РОССИЙСКАЯ АКАДЕМИЯ НАУК
Южный научный центр

RUSSIAN ACADEMY OF SCIENCES
Southern Scientific Centre

Кавказский Энтомологический Бюллетень

CAUCASIAN ENTOMOLOGICAL BULLETIN

Том 20. Вып. 2
Vol. 20. Iss. 2

Ростов-на-Дону
2024

A review of the tribe Podagrionini Ashmead, 1904 (Chalcidoidea: Torymidae) of the fauna of Russia and adjacent countries, with descriptions of two new species

© S.V. Tyulina[1], G. Delvare[2]

[1]The Herzen State Pedagogical University of Russia, Moyka River Embankment, 48, Saint Petersburg 191186 Russia. E-mail: sofia.tyulina@yandex.ru
[2]Biology Center for Populations Management, Avenue Agropolis, Montpellier Cedex 5 34398 France

Abstract. Species of the tribe Podagrionini Ashmead, 1904 of the subfamily Podagrioninae Ashmead, 1904 (Hymenoptera: Torymidae) are reviewed. Four species from the Mediterranean Basin, *Iridophaga lichtensteini* (Picard, 1933), **comb. rev.**, *I. korsakowi* (Picard, 1936), **comb. rev.**, *I. eremiaphilae* (Doğanlar et Doğanlar, 2008), **comb. n.** and *I. konyaensis* (Doğanlar et Doğanlar, 2008), **comb. n.**, are transferred from *Podagrionella* Girault, 1913 to *Iridophaga* Picard, 1933. *Iridophagoides petiolatus* Erdös, 1964, **comb. rev.** and *I. tatianae* Bouček, 1976, **comb. rev.** are transferred back to the genus *Iridophagoides* Erdös, 1964 from *Podagrionella*. Two new species, *Podagrion kondarensis* Tyulina, **sp. n.** from Russia and Tajikistan and *Podagrion murgabensis* Tyulina, **sp. n.** from Turkmenistan and Tajikistan, are described and illustrated. The female of *P. libycum* Masi, 1929 is described and illustrated for the first time. New distribution records are reported: *Iridophagoides tatianae* in Armenia and Azerbaijan; *Podagrion gibbum* Bernard, 1938 in Russia, Armenia, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan; *P. libycum* Masi, 1929 in Russia, Turkmenistan and Tajikistan; *P. minus* Strand, 1911 in Armenia and Kazakhstan; *P. pachymerum* (Walker, 1833) in Abkhazia and Tajikistan; *P. splendens* Spinola, 1811 in Kazakhstan, Turkmenistan, Tajikistan and Mongolia. An identification key to females of the species of Podagrionini of the fauna of Russia and adjacent countries is provided.

Key words: Chalcidoidea, Torymidae, Podagrionini, parasitoids of mantids, new species, key, distribution.

Обзор трибы Podagrionini Ashmead, 1904 (Chalcidoidea: Torymidae) фауны России и сопредельных стран с описанием двух новых видов

© С.В. Тюлина[1], Ж. Дельвар[2]

[1]Российский государственный педагогический университет им. А.И. Герцена, набережная реки Мойки, 48, Санкт-Петербург 191186 Россия. E-mail: sofia.tyulina@yandex.ru
[2]Центр биологии и регуляции популяций, Авеню Агрополис, Монпелье Седекс 5 34398 Франция

Резюме. Дан обзор видов трибы Podagrionini Ashmead, 1904 подсемейства Podagrioninae Ashmead, 1904 (Hymenoptera: Torymidae). Четыре вида из Средиземноморского бассейна, *Iridophaga lichtensteini* (Picard, 1933), **comb. rev.**, *I. korsakowi* (Picard, 1936), **comb. rev.**, *I. eremiaphilae* (Doğanlar et Doğanlar, 2008), **comb. n.** и *I. konyaensis* (Doğanlar et Doğanlar, 2008), **comb. n.** перенесены из рода *Podagrionella* Girault, 1913 в род *Iridophaga* Picard, 1933. *Iridophagoides petiolatus* Erdös, 1964, **comb. rev.** и *I. tatianae* Bouček, 1976, **comb. rev.** возвращены в род *Iridophagoides* Erdös, 1964 из *Podagrionella*. Описаны и проиллюстрированы два новых вида: *Podagrion kondarensis* Tyulina, **sp. n.** из России и Таджикистана и *Podagrion murgabensis* Tyulina, **sp. n.** из Туркменистана и Таджикистана. Впервые описана и проиллюстрирована самка вида *P. libycum* Masi, 1929. Приведены следующие новые данные о распространении видов: *Iridophagoides tatianae* в Армении и Азербайджане; *Podagrion gibbum* Bernard, 1938 в России, Армении, Азербайджане, Казахстане, Туркменистане, Узбекистане, Таджикистане и Кыргызстане; *P. libycum* Masi, 1929 в России, Туркменистане и Таджикистане; *P. minus* Strand, 1911 в Армении и Казахстане; *P. pachymerum* (Walker, 1833) в Абхазии и Таджикистане; *P. splendens* Spinola, 1811 в Казахстане, Туркменистане, Таджикистане и Монголии. Дана определительная таблица для самок трибы Podagrionini фауны России и сопредельных стран.

Ключевые слова: Chalcidoidea, Torymidae, Podagrionini, паразитоиды богомолов, новые виды, ключ, распространение.

Introduction

In the past, taxonomic rank of Podagrioninae (Hymenoptera: Torymidae) often changed from the family to the tribe level. Nowadays, it is considered a subfamily of Torymidae. Podagrioninae include the tribe Podagrionini Ashmead, 1904 and its sister group, Palachiini Bouček, 1976 [Janšta et al., 2018]. Three genera of Podagrionini are known in the Palaearctic region, i.e. *Podagrion* Spinola, 1811, *Iridophaga* Picard, 1933 and *Iridophagoides* Erdös, 1964. *Iridophaga* was synonymized with *Podagrionella* Girault, 1913 and *Iridophagoides* by Bouček [1988] and Grissell [1995] respectively. The two latter genera were revalidated by Janšta et al. [2018] after the phylogenomic study of the Torymidae. Based on this study as well as on the examination of type material by one of the authors (Gerard Delvare), we transfer four species from the Mediterranean Basin, namely, *Iridophaga lichtensteini* (Picard, 1933), **comb. rev.**, *I. korsakowi* (Picard, 1936), **comb. rev.**, *I. eremiaphilae* (Doğanlar et Doğanlar, 2008), **comb. n.** and *I. konyaensis* (Doğanlar et Doğanlar, 2008), **comb. n.**, from *Podagrionella* to *Iridophaga*. We also transfer *Iridophagoides petiolatus* Erdös, 1964, **comb. rev.** and *I. tatianae* Bouček, 1976, **comb. rev.** back to *Iridophagoides*.

Research Article / Научная статья
DOI: https://doi.org/10.5281/zenodo.14509475
ZooBank Article LSID: urn:lsid:zoobank.org:pub:F8D3AA58-F81C-45CA-A9FA-4FC264A6C249

The genus *Podagrion* contains 10 species in the Palaearctic region: *P. bouceki* Delvare, 2005, *P. breviveinus* Zhao, Huang et Xiao, 2007, *P. gibbum* Bernard, 1938, *P. klugianum* (Westwood, 1847), *P. libycum* Masi, 1929, *P. minus* Strand, 1911, *P. nipponicum* Habu, 1962, *P. okinawense* Habu, 1962, *P. pachymerum* (Walker, 1833) and *P. splendens* Spinola, 1811. *Podagrion philippinense* Crawford, 1910 and *P. sinense* (Walker, 1852) are the mostly Oriental species with marginal distribution in the Palaearctic region [Grissell, 1995; Noyes, 2019]. Up to now, only two species, i.e. *P. pachymerum* and *P. splendens*, were recorded from Russia [Zerova, Seryogina, 1999; Kostjukov et al., 2004], whereas *P. mantis* Ashmead, 1886 was incorrectly reported from the northern part of the European Russia (Arkhangelsk Region) [Grissell, 1995; Noyes, 2019; Tselikh et al., 2019].

All Podagrioninae are solitary parasitoids of mantid (Mantodea) egg cases ([Grissell, 1995; Delvare, 2005], Gerard Delvare and Irina Zonstein, personal observations). Species of *Iridophagoides* and *Iridophaga* were reared from several members of the genus *Ameles* Burmeister, 1838. In addition, *Iridophaga* was also reared from *Iris oratoria* (Linnaeus, 1758) and *Blepharopsis mendica* (Fabricius, 1775) [Picard, 1933, 1936a].

The aim of this work is to describe two new species of *Podagrion* from Russia and Central Asia, together with the newly discovered female of *P. libycum*. New records of Podagrionini species from Russia and neighboring countries are also listed. An identification key to females of Podagrionini from Russia and adjacent countries is provided.

Material and methods

Examined specimens, including holotypes and paratypes of new species, are deposited in the collection of the Zoological Institute of the Russian Academy of Sciences (ZISP, Saint Petersburg, Russia). Type material of other species of *Iridophagoides* and *Podagrion* is deposited in Natural History Museum (BMNH, London, UK), Muséum national d'Histoire naturelle (MNHN, Paris, France), Museo Civico di Storia Naturale (MCSN, Genova, Italy), Universitá degli Studi di Napoli (Portici, Italy) and Museum für Naturkunde – Leibniz-Institut für Evolutions- und Biodiversitätsforschung (MNLI, Berlin, Germany).

Morphological terminology, including sculpture and wing venation nomenclature, follows Gibson [1997] and Delvare [2005]. Pedicel is measured in lateral view. Following abbreviations are used: Fu_1–Fu_7 – funicular segments; OOL – ocello-ocular line, minimum distance between lateral ocellus and compound eye; LOD – lateral ocellar diameter; POL – postocellar line.

Specimens were examined using MSP-2, Leica MZ95 and Keyence VHX-5000 multiple-focus imaging system stereomicroscopes. Photographs were taken using Canon EOS 70D digital camera mounted on an Olympus SZX10 microscope in ZISP and Keyence VHX-5000 stereomicroscope in Centre for Population Biology and Management (Montpellier, France).

Known information on the geographical distribution and hosts of Podagrionini is given according to Grissell [1995], Zerova, Seryogina [1999], Kostjukov et al. [2004], Delvare [2005] and Noyes [2019].

New species records for countries and territories are marked with an asterisk (*).

Family Torymidae Walker, 1833
Subfamily Podagrioninae Ashmead, 1904
Tribe Podagrionini Ashmead, 1904
Genus *Iridophagoides* Erdös, 1964

Iridophagoides Erdös, 1964: 93 (type species *Iridophagoides petiolatus* Erdös, 1964, by monotypy).

Podagrionella Girault, 1913a: 96 (type species *Podagrionella bella* Girault, 1913, by monotypy). Synonymy by Grissell [1995: 152]. Status restored by Janšta et al. [2018: 627, 635, 645].

Iridophagoides petiolatus Erdös, 1964, **comb. rev.**

Iridophagoides petiolatus Erdös, 1964: 93. Holotype female (MNHN, not examined).

Podagrionella petiolatus (Erdös, 1964). New combination by Grissell [1995: 250]. Combination restored by Janšta et al. [2018: 627, 635, 645].

Biology. Unknown.

Distribution. Algeria.

Iridophagoides tatianae Bouček, 1976, **comb. rev.**
(Figs 1–7)

Iridophagoides tatianae Bouček, 1976: 182–183. Holotype female (BMNH, not examined).

Podagrionella tatianae (Bouček, 1976). New combination by Grissell [1995: 250]. Combination restored by Janšta et al. [2018: 627, 635, 645].

Material. Armenia. 1♀, Yerevan, 11.05.1957 (V.A. Trjapitzin).
Azerbaijan. 1♂, Nakhichevan Autonomous Republic, Ulya Norashen vill., 16.10.1955 (E. Arens).

Biology. Parasitoid of mantids, *Ameles* sp. and *Ameles spallanzania* (Rossi, 1792) (Mantidae) (Gerard Delvare, personal observation).

Distribution. Spain, Armenia*, Azerbaijan*, Greece* (Gerard Delvare, personal observation).

Genus *Podagrion* Spinola, 1811

Podagrion Spinola, 1811: 147 (type species *Podagrion splendens* Spinola, 1811, by monotypy).

Priomerus Walker, 1833: 116 (type species *Priomerus pachymerus* Walker, 1833, by original designation). Synonymy by Grissell [1995: 161, 234].

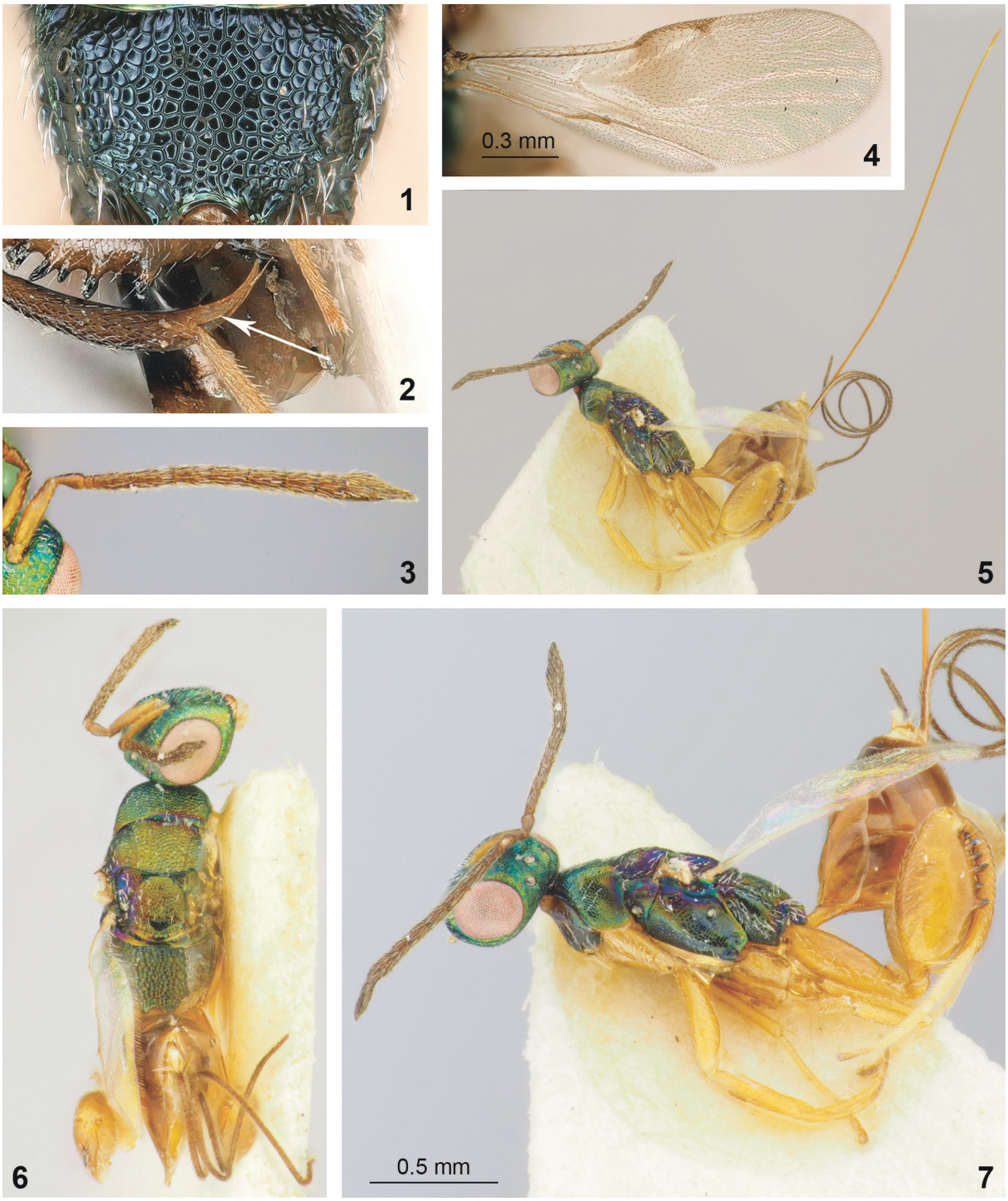
Palmon Westwood, 1847: 260 (type species *Palmon klugianus* Westwood, 1847, by original designation). Synonymy by Grissell [1995: 161, 163, 234].

Bactyrischion Costa, 1857: 223 (type species *Bactyrischion bicoloratum* Costa, 1857, by original designation). Synonymy by Grissell [1995: 161, 234].

Blephonira Holmgren, 1868: 438 (type species *Blephonira fulvipes* Holmgren, 1868, by original designation). Synonymy by Grissell [1995: 161, 234].

Cleptimorpha Walker, 1872: 84 (type species *Cleptimorpha binotata* Walker, 1872, by original designation). Synonymy by Grissell [1995: 161, 234].

Cyanostola Saussure, 1890: pl. XV, fig. 30 (type species *Cyanostola coerulea* Saussure, 1890 by original designation). Synonymy by Grissell [1995: 161, 163, 234].

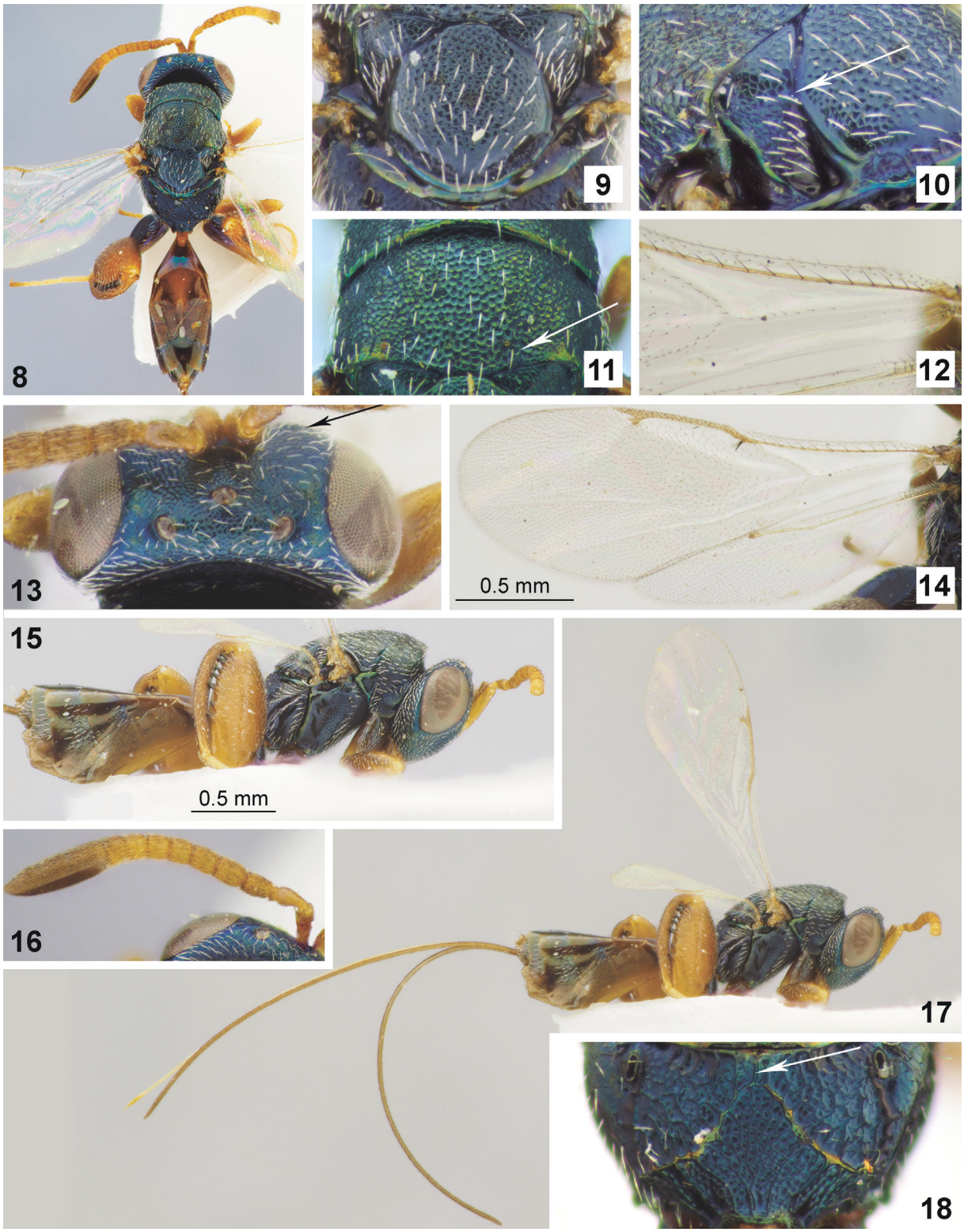


Figs 1–7. *Iridophagoides tatianae*, female, details of structure.

1 – propodeum, dorsal view; 2 – hind tibia (arrow shows spine of apex of hind tibia); 3 – antenna; 4 – wings; 5, 7 – habitus, lateral view; 6 – habitus, dorsal view.

Рис. 1–7. *Iridophagoides tatianae*, самка, детали строения.

1 – промежуточный сегмент, дорсально; 2 – задняя голень (стрелкой показан шип вершины задней голени); 3 – усик; 4 – крылья; 5, 7 – габитус, латерально; 6 – габитус, дорсально.



Figs 8–18. *Podagrion gibbum*, female.

8 – habitus, dorsal view; 9 – scutellum, dorsal view; 10 – axilla, dorso-lateral view (arrow shows axillar groove); 11 – mesoscutum, dorsal view (arrow shows notaulus); 12 – forewing, basal part; 13 – head, dorsal view (arrow shows frons); 14 – wings; 15, 17 – habitus, lateral view; 16 – antenna; 18 – propodeum, dorsal view (arrow shows median carina of propodeum).

Рис. 8–18. *Podagrion gibbum*, самка.

8 – габитус, дорсально; 9 – щиток, дорсально; 10 – аксилла, дорсо-латерально (стрелкой показана аксиллярная борозда); 11 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 12 – переднее крыло, базальная часть; 13 – голова, дорсально (стрелкой показан лоб); 14 – крылья; 15, 17 – габитус, латерально; 16 – усик; 18 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента).

Pachytomoidella Girault, 1913b: 40 (type species *Pachytomoidella magniclavus* Girault, 1913, by original designation). Synonymy by Grissell [1995: 161, 163, 234].

Propodagrion Girault, 1915: 287 (type species *Propodagrion worcesteri* Girault, 1915, by original designation). Synonymy by Grissell [1995: 161, 234].

Coquereliana Gahan et Fagan, 1923: 38. Synonymy by Grissell [1995: 161, 163, 234].

Podagrion gibbum Bernard, 1938 (Figs 8–18)

Podagrion pachymerum gibba Bernard, 1938: 42. Lectotype female (MNHN) designated by Delvare [2005: 72].

Podagrion gibbum Bernard, 1938: Delvare, 2005: 72–75 (new status).

Material. Russia. Rostov Region: 1♂, Orlovskiy Distr., Kurgan vill., sand place, 3.08.2020 (O.V. Kosheleva). Volgograd Region: 1♀, Sarepta vill., 1.06.1917 (N.N. Kuznetsov-Ugamsky); 7♀, 1♂, Elton Lake, mantid eggs, 2.05.1951 (Burnasheva). Kalmykia: 3♀, 1♂, 20 km SE Tsagan-Aman vill., 21.05.1986 (D.R. Kasparyan); 1♂, Davsna Sands, 20 km E Khulhuta vill., 46°17′31.2″N / 46°40′19.2″E, on Peganum harmala L., 16.06.2018 (K.I. Fadeev). Astrakhan Region: 1♀, Aktobe Distr., 5 km W Baskunchak Lake, 23.05.1986 (D.R. Kasparyan). Stavropol Region: 1♀, Podkumok vill., 26.05.1929 (Smolyannikov). Orenburg Region: 1♀, Orsk, mantid eggs, 06.1936 (I.A. Chetyrkina). Crimean Peninsula: 1♀, Kerch Distr., Kazantip Cape, 4.06.1927 (E.A. Kuznetsova, V.A. Kuznetsov); 3♀, 1♂, Kerch Distr., Lis'ya Bay, ootheca of *Iris* sp., 11–13.06.2021 (K.I. Fadeev).

Armenia. Syunik Region: 1♂, Shurnukh vill., Vorotan Gorge, 14.09.1956 (V.A. Trjapitzin); 1♀, Goris, 19.09.1956 (V.A. Trjapitzin).

Azerbaijan. 1♂, Baku, Karadagh Distr., Caspian Sea coast, 20 km S Alyat vill., 6.06.1985 (V.I. Tobias).

Kazakhstan. West Kazakhstan Region: 3♀, Akzhaik Distr., Kharkino vill. (= Shabdarzhap), Ural River, 13.05.1951, 1.06.1951, 12.06.1951 (V.P. Rudolf); 1♀, same locality, 13.06.1951 (L.V. Arnoldi); 4♀, Burlinsk Distr., 10 km SE Mirgorodka vill., 30.05.1986 (D.R. Kasparyan). Turkestan Region: 1♀, Karzhantau Ridge, steppe with umbelliferous plants and cereals, 4.07.1937 (Obukhova); 1♀, Karzhantau Ridge, tugay vegetation near Bogu-chalpak Gorge (= Boguchalpak), 13.07.1938 (Obukhova); 1♀, "Хр. Каржантау, древ. разнотр. тугая Су-сингана" [Karzhantau Ridge, woody herbs of tugai Su-singan], 1.08.1938 (Obukhova); 1♀, "Хр. Каржантау, листв. лес устья Су-сингана" [Karzhantau Ridge, deciduous forest of mouth of Su-singan], 11.08.1938 (Obukhova); 2♀, Karzhantau Ridge, Kyzyl-Tal vill., wheatgrass steppe, 12.08.1938 (Obukhova); 1♀, Karzhantau Ridge, tugay vegetation near Bogu-chalpak Gorge (= Boguchalpak), 13.08.1938 (Obukhova); 1♀, Karzhantau Ridge, subalpine meadow, north, 3.07.1939 (Obukhova). Almaty Region: 1♀, Talgar Distr., Karatau Mts., Boyaldyr River Valley, 15 km SSW Mynzhylky Mt., 9–10.07.1981 (M.G. Volkovitsh). East Kazakhstan Region: 1♂, 45 km ENE Tarbagatai Mts., 21.07.1983 (A.N. Alekseev).

Turkmenistan. Balkan Region: 1♀, Magtymguly Distr., Kopetdag Mts., Upper Ay-Dere Gorge, 9.05.1980 (N.A. Storozheva); 1♂, Magtymguly Distr., Kopetdag Mts., 950 m from Ay-dere vill., 30.04.1986 (E. Budrys); 1♀, Magtymguly Distr., Kopetdag Mts., 3 km E Ay-dere vill., 6.05.1986 (E. Budrys).

Uzbekistan. 1♀, Navoiy Region, Khatyrchi Distr., Karatau Mts., Gumbaz Tract, 20 km WSW Langar vill., 27.05.1984 (M.G. Volkovitsh).

Tajikistan. 1♂, Stalinabad (= Dushanbe), foothill, 27.06.1935 (V.V. Gussakovskij).

Kyrgyzstan. Chui Region: 2♀, Kemin Distr., 20 km SE Kemin, 1350 m, mouth of Chon-Kemin River, steppe slopes and semi-desert, 13.07.1979 (D.R. Kasparyan). Osh Region: 1♀, "Советский район, 5 км ЮВ кишл. Терек (Кызыл-Кия)" [Sovetskiy Distr., 5 km SE of Terek village (Kyzyl-Kiya)], 17.08.1985 (E. Budrys).

Biology. Parasitoid of mantids, *Ameles decolor* (Charpentier, 1825), *A. spallanzania*, *Iris oratoria*, *Mantis religiosa* (Linnaeus, 1758) (Mantidae) and *Empusa pennata* (Thunberg, 1815) (Empusidae).

Distribution. Spain, France, Romania, Greece, Russia*, Armenia*, Azerbaijan*, Kazakhstan*, Turkmenistan*, Uzbekistan*, Tajikistan*, Kyrgyzstan*.

Podagrion kondarensis Tyulina, **sp. n.** (Figs 19–30)

Material. Holotype, ♀ (ZISP): Tajikistan, «ущ. Кондара, с. Варзоб, 1100 м» [Kondara Gorge, Varzob vill., 1100 m], 18.07.1938 (V.V. Gussakovskij). Paratype: 1♀ (ZISP), Russia, Kalmykia, Ketchenery Distr., 30 km NNW Sarpa vill., Tsagan-Nur Lake (= Sarpa Lake), 20.05.1986 (D.R. Kasparyan).

Diagnosis. Flagellomeres relatively short with combined length of pedicel and flagellum 1.85 times as long as width of head and Fu_1 1.5–1.6 times as long as broad. Head 1.9–2.2 times as broad as long in dorsal view. Fronto-vertex as long as eye height. Ocelli relatively large, OOL less than LOD. Notauli complete, shallow posteriorly. Axillar grooves homogeneous, not crenulate. Axillae squamose. Frenum smooth. Propodeal lateral carinae forming an inverted V, propodeum reticulate between them; spiracle of propodeum as long as its distance to posterior margin of dorsellum. Forewing with cubital fold bare along basal cell. Ovipositor sheaths about as long as body.

Description. Female. Body length 3.2–4 mm; forewing length 2.2–2.6 mm.

Combined length of pedicel and flagellum 1.85 times as long as width of head. Fu_1 1.5–1.6 times as long as broad and 0.8–0.9 times as long as pedicel. Fu_7 0.68 times as long as wide, clava 1.22 times as long as scape. Frons moderately convex. Head 1.9–2.2 times wider than maximum length in dorsal view, 2.2–2.4 times wider than minimum length in dorsal view and 1.2–1.3 times as broad as high in frontal view. Vertex 0.95 times as broad as frons in dorsal view; 1.9–2 times as broad as eye in dorsal view; 2.19–2.28 times as broad as POL. POL 2.92–3.1 times as long as OOL; OOL 0.8–0.9 times as long as LOD. Fronto-vertex as long as eye height, malar space 0.4–0.5 times as long as eye height and 0.7–0.8 times as long as oral fossa. Distance between lower edge of antennal toruli and ventral margin of clypeus as long as scape.

Mesosoma 1.3–1.4 times as long as wide; mesoscutum 0.65–0.75 times as long as broad; scutellum slightly longer than wide; frenum 0.2–0.3 times as long as scutellum; notauli complete, shallow posteriorly; axillar grooves homogeneous. Median carina of propodeum absent; lateral carinae straight, curving outwards posteriorly, forming an inverted V, with acute angle between them (60–70°); spiracles elongated, 1.14–1.28 times as long as its distance to posterior margin of dorsellum; spiracular grooves obviously deep, long and broad.

Legs. Metacoxa 2.3–2.4 times as long as wide; metafemur 2 times as long as broad, with 7–8 teeth, two last teeth enlarged and partly fused.

Forewing 2.6–2.8 times as long as maximum width. Cubital fold completely bare along basal cell; costal cell 1.1–1.2 times as long as width of forewing; basal fold with 4–7 hairs. Marginal vein 0.4–0.43 times as long as costal cell, 2.74–3.68 times as long as postmarginal vein, 6.09–6.36 times as long as stigmal vein; postmarginal vein 1.8–1.9 times as long as stigmal vein.

Ovipositor sheaths as long as body.

Colouration. Head and mesosoma metallic green with diffuse coppery reflection. Antenna with scape and pedicel yellowish-brown, funicle yellow, clava brown. Forecoxae and mesocoxae brown with metallic green reflection; metacoxae metallic green; foretibiae and mesotibiae yellow; metatibiae brown; all femora brown with metallic green reflection; all tarsi yellow. Wings hyaline; submarginal, marginal, postmarginal and stigmal veins of forewing brown, other veins hyaline. Metasoma metallic green with light spot dorsally, brown ventrally; ovipositor sheaths brown.

Sculpture. Head squamose. Pronotum and mid lobe of mesoscutum reticulate, lateral lobes squamose-reticulate. Scutellum reticulate, axilla squamose, frenum smooth, dorsellum smooth. Propodeal surface with reticulate to rugulose-reticulate sculpture. Metasoma alutaceous.

Male unknown.

Comparison. Females of this species are close to *P. splendens* in having OOL shorter than LOD; head globose in dorsal view, frons moderately convex and

reticulate; Fu_1 0.8–0.9 times as long as pedicel; propodeum with carinae forming an inverted V, angle between lateral carinae acute; cubital fold bare. Differences between these species are given in the key.

This species is also similar to *P. murgabensis* Tyulina, **sp. n.** by the head being 1.2–1.3 times as broad as high in frontal view; axilla squamose; axillar grooves homogeneous; frenum 0.2–0.3 times as long as scutellum; spiracle grooves long, wide and deep; metafemora with 7–8 teeth, two last teeth partly fused. However, *P. kondarensis* Tyulina, **sp. n.** differs from *P. murgabensis* Tyulina, **sp. n.** by POL 2.92–3.1 times as long as OOL (vs 3.67–4.1 times); frons moderately convex (vs frons obviously convex); notauli complete, shallow posteriorly (vs incomplete); mesosoma 1.3–1.4 times as long as wide (vs 1.7–1.9 times); propodeum with carinae forming an inverted V (vs propodeum with carinae forming an inverted Y); ovipositor sheaths as long as body (vs 1.55–1.7 times longer than body).

Biology. Unknown.

Distribution. Russia, Tajikistan.

Etymology. The species is named after the type locality, Kondara Gorge in Tajikistan.

Podagrion libycum Masi, 1929
(Figs 31–42)

Podagrion libycum Masi, 1929: 221. Holotype female (MCSN). The holotype was identified as male by Delvar [2005: 79].

Material. Russia. Voronezh Region: 8♀, «Хоперск. Зап., Балаш. обл., яйца богомола» [Khoperskiy Reserve, mantid eggs], 1948 (S.I. Malyshev). Rostov Region: 1♀, Pokrovskoe vill., 5.08.2020 (E.V. Tselikh). Krasnodar Region: 1♂, Sochi, Lazarevskoe, 27.05.1974 (V.I. Tobias); 1♀, Sochi, Lazarevskoe, 22.07.1974 (V.I. Tobias); 9♀, Sochi, Adler, arboretum, mantid ootheca on cereal stalk, 9.03.2007 (collection date), 04.2007 (date of insect emergence) (P.N. Petrov); 1♀, Sochi, Lazarevskoe, power line, sweeping, 31.07.2020 (O.V. Kosheleva). Dagestan: 14♀, 9♂, Magaramkent Distr., Samur vill., mantid ootheca, 26–27.05.2023 (S.A. Basov); 8♀, 16♂, same locality, mantid ootheca, 27.05.2023 (S.A. Basov); 16♀, 42♂, same locality, 28.05.2023 (S.A. Basov); 193♀, 57♂, same locality, 28.05–5.07.2023 (S.A. Basov); 90♀, 20♂, Dagestan Reserve, "Samur Delta" cordon, 41°52′1″N / 48°33′22″E, Malaise trap, mantid ootheca, 26–29.05.2023 (S.A. Basov); 2♀, Samur Reserve, 44°51′49″N / 48°33′20″E, Malaise trap, 26.05–25.06.2023 (E.V. Iljina); 89♀, 10♂, Dagestan Reserve, "Samur Delta" cordon, 30.05.2023 (S.A. Basov); 92♀, 19♂, Magaramkent Distr., Samur vill., mantid ootheca, 1.06.2023 (S.A. Basov).

Turkmenistan. Balkan Region: 1♂, "Кара-Кала, Туркм., сад ВИР" [Magtymguly Distr., Kara-Kala (= Magtymguly), Garden of All-Union Institute of Plant Growing], 11.04.1953 (Gornovskaya); 2♂, same locality, 26.05.1953 (Gornovskaya); 1♀, same locality, 29.05.1953 (D.M. Steinberg); 1♀, same locality, 06.1953 (G.H. Shaposhnikov); 1♀, Kopetdag Mts., 3 km E Ay-dere vill., 5.05.1986 (E. Budrys). Lebap Region: 1♀, Kerki, Amu-Darya River, 17.05.1934 (E.P. Luppova); 23♀, 31♂, Halach Distr., Halach, left bank of the Amu-Darya River, below Kerki, 25–26.05.1934 (E.P. Luppova); 1♀, 1♂, Chardjou (= Turkmenabad), mantid eggs, 9.05.1958 (Nadezhdina); 1♀, 1♂, Chardzhev Distr., 30 km NW Farab (= Farap), tugay vegetation, pier, 14.06.1981 (M.G. Volkovitsh). Mary Region: 1♀, Yoleten Distr., Krasnoe Znamya vill., 50 km S Yoleten, floodplain of the Murgab River, 4.06.1981 (M.G. Volkovitsh).

Tajikistan. Varzob Region: 19♀, 3♂, Kondara Gorge, Varzob vill., 1100 m, 24.06.1937, 5.07.1937, 15.06.1938, 22.06.1938, 12.07.1938, 14.07.1938, 15.07.1938, 18.07.1938, 25.07.1938, 26.07.1938, 1.08.1938, 19.08.1938, 6.09.1938, 15.09.1938, 17.09.1938, 22.09.1938 (V.V. Gussakovskij); 6♀, 12♂, Kondara Gorge, eggs of *Hierodula tenuidentata* Saussure, 1869, 15–16.06.1939 (V.V. Gussakovskij); 4♀, Kondara Gorge, 16.06.1939 (V.V. Gussakovskij); 2♀, Kondara Gorge, Kondara, 23–24.08.1946 (V.V. Gussakovskij); 1♀, Kondara Gorge, Varzob River, 7.09.1946 (V.P. Rudolf). Stalinabad (= Dushanbe): 1♂, 1–4.06.1932 (N.I. Fursov); 2♀, 07.1943 (M.N. Nikolskaya). Khatlon Region: 1♀, old pier close to Jilikul, Vakhsh River, 5.07.1944 (V.V. Gussakovskij).

Diagnosis. Flagellomeres relatively short, combined length of pedicel and flagellum 1.4–1.5 times as long as width of head and Fu_1 1.25–1.5 times as long as broad. Head 1.8–2 times as broad as long in dorsal view. Width of frontovertex equal to eye height. OOL 0.7–1 times as long as LOD. Notauli complete. Axillar grooves relatively heterogeneous and crenulate. Frenum alutaceous. Propodeal lateral carinae forming an inverted Y, median carina short, lateral carinae straight, basally forming slightly acute or almost right angle; spiracle elongate, 1.32–2.12 times as long as its distance to posterior margin of dorsellum. Cubital fold of forewing with 2–8 setae along basal cell. Ovipositor sheaths 1.1–1.2 times as long as body.

Description. Female. Body length 3.3–3.8 mm; forewing length 2.6–2.8 mm.

Combined length of pedicel and flagellum 1.4–1.5 times as long as width of head. Fu_1 1.25–1.5 times as long as broad and 0.8–1 times as long as pedicel. Fu_7 0.6–0.8 times as long as wide, clava 1.2–1.3 times as long as scape. Head 1.8–2 times wider than maximum length in dorsal view, 2.36–2.55 times wider than minimum length in dorsal view and 1.1–1.3 times as broad as high in frontal view. Vertex 0.9–0.98 times as broad as frons in dorsal view; 2.45–2.95 times as broad as eye in dorsal view; 2.33–2.6 times as broad as POL. POL 2.44–3 times as long as OOL; OOL 0.7–1 times as long as LOD. Length of frontovertex equal to eye height, malar space 0.4–0.6 times as long as eye height and 0.5–0.8 times longer than oral fossa. Distance between lower edge of antennal toruli and ventral margin of clypeus 1–1.3 times as long as scape. Frons obviously convex.

Mesosoma 1.7–1.9 times as long as wide; mesoscutum respectively 0.5–0.65 times as long as wide; scutellum as long as broad or slightly longer; frenum 0.2–0.3 times as long as scutellum; notauli complete; axillar grooves relatively heterogeneous. Median carina of propodeum short; lateral carinae straight, forming an inverted Y, with somewhat acute or almost right angle between them; spiracle elongate, 1.32–2.12 times longer than its distance to posterior margin of dorsellum; spiracular grooves shallow, long, generally broad, sometimes narrow posteriorly.

Legs. Metacoxa 2–2.1 times as long as wide. Metafemur 1.9–2.2 times as long as broad, with 6–8 teeth, penultimate tooth partly fused with terminal one, last tooth broadened.

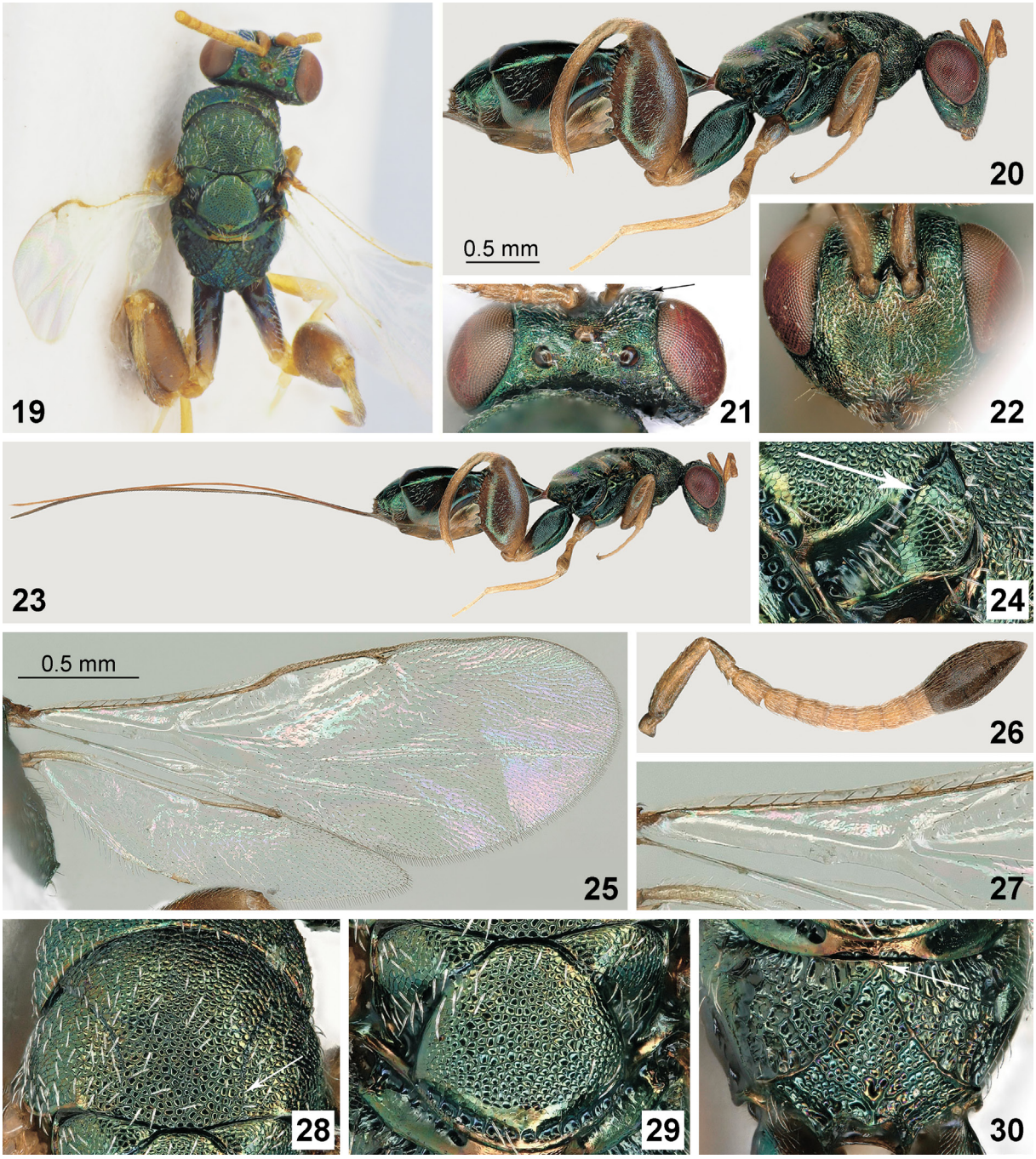
Forewing 2.75–2.9 times as long as maximum width. Cubital fold with 2–8 setae along basal cell; length of costal cell equal to width of forewing; basal fold has 7–11 setae. Marginal vein 0.5–0.6 times as long as costal cell or slightly longer, 3.24–4.31 times as long as postmarginal vein, 7–8.9 times as long as stigmal vein; postmarginal vein 1.8–2.3 times as long as stigmal vein.

Ovipositor sheaths 1.1–1.2 times longer than body.

Colouration. Head and mesosoma metallic green with diffuse coppery reflection. Antenna with scape, pedicel and funicle yellowish-brown, clava dark brown. Forecoxae and mesocoxae dark brown with metallic green reflection; metacoxae metallic green; all femora yellowish-brown; foretibiae and mesotibiae yellow; metatibiae brown; all tarsi yellow. Wings hyaline; submarginal, marginal, postmarginal and stigmal veins of forewing brown, other veins hyaline. Metasoma metallic green with diffuse bluish-coppery reflection dorsally, brown ventrally; ovipositor sheaths brown.

Sculpture. Head squamose-reticulate. Pronotum and mid lobe of mesoscutum reticulate, lateral lobes squamose-reticulate, reticulate near notauli. Scutellum reticulate apically, axilla, frenum and dorsellum alutaceous, frenum almost smooth. Mid part of propodeum delicately reticulate, with strong and long rugulae from lateral carinae, lateral parts reticulate to rugulose-reticulate. Metasoma alutaceous.

Male. Body length 2.8–3.8 mm; forewing length 2.35–2.8 mm. Antennae with Fu_7 1.2–1.3 times as long as broad; clava as long as scape or slightly shorter. Mesosoma 1.9–2.04 times as long as broad. Spiracles elongated, 2–5 times longer than its distance to posterior margin of dorsellum; spiracular grooves long and broad, especially deep near spiracles. Marginal vein 5.78–7.92 times

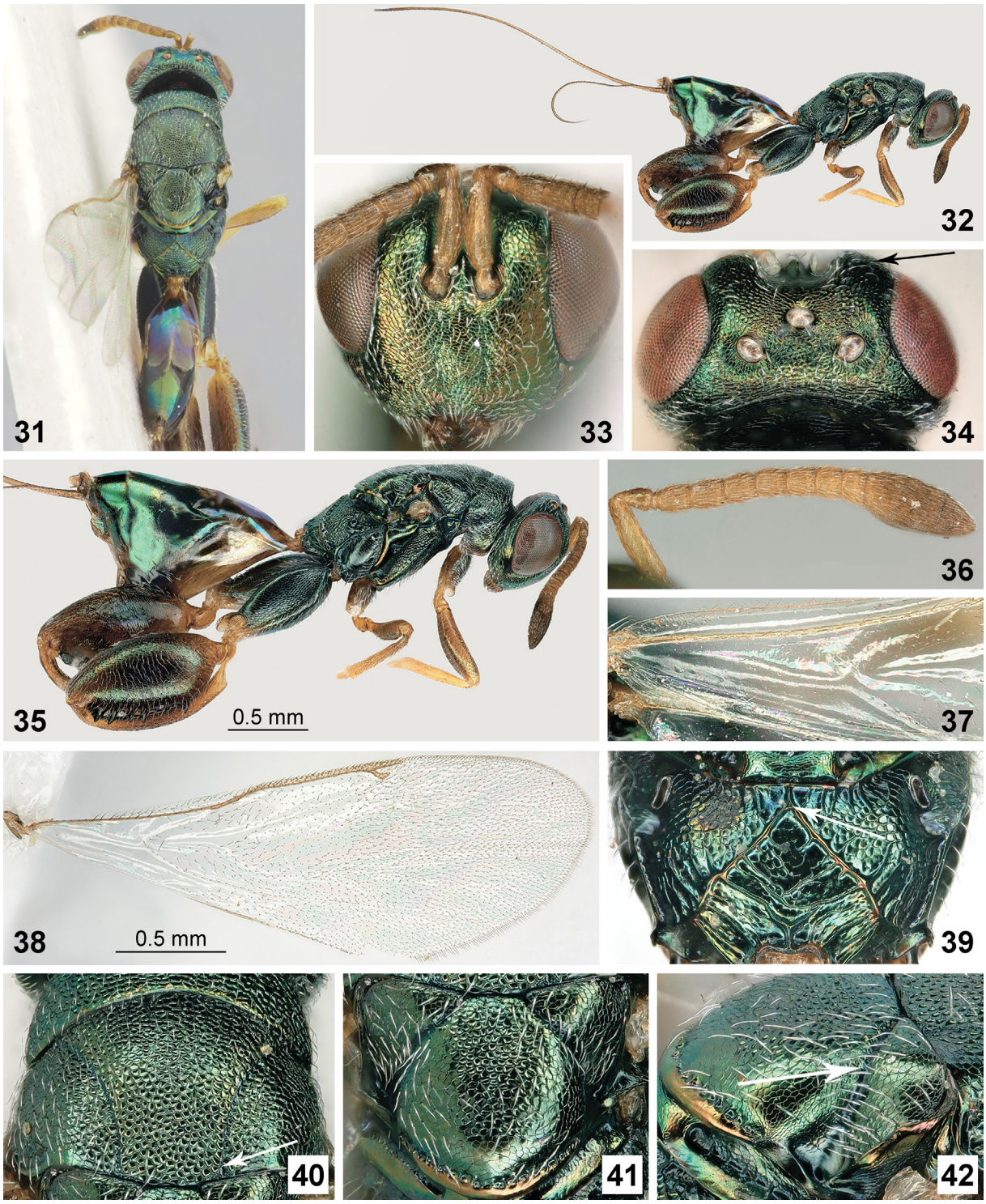


Figs 19–30. *Podagrion kondarensis* Tyulina, **sp. n.**, female, holotype.

19 – head and thorax, dorsal view; 20, 23 – habitus, lateral view; 21–22 – head: 21 – dorsal view (arrow shows frons), 22 – frontal view; 24 – axilla, dorso-lateral view (arrow shows axillar groove); 25 – wings; 26 – antenna; 27 – forewing, basal part; 28 – mesoscutum, dorsal view (arrow shows notaulus); 29 – scutellum, dorsal view; 30 – propodeum, dorsal view (arrow shows junction of lateral carinae of propodeum).

Рис. 19–30. *Podagrion kondarensis* Tyulina, **sp. n.**, самка, голотип.

19 – голова и грудь, дорсально; 20, 23 – габитус, латерально; 21–22 – голова: 21 – дорсально (стрелкой показан лоб), 22 – фронтально; 24 – аксилла, дорсо-латерально (стрелкой показана аксиллярная борозда); 25 – крылья; 26 – усик; 27 – переднее крыло, базальная часть; 28 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 29 – щиток, дорсально; 30 – промежуточный сегмент, дорсально (стрелкой показана точка соединения латеральных килей промежуточного сегмента).

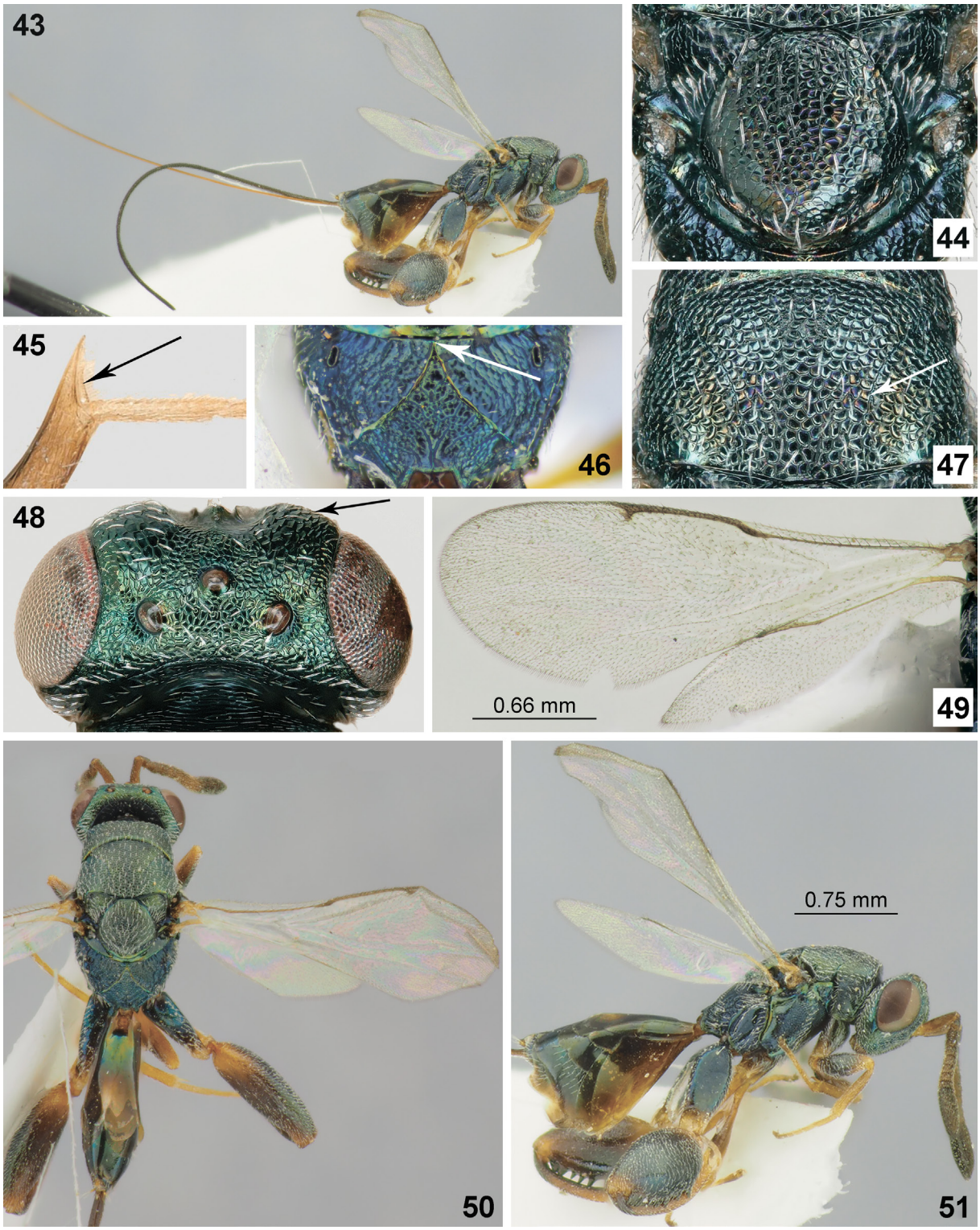


Figs 31–42. *Podagrion libycum*, female.

31–32, 35 – habitus: 31 – dorsal view, 32, 35 – lateral view; 33–34 – head: 33 – frontal view, 34 – dorsal view (arrow shows frons); 36 – antenna; 37 – forewing, basal part; 38 – forewing; 39 – propodeum, dorsal view (arrow shows median carina of propodeum); 40 – mesoscutum, dorsal view (arrow shows notaulus); 41 – scutellum, dorsal view; 42 – axilla, dorso-lateral view (arrow shows axillar groove).

Рис. 31–42. *Podagrion libycum*, самка.

31–32, 35 – габитус: 31 – дорсально, 32, 35 – латерально; 33–34 – голова: 33 – фронтально, 34 – дорсально (стрелкой показан лоб); 36 – усик; 37 – переднее крыло, базальная часть; 38 – переднее крыло; 39 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента); 40 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 41 – щиток, дорсально; 42 – аксилла, дорсо-латерально (стрелкой показана аксиллярная борозда).

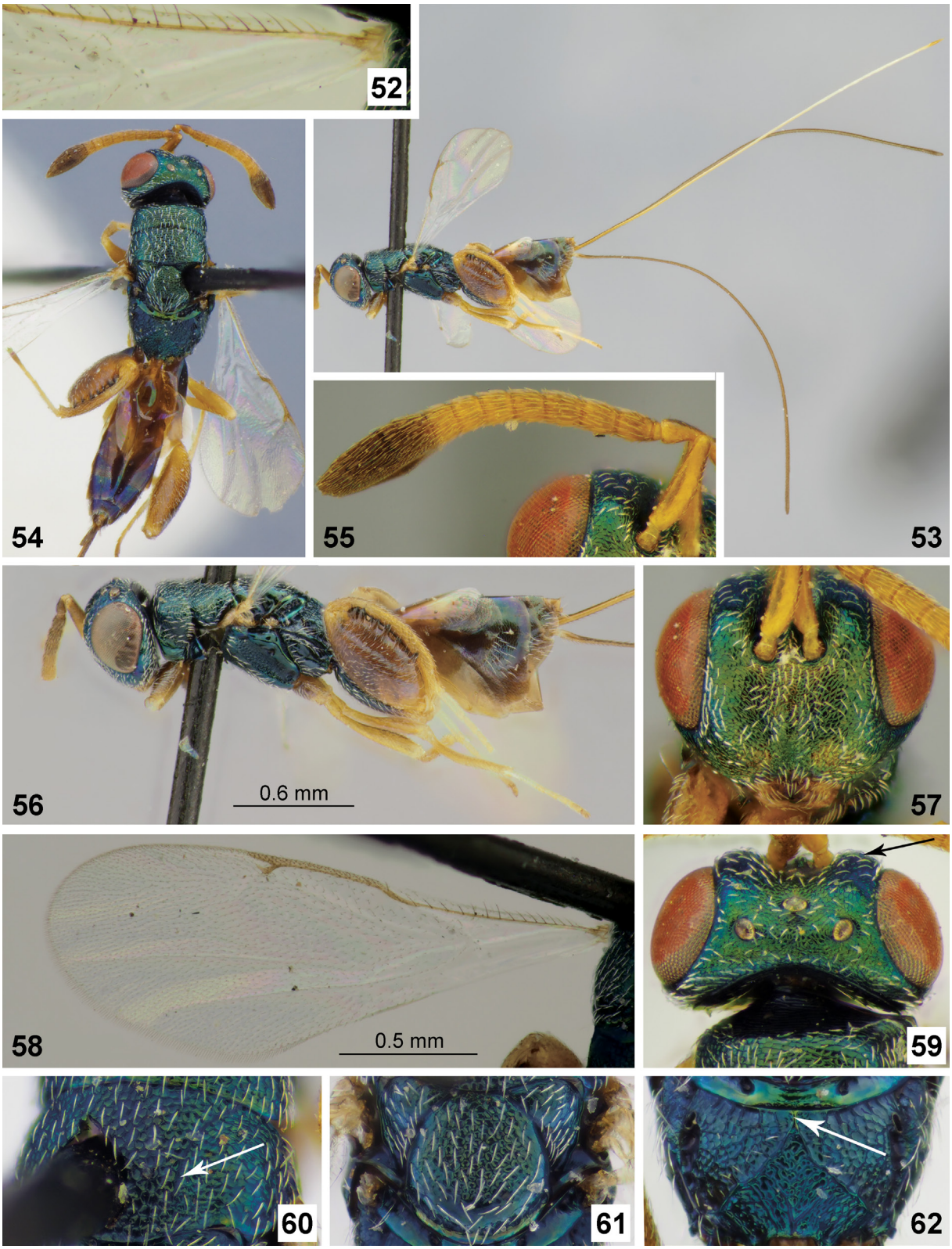


Figs 43–51. *Podagrion minus*, female.

43, 50–51 – habitus: 43, 51 – lateral view, 50 – dorsal view; 44 – scutellum, dorsal view; 45 – hind tibia (arrow shows spine of apex of hind tibia); 46 – propodeum, dorsal view (arrow shows median carina of propodeum); 47 – mesoscutum, dorsal view (arrow shows notaulus); 48 – head, dorsal view (arrow shows frons); 49 – wings.

Рис. 43–51. *Podagrion minus*, самка.

43, 50–51 – габитус: 43, 51 – латерально, 50 – дорсально; 44 – щиток, дорсально; 45 – задняя голень (стрелкой показан шип вершины задней голени); 46 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента); 47 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 48 – голова, дорсально (стрелкой показан лоб); 49 – крылья.



Figs 52–62. *Podagrion murgabensis* Tyulina, **sp. n.**, females.

52–53, 56, 58, 60–62 – holotype; 54–55, 57, 59 – paratype. 52 – forewing, basal part; 53–54, 56 – habitus: 53, 56 – lateral view, 54 – dorsal view; 55 – antenna; 57, 59 – head: 57 – frontal view, 59 – dorsal view (arrow shows frons); 58 – forewing; 60 – mesoscutum, dorsal view (arrow shows notaulus); 61 – scutellum, dorsal view; 62 – propodeum, dorsal view (arrow shows median carina of propodeum).

Рис. 52–62. *Podagrion murgabensis* Tyulina, **sp. n.**, самки.

52–53, 56, 58, 60–62 – голотип; 54–55, 57, 59 – паратип. 52 – переднее крыло, базальная часть; 53–54, 56 – габитус: 53, 56 – латерально, 54 – дорсально; 55 – усик; 57, 59 – голова: 57 – фронтально, 59 – дорсально (стрелкой показан лоб); 58 – переднее крыло; 60 – среднеспинка, дорсально, (стрелкой показана парапсидальная борозда); 61 – щиток, дорсально; 62 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента).

as long as stigmal vein; postmarginal vein 1.7–1.95 times as long as stigmal vein. Metacoxa 1.7–1.9 times as long as wide; metafemora has 4–6 teeth, penultimate one separated from last widened tooth. Metasoma light brown, apex darker. Lateral propodeal parts reticulate. Otherwise similar to female.

Comparison. Females of this species are similar to *P. gibbum* due to head being 1.8–2 times as broad as long in dorsal view; notauli complete; axillar grooves heterogeneous; propodeal median carina short; spiracular grooves shallow; ovipositor sheaths slightly longer than body. However, *P. libycum* differs from *P. gibbum* by the frons obviously convex (vs frons not convex); vertex dorsally 2.33–2.6 times as broad as POL (vs 2.15–2.3 times as broad as POL); OOL 0.7–1 times as long as LOD (vs OOL 1.2–1.4 times as long as LOD); axillae alutaceous (vs squamose); frenum alutaceous, separated from sculpture of lateral parts of scutellum (vs frenum smooth, fused with sculpture of lateral parts of scutellum); mid part of propodeum delicately reticulate, with strong and long rugulae from lateral branches (vs reticulate or rugulose-reticulate).

This species is also similar to *P. pachymerum* in having the vertex 0.9–0.98 times as broad as frons dorsally; 2.33–2.6 times as broad as POL in dorsal view; OOL shorter than LOD; notauli complete; propodeum with carinae forming an inverted Y, propodeal lateral carinae straight, with acute angle between them. However, *P. libycum* differs from *P. pachymerum* by the head being 2.36–2.55 times wider than minimum length in dorsal view (vs 2.13–2.33 times); frons obviously convex (vs frons moderately convex); combined length of pedicel and flagellum 1.4–1.5 times as long as head width (vs 1.55–1.65 times as long as head width); Fu_1 1.25–1.5 times longer than wide (vs 1.6–1.95 times); axillae alutaceous (vs squamose); axillar grooves heterogeneous (vs homogeneous axillar grooves); frenum separated from sculpture of lateral parts of scutellum (vs frenum fused with sculpture of lateral parts of scutellum); mid part of propodeum delicately reticulate, with strong and long rugulae from lateral carinae (vs rugulose-reticulate); spiracle 1.4–1.7 times longer than distance to posterior margin of dorsellum (vs spiracle as long as distance to posterior margin of dorsellum); spiracular grooves shallow (vs deep); cubital fold with 2–8 setae (vs 11–20 setae); ovipositor sheaths 1.1–1.2 times as long as body (vs 1.27–1.4 times longer than body).

Biology. Parasitoid of mantids, *Hierodula tenuidentata* Saussure, 1869 and *H. transcaucasica* Brunner von Wattenwyl, 1878.

Distribution. Libya, Russia*, Turkmenistan*, Tajikistan*.

Podagrion minus Strand, 1911
(Figs 43–51)

Podagrion minus Strand, 1911: 158–159. Holotype (MNLI).

Material. Crimean Peninsula: 1♀, Yalta Distr., Alupka, South Coast of Crimea, 14.07.1899 (N.Ya. Kuznetsov); 3♀, Feodosia Distr., Karadag Reserve, Malaise trap, 20–31.05.2019, 14–21.06.2019, 4–11.09.2019 (K.I. Shorenko).

Armenia. 15♀, 2♂, Aragatsotn Region, AR22-06, 2.9 km SE Byurakan vill., 40°18′28.4″N / 44°17′14.5″E, 1102 m, 3.08.2022 (M.Yu. Dolgovskaya).

Kazakhstan. 2♂, Almaty Region, *Rivetina syriaca* (Saussure, 1869), 10.07.1953 (P.I. Marikovsky).

Biology. Parasitoid of mantids, *Sphodromantis viridis* Forskal, 1775, *Rivetina syriaca*. Presumably develops in oothecae of mantids of the subfamily Amelinae.

Distribution. Morocco, Spain, Italy, Crimean Peninsula*, Armenia*, Kazakhstan*.

Podagrion murgabensis Tyulina, **sp. n.**
(Figs 52–62)

Material. Holotype, ♀ (ZISP): Turkmenistan, Mary Region, Merv oasis, "Мург. Гос. Им., VII.1912, К. Демокидов" [the Sovereign's Estate on Murghab, 07.1912, K. Demokidov]. Paratypes: 5♀, 1♂ (ZISP), same data as for holotype; 1♀ (ZISP), Turkmenistan, Lebap Region, Chardzhev Distr., Farab (= Farap), 12.05.1929 (Shestakova); 1♀ (ZISP), Turkmenistan, Yartykala vill. on the Chandyr River, Kopetdag Mts., 19.08.1934 (V.V. Popov); 2♀, 2♂ (ZISP), Tajikistan, Vahdat Distr., Romit Gorge, Ramit Reserve (= Romit Reserve), southern slopes of the Hissar Mts., 70 km from Dushanbe, ootheca of *Iris* sp., 17.11.1960 (I. Malyavin).

Diagnosis. Flagellomeres short, with combined length of pedicel and flagellum 1.45 times as long as width of head and Fu_1 1.3–1.5 times as long as broad. Head not especially transverse, 1.7–2 times as broad as long in dorsal view. Frontovertex 0.7–0.8 times shorter than eye height. OOL as long as LOD. Notauli incomplete. Axillar grooves homogeneous. Axillae alutaceous. Frenum smooth or alutaceous. Propodeal lateral carinae forming an inverted Y, with a median carina short; lateral carinae mostly straight, enclosing an acute angle, slightly curving outwards posteriorly. Forewing with cubital fold bearing only a few setae (0–6) along basal cell. Ovipositor sheaths 1–1.65 times longer than body.

Description. Female. Body length 2.6–3.7 mm; forewing length 1.95–2.6 mm.

Combined length of pedicel and flagellum 1.45 times as long as width of head. Fu_1 1.3–1.5 times as long as broad and 0.8–1 times as long as pedicel. Fu_7 0.76 times as long as wide, clava as long as scape. Head 1.7–2 times wider than maximum length in dorsal view, 2.3–2.62 times wider than minimum length in dorsal view and 1.2–1.3 times as broad as high in frontal view. Vertex dorsally 0.89–0.95 times as broad as frons; 2–2.37 times as broad as eye in dorsal view; 2.05–2.18 times as broad as POL. POL 3.67–4.1 times as long as OOL; OOL 0.94–1 times as long as LOD. Frontovertex 0.7–0.8 times as long as eye height, malar space 0.4–0.6 times as long as eyes. Distance between lower edge of antennal toruli and ventral margin of clypeus as long as scape or slightly longer. Head ellipsoid in dorsal view, frons obviously convex.

Mesosoma 1.7–1.9 times as long as wide; mesoscutum 0.5–0.6 times as long as wide; scutellum as long as broad; frenum 0.2–0.3 times as long as scutellum; notauli incomplete; axillar grooves homogeneous. Median carina of propodeum short; lateral carinae straight, forming an inverted Y, with acute angle between them; spiracle 0.94–1.38 times longer than its distance to posterior margin of dorsellum; spiracular grooves obviously deep, long and broad.

Legs. Metacoxa 2.3–2.5 times as long as wide. Metafemur 2–2.15 times as long as broad or slightly longer, with 7–8 teeth, penultimate one partly fused with last tooth.

Forewing 2.7–2.9 times as long as maximum width. Cubital fold with 0–4, rarely 6 setae along basal cell; costal cell slightly longer than forewing width; basal fold with 6–9 hairs. Marginal vein 0.4–0.5 times as long as costal cell, 3.05–4.05 times as long as postmarginal vein, 6.2–7.15 times as long as stigmal vein; postmarginal vein 1.6–1.8 times longer than stigmal vein.

Ovipositor sheaths 1–1.65 times as long as body.

Colouration. Head metallic green with diffuse coppery reflection. Mesosoma metallic green with diffuse bluish reflection.

Antennae with scape, pedicel and funicle yellowish-brown, clava brown. Forecoxae and mesocoxae brown with metallic green reflection; metacoxae metallic green; all femora yellowish-brown; all tibiae and all tarsi yellow. Wings hyaline; submarginal, marginal, postmarginal and stigmal veins of forewing brown, other veins hyaline. Metasoma metallic green with light spot dorsally, brown ventrally; ovipositor sheaths brown.

Sculpture. Head squamose-reticulate. Pronotum and mid lobe of mesoscutum reticulate, lateral lobes squamose-reticulate. Scutellum reticulate, axilla alutaceous, frenum smooth or alutaceous, dorsellum smooth. Propodeal surface reticulate to rugulose-reticulate. Metasoma alutaceous.

Male. Body length 2.05 mm; forewing length 1.8 mm. Gena and vertex slightly bluish laterally. Propodeal lateral carinae straight, median carina short. Forewing 2.25 times as long as broad; cubital fold with 4–5 setae along basal cell; costal cell 0.86 times forewing width; marginal vein 5.9 times as long as stigmal vein. Metacoxa 1.73 times as long as wide; metafemora with 6 teeth, penultimate tooth partly fused with terminal one. Metafemora light brown. Frons finely reticulate; notauli incomplete, sometimes visible in sculptured part of mesoscutum; frenum delicately reticulate; propodeum reticulate, with weak and short rugulae from lateral carinae and adpetiole. Otherwise similar to female.

Comparison. Females of this species are related to *P. minus* in having the vertex 0.89–0.95 times as broad as frons in dorsal view; head ellipsoid in dorsal view; notauli incomplete; axillar grooves homogeneous; propodeum with carinae forming an inverted Y with short median carina; propodeal median carina short, lateral propodeal carinae straight or slightly curving outwards posteriorly. Differences between these species are given in the key.

This species is also similar to *P. kondarensis* Tyulina, **sp. n.** by head being 1.2–1.3 times as broad as high in frontal view; axilla squamose; axillar grooves homogeneous; frenum 0.2–0.3 times as long as scutellum; spiracle grooves long, wide and deep; metafemora with 7–8 teeth, two distal teeth partly fused. However, *P. murgabensis* Tyulina, **sp. n.** differs from *P. kondarensis* Tyulina, **sp. n.** by the POL 3.67–4.1 times as long as OOL (vs 2.92–3.1 times); frons obviously convex (vs frons of moderately convex); notauli incomplete (vs complete, shallow posteriorly); mesosoma 1.7–1.9 times as long as wide (vs 1.3–1.4 times); propodeum with carinae forming an inverted Y (vs propodeum with carinae forming an inverted V).

Biology. Unknown.

Distribution. Turkmenistan, Tajikistan.

Etymology. The species is named after the type locality, the sovereig's estate on the Murghab River in the Merv oasis in Turkmenistan.

Podagrion pachymerum (Walker, 1833)
(Figs 62–73)

Priomerus pachymerus Walker, 1833: 118. Lectotype, female (BMNH), designated by Eady [1959: 270].

Palmon religiosus Westwood, 1847: 259 (no country quoted in original description). Apparently synonymized by Mayr [1874: 63]).

Palmon pachymerus rufiventris Giraud, 1863: 1311. Lectotype female (MNHN). Lectotype designation and synonymy by Delvare [2005: 80].

Cleptimorpha binotata Walker, 1872: 85. Neotype female (BMNH). Neotype designation and synonymy by Delvare [2005: 80].

Podagrion bellator Nikol'skaya, 1952: Delvare, 2005: 80 (misidentification).

Material. Russia. Krasnodar Region: 3♂, Chernomorsk Distr., Novorossiysk, eggs of *Mantis religiosa*, 26.04.1928 (P.N. Nowicki); 1♀, Novorossiysk, eggs of *Mantis religiosa*, 26.04.1928 (Mashkova); 10♀, 2♂, Sochi, Lazarevskoe, 10–11.05.1971, 17.05.1974, 23.05.1974, 27.05.1974, 10.06.1974, 17.05.1977, 5–6.05.1979, 18–19.06.1979, 22.06.1979 (V.I. Tobias); 2♀, same locality, 12.05.1983 (V.I. Tobias); 3♀, Golovinskiy Hunting Reserve, 3.05.1988, 5.05.1988, 11.05.1988 (V.I. Tobias); 1♀, Aderbievka vill., hills with forb meadows, 26.07.2020 (O.V. Kosheleva); 1♀, same locality, 26.07.2020 (E.V. Tselikh). Dagestan: 1♀, Samur Reserve, 44°51′49″N / 48°33′20″E, Malaise trap, 1–26.05.2023 (E.V. Iljina); 1♂, Samur Reserve, 44°51′49″N / 48°33′20″E, Malaise trap, 26.05–25.06.2023 (E.V. Iljina). Orenburg Region: 15♀, 2♂, Orsk, mantid eggs, 06.1936 (I.A. Chetyrkina). Primorskiy Region: 13♀, 23♂, Khasan Distr., Khasan Lake, mantid ootheca, 5.08.1962 (O.V. Kovalev); 2♀, Shkotov Distr., Anisimovka vill., 7.06.1993 (S.A. Belokobylskij); 1♀, Khanka Distr., Novokachalinsk vill., 22.07.1995 (S.A. Belokobylskij); 1♀, Khanka Distr., Khanka Lake, 25.07.1995 (S.A. Belokobylskij); 2♀, Spassk Distr., 11.08.1995 (S.A. Belokobylskij). Crimean Peninsula: 1♀, Kerch Distr., Kazantip Cape, 4.06.1927 (E.A. Kuznetsova, V.A. Kuznetsov); 1♀, Bakhchisaray Distr., Tabachnoe vill., 29.08.1989 (V.A. Trjapitzin); 2♀, Feodosia Distr., Karadag Mts., 4.06.1990, 9.06.1990 (D.R. Kasparyan); 1♂, Simferopol Distr., Perevalnoe vill., 44°51′37″N / 34°19′57.2″E, forest, meadow, 20–22.07.2020 (E.V. Tselikh); 7♀, Simferopol Distr., Kizil-Koba Caves, Perevalnoe vill., 22.07.2020 (E.V. Tselikh); 2♀, Simferopol Distr., Perevalnoe vill., plateau, 22.07.2020 (O.V. Kosheleva).

Abkhazia. 4♀, 7♂, Sukhum, mantid eggs, 15–25.04.1932 (M.N. Nikolskaya); 1♀, same locality, 1933 (R. Wasser).

Kazakhstan. 1♂, Jambyl Region, Aksu-Zhabagly Reserve, 3 km S of Novonikolaevka vill. (= Zhabagly), steppe slopes, ravine with shrubs, 29.06.1979 (D.R. Kasparyan).

Tajikistan. Varzob Region: 1♀, Kondara Gorge, Varzob River valley, 8.09.1946 (V.V. Gussakovskij). Stalinabad (= Dushanbe): 1♀, foothill, 19.07.1934 (V.V. Gussakovskij). Khatlon Region: 49♀, 7♂, Parkhar Distr., Parkhar vill., 3.05.1956 (I. Linyat).

Distribution. Algeria, Madeira, Spain, France, Germany, Czech Republic, Austria, Italy, Slovenia, Croatia, Poland, Slovakia, Hungary, Ukraine, Moldova, Romania, Bulgaria, Russia, Abkhazia*, Syria, Iran, Kazakhstan, Tajikistan*, India.

Biology. Parasitoid of mantids, almost exclusively of *Mantis religiosa* and *Iris oratoria*.

Podagrion splendens Spinola, 1811
(Figs 74–83)

Podagrion splendens Spinola, 1811: 147. Neotype female (BMNH) designated by Delvare [2005: 85].

Podagrion splendidum Spinola, 1811: Walker, 1871: 19 (unjustified emendation).

Material. Russia. 5♀, Kalmykia, 20 km SE Tsagan-Aman vill., 21.05.1986 (D.R. Kasparyan). Crimean Peninsula: 1♀, Feodosia Distr., Karadag Mts., 4.06.1990 (D.R. Kasparyan); 1♀, Feodosia Distr., Karadag Mts., Kurortny vill., sweeping, 17.07.2020 (O.V. Kosheleva).

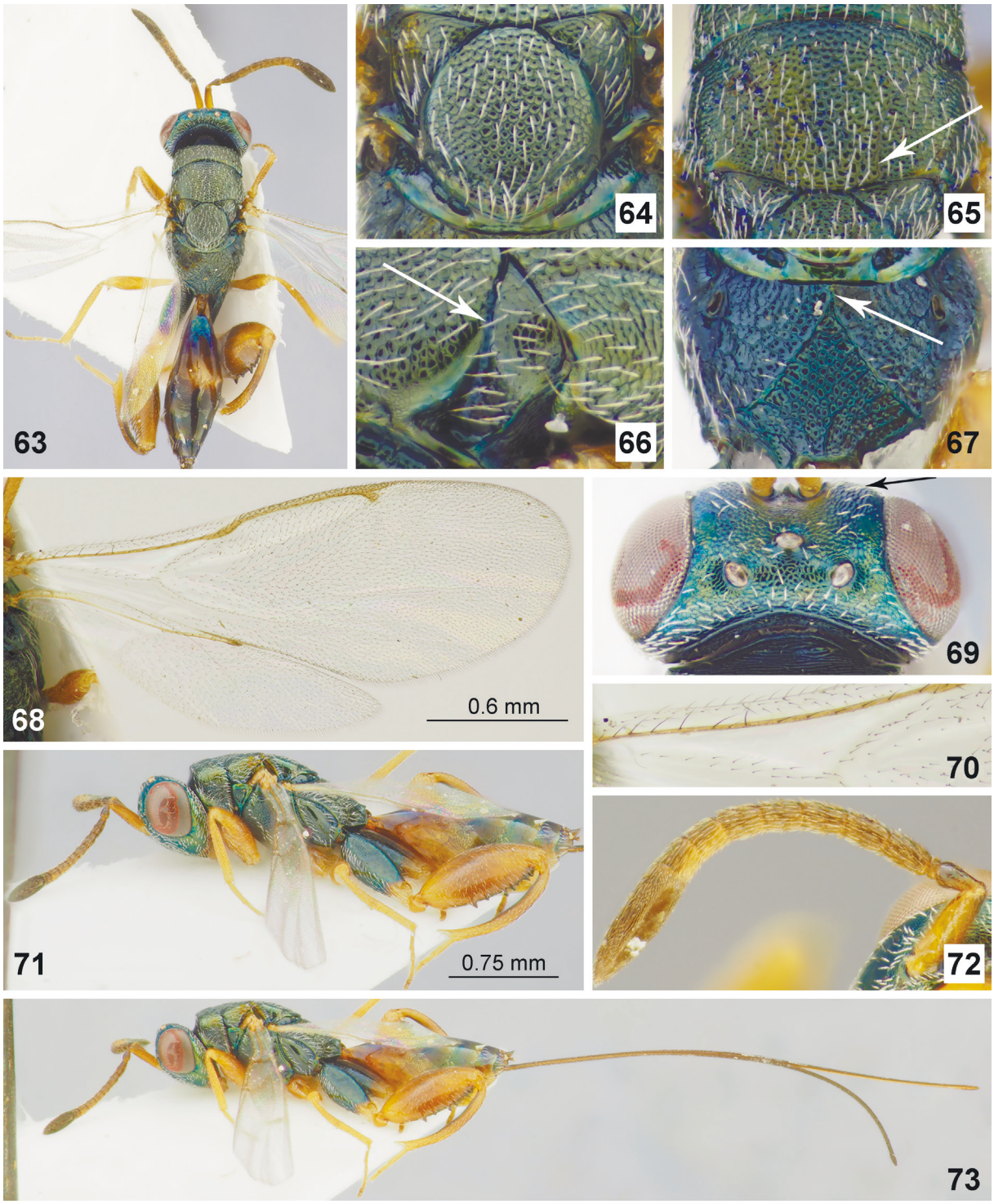
Kazakhstan. 3♀, Jambyl Region, Ryskulov Distr., Akyr-tobe vill., Muyun-kum Desert, 26.07.1931 (P.A. Veltishchev).

Turkmenistan. Akhal Region: 1♀, Archabil Distr., Firyuza vill., 16.08.1969 (V.A. Trjapitzin). Transcaspian Region (= Mary Region): 6♀, 6♂, Bayram-Ali, eggs of *Mantis* sp., 30.04.1907 (K.E. Demokidov); 26♀, 4♂, Bayram-Ali, mantid ootheca on pomegranate, 9.04.1974 (M.I. Ishankuliev). Lebap Region: 1♀, 1♂, Halach Distr., Halach, left bank of the Amu-Darya River, below Kerki, 25–26.05.1934 (E.P. Luppova).

Tajikistan. Varzob Region: 1♀, Kondara Gorge, Varzob vill., 1100 m, 9.07.1937 (V.V. Gussakovskij); 2♀, southern slopes of the Hissar Mts., Khoja-obi-garm vill., 4.08.1944 (M.N. Nikolskaya); 2♀, Kondara Gorge, 1–2.08.1946 (V.V. Gussakovskij). Khatlon Region: 4♀, Parkhar Distr., Parkhar vill., 3.05.1956 (I. Linyat).

Mongolia. Khovd Region: 1♀, Altan-Khuhei Mts., 60 km N Myangad, 4.08.1970 (I.M. Kerzhner).

Biology. Parasitoid of mantids, mostly of *Empusa pennata* (Empusidae) and *Mantis religiosa*, much less frequently of *Iris oratoria* (Mantidae) and *Empusa fasciata* Brullé, 1832 (Empusidae).

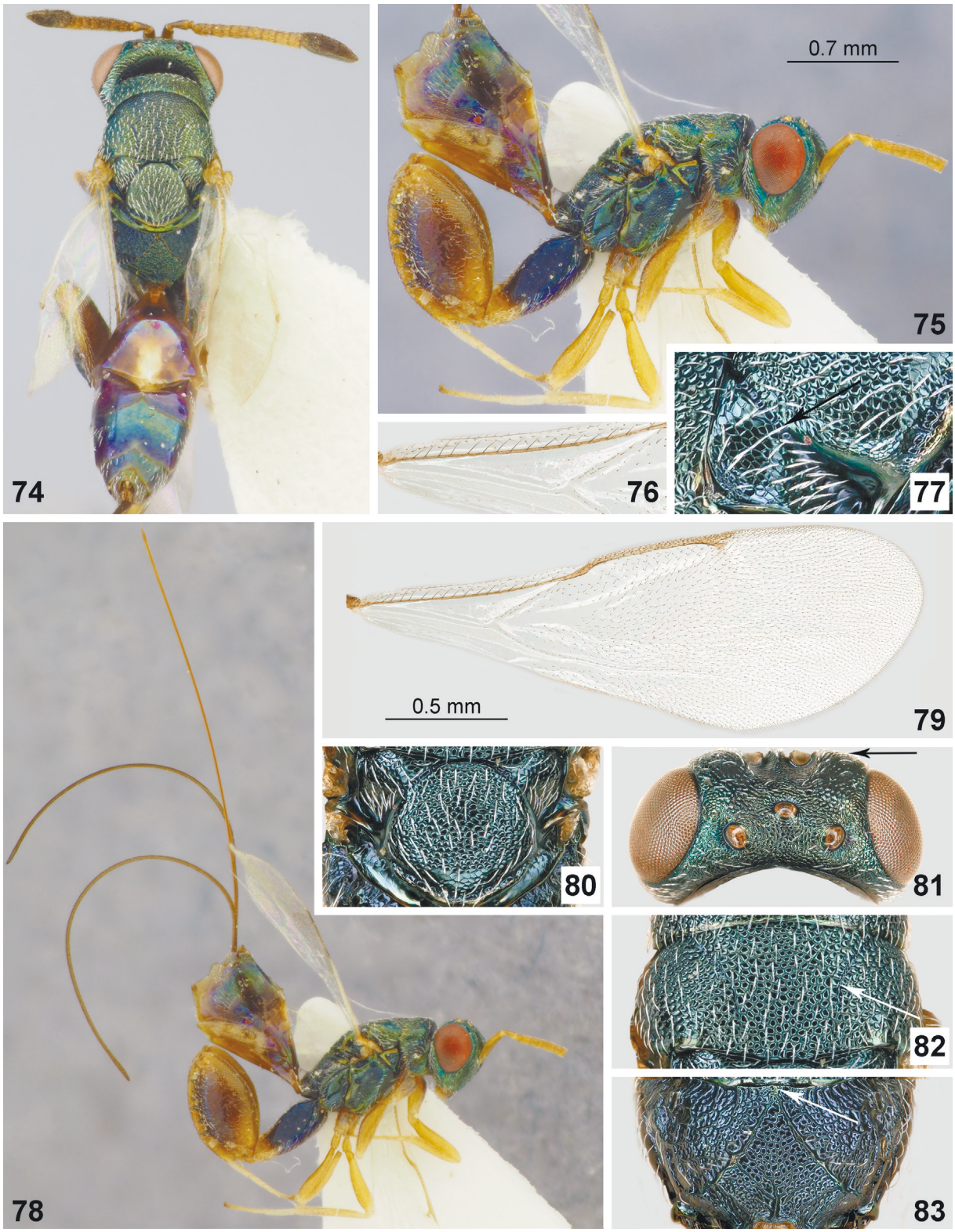


Figs 63–73. *Podagrion pachymerum*, female.

63, 71, 73 – habitus: 63 – dorsal view, 71, 73 – lateral view; 64 – scutellum, dorsal view; 65 – mesoscutum, dorsal view (arrow shows notaulus); 66 – axilla, dorso-lateral view (arrow shows axillar groove); 67 – propodeum, dorsal view (arrow shows median carina of propodeum); 68 – wings; 69 – head, dorsal view (arrow shows frons); 70 – forewing, basal part; 72 – antenna.

Рис. 63–73. *Podagrion pachymerum*, самка.

63, 71, 73 – габитус: 63 – дорсально, 71, 73 – латерально; 64 – щиток, дорсально; 65 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 66 – аксилла, дорсо-латерально (стрелкой показана аксиллярная борозда); 67 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента); 68 – крылья; 69 – голова, дорсально (стрелкой показан лоб); 70 – переднее крыло, базальная часть; 72 – усик.



Figs 74–83. *Podagrion splendens*, female.

74–75, 78 – habitus: 74 – dorsal view, 75, 78 – lateral view; 76 – forewing, basal part; 77 – axilla, dorso-lateral view (arrow shows axillar groove); 79 – forewing; 80 – scutellum, dorsal view; 81 – head, dorsal view (arrow shows frons); 82 – mesoscutum, dorsal view (arrow shows notaulus); 83 – propodeum, dorsal view (arrow shows median carina of propodeum).

Рис. 74–83. *Podagrion splendens*, самка.

74–75, 78 – габитус: 74 – дорсально, 75, 78 – латеральный вид; 76 – переднее крыло, базальная часть; 77 – аксилла, дорсо-латерально (стрелкой показана аксиллярная борозда); 79 – переднее крыло; 80 – щиток, дорсально; 81 – голова, дорсально (стрелкой показан лоб); 82 – среднеспинка, дорсально (стрелкой показана парапсидальная борозда); 83 – промежуточный сегмент, дорсально (стрелкой показан медиальный киль промежуточного сегмента).

Distribution. Morocco, Spain, France, Italy, Czech Republic, Slovakia, Croatia, Hungary, Bosnia and Hercegovina, Bulgaria, Greece, Turkey, Russia, Georgia, Azerbaijan, Kazakhstan*, Turkmenistan*, Tajikistan*, Mongolia*.

Key to females of the tribe Podagrionini of the fauna of Russia and adjacent countries

1. Propodeum without carinae (Fig. 1). Apex of metatibia extending as a long, curved spine 2.7 times as long as breadth of tibia at tarsal insertion (Fig. 2) .... *Iridophagoides* spp.
– Propodeum with carinae (Figs 18, 30, 39, 46, 62, 67, 83). Apex of metatibia extending as a short, triangle spine at most about 1.5 times as long as breadth of tibia at tarsal insertion (Fig. 45) ..... *Podagrion* spp.
2. Notauli complete and well visible throughout (Figs 11, 40, 65) 3
– Notauli incomplete (Figs 47, 60, 82) or shallow posteriorly (Fig. 28) 5
3. Mid part of propodeum delicately reticulate, with strong and long rugulae from oblique carinae (Fig. 39). Frons obviously convex (Fig. 34) ..... *P. libycum*
– Mid part of propodeum reticulate to rugulose-reticulate (Figs 18, 67). Frons moderately convex or not convex (Figs 13, 69) 4
4. Flagellomeres relatively long; pedicel plus flagellum 1.55–1.65 times as long as width of head; Fu_1 1.6–1.95 times as long as wide (Fig. 72). OOL 0.85–1 times as long as LOD (Fig. 69). Axillar grooves homogeneous (Fig. 66). Spiracular grooves deep (Fig. 67). Cubital fold of fore wing with 11–20 setae along basal cell; basal fold with 9–14 setae (Fig. 70) ..... *P. pachymerum*
– Flagellomeres shorter; pedicel plus flagellum 1.25–1.4 times as long as width of head; Fu_1 1.3–1.5 times as long as wide (Fig. 16). OOL 1.2–1.4 times as long as LOD (Fig. 13). Axillar grooves heterogeneous (Fig. 10). Spiracular grooves shallow (Fig. 18). Cubital fold with 5–10 setae along basal cell; basal fold with 5–9 setae (Fig. 12) ..... *P. gibbum*
5. Propodeum with carinae forming an inverted V (Figs 30, 83) 6
– Propodeum with carinae forming an inverted Y (Figs 46, 62) 7
6. Ovipositor sheaths 0.97–1.07 times as long as body (Fig. 23). Axillar grooves homogeneous (Fig. 24). Frenum smooth (Fig. 29). Vertex dorsally 1.9–2 times as broad as eye in dorsal view (Fig. 21). Spiracular grooves deep (Fig. 30). Basal fold of forewing with 4–7 setae (Fig. 27) ..... *P. kondarensis* Tyulina, **sp. n.**
– Ovipositor sheaths 1.25–1.4 times longer than body (Fig. 78). Axillar grooves heterogeneous (Fig. 77). Frenum delicately reticulate (Fig. 80). Vertex dorsally 2.13–2.83 times as broad as eye in dorsal view (Fig. 81). Spiracular grooves shallow (Fig. 83). Basal fold with 9–13 setae (Fig. 76) ..... *P. splendens*
7. Ovipositor sheaths 1–1.65 times as long as body (Fig. 53). Frons obviously convex; vertex 2–2.37 times as broad as width of eye in dorsal view; POL 3.67–4.1 times as long as OOL; OOL 0.94–1 times as long as LOD (Fig. 59). Frenum smooth to alutaceous (Fig. 61). Spiracular grooves deep (Fig. 62) .... *P. murgabensis* Tyulina, **sp. n.**
– Ovipositor sheaths 1.1–1.26 times as long as body (Fig. 43). Frons moderately convex; vertex 2.55–2.9 times as broad as eye in dorsal view; POL 2.3–2.67 times as long as OOL; OOL 1.2–1.3 times as long as LOD (Fig. 48). Frenum delicately reticulate (Fig. 44). Spiracular grooves shallow (Fig. 46) ..... *P. minus*

Discussion

Distribution of Podagrionini and their hosts (praying mantids) in Russia and adjacent countries. Distribution of the praying mantids in Northern Eurasia shows that they are present only in the southernmost regions of Russia, i.e. Astrakhan, Volgograd, Krasnodar, Primorskiy Regions, Republic of Dagestan and neighboring countries [Jacobson, Bianchi, 1905; Mistshenko, 1949, 1951, 1956, 1967; Lindt, 1953, 1968, 1985; Pravdin, 1969; Storozhenko, 1987; Chogsomzhav, 1989; Battiston, Massa, 2008; Stolyarov, 2009; Chelpakova et al., 2011; Shcherbakov et al., 2013; Kazenas, 2014; Shcherbakov, Savitsky, 2015; Akhmedov, Kholmatov, 2019; Shcherbakov, Battiston, 2020a, b; Shcherbakov, Govorov, 2021]. Diversity of mantids is also higher in these regions, and distribution of Podagrionini perfectly matches that of their mantid hosts.

Bionomic characteristics of mantids and their parasitoids. Although a mantid egg case is a valuable source of nutrients, which may contain a few dozen to several hundred host eggs, it is inaccessible to parasitoids during certain times of the year. Thus, life cycles of these parasitoids and their hosts must be synchronized. However, in the Western Palaearctic, females of most mantid species, e.g. *Mantis religiosa*, lay eggs at the end of summer to the beginning of autumn. This could mean that these oothecae can be attacked by parasitoids until the end of next spring, when first-instar larvae of the hosts emerge. Nevertheless, adult Podagrionini appear far in advance of the new generation of adult mantids, at least in Western Europe (Gerard Delvare, personal observation), and this, in turn, effectively means that these parasitoids have to survive during the summer. For example, *Podagrion pachymerum* is a single member of its genus specialized on *M. religiosa* in Western and Central Europe (e.g. including Poland [Delvare, 2005]) and Primorskiy Region of Russia. This parasitoid is apparently univoltine, but it probably attacks host oothecae in April to the beginning of May and thus develops another generation during the spring according to Chopard [1922]. This author observed ovipositing females, who seemingly attacked the same egg case from which they had previously emerged. However, this appeared to be an apparent artifact, since careful laboratory experiments demonstrated that emerging females quickly left their egg cases after copulation (Gerard Delvare, personal observation). Moreover, reports of *P. pachymerum* females associated with egg cases of *M. religiosa* in the spring obviously involved already oviposited parasitoids, which then guarded the oothecae to prevent oviposition by other females. In fact, laboratory observations confirmed

that females can compete and even fight between each other, if confined with a single fresh ootheca of the host. After oviposition, every female remained on the egg case, guarding it for several days or even weeks from other parasitoids (Gerard Delvare, personal observation). In southern Europe, adults of *P. pachymerum* mostly appear in June, soon after emergence of the host larvae, and the parasitoids therefore must wait for the next generation of *M. religiosa.* Laboratory observations showed that female longevity was essential for the survival of the species, since most females remained alive at least for a month after emergence, and a few parasitoids survived up to 110 days (Gerard Delvare, personal observation). Similar results were obtained by Iwasaki [2000], who studied *Podagrion nipponicum*.

Empusidae, i.e. *Empusa* spp. and *Blepharopsis mendica*, demonstrate an alternative type of the life cycle. Specifically, females of these species appear in the end of spring and lay their eggs in summer, and these eggs are therefore available for parasitization during summertime. In Western Europe, this can be observed in *Podagrion bouceki* [Delvare, 2005] and to a lesser extent, in *P. gibbum*. This apparently means that these parasitoids can successfully develop in the summer, thus escaping the above-mentioned constraint.

Implications of morphology of mantid eggs and egg cases for parasitoid biology. In the oothecae, mantid eggs are often surrounded by a spongy cover [Gerling, 1965: figs 1–3]. This cover apparently protects the eggs from both extremely high and low temperatures and also represents a serious obstacle for ovipositing parasitoid females. For example, egg cases of *Empusa pennata* lack the spongy layer, and, indeed, they are strongly parasitized by *Podagrion bouceki* in southern France (Gerard Delvare, personal observation). Examination of ovipositor length in *Podagrion* or other podagrionine genera, e.g. *Iridophaga* or *Mantiphaga* Ferrière, 1955, showed that the total length of the ovipositor is correlated with the presence/absence and thickness of the oothecal cover of the hosts. Thus, *Podagrion klugianum*, which is widely distributed in the West Palaearctic and Afrotropical regions [Delvare, 2005], has the longest ovipositor among other members of this genus. It is therefore not surprising that this species is able to parasitize oothecae of *Sphrodomantis* spp. and *Tenodera* spp., which have the thickest spongy covers in the above-mentioned regions. On the other hand, both *Podagrion pachymerum* and *P. splendens* have ovipositors of medium length. They can successfully attack egg cases of *Mantis religiosa* and *Blepharopsis mendica* in the lab (Gerard Delvare, personal observation) and are able to parasitize *Hierodula* spp. as well. This may also be true for the new species, *Podagrion murgabensis* Tyulina, **sp. n.**, which hosts are still unknown. The host range of Podagrioninae with short ovipositors, such as *Iridophaga lichtensteini*, *Iridophagoides tatianae* and *Podagrion minus* is therefore limited to mantid egg cases with a thin or completely absent spongy cover, as, for example, in Amelinae and *Iris* spp.

The egg size represents another constraint for potential parasitoids. It is often correlated with the size of the ootheca and/or the presence of the spongy cover. The largest egg size, measured through transverse sections of the egg cases, was found in *Empusa* spp. Members of this genus are therefore easily accessible for parasitoids, because they contain large eggs, have no spongy cover and are available during summertime. However, these egg cases are often dispersed and contain relatively few eggs, which substantially reduces the parasitism rate. On the other hand, eggs of *Mantis religiosa*, *Blepharopsis mendica* and *Hierodula* spp. are somewhat smaller than those of *Empusa* spp., but are nevertheless parasitized by *Podagrion pachymerum*, *P. splendens*, *P. gibbum*, *P. libycum* as well as by the two new species described in the present paper, which are all about the same size. Finally, Amelinae and *Iris* spp., i.e. mantids with the smallest eggs, are attacked only by *Iridophagoides* spp., *Iridophaga lichtensteini* and *Podagrion minus*, since no other species were reared from these hosts.

Conclusions and perspectives

The present study significantly adds to our knowledge of Podagrionini of Russia, the Caucasus and Central Asia by providing descriptions of two new *Podagrion* species together with the species key. The known distribution of *Iridophagoides tatianae* is extended eastwards. Moreover, distributions of *Podagrion gibbum*, *P. libycum* and *P. splendens* are also extended eastwards to Central Asia and Mongolia. Nevertheless, many records of Podagrionini are outdated, and the number of identified hosts is also low. To improve the situation, extensive sampling of mantid egg cases in the southern regions of Russia is apparently needed. This sampling will provide new distribution data for the already registered species, and, moreover, will undoubtedly reveal new taxa, especially in the genera *Microdontomerus* Crawford, 1907, *Iridophaga* and *Palachia* Boucek, 1969, which are presently known only from the neighboring countries [Mirzaee et al., 2022]. Finally, it will also discover new bionomic and ecological data for both hosts and their parasitoids.

Acknowledgements

The authors sincerely thank E.V. Tselikh for her comments to the first draft of this manuscript as well as S.A. Belokobylskij and E.V. Tselikh for their help during our study of the ZISP collections. The authors are grateful to E.O. Shcherbakov for providing data on the distribution of praying mantids as well as to S.A. Basov, S.A. Belokobylskij, M.Yu. Dolgovskaya, K.I. Fadeev, E.V. Iljina, D.R. Kasparyan, O.V. Kosheleva, P.N. Petrov, K.I. Shorenko, V.A. Trjapitzin, E.V. Tselikh and M.G. Volkovitsh for providing collected specimens and to anonymous reviewer for helpful comments.

References

Akhmedov A.G., Kholmatov B.R. 2019. Fauna and some ecological aspects of praying mantises (Insecta, Mantodea) of Uzbekistan. *Vestnik Tyumenskogo gosudarstvennogo universiteta. Ekologiya i prirodopol'zovanie*. 5(1): 129–140 (in Russian). DOI: 10.21684/2411-7927-2019-5-1-129-140

Battiston R., Massa B. 2008. The Mantids of Caucasus (Insecta Mantodea). *Atti dell'Accademia roveretana degli Agiati, B, ser. VIII.* 8: 5–28.

Bernard F. 1938. Hyménoptères parasites d'oothèques de Mantides (3è note). Hôtes des pontes d'Empuse et de Mante religieuse. *Bulletin de la Société Entomologique de France*. 43: 42–45.

Bouček Z. 1976. On the Mediterranean Podagrioninae, with the description of a new *Iridophagoides* (Hym., Torymidae). *Entomologische Berichten*. 36: 182–184.

Bouček Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. Aberystwyth: Cambrian News Ltd. 832 p.

Chelpakova Zh.M., Davletbakov A.T., Kustareva L.A. 2011. Zhivotnyy mir Kyrgyzstana [Fauna of Kyrgyzstan]. Bishkek: Al Salam. 264 p. (in Russian).

Chogsomzhav L. 1989. Composition and distribution of fauna of the Orthopteroidea in the Mongolian People's Republic. *In*: Nasekomye Mongolii. Vypusk 10 [Insects of Mongolia. Iss. 10]. Leningrad: Nauka: 84–96 (in Russian).

Chopard L. 1922. Les parasites de la mante religieuse. *Annales de la Société Entomologique de France*. 91: 249–271. DOI: 10.1080/21686351.1922.12280297

Costa O.G. 1857. De quibusdam novis insectorum generibus descriptis iconibusque illustrates. *Memorie dell'Accademia di Scienze*. 2(2): 223–225.

Delvare G. 2005. A revision of the West-Palearctic *Podagrion* (Hymenoptera: Torymidae), with the description of *Podagrion bouceki* sp. nov. *Acta Societatis Zoologicae Bohemicae*. 69: 65–88.

Eady R.D. 1959. Revision of the nomenclature in the European Torymidae, with special reference to the Walker types. *Entomologist's Monthly Magazine*. 94: 257–271.

Erdös J. 1964. Chalcidoidea nova in Gallia et Numidia inventa (Hym.). *Bulletin de la Société Entomologique de France*. 69(3–4): 89–101.

Gahan A.B., Fagan M.M. 1923. The type species of the genera of Chalcidoidea or chalcid-flies. Washington: Bulletin of the United States National Museum. 173 p.

Gerling D. 1965. Host acceptance and oviposition by *Podagrion meridionale* Masi. *Entomophaga*. 14(3): 329–334. DOI: 10.1007/BF02371115

Gibson G.A.P. 1997. Morphology and terminology. *In*: Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera). Ottawa: NRC Research Press: 16–44.

Giraud J. 1863. Note sur quelques Hyménoptères très rares découverts en Austriche, et description d'un chalcidien nouveau (*Dirrhinus imperialis*). *Verhandlungen der Zoologisch-Botanischen Vereins in Wien*. 13: 1306–1312.

Girault A.A. 1913a. Diagnoses of new chalcidoid Hymenoptera from Queensland, Australia. *Archiv für Naturgeschichte*. 79: 90–107.

Girault A.A. 1913b. A few new chalcidoid Hymenoptera Hymenoptera from Queensland, Australia. *Bulletin of the Wisconsin Natural History Society*. 11(1–2): 35–48.

Girault A.A. 1915. Australian Hymenoptera Chalcidoidea – XII. The family Callimomidae with descriptions of new genera and species. *Memoirs of the Queensland Museum*. 4: 275–309.

Grissell E.E. 1995. Toryminae (Hymenoptera: Chalcidoidea: Torymidae): A redefinition, generic classification, and annotated World catalog of species. Gainesville: Memoirs on Entomology, International. 473 p.

Holmgren A.E. 1868. Hymenoptera. Species novas descripsit. *In*: Kongliga Svenska Fregatten Eugenies Resa omkring Jorden, Zoologi, Insecta. Stockholm: Vetenskapliga Iakttagelser: 391–442.

Iwasaki T. 2000. Parasitization of overwintering egg cases of two praying Mantises, *Tenodera aridifolia* (Stoll) and *T. angustipennis* Saussure by the torymid wasp, *Podagrion nipponicum* Habu. *Japanese Journal of Entomology*. 3(2): 65–70.

Jacobson G.G., Bianchi V.L. 1905. Pryamokrylye i lozhnosetchatokrylye Rossiyskoy Imperii i sopredel'nykh stran [Orthoptera and Pseudoptera of the Russian Empire and neighboring countries]. St Petersburg: Devrien A.F. 952 p. (in Russian).

Janšta P., Cruaud A., Delvare G., Genson G., Heraty J., Křížková B., Rasplus J.-Y. 2018. Torymidae (Hymenoptera, Chalcidoidea) revised: molecular phylogeny, circumscription and reclassification of the family with discussion of its biogeography and evolution of life-history traits. *Cladistics*. 34(6): 627–651. DOI: 10.1111/cla.12228

Kazenas V.L. 2014. Insects of Kazakhstan (main orders). *In*: Zhivotnye Kazakhstana v fotografiyakh [Animals of Kazakhstan in photographs]. Almaty: Nur-Print. 147 p. (in Russian).

Kostjukov V.V., Khomchenko E.V., Kosheleva O.V. 2004. Chalcids (Hymenoptera, Chalcidoidea) in Stavropol and Krasnodar Regions. Report II – species of the families Chalcididae, Pteromalidae, Eupelmidae, Eurytomidae, Torymidae, Tetracampidae, Eulophidae, Elasmidae. *In:* Biologicheskaya zashchita rasteniy – osnova stabilizatsii agroekosistem. Vypusk 2. Materialy dokladov mezhdunarodnoy nauchno-prakticheskoy konferentsii [Biological plant protection as a basis for stabilizing agroecosystems. Issue 2. Proceedings of International scientific and practical conference (Krasnodar, Russia, 29 September – 1 October 2004). Krasnodar: All-Russian Research Institute of Biological Plant Protection: 170–181 (in Russian).

Lindt I.I. 1953. To the knowledge of the fauna of mantises of Tajikistan with description of a new species. *Entomologicheskoe obozrenie*. 33: 273–280 (in Russian).

Lindt I.I. 1968. New species of mantises (Mantoidea, Mantidae) from the basin of the Varzob River (Tajikistan). *In*: Ushchel'e Kondara. Kniga 2 [Kondara Gorge. Book 2]. Dushanbe: Donish: 118–123 (in Russian).

Lindt I.I. 1985. Praying Mantis. *In*: Zoologicheskaya nauka Tadzhikistana za 60 let [Zoological science of Tajikistan for 60 years]. Dushanbe: Donish: 66–71 (in Russian).

Masi L. 1929. Risultati zoologici della Missione inviata dalla R. Società Geografica Italiana per l'esplorazione dell'Oasi di Giarabub (1926–1927). Hymenoptera Chalcididae. *Annali del Museo Civico di Storia Naturale Giacomo Doria*. 53: 195–240.

Mayr G.L. 1874. Die europäischen Torymiden, biologisch und systematisch bearbeitet. *Verhandlungen der Kaiserlich Königlichen Zoologisch-Botanischen Gesellschaft in Wien*. 24: 1–90.

Mirzaee T., Lotfalizadeh H., Sadhegi S. 2022. Chalcidoid parasitoids (Hymenoptera: Torymidae and Eupelmidae) of mantids (Mantodea) oothecae in Iran. *Phytoparasitica*. 50: 487–499. DOI: 10.1007/s12600-021-00965-1

Mistshenko L.L. 1949. Leatherwings (Dermatoptera), cockroaches (Blattodea), mantises (Mantodea), ghosts (Phasmatodea) and jumping orthopterans [Saltatoria (Orthoptera s. str.)] of the Gissar valley (Tajik SSR). *In:* Trudy Zoologicheskogo instituta AN SSSR. T. 8, vyp. 4. Sbornik rabot po faune Sredney Azii i sopredel'nykh stran [Proceedings of the Zoological Institute of the Academy of Sciences of the USSR. Vol. 8, iss. 4. Collection of works on the fauna of Middle Asia and adjacent countries]. Leningrad: Academy of Sciences of the USSR: 735–749 (in Russian).

Mistshenko L.L. 1951. To the fauna of cockroaches, earwigs, mantises, stick insects and Orthoptera of the southern slope of the Gissar Ridge. *In*: Ushchel'e Kondara [Kondara Gorge]. Moscow, Leningrad: Academy of Sciences of the USSR: 198–205 (in Russian).

Mistshenko L.L. 1956. Praying mantises (Mantoidea) of the southern slope of the Gissar Ridge (Tajikistan). *Entomologicheskoe obozrenie*. 35(3): 652–658 (in Russian).

Mistshenko L.L. 1967. New species of *Rivetina* Berl. et Chop. (Mantoptera, Manteidae) from Kazakhstan, Turkmenistan and Asia Minor. *Entomologicheskoe obozrenie*. 46(3): 699–711 (in Russian).

Noyes J.S. 2019. Universal Chalcidoidea database. WWW publication. London: the Natural History Museum. Available at: https://www.nhm.ac.uk/our-science/data/chalcidoids/database/index.dsml (last updated March 2019).

Picard F. 1933. Sur les Hyménoptères parasites des oothèques de Mantides, avec la description d'un chalcidide: *Iridophaga lichtensteini* n. g. et n. sp. *Bulletin de la Société zoologique de France*. 58: 235–240.

Picard F. 1936. Sur le genre *Iridophaga* [Hym. Chalcididae] avec la description d'une nouvelle espèce parasite de *Blepharopsis mendica F. Bulletin de la Société entomologique de France*. 41(5): 75–77.

Pravdin F.N. 1969. Ordo Praying Mantis (Mantoptera or Mantodea). *In*: Zhizn' zhivotnykh. Tom 3 [Life of animals. Vol. 3]. Moscow: Prosveshchenie: 211–215 (in Russian).

Saussure H. 1890. Histoire naturelle des Hyménoptères. Histoire Physique, Naturelle et Politique de Madagascar. Paris: Librairie Hachette et Cie. 680 p.

Shcherbakov E., Battiston R. 2020a. *Rivetina nana*. *The IUCN Red List of Threatened Species*. Available at: https://www.iucnredlist.org/species/118892118/118892189. DOI: 10.2305/IUCN.UK.2020-2.RLTS.T118892118A118892189.en

Shcherbakov E., Battiston R. 2020b. *Severinia turcomaniae*. *The IUCN Red List of Threatened Species*. Available at: https://www.iucnredlist.org/species/118891933/118892034. DOI: 10.2305/IUCN.UK.2020-2.RLTS.T118891933A118892034.en

Shcherbakov E., Govorov V. 2021. Riders on the storm? A short note on the biology of *Severinia turcomaniae* (Saussure, 1872) (Mantodea: Toxoderidae). *Annales de la Société entomologique de France*. 57(4): 372–378. DOI: 10.1080/00379271.2021.1950050

Shcherbakov E.O., Savitsky V.Yu. 2015. New data on the fauna, taxonomy and ecology of praying mantises (Dictyoptera, Mantodea) from Russia. *Zoologicheskii zhurnal*. 94(1): 37–55 (in Russian). DOI: 10.7868/S0044513415010134

Shcherbakov E.O., Yakovlev R.V., Titov S.V. 2013. Notes on the fauna of praying mantids (Mantodea) of the Kulunda steppe. *Amurian*

zoological journal. 5(1): 16–20 (in Russian). DOI: 10.33910/1999-4079-2013-5-1-16-20

Spinola M. 1811. Essai d'une nouvelle classification générale des Diplolépaires. *Annales du Muséum National d'Histoire Naturelle*. 17: 138–152.

Stolyarov M.V. 2009. A preying mantis species (Mantidae) new for the fauna of Russia. *Entomological Review*. 89(2): 189–190. DOI: 10.1134/S0013873809020092

Storozhenko S.Yu. 1987. Terrestrial orthopteroid insects (Orthopteroidea) of the Far Eastern State Marine Reserve. *In*: Novye dannye po sistematike nasekomykh Dal'nego Vostoka [New data on the taxonomy of insects of the Far East]. Vladivostok: Far Eastern Branch of the Academy of Sciences of the USSR: 4–10 (in Russian).

Strand E. 1911. Neue Arten der Chalcididengattungen Epistenia Westw., Aepocerus Mayr und *Podagrion* Spin. *Archiv für Naturgeschichte*. 77: 153–159.

Tselikh E.V., Zerova M.D., Trjapitzin V.A. 2019. 42. Family Torymidae. *In*: Annotated Catalog of the Hymenoptera of Russia. Vol. 2. Apocrita: Parasitica. *Proceedings of the Zoological Institute of the Russian Academy of Sciences*. 323(suppl. 8): 83–111.

Walker F. 1833. Monographia Chalciditum (continued from page 29). Family II – Torymidae. *Entomological Magazine*. 1(2): 115–142.

Walker F. 1871. Part II – Eurytomidae and Torymidae. *In*: Notes on Chalcidiae. London: E.W. Newman: 19–36.

Walker F. 1872. Part V – Encyrtidae, Myinidae, Eupelmidae, Cleonymidae, Spalangidae and Pirenidae. *In*: Notes on Chalcidiae. London: E.W. Janson: 71–88.

Westwood J.O. 1847. XL. On the economy of the genus *Palmon* of Dalman with descriptions of several species belonging thereto. *Transactions of the Entomological Society of London*. 4(4): 256–261. DOI: 10.1111/j.1365-2311.1847.tb01364.x

Zerova M.D., Seryogina L.Ya. 1999. Torymid chalcidoid wasps (Hymenoptera, Chalcidoidea, Torymidae) of tribes Podagrionini and Monodontomerini of the Ukrainian fauna. *Vestnik zoologii*. Suppl. 13: 3–130 (in Russian).

Received / Поступила: 10.06.2024
Accepted / Принята: 2.10.2024
Published online / Опубликована онлайн: 17.12.2024