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

Nовые фаунистические находки мирмелеонтоидных сетчатокрылых (Neuroptera: Myrmeleontidae, Ascalaphidae, Nemopteridae) в Армении

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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 owlfies could be characterized as manifold, organized under the influence of Anatolian faunistic center. Distostole 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 (Hölzel, 1972), Bagaturov et Prokopov, 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 (Olivel, 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 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 were not found in Armenia.

Резюме. Представлены новые указания 19 видов мирмелеонтоидных сетчатокрылых для Армении. По сравнению с фаунами соседних кавказских стран фауна муравьиных львов, нитекрылок и аскалафов Армении может быть определена как переходная, находящаяся под влиянием Анатолийского фаунического центра. Distostole 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) и морфа Libelloides macaronius kolyvanensis морфа alba Krivokhatsky, Bagaturov et Prokopov, 2018 впервые указываются для Армении. Мы предлагаем новый статус для трех таксонов, которые интерпретируются здесь как подвиды вида Delfimeus irroratus (Olivel, 1811): D. irroratus morgani stat. n., D. irroratus iranensis stat. n. and D. irroratus friedeli stat. n. Все 4 таксона (включая номинативный подвид) отличаются рисунком пронотума и цветом крыльев и имеют частично перекрывающиеся ареалы. Крупнейший (переднее крыло 25 мм) номинативный подвид и маленький подвид D. irroratus friedeli с густым жилкованием не были найдены в Армении.

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 [Ilyina, Krivokhatsky, 2012; Ilyina et al., 2014] and Krasnodar Region [Schurov, 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 Myrmeleonidae

*Palpares libelluloides* (Linnaeus, 1764)

**Material.** 1♂, Ararat Prov., env. Lanjar vill., 39.81887°N / 44.9507°E, 1796 m, 18.08.2016 (A. Danченко); 1♀, Ararat Prov., env. Dashtakar 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., <5 km ENE 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. Dashtakar vill., 39.92319°N / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan).

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

**Distribution.** Described from Syria in the genus *Formicaleo* sensu Brauer, 1854. Reported by Hölzel [1972] from Israel, Lebanon, Sudan and Ethiopia. Widely spread on Arabian Peninsula and in Levant [Aspöck et al., 2001]. East-Mediterranean species, firstly recorded from Armenia.

*Delfineus irroratus* (Olivier, 1811)

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

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

**Additional material.** Azerbaijan: 1♀ (ZIN), Ondubad, 19.06.1931 (M. Rjabov).  
Iran: 2♂ (ZIN), Shahrud, 6.07.1914 (A. Kiritschenko).

**Notes.** See explanation for a new status in the next subspecies. The dark brown subspecies, diagnosed by pronounced v-shaped figure on pronotum.

*Delfineus irroratus* subsp. *morgani* (Navás, 1913), stat. n.

**Material.** 1♂, 2♀, Ararat Prov., env. Dashtakar 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 ZInsecta above mentioned listed the the following four taxa as conspecific: *Delfineus irroratus* (Olivier, 1811) = *Maracanda morgani* Navás, 1913 = *Pignatellus friedeli* Hölzel, 1972 = *Pignatellus iranensis* Hölzel, 1972. Here we proposed a new status for three taxa which are interpreted as subspecies of *Delfineus 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) nonmotypical subspecies and a small subspecies *D. irroratus friedeli* with dense venation differ from each other according to the diagnosis of Hölzel [1972] and were not found in Armenia.

**Distribution.** The South-Western Palaeartic species. According to the most recent compendium [Aspöck et al., 2001] *Delfineus irroratus* was 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

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

*Neuroleon (Ganussa) tenellus* (Klug in Ehrenberg, 1834)

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

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

*Creoleon plumbeus* (Olivier, 1811)

(Fig. 3)

**Material.** 1♂, Syunik Prov., N env. Kapan town, Shahumyan locality, 1.08.2007 (Fig. 3, photo by M. Kalashian); 2♂, 3♀, Ararat Prov., env. Lanjar vill., 39.81887°N / 44.9507°E, 1796 m, 18, 22.08.2016 (A. Danченко).

**Additional material.** Armenia: 1♀ (ZIN), Echmiadzin, 4.07.1925; 1♂ (ZIN), Lori Prov., Achtala [Akhtala], 26.08.1925; 1♀ (ZIN), Yerevan env., 2.07.1928 (A. Shelkovnikov); 1♂ (ZIN), Meghri, 3.07.1929 (A. Shelkovnikov); 1♀ (ZIN), Zanga [Hrazdan] River Valley, pt. Erivan, 13.07.1932 (G. Kostylev); 1♂ (ZIN), Aras, 6.08.1932 (M. Rjabov); 1♂ (ZIN), Yerevan, 15.09.1991 (M. Kalashian).
Figs 1–10. Myrmeleontoid lacewings.

1 – Palpares turcicus, female, Uranots; 2 – Macronemurus persicus var. persica, female, Goravan; 3 – Creoleon plumbeus, male, Shaumyan; 4 – Acanthaclisis occitanica morpha typica, female, Hatsavan; 5 – Libelloides macaronius kolyvanensis, female, Geghanush; 6 – Nemoptera sinuata, male and female, Khosrov Reserve; 7 – Lerthta ledeneri, female, Goravan; 8 – Lerthta ledeneri, male, Turkey; 9 – Olivierina extensa, female, Goravan; 10 – O. extensa, female, Meghri. 1–3, 5–7, 9 – photos by M. Kalashian, 4 – photo by S. Shinkarenko, 8 – photo by Ju. Samartseva, 10 – photo by V. Krivokhatsky.

Рис. 1–10. Мирмелеонтоидные сетчатокрылые.

1 – Palpares turcicus, самка, Уранотс; 2 – Macronemurus persicus var. persica, самка, Гораван; 3 – Creoleon plumbeus, самец, Шаумян; 4 – Acanthaclisis occitanica morpha typica, самка, Ацван; 5 – Libelloides macaronius kolyvanensis, самка, Гегануш; 6 – Nemoptera sinuata, самец и самка, Хосровский заповедник; 7 – Lerthta ledeneri, самка, Гораван; 8 – Lerthta ledeneri, 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].

*Creoleon 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, Palestine, South Arabia, Oman, Iran, Turkmenistan, Uzbekistan, Tadjikistan and India.

*Myrmecaelurus tygrannus* Ollivier, 1811

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

**Additional material.** Armenia: 1♀ (ZIN), Migry [Meghri], Aras River, 2.06.1957 (V. Trjapitzyn).

**Distribution.** The widespread Saharan-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.

*Myrmecaelurus solarius* Krivokhatsky, 2002

**Material.** 2♂, 2♀, Ararat Prov., env. Dashtakar vill., 39.92319° / 44.74741°E, 965 m, 6.08.2016 (G. Karagyan); 1♂, Kotayk Prov., env. Geghvard vill., 23.08.2016 (A. Danchenko); 1♀, Ararat Prov., Yervandashat env., 40.10367°N / 43.68528°E, 957 m, 21.09.2016 (G. Karagyan).

**Additional material.** Armenia: 1♀ (ZMM), Yerevan env., 16.07.1932 (P. Kostylev); 1♂ (ZMM), Dzirvez, Yerevan env., 23.06.1960 (G. Dlusky); 2♀ (ZMM), Migry [Meghri], 6.08.1977 (A. Lisetsky); 1♂, 1♀ (ZMM), Migry [Meghri], 10.07.[19]?? (N. Filipov).

**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].

*Libelloides macaronius kolyvanensis* (Laxmann, 1770)

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

**Acanthacis occitana* (Villers, 1789) Acanthacis occitana morpha typica (Fig. 4)

**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)

**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., 38.99019° / 46.18598°E, 1355 m, 4.06.2017 (G. Karagyan).

**Libelloides macaronius kolyvanensis morpha alba** Krivokhatsky, Bagaturov et Prokopov, 2018

**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 [Krivokhatksky 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. Zangakatun vill., 39.841380°N / 45.046694°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. Angedzor 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, Krivokhatksky, 2019]; common in some biotopes in Armenia.

*Lerthta ledereri* (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. Gheriyan).

**Additional material.** Armenia: 1♂ (ZIN), Asni (currently abandoned), near Araxayjan, Armenia mar., 3.07.1993 (S. Paramonov), "Lerthta ledereri Selys, S. Paramonov det"; 1♀ (ZIN), Vedi env., Gorovan Sands, 29.05-30.05.1996 (M. Volkovitsh). Turkey: 1♂ (ZIN), "Nemoptera Ledererii Selys Long., Bos Dadhi(Tmold), Anatolia", "Lerthta ledereri Selys, Kolbe det" (Fig. 8).

**Distribution.** Anatolian 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, 39.88915°N / 44.73302°E, 956 m, 31.05.2017 (T. Gheriyan).

**Additional material.** Armenia: 1♂, 1♀ (ZIN), Migry env. [Meghri], 8.07.1931 (All-Union Institute of Plant Protection leg.); 1♂ (ZIN), Migry env. [Meghri], Vedi, 8.07.1931 (All-Union Institute of Plant Protection leg.); 1♀, Zangezur, pr. Megry [Meghri], 07.1935, "Lerthta extensa Oliv., Ph. Zaitzev det"; 1♀ (ZIN), Megrhi, Aras Valley, 23.06.1974 (M. Volkovitsh); 1♀, Megrhi, 27.06.2010 (M. Volkovitsh) (Fig. 10). Azerbaijan: 1♂, 1♀ (ZIN), Disar, near Ordubad, Nakhichevan, 24.07.1933 (ZIN), Abbasan, W Persia, Lorestan, 16.05.1914 (Nesterov); 2♂ (ZIN), Abbasan, Persian-Turkestane border, "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., Chaijerli, 2100 m, 13.07.2004 (V. Lukhtanov). Turkey: 1♂ (ZIN), Elazig, 23 km NE Kavancilar, 3.07.2005 (M. Volkovitsh); 1♀ (ZIN), Igdir, Ararat foot, 82 km W Arakil, 8.07.2005 (M. Volkovitsh).

**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 *Lerthta 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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