New faunistic records of Myrmeleontoid lacewings (Neuroptera: Myrmeleontidae, Ascalaphidae, Nemopteridae) in Armenia

Новые фауnistические находки мирмелеонтоидных сетчатокрылых (Neuroptera: Myrmeleontidae, Ascalaphidae, Nemopteridae) в Армении

© V.A. Krivokhatsky¹, G.H. Karagyayan², T.L. Ghrejyan², M.Yu. Kalashian²
© В.А. Кривохатский¹, Г.А. Карагян², Т.А. Греяйян², М.Ю. Калашиян²

¹ Zoological Institute of the Russian Academy of Sciences, Universitetskaya Emb., 1, St Petersburg 199034 Russia. E-mail: myr@pochta.ru
² Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Armenia, P. Sevak str., 7, Yerevan 0014 Armenia. E-mails: gaykaragyayan@yahoo.com, tkredijyan@gmail.com, mkalashian1@gmail.com

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Abstract. New records of 19 species of myrmeleontoid lacewings (Neuroptera: Myrmeleontidae, Ascalaphidae, Nemopteridae) of Armenian fauna are presented. In comparison with adjacent Caucasian countries Armenian fauna of antlions, spoonwings and owlfries could be characterized as manifold, organized under the influence of Anatolian faunistic center. Distoleon laticollis (Navás, 1913), Delfimeus irroratus iranensis (Hölzel, 1972), D. irroratus morgani (Navás, 1913), Neuroleon tenellus (Klug in Ehrenberg, 1834), Creoleon griseus (Klug in Ehrenberg, 1834), Libelloides macaronius kolyvanensis morpha alba Krivokhatsky, Bagaturov et Prokopyov, 2018 are reported for Armenia for the first time. Here we proposed a new status for three taxa, which are interpreted as subspecies of Delfimeus irroratus (Olivier, 1811): D. irroratus morgani stat. n., D. irroratus iranensis stat. n. and D. irroratus friedeli stat. n. All four taxa (including the nominotypical subspecies) differ in the pronotum pattern and the color of wings and have a partially sympatric distribution. The largest representatives (forewing 25 mm) nomenclatural subspecies and a small subspecies D. irroratus friedeli with dense venation were not found in Armenia.

Special studies of lacewings including antlions have not been conducted in Armenia. Some data on antlions were published in reviews dedicated to larger territories and based on the materials collected in 19th–20th centuries [Esben-Petersen, 1913; Hölzel, 1972; Aspöck et al., 1980a, b; Zakharenko, Krivokhatsky, 1993; Aspöck et al., 2001]. In recent years the fauna of antlions was studied rather comprehensively in neighboring territories: Dagestan [Ilina, Krivokhatsky, 2012; Ilina et al., 2014] and Krasnodar Region [Shchurov, Makarkin, 2013] of Russia, Georgia [Dobosz et al., 2017, 2018], Azerbaijan [Kerimova, Krivokhatsky, 2018a, b], Turkey [Ari, 2014; Canbulat, 2007].

The material for this study was collected mainly in central and southern provinces of Armenia (Kotayk, Ararat and Syunik) during 2016–2017. The material was fixed using the methods applying for cytogenetic and molecular
studies in ethanol-acetic mixture and partly in ethanol. Data on correctly recognizable specimens from the photos taken from the natural habitats are included into the list as well. The material is deposited in the Zoological Institute of the Russian Academy of Sciences (ZIN, St Petersburg, Russia); some data on the structure of the reproductive systems of Myrmeleoniformia have already been published [Kuznetsova et al., 2019].

In addition to these recently collected materials, data on materials from the collections of ZIN and Moscow State University (ZMM, Moscow, Russia) were partly taken into consideration as well. For these materials the label data are provided together with current geographic names corresponding to well-known web-resources [e.g., Google Earth] and given in the square brackets.

**Family Myrmeleontidae**

*Palpares libelluloides* (Linnaeus, 1764)

**Material.** 1♂, Ararat Prov., env. Lanjar vill., 39.81887°N / 44.98507°E, 1796 m, 18.08.2016 (A. Danchenko); 1♀, Ararat Prov., env. Dashakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Distribution.** *Palpares libelluloides* is a widespread Eastern Mediterranean species with two main exclaves: the South European-African and the Caucasian-Asian. The species is regularly collected in Armenia since 1926 [Krivokhatsky et al., 2017].

*Palpares turcicus* Koçak, 1976

(Fig. 1)

**Material.** 2♂, Ararat Prov., env. Surenavan vill., 39.8097°N / 44.8354°E, Uranots locality, 12.07.2007 (Fig. 1, photo by M. Kalashian).

**Distribution.** This Irano-Anatolian species is represented in ZIN collection by materials from Armenia since 1864 [Krivokhatsky et al., 2017].

*Distoleon laticollis* (Navas, 1913)

**Material.** 2♂, Ararat Prov., env. Dashakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Additional material.** Israel: 1♂ (ZIN), Akhziv, 29.07.1996 (M. Volkovitch, M. Dolgovskaya) [photo published in [Krivokhatsky, 2003]).


*Delfimeus irroratus* (Olivier, 1811)

*Delfimeus irroratus* subsp. *iranensis* (Hölzel, 1972), **stat. n.**

**Material.** 1♂, Ararat Prov., env. Dashakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Additional material.** Azerbaijan: 1♂ (ZIN), Ordubad, 19.06.1931 (M. Rjabov).

**Iran:**

*Macronemurus persicus Navás, 1915*

*Macronemurus persicus var. graciosa* Krivokhatsky, Dobosz et Khabiev, 2015

**Material.** 1♀, 1♂, Ararat Prov., env. Goravan vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Distribution.** The widely distributed Southern Palaearctic species, firstly recorded from Armenia; two taxa *D. irroratus morgani* and *D. irroratus iranensis* were reported for Iran only. Both subspecies are recorded from Armenia for the first time.

*Macronemurus persicus Navás, 1915* (Fig. 2)

**Material.** 1♂, Ararat Prov., env. Goravan vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Distribution.** Kura-Araxian – South-Turanian species, from Armenia previously reported from Meghri. Nominative variation *Macronemurus persicus var. persica* predominate among Armenian populations [Krivokhatsky et al., 2015].

*Neuroleon (Sanctuary, 11.07.2007 (Fig. 2, photo by M. Kalashian)).

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**Notes.** Small light subspecies, forewing 20 mm, pronotum without obvious brown pattern. Since 2001 Krivokhatsky [2003] in the internet project Zlnsecta above mentioned listed the the following four taxa as conspecific: *Delfimeus irroratus* (Olivier, 1811) = *Maracandia morgani* Navás, 1913 = *Pignatellus friedeli* Hözel, 1972 = *Pignatellus iranensis* Hözel, 1972. Here we proposed a new status for three taxa which are interpreted as subspecies of *Delfimeus irroratus* (Olivier, 1811): *D. irroratus morgani* **stat. n., D. irroratus iranensis** **stat. n.** and *D. irroratus friedeli* (Hölzel, 1972), **stat. n.**

All four taxa (including the nominotypical subspecies) differ in the pronotum pattern and the color of wings and have a partially sympatric distribution. The largest representatives (forewing 25 mm) nominotypical subspecies and a small subspecies *D. irroratus friedeli* with dense venation differ from each other according to the diagnosis of Hözel [1972] and were not found in Armenia.

**Family Creoleonidae**

*Creoleon plumbeus* (Olivier, 1811)

**Material.** 1♂, 3♀, Ararat Prov., env. Lanjar vill., 39.81887°N / 44.98507°E, 1796 m, 18.08.2016 (A. Danchenko); 1♀, Ararat Prov., env. Dashakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Distribution.** The widely distributed Southern Palaearctic, mainly East-Mediterranean species [Krivokhatsky, 1996]; biogeographic indicator for Anatolian original fauna [Krivokhatsky, Emelianov, 2000]. Recorded from Armenia for the first time.

**Notes.** No new status for the new subspecies. The dark brown subspecies, diagnosed by pronounced v-shaped figure on pronotum.

*Creoleon plumbeus* subsp. *morgani* (Navás, 1913), **stat. n.**

**Material.** 1♂, 2♀, Ararat Prov., env. Dashakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

**Additional material.** Armenia: 5♂ (ZIN), Meghri, Aras River, 30.08.1932 (I. Rodionov).

**Notes.** Small light subspecies, forewing 20 mm, pronotum without obvious brown pattern. Since 2001 Krivokhatsky [2003] in the internet project Zlnsecta above mentioned listed the the following four taxa as conspecific: *Delfimeus irroratus* (Olivier, 1811) = *Maracandia morgani* Navás, 1913 = *Pignatellus friedeli* Hözel, 1972 = *Pignatellus iranensis* Hözel, 1972. Here we proposed a new status for three taxa which are interpreted as subspecies of *Delfimeus irroratus* (Olivier, 1811): *D. irroratus morgani* **stat. n., D. irroratus iranensis** **stat. n.** and *D. irroratus friedeli* (Hölzel, 1972), **stat. n.**

All four taxa (including the nominotypical subspecies) differ in the pronotum pattern and the color of wings and have a partially sympatric distribution. The largest representatives (forewing 25 mm) nominotypical subspecies and a small subspecies *D. irroratus friedeli* with dense venation differ from each other according to the diagnosis of Hözel [1972] and were not found in Armenia.
Figs 1–10. Myrmeleontoid lacewings.


Рис. 1–10. Мирмелеонтовые сетчатокрылые.

1 – Palpares turcicus, самка, Уранотс; 2 – Macronemurus persicus var. persica, самка, Гораван; 3 – Creoleon plumbeus, самец, Шаумян; 4 – Acanthoclisis occitanica morpha typica, самка, Ацаван; 5 – Libelloides macaronius kolyvansensis, самка, Geghanush; 6 – Nemoptera sinuata, самец и самка, Хосровский заповедник; 7 – Lerthta ledereri, самка, Гораван; 8 – Lerthta ledereri, самец, Турция; 9 – Olivierina extensa, самка, Гораван; 10 – Olivierina extensa, самка, Мегри. 1–3, 5–7, 9 – фото М. Калашяна, 4 – фото С. Шинкаренко, 8 – фото Ю. Самарцевой, 10 – фото В. Кривохатского.
Distribution. The ancient-Mediterranean *Creoleon plumbeus* is biogeographic indicator for Anatolian original fauna [Krivokhatsky, Emeljanov, 2000]. It is known from Armenia since the beginning of 19th century [Hagen, 1858].

*C. griseus* (Klug, 1834)

Material. 1♂, Yerevan, 40.20888° / 44.53647°E, 1250 m, 15.08.2016 (I. Stepanyan).

Distribution. Ancient-Mediterranean, mainly Saharan-Turanian species, firstly recorded from Armenia. Species known from Sudan, Egypt, Tunisia, Israel, Palestina, South Arabia, Oman, Iran, Turkmenistan, Uzbekistan, Tadjikistan and India.

*Myrmeleon hyalinius* Olivier, 1811 subsp. *distinguendus* Rambur, 1842

Material. 1♀, Ararat Prov., env. Dashtakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

Distribution. The widespread Saharo-Turanian species. The subspecies *distinguendus* is distributed in South Europe and common in Transcaucasia. It was not recorded from Armenia in the recent compendium [Aspöck et al., 2001] where this taxon is listed as a separate species.

*Myrmeceaulurus trigrammus* (Pallas, 1771)

Material. 1♀, Ararat Prov., env. Dashtakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

Distribution. The Ancient-Mediterranean West Palaearctic species. It was not recorded from Armenia in the recent compendium [Aspöck et al., 2001], but listed and indicated for the country on a map of distribution of the species in the fauna of Russia [Krivokhatsky, 2011].

*Myrmeceaulurus solarius* Krivokhatsky, 2002

Material. 2♂, 2♀, Ararat Prov., env. Dashtakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan); 1♀, 2♀, Ararat Prov., env. Lanjar vill., 39.81887°N / 44.98507°E, 1796 m, 22.08.2016 (A. Danchenko); 1♀, Kotayk Prov., env. Geghard vill., 28.08.2016 (A. Danchenko).

Distribution. The Irano-Turanian species, which is known from Armenia by the type series (four paratypes deposited in ZIN) from this country. Paratypes originated from Chimankend [Ursadzor], Yerevan, Migry [Meghri] and Vedi [Krivokhatsky, 2002].

*Nothoveus zigan* (Aspöck, Aspöck et Hölzel, 1980)

Material. 1♀, Armavir prov., Yervandashat env., 40.10367°N / 43.68528°E, 957 m, 21.09.2016 (G. Karagyan); 1♀, env. Goravan vill., Goravan Sands Sanctuary, 39.88915°N / 44.73302°E, 956 m, 31.05.2017 (T. Ghrejyan).

Distribution. The South-Scythian – North-Turanian species [Krivokhatsky, 1994], recorded from Armenia as *Nothoveus punctulatus* (Steven in Waldheim, 1846) [Aspöck et al., 2001).

*Cueta anomala* Navás, 1915

Material. 1♀, Ararat Prov., env. Dashtakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

Distribution. This widespread Kura-Aras-Anatolian species occurs in Iran, Anatolia and the Caucasus [Krivokhatsky, 2011]. It has been recorded for Armenia and Azerbaijan without a distinct locality by Krivokhatsky [2011]. Localities of this species in Armenia are published here for the first time.

*Acanthacis occitanica* (Villers, 1789)

*Acanthacis occitanica* morpha typica

(Fig. 4)

Material. 1♀, Ararat Prov., Hatsavan vill., at light, 10.06.2018 (Fig. 4, photo by S. Shinkarenko).

*Acanthacis occitanica* morpha nigrilenta

Krivokhatsky, 2005

Material. 1♀, Ararat Prov., env. Azat Reservoir, 40.07675°N / 44.51297°E, 1071 m, 11.06.2017 (G. Karagyan).

Distribution. South-West-Palaearctic species, known from Armenia; black striped morpha *nigrilenta* was not registered in Armenia previously [Krivokhatsky, 2005].

Family Ascalaphidae

*Libelloides macaronius kolyvanensis* (Laxmann, 1770)

(Fig. 5)

*Libelloides macaronius macaronius* morpha typica

Material. 1♀, Syunik Prov., ~5 km N Shvanidzor vill., 21.06.2007 (photo by M. Kalashian); 1♀, Syunik Prov., between Kapan town and Geghanush vill., 27.06.2007 (Fig. 5, photo by M. Kalashian); 2♂, 1♀, Syunik Prov., env. Aygedzor vill., 39.88901°N / 46.18598°E, 1355 m, 4.06.2017 (G. Karagyan).

*Libelloides macaronius kolyvanensis* morpha *alba*

Krivokhatsky, Bagaturov et Prokopov, 2018

Material. 2♂, Syunik Prov., env. Aygedzor vill., 39.88901°N / 46.18598°E, 1355 m, 4.06.2017 (G. Karagyan).

Distribution. The mostly West-Scythian subspecies, known from the Pontic biogeographic province of the Caucasus. It was recorded for Armenia as *Libelloides macaronius* (Scopoli, 1763) [Aspöck et al., 2001] and as *Libelloides macaronius kolyvanensis* (Laxmann, 1770) [Krivokhatsky et al., 2018]. The rare species in Armenia,
only seven specimens collected from 1924 to 1982 (morpha *typica*) are deposited in ZIN [Krivokhatsky et al., 2018]. Morpha *alba* is recorded for Armenia for the first time. It is remarkable that specimens of both morphs were collected from one population.

**Family Nemopteridae**

*Nemoptera sinuata* Olivier, 1811

(Fig. 6)

**Material.** 2♂, 1♀, Khosrov Forest State Reserve, Central (Vedi) area, 24.06.2006 (Fig. 6, photo by M. Kalashian); 1♂, Ararat Prov., env. Zangakatan vill., 39.841386°N / 45.046696°E, 1870 m, 30.07.2016 (A. Danchenko); 1♀, Ararat Prov., env. Azat Reservoir, 40.07675°N / 44.1297°E, 1071 m, 11.06.2017 (G. Karagyan); 1♀, Syunik Prov., env. Aygedvor vill., 38.99019°N / 46.18598°E, 1355 m (G. Karagyan).

**Distribution.** The East-Mediterranean species; well-known and usual for Transcaucasia [Alexandrov-Martynov, 1930; Makarian, 1930; Dobosz, Krivokhatsky, 2019]; common in some biotopes in Armenia.

*Lertha lederi* (Selys-Longchamps, 1866) (Figs 7, 8)

**Material.** 1♂, Ararat Prov., env. Goravan vill., Goravan Sands Sanctuary, 30.05.2009 (Fig. 7, photo by M. Kalashian); 2♀, Ararat Prov., env. Goravan vill., Goravan Sands Sanctuary, 39.88915°N / 44.73302°E, 956 m, 31.05.2017 (T. Ghrejyan).


Turkey: 1♂ (ZIN), “Nemoptera ledleri Selys Long., Bos Dagh(Tmtd), Anatolia”; 1♀ (ZIN), “Lertha lederi Selys, Kolbe det.” (Fig. 8).

**Distribution.** Anatomical species, known from Turkey and Armenia.

*Olivierina extensa* (Olivier, 1811) (Figs 9, 10)

**Material.** 1♀, Ararat Prov., env. Goravan vill., Goravan Sands Sanctuary, 12.07.2007 (Fig. 9, photo by M. Kalashian); 1♂, Ararat Prov., env. Goravan vill., Goravan Sands Sanctuary, 39.89195°N / 44.73302°E, 956 m, 31.05.2017 (T. Ghrejyan).

**Additional material.** Armenia: 1♂ (ZIN), Migry env. [Meghrli], 8.07.1931 (All-Union Institute of Plant Protection leg.); 1♂ (ZIN), Migry env. [Meghrli], Vedi, 8.07.1931 (All-Union Institute of Plant Protection leg.); 1♂, Zangezur, pr. Megry [Meghrli], 07.1935, “Olivierina extensa Oliv., Ph. Zaitsev det”; 1♀ (ZIN), Meghr, Aras Valley, 23.06.1974 (M. Volkovitsch); 1♀, Meghr, 27.06.2010 (M. Volkovitsch) (Fig. 10).

Azerbaijan: 1♂, 1♀ (ZIN), Disar, near Ordubad, Nakhichevan, 24.07.1933 (Znoiko).

Iran: 1♀ (ZIN), Abbasan, W Persia, Luristan, 16.05.1914 (Nesterov); 2♂ (ZIN), Abbasan, Persian-Turkestani boundary, “Olivierina extensa, Ph. Zaitzev det.”, 15.06.1914 (Nesterov); 1♂ (ZIN), Fars Prov, Barm i Firuze, Shiraz env., 19.07.2003 (V. Lukhtanov); 1♀ (ZIN), Azerbaijan Prov., Chajqndar, 2100 m, 13.07.2004 (V. Lukhtanov).

Turkey: 1♂ (ZIN), Elazig, 23 km NE Kavancilar, 3.07.2005 (M. Volkovitsch); 1♀ (ZIN), Igdır, Ararat foot, 82 km W Aralik, 8.07.2005 (M. Volkovitsch).

**Notes.** Almost all of studied specimens are characterized by the presence of the distinct apical white round spot on the apical extension of the hind wing (Figs 9, 10). Only Nakhichevan specimens have the similar spot slightly expressed, cloudy. According to R. Dobosz (personal communication), they should be referred to the species *Lertha palmonii* Tjeder, 1970, but status of this form is disputable and needs further study and clarification.

**Distribution.** The Anatolian species known from Turkey and Armenia.


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