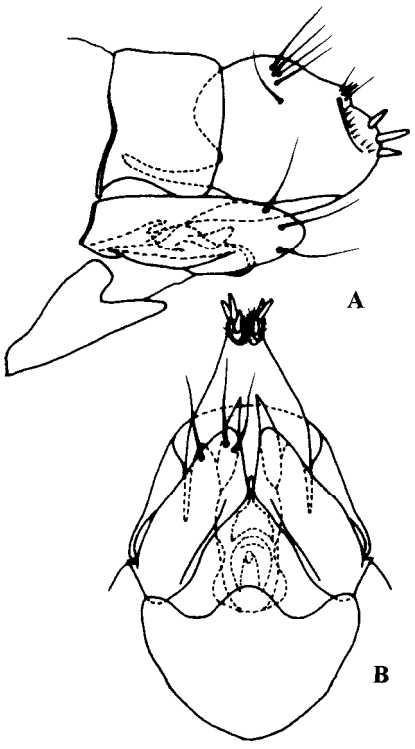

Figure 4. *Ecnomus yamashironis* Tsuda, female genitalia in lateral (A) and ventral (B) views

River at Zabaikalskoye Vil., 23 July 1996 (T. Arefina). PRIMORYE TERRITORY: 1 female, Kirovsky Region, Ussuri River at Gornye Klyuchi Vil., 18 July 1996 (T. Arefina); 8 males, 2 females, Dalnerechensky Region, Bolshaya Ussurka River (Ussuri River Basin) at Dalnerechensk, 4 August 1996 (T. Arefina); 3 males, 1 female, Khankaisky Region, Khanka Lake at Novonikolayevka Vil., 27 July 2002 (V. Lubaretz); 3 females, Khankaisky Region, Khanka Lake at Vostochny Vil., 17 July 1996 (T. Arefina).

Description: Length of forewings: males – 4.2-5.0 mm, females – 4.8-5.5 mm.

Male genitalia: Sternum IX with longitudinal median line, anterior margin of sternum with deep median incision in ventral view. Segment X long and slender, anterolateral arms directed anterad; posterior ventral projections each with lateral expansion in mid length. Superior appendages triangular in lateral view, tapering to blunt apex. Inferior appendages equal in length with superior appendages, each elongate, slightly curved dorsad apically, with rounded apex and small triangular project subapically; dorsomesal surface concave at middle. Phallus tubular, with apex long and acute in lateral view.

Female genitalia: Ventromesal plate of segment VII well sclerotized, apically broad, crown-shaped in ventral view. Ventral plates of segment VIII elongate, triangular apically in ventral view, bearing three long setae along apical margin. Segment X with transverse row of long setae. Segment XI slightly sclerotized.

Distribution: Russian Far East (Khabarovsk and Primorye Territories), Japan, Korea, China.

Ecnomus connatus Group Li and Morse, 1997

Ecnomus tsudai Kumanski, 1992
Figures 5, 6

Ecnomus tsudai Kumanski, 1992: 62-63, figs. 35-40, type locality: North Korea; Vshivkova, 1995: 4.

Material examined: KHABAROVSK TERRITORY: 54 males, 36 females, Kiya River (Ussuri River Basin) at Ekaterinoslavka Vil., 26 July 1996 (T. Arefina); 9 males, 83 females, Kiya River (Ussuri River Basin) at Petrovichi Vil., 3 August 1996 (T. Arefina); 1 male, Bikin River (Ussuri River Basin) at Zvenyevoy Vil., 22 July 1996 (T. Arefina). PRIMORYE TERRITORY: 1 female, Dalnerechensky Region, Bolshaya Ussurka River (Ussuri River Basin) at Zvenigorodka Vil., 20 July 1996 (T. Arefina).

Description: Length of forewings: males – 5.4-5.8 mm, females – 5.2 – 5.9 mm.

Male genitalia: Sternum IX massive, expanded on dorsal margin at middle in lateral view; ventrally sternum lacks of median line, its anterior and posterior margins slightly concave. Posterior ventral projections of segment X short and broad, nearly triangular in lateral view, with three setae at apex. Superior appendages long, dorsal and ventral margins parallel-sided, apex rounded, mesoapical surface with several strong spines; each appendages bearing slender, basoventral process, with two apical setae. Inferior appendages massive, boot-shaped in lateral view. Phallus thick, with dorsobasal lobe distinct from parameres; phallic parameres fused basally, directed dorsocaudad, heavily sclerotized, capitate in lateral view; phallic apex sharp and claw -like, directed ventrad in lateral view.

Female genitalia: Ventromesal plate of segment VII absent. Ventral plates of segment VIII somewhat mitten-shaped in ventral view, with apical margin sinuous, bearing long setae. Segment X with four long setae apically. Segment XI small, setose, anterior margin oblique.

Distribution: Russian Far East (Khabarovsk and Primorye Territories), Korea.

Remarks: This species is recorded from the Khabarovsk Territory for the first time.

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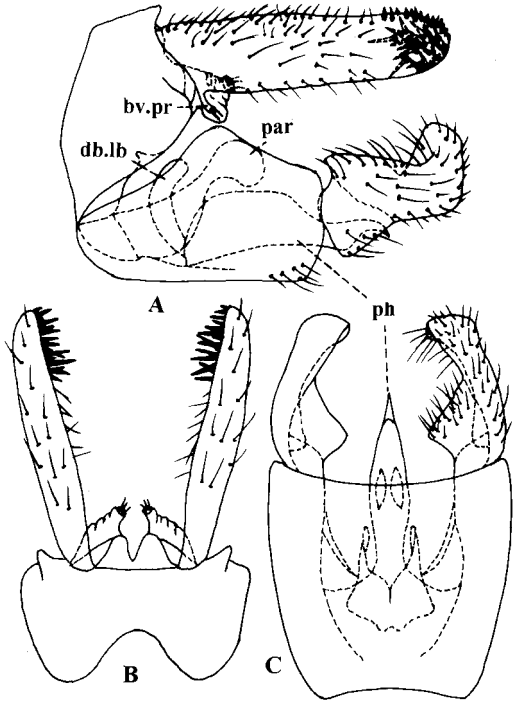

Figure 5. *Ecnomus tsudai* Kumanski, male genitalia in lateral (A), dorsal (B) and ventral (C) views. Abbreviations: bv.pr – basoventral process of superior appendage; db.lb – dorsobasal lobe; par – parameres; ph – phallus

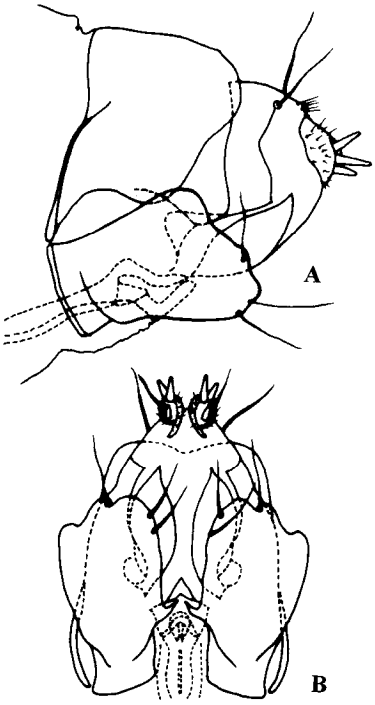

Figure 6. *Ecnomus tsudai* Kumanski, female genitalia in lateral (A) and ventral (B) views

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