

Review of Kazakhstan species of the genus *Pachyneuron* Walker, 1833 (Hymenoptera: Chalcidoidea: Pteromalidae)

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Ten species of *Pachyneuron* are reported from Kazakhstan. Data on distribution and biology are reported for the first time for most of these species. A key to the species is provided.

Key words: Hymenoptera, *Pachyneuron*, Kazakhstan

INTRODUCTION

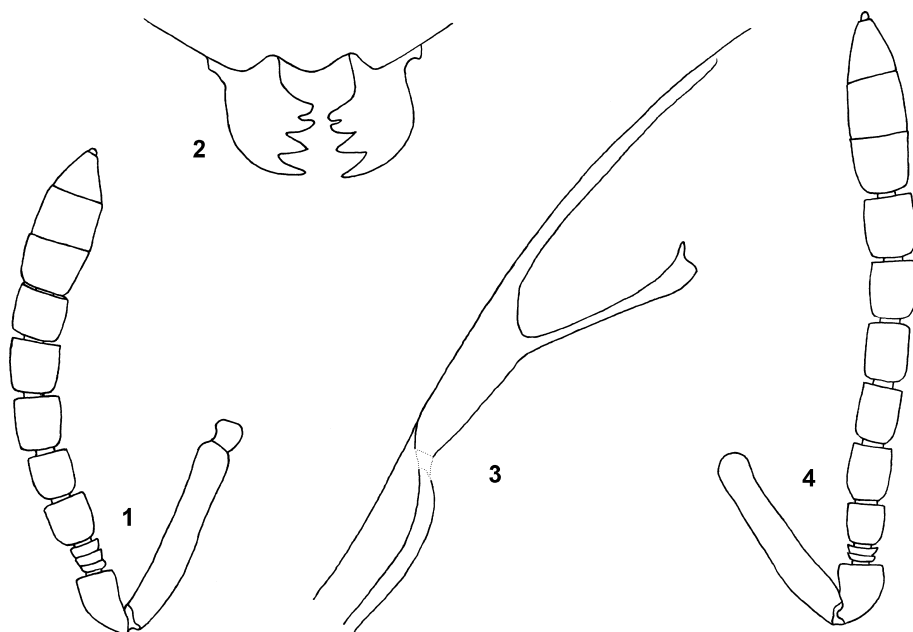
Pachyneuron Walker, 1833 is a cosmopolitan genus. Members of the genus are mainly hyperparasites of Homoptera (Aphidoidea, Coccoidea and Psylloidea) through Hymenoptera (Ichneumonoidea: Braconidae, Aphidiinae; Chalcidoidea: Encyrtidae, Aphelinidae), or primary and secondary parasites of the predators of aphidophagous Diptera (Syrphidae, Chamaemyidae), Coleoptera (Coccinellidae), Neuroptera (Chrysopidae), and also of eggs of Lepidoptera (Graham, 1969; Bouček, 1965, 1970, 1977, 1988; Dzhanokmen, 1978, 1984; Gafarov, 1979; Noyes, 1998; Gibson, 2001).

The taxonomy of the Kazakhstan species of *Pachyneuron* is not yet completely cleared up. Ten species as occurring in Kazakhstan are recorded here. The key to European species given by Graham (1969) is modified here because *P. erzurumicum* Doğanlar, 1986 has been found in Kazakhstan, and also because since then some changes in nomenclature have been made. In the meantime, some difficulties remain because morphological characters separating some species are rather small. It concerns mainly some rather variable species such as *P. formosum* Walker, *P. groenlandicum* (Holmgren), and *P. leucopiscida* Mani.

The following abbreviations are used for collectors of the material: D.K. – K.A. Dzhanokmen; F.M. – M.Ya. Fol'kina; K.V. – V.L. Kazenas, Kh.L. – L.G. Khlebutina; L.V. – V.G. Linskiy; S.A. – A.E. Slivkin; S.E. – E.S. Sugonyaev; S.N. – N.E. Smailova; T.N. – N.G. Telepa.

Pachyneuron aphidis (Bouché, 1834) (Figs 1-4)

Material examined. Kazakhstan: North Kazakhstan Prov., 2 females, near town of Shchuchinsk, on *Salix* sp., 27 July 1976, D.K.; Akmolinsk Prov., 4 females, in the vicinity of Zhuravlevka village, from aphids (unknown species), July 1974, S.N.; South Kazakhstan Prov., 60 females, 47 males, town of Dzhetysay, from *Pterochloroides persicae* Chol. (Aphididae, Lachninae) on *Persica vulgaris* Mill., 28 Oct. 1977, F.M.; 1 female, same locality, from *Aphis fabae* Scopoli (Aphididae, Aphidinae) on *Rumex confertus* Willd., 24 Sept. 1978, F.M.; 3 females, 2 males, same locality, from *Hyalopterus pruni* (Geoffroy) (Aphididae, Aphidinae) on *Armeniaca vulgaris* Lam., 29 May 1976, F.M.; 2 females, 1 male, same locality, swept from *Tamarix* sp., 9 Aug., 1 Sept. 1980, D.K.; Kzylorda Prov., 2 females, 1 male, near Chiili railway station, from aphids (unknown species) on *Alhagi pseudalhagi* (M. B.) Desv., 20 June 1984, D.K.; Zhambyl. Prov., 2 females, 10 males, near Karatau town, motley grass meadow, 27 May – 3 June 2000, D.K.; Almaty Prov., 2 males, Petropavlovka village, northern spurs of Dzungarian Alatau Mountain Range, Lepsy R. flood lands, secondary parasite of *Cacopsylla hippophaes* (Förster) (Psyllidae) larvae through Encyrtidae, on *Hippophae rhamnoides* L., 25 June 1985, Kh.L.; 6 females, 4 males, near Karaagash village, lower Ili R. flood lands, in gallery forest, on *Berberis iliensis* M. Pop., 21-29 May, 15 Aug. 2003, D.K.; 1 female, Masak, Chilik R. flood lands, on *Tamarix ramosissima* Ledeb. in gallery forest, 14 June 2006, D.K.; 1 female, Kaskelen Distr., from aphid on spring wheat, July 1979, S.A.; 1 female, 26 km SW of Almaty, motley grass meadow, 9 July 1996; 1 female, 72 km NE of Almaty, motley grass, 3 July 2007, D.K.; 1 female, Talgar town, on herbage, 18 July 2006, D.K.; 3 females, 4 males, near Turgen village, 19 July 2006; East Kazakhstan Prov., 1 female, 30 km NW of



Figs 1-4. *Pachyneuron aphidis*. 1, antenna, female; 2, anterior margin of clypeus and mandibles, female; 3, fore wing venation, female; 4, antenna, male.

Kaynar village, Kazakh Melkosopochnik, swept from herbage, 22 June 1978, D.K.; 7 females, 3 males, near Kaznakovka village, sand-dunes, swept from herbage, 25 June 1979, D.K.

Hosts. This species develops as a primary parasite or a hyperparasite. A list of the hosts of this species includes Homoptera (Aphidoidea: Aphididae, Pemphigidae; Coccoidea: Coccidae, Kermesidae, Pseudococcidae; Psylloidea: Psyllidae), Diptera (Syrphidae, Cecidomyiidae) and Hymenoptera (Braconidae: Aphidiinae; Chalcidoidea: Encyrtidae, Aphelinidae).

Distribution. Cosmopolitan species.

***Pachyneuron erzurumicum* Doğanlar, 1986**
(Figs 5-7)

Material examined. **Kazakhstan:** Mangistau Prov., 1 female, Aktau town (former Shevchenko town), botanical garden, on *Tamarix* sp., 12 June 1989, D.K.; **Almaty Prov.,** 2 females, southern part of Balkhash L. basin, lower Ili R. valley, near Karaagash village, on *T. ramosissima* Ledeb., 31 May 2003, 7 June 2004, D.K.

Host. Unknown.

Distribution. Turkey, Kazakhstan.

***Pachyneuron formosum* Walker, 1833**
(Figs 8-10)

Material examined. **Kazakhstan:** 1 female, 9 males, **South Kazakhstan Prov.,** near Karatau town, 27 May – 5 June 2000, D.K.; 6 females, 2 males, **Almaty Prov.,** Koktuma village, southern shore of Alakol' L., on *Elaeagnus oxycarpa* Schlecht., 10 July 2007, D.K.

Hosts. Parasite of aphidophagous Syrphidae: *Syrphus ribesii* L., *Epistrophe balteata* (DeGeer), *Xanthandrus comptus* Harr. (Graham, 1969; Bouček, 1977).

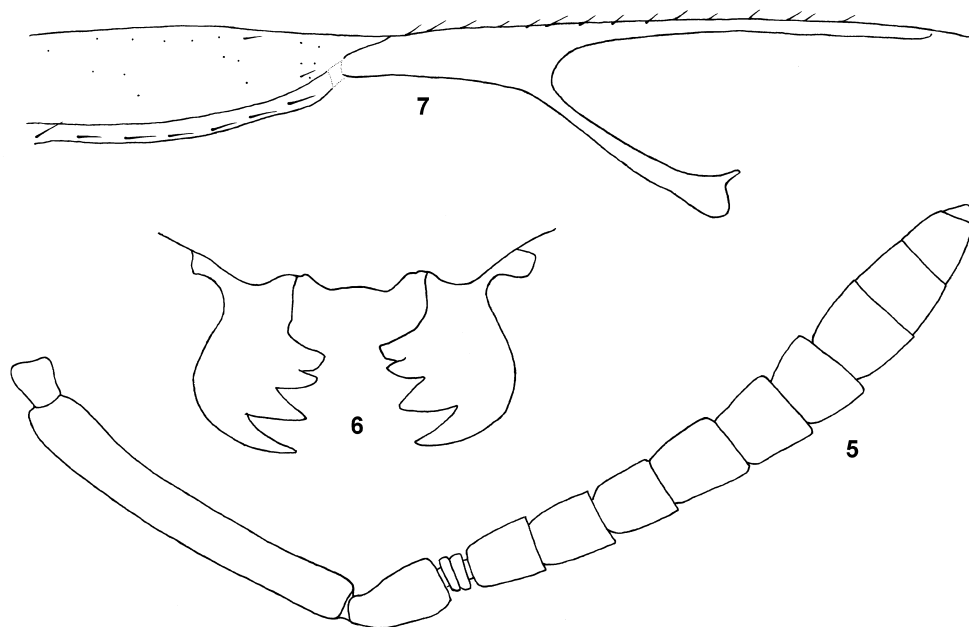
Distribution. United Kingdom, France, Germany, Italy, Middle East, Kazakhstan, Kyrgyzstan, Tajikistan.

***Pachyneuron grande* Thomson, 1878**

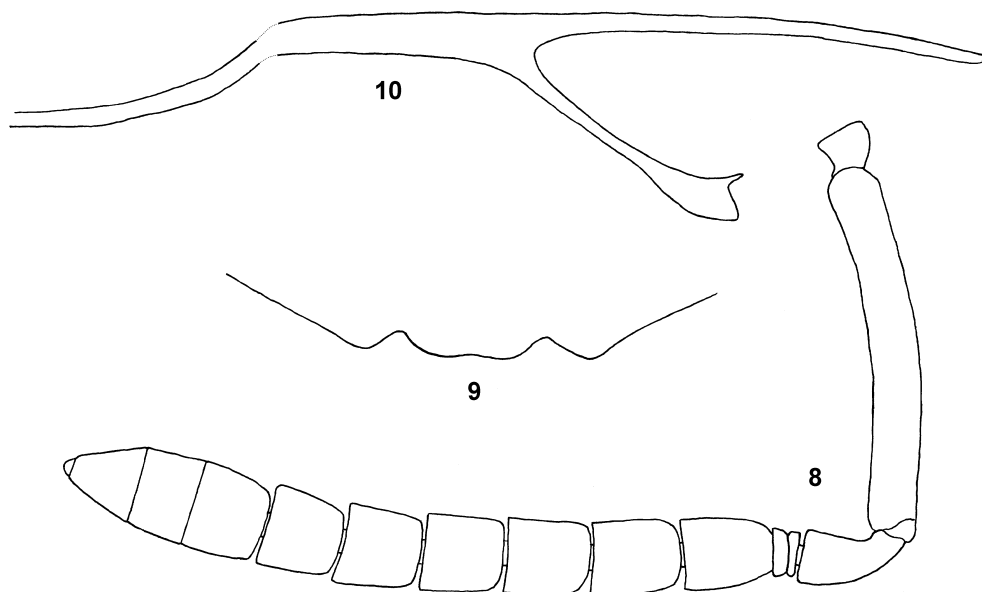
Material examined. **Kazakhstan:** **North Kazakhstan Prov.,** 2 females, near Barmashino, glades in birch forest, 12 Aug. 1976, D.K.

Host. In Europe, the species has been reared from puparia of aphidophagous syrphids *Syrphus arcuatus* Fll. and *Epistrophe balteata* (DeGeer) (Graham, 1969).

Distribution. Europe, Kazakhstan, Kyrgyzstan.



Figs 5-7. *Pachyneuron erzurumicum*, female. **5**, antenna; **6**, anterior margin of clypeus and mandibles; **7**, fore wing venation.



Figs 8-10. *Pachyneuron formosum*, female. **8**, antenna; **9**, anterior margin of clypeus and mandibles; **10**, fore wing venation.

Pachyneuron groenlandicum
(Holmgren, 1872)
(Figs 11-13)

Pachyneuron umbratum Delucchi, 1955. (Synonymy by Hedqvist, 1977).

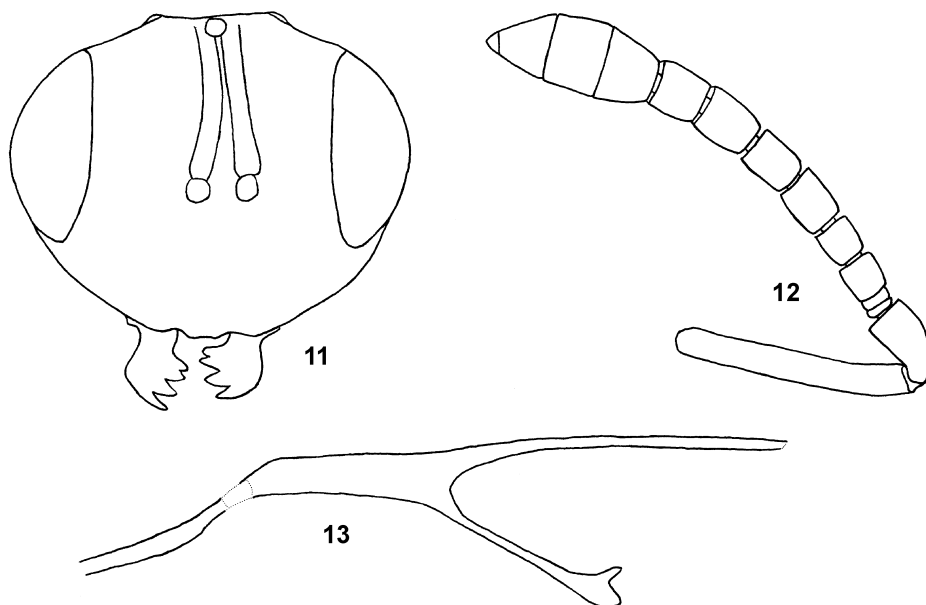
Material examined. Kazakhstan: North Kazakhstan Prov., 1 female, 2 males, Leonidovka village, from syrphid puparia, 13 Aug. 1981, T.N.; Atyrau Prov., 6 females, Caspian depression, 45 km W of Ganyushkino railway station, Kigach R. flood lands, on *Tamarix* sp., 15 Aug. 1985, D.K.; 1 female, 7-10 km N of Atyrau, Ural R. valley, 15 May 2003, K.V.; 17 females, Southern part of Balkhash L. basin, lower Ili R. valley, near Karaagash village, on *T. ramosissima*, 13-31 May, 12-15 Aug. 2003, D.K.; 5 females, 3 males, near Almaty, from puparia of *Sphaerophoria scripta* L. (Syrphidae) on wheat, 25 June 1981, S.A.; 3 females, 3 males, near Almaty, on cabbage, from puparia of Syrphidae, 21 Aug., 19 Sept. 1974, L.V.; 2 females, Kaynazarka village, on herbaceous plants, 1 June 2000, 8 Aug. 1998, D.K.; near Turgen' village, foothills of Trans-Ili Alatau Mts., pasture, 19 July 2006, D.K.; 2 females, 25 km S of Turgen village, Trans-Ili Alatau Mts., 19 and 23 July 1971, D.K.; 2 females, 1 male, Zhalanash village, from syrphid puparia on barley, 23

July 1982, S.A.; 2 females, 70 km N of Almaty, on *Elaeagnus oxycarpa* Schlecht., 7 June 2006, D.K.; 3 females, 1 male, 8 km SW of Zharkent town, 5 and 16 Sept. 1970, K.V.; 1 female, East Kazakhstan Prov., near Semipalatinsk town, 5 Aug. 1981, D.K.

Host. Reared from puparia of *Sphaerophoria scripta* L. (Syrphidae) and from puparia of undetermined species aphidophagous syrphids. There is also one record from *Oscinella frit* (L.) (Chloropidae) (Graham, 1969).

Distribution. Holarctic Region.

Remarks. The status of *P. groenlandicum* is rather doubtful, and this taxon probably falls within range of variation of *P. formosum*. These two species are very similar, but typical *P. groenlandicum* has marginal vein as long as, or slightly longer than the stigmal vein; basal vein with 2-12 setae; whilst typical *P. formosum* has marginal vein a little shorter than the stigmal vein; basal vein usually bare or rarely with 1-2 setae. These differences are small and not reliable for separating *P. groenlandicum* from *P. formosum*. On the other hand, in some series



Figs 11-13. *Pachyneuron groenlandicum*, female. 11, head (front view); 12, antenna; 13, fore wing venation.

all intermediate forms occur. For instance, in a material of *P. formosum* reared from puparia of *Ischiodon scutellaris* F. (Syrphidae) on cotton (Tajikistan, 1 June 1977, leg. Gafarov) some females have marginal vein and pilosity of the basal vein of the fore wing as in typical *P. formosum*, others are intermediate in these characters between *P. formosum* and *P. groenlandicum* or virtually identical with typical *P. groenlandicum*. Bouček (1965) suggested that *P. umbratum* might be conspecific with as *P. formosum*. He examined British material of *P. formosum*, "which differs mainly only by the relatively shorter marginal vein from most continental specimens" (Bouček, 1965: 18). For the present *P. groenlandicum* is considered as being distinct from *P. formosum*. Actually it is not easy to decide, without studying of reared specimens from different regions in Palaearctic, whether *P. groenlandicum* is a synonym of *P. formosum* or a valid species.

***Pachyneuron leucopiscida* Mani, 1939**
(Figs 14-16)

Pachyneuron cremifaniae Delucchi, 1953. (Synonymy by Bouček et al., 1979).

Material examined. Kazakhstan: *Almaty Prov.*, 1 female, 1 male, Talgar town, from puparia of *Leucopis ninae* Tanasijtshuk (Chamaemyiidae)

found amongst aphids *Brachycaudus persicaecola* Boisd. (Aphididae) on *Prunus domestica* L., 21 Aug. 1969, F.M.; 1 female, same locality, from puparia of *L. ninae* found amongst *Hyalopterus pruni* (Geoffr.) (Aphididae) on *Phragmites australis* (Cav.) Trin., 15 Aug. 1968, F.M.

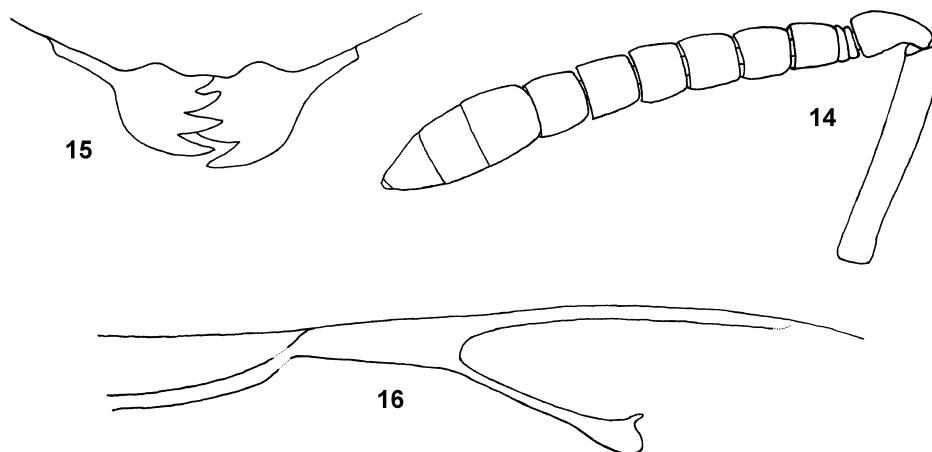
Hosts. *Cremifania nigrocellulata* Cz. (Chamaemyiidae) (Graham, 1969), *Leucopis argentata* Heeger, *L. glyphinivora* Tanasijtshuk, *L. argenticollis* Ztt., *L. ninae* Tanasijtshuk (Chamaemyiidae) (Dzhanokmen, 1984).

Distribution. United Kingdom, Germany, Switzerland, former Czechoslovakia, Belorussia, Moldavia, Russia, Kazakhstan, Kyrgyzstan, India.

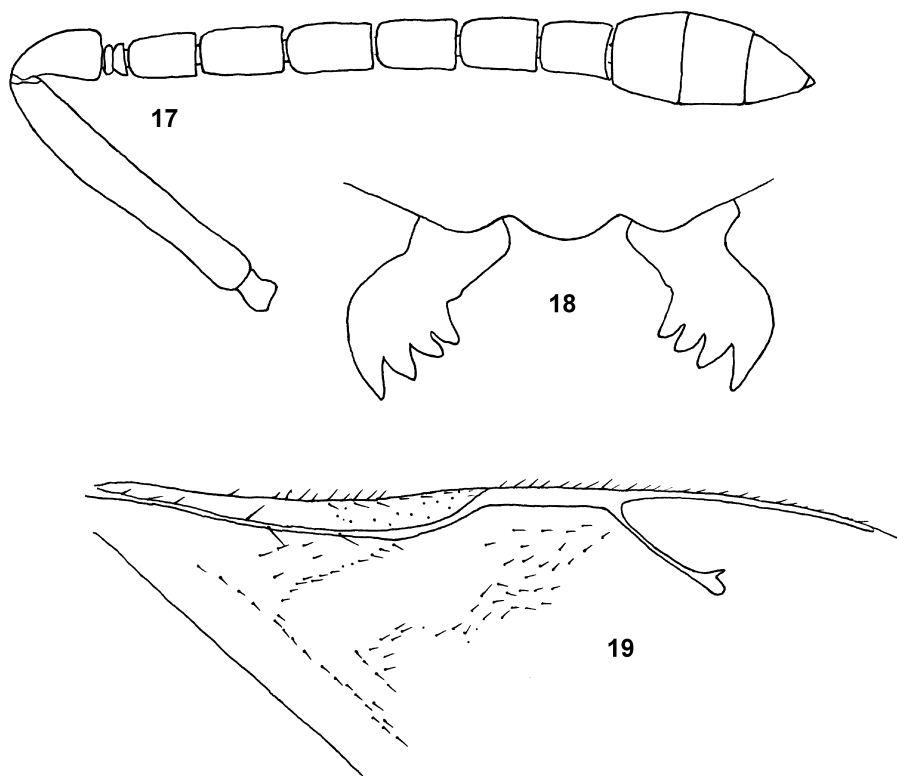
***Pachyneuron muscarum* (Linnaeus, 1758)**
(Figs 17-19)

Pteromalus concolor Förster, 1841; *Pachyneuron psyllaephagum* Mani, 1939; *Pachyneuron siculum* Delucchi, 1955. (Synonymy by Bouček, 1981).

Material examined. Kazakhstan: *Almaty Prov.*, 2 females, 1 male, Talgar town, from *Parthenolecanium corni* Bouché (Homoptera: Coccidae) on *Prunus domestica* L., 4 July 1976, D.K.; 1 female, near Almaty, from *P. corni* on *Ulmus pumila* L., 28 July 1961, S.E.; 2 females, near Almaty, Trans-Ili Alatau Mts., from *Physokermes fasciatus* Borchs. (Coccidae) on *Picea schrenkiana* Fisch. et Mey., 18-20 July 1961, S.E.



Figs 14-16. *Pachyneuron leucopiscida*, female. **14**, antenna; **15**, anterior margin of clypeus and mandibles; **16**, fore wing venation.



Figs 17-19. *Pachyneuron muscarum*, female. **17**, antenna; **18**, anterior margin of clypeus and mandibles; **19**, part of fore wing.

Host. This species develops mainly as hyperparasite of various Coccidae through Encyrtidae, in nymphs of Psyllidae, and in pupae of aphidophagous Coccinellidae (Graham, 1969; Bouček, 1970, 1977; Dzhannokmen, 1978).

Distribution. Probably whole of Europe, Israel, Kazakhstan.

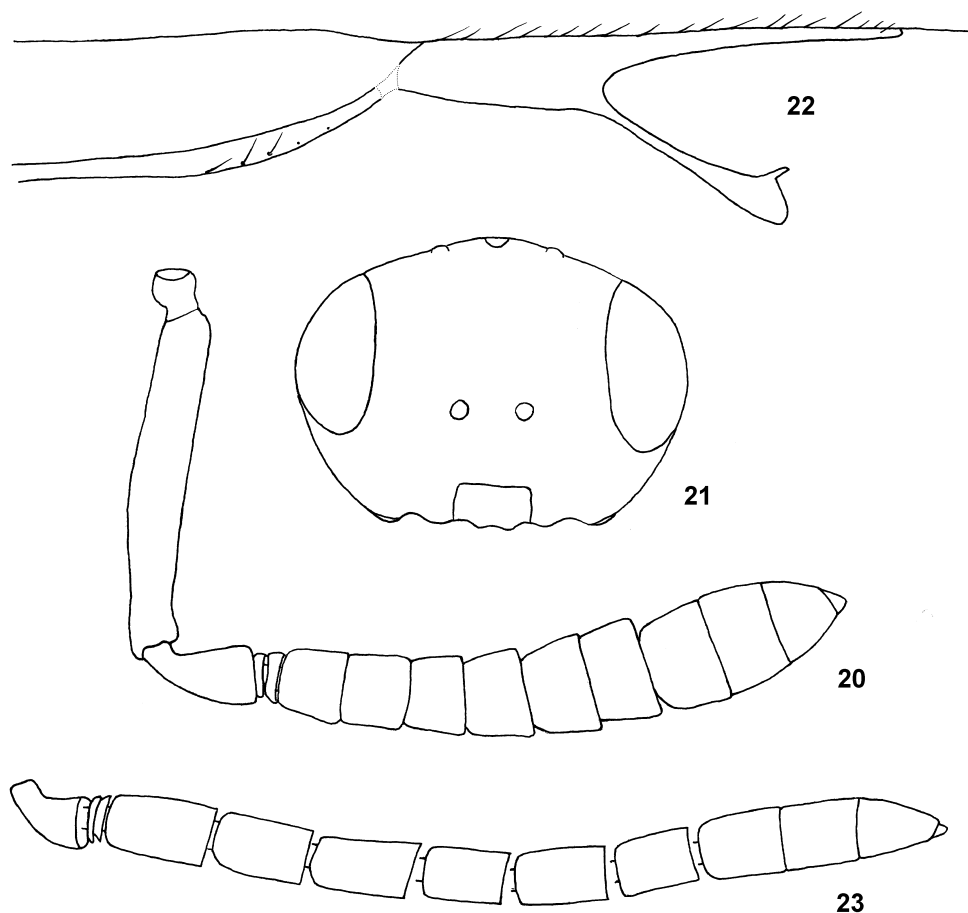
***Pachyneuron nelsoni* Girault, 1928**

(Figs 20-23)

Pachyneuron aeneus Masi, 1929. (Synonymy by Bouček, 1988).

Material examined. Kazakhstan: *Atyrau Prov.*, 2 females, 16-30 km SE of Karabatan village, 22 May 2005, K.V.; *Mangistau Prov.*, 2 females, 4 males, Mountainous Mangyshlak, 30 km SE of Shetpe railway station, on *Tamarix* sp., 1 June 1988, D.K.; 1 female, 2 males, Mountain-

ous Mangyshlak, near Tauchik village, on *Tamarix* sp., 23-24 May 1988, D.K.; 3 females, Aktau town (former Shevchenko town), botanical garden, on *Tamarix* sp., 7, 19 June 1989, D.K.; *South Kazakhstan Prov.*, 1 female, near Biylikol L., 20 km E of Karatau town, on *Elaeagnus oxycarpa* Schlecht., 30 May 2002, D.K.; *Zhambyl Prov.*, 4 females, 10 males, near Karatau town, on *Tamarix ramosissima* Ledeb., 27-29 May 2000, 3 June 2000, D.K.; *Almaty Prov.*, 4 females, 2 males, near Almaty, from unknown species of Syrphidae puparia, 12 Jan. 1981, L.V.; 11 female, 5 males, southern part of Balkhash L. basin, lower Ili R. valley, near Karaagash village, on *T. ramosissima*, 15.31 May 2003, 12-15 Aug. 2003, D.K.; 1 female, 1 male, Masak, Chilik R. flood lands, on *T. ramosissima* in gallery forest, 25 May 2004, 26 June 2007, D.K.; 2 males, 30 km SE of Chilik, Zhingilsu R. flood lands, on *T. ramosissima*, 4 June 2005, D.K.; 1 male, Charyn R. valley, Sortogay natural boundary, on *T. ramosissima*, 7 June 2005, D.K.; 1 female, Syugatinskaya Val-



Figs 20-23. *Pachyneuron nelsoni*. 20, antenna, female; 21, head (front view), female; 22, fore wing venation, female; 23, antenna excluding scape, male.

ley, 6 June 2005, D.K.; *Karaganda Prov.*, 1 female, northern part of Balkhash L. basin, 50 km NE of Balkhash town, motley grass meadow, 11 June 1978, D.K.; 1 female, 85 km NE of Balkhash town, on *T. ramosissima*, 12 June 1978, D.K. *East Kazakhstan Prov.*, 1 female, 118 km SW of Ust'-Kamenogorsk, NW spurs of Kalbinskiy Range, Kyzyl-su natural boundary, flood lands, 18 June 1979, D.K.

Hosts. *Paragus tibialis* Fll., *P. pulcherrimus* Strobl, *P. aegyptius* Wiedemann, *Scaeva albomaculata* Mcq., *Ischiodon scutellaris* F., *Epistrophe balteata* (DeGeer) (Diptera, Syrphidae) (Bouček, 1977; Gafarov, 1979; Dzhanokmen, 1984).

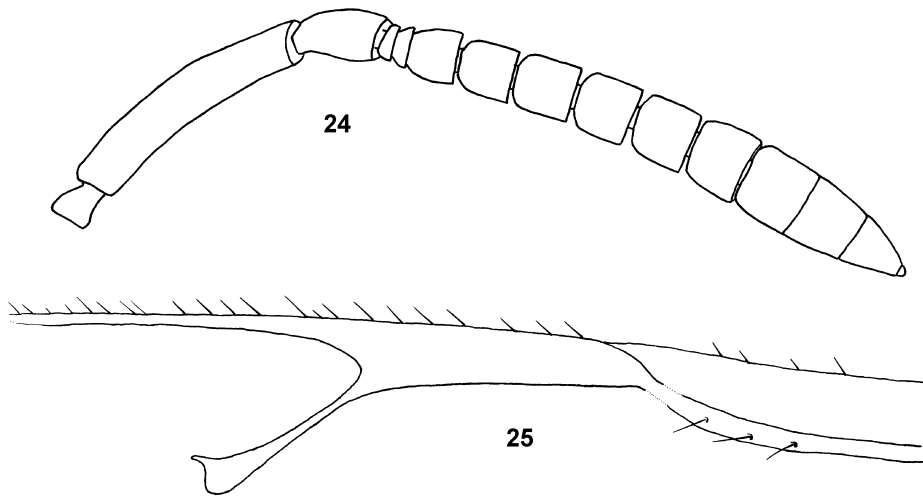
Distribution. Yugoslavia, Moldavia, European part of Russia, Azerbaijan, Turkey,

Libya, Kazakhstan, Tajikistan, India, Australia.

***Pachyneuron planiscuta* Thomson, 1878**
(Figs 24-25)

Material examined. **Kazakhstan:** *Atyrau Prov.*, 1 female, 30 km NE of Karabatan village, 17 May 2003, K.V.; *South Kazakhstan Prov.*, 1 female, Dzhetyysay, on *Phragmites australis*, 12 Aug. 1980, D.K.

Hosts. Unknown species of Syrphidae puparia on *Phragmites australis* (Cav.) Trin. in Finland (Vikberg, 1982) and from Syrphidae puparia on paddy in Russia (Dzhanokmen, 1984).



Figs 24-25. *Pachyneuron planiscuta*, female. 24, antenna; 25, fore wing venation.

Distribution. Ireland, Sweden, Finland, Hungary, Moldavia, European part of Russia, Kazakhstan.

***Pachyneuron solitarium* (Hartig), 1838**
(Figs 26-29)

Material examined. Kazakhstan: *West Kazakhstan Prov.*, 4 females, Uralsk town, Ural R. flood lands, swept from herbage, 9 Sept. 1977, D.K.; *Almaty Prov.*, 2 females, 25 km S of Turgen' village, Trans-Ili Alatau Mts., swept from *Picea schrenkiana* Fisch. et Mey., 22 July 1971, D.K.

Hosts. Reared from eggs of *Dendrolimus pini* (L.) (Lasiocampidae) (Graham, 1969). I also identified specimens from eggs of *D. pini* (Belorussia, Gomel', July 1965, leg. Entin; Georgia, Khashuri, Sept. 1978, leg. Zharkov).

Distribution. Germany, former Czechoslovakia, Belorussia, Moldavia, Georgia, Kazakhstan.

Key to species of *Pachyneuron* from Kazakhstan (modified from Graham, 1969)

1(4). Fore wing without apical marginal fringe.
2(3). Postmarginal vein slightly longer than stigmal vein (Fig. 22). Funicular segments 1-3 subquadrate, 4-6 transverse; funicle more stout (Fig. 20) ***P. nelsoni***

3(2). Postmarginal vein distinctly longer than stigmal vein (Fig. 7). Funicular segments 1-4 longer than broad, 5-6 quadrate; funicle less stout (Fig. 5) ***P. erzurumicum***

4(1). Fore wing with apical marginal fringe.

5(6). Mesosoma weakly arched dorsally; scutellum in profile nearly flat, its disc with rather fine sculpture and more shiny, than sides. Genae hardly sharp above bases of mandibles, and with a small hollow. Head in frontal view about 1.5 times as broad as high. – Female antenna, Fig. 24; female fore wing venation, Fig. 25 ***P. planiscuta***

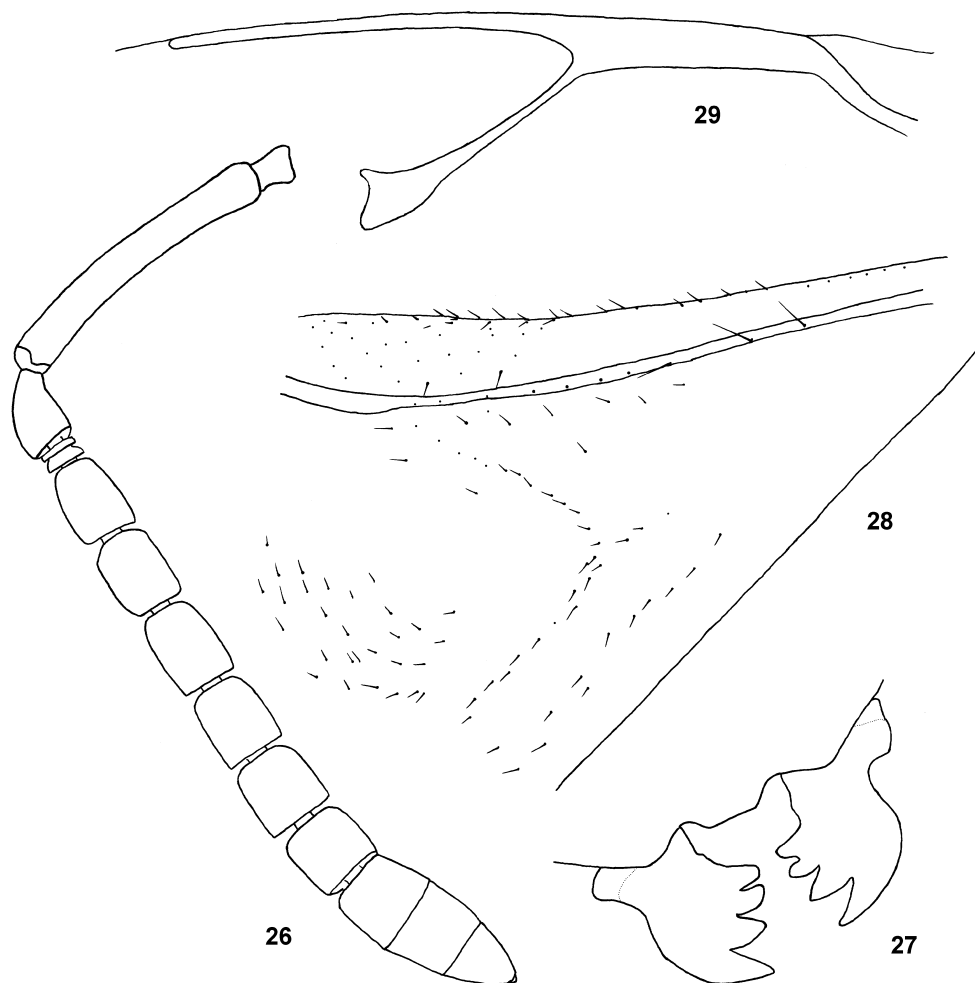
6(5). Mesosoma usually moderately to strongly arched dorsally; scutellum convex and distinctly reticulate throughout. Genae usually distinctly sharp above bases of mandibles, and with a larger hollow. Head in frontal view usually less transverse.

7(16). Lower margin of clypeus slightly emarginate or truncate medially (Figs 9, 11, 15, 21, 27), surface of clypeus virtually flat.

8(9). Fore wing with speculum closed below. Upper surface of costal cell with a row of hairs extending over its distal quarter to one third (Fig. 28). – Female antenna, Fig. 26 ***P. solitarium***

9(8). Fore wing with speculum open below. Upper surface of costal cell often bare.

10(11). Scutellum in profile weakly convex. Propodeum only slightly more than half as long as scutellum. Nucha mainly smooth or virtually so, and marked off by very distinct constriction. – Female antenna, Fig. 14; fe-



Figs 26-29. *Pachyneuron solitarium*, female. **26**, antenna; **27**, lower margin of clypeus and mandibles; **28**, part of fore wing; **29**, fore wing venation.

- male fore wing venation, Fig. 16 *P. leucopiscida*
- 11(10). Scutellum in profile more strongly convex. Propodeum often rather longer. Nucha mainly to entirely reticulate or transversely aciculate.
- 12(13). Costal cell of fore wing on upper surface with row of setae extending over its distal third to half *P. grande*
- 13(12). Costal cell of fore wing on upper surface bare.
- 14(15). Fore wing with marginal vein a little shorter than the stigmal vein. Basal vein usually bare, rarely with 1-2 setae. – Female antenna, Fig. 8; female fore wing venation, Fig. 10 *P. formosum*
- 15(14). Fore wing with marginal vein approximately as long as, or slightly longer than stigmal vein. Basal vein with 2-12 setae. – Female antenna, Fig. 12; female fore wing venation, Fig. 13 *P. groenlandicum*
- 16(7). Lower margin of clypeus obtuse, rounded or angular medially, surface of clypeus convex (Figs 2, 18).
- 17(18). Length of marginal vein 2.7-3 times its maximum breadth (Fig. 3); speculum open below. Antennal formula of female 11353 (Fig. 1). Metasoma short and broad; metasomal petiole not longer than broad, virtually smooth. – Male antenna, Fig. 4. . . *P. aphidis*
- 18(17). Length of marginal vein 4-5 times its maximum breadth, speculum closed or nearly

closed below (Fig. 19). Antennal formula of female 11263 (Fig. 17). Metasoma relatively longer; metasomal petiole conspicuously longer than broad, its dorsal surface transversely aciculate or aciculate-reticulate
 *P. muscarum*

ACKNOWLEDGEMENTS

I am thankful to S.A. Belokobylskij for commenting on the manuscript. Thanks are expressed to all my colleagues for the specimens used in this study.

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Received 13 November 2008 / Revised 12 May 2009 / Accepted 20 May 2009