

New records of Heteroptera (Insecta: Hemiptera) from Iran and in memoriam Dr. Rauno E. Linnavuori

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Abstract This faunistic paper deals with representing ten new records of Heteroptera species in Iran. Those ten species, belonging to eight families: Coreidae, Corixidae, Geocoridae, Lygaeidae, Naucoridae, Notonectidae, Oxycarenidae, and Reduviidae, were collected and identified as new records for the fauna of Iran considering the published data.

Key words: Hemiptera, Heteroptera, true-bugs, faunistics, geographic distribution, host plants, new records, Iran.

Introduction

Heteroptera (Hemiptera) is one of the most important suborder of insect which includes agricultural pests, predators and blood-sucking species (Schuh & Slater 1995; Henry 2009). With more than 40,000 described species, Heteroptera are one of the most successful radiation of nonholometabolous insects (Weirauch & Schuh 2011).

The Iranian Heteroptera fauna has been well studied, and all the families were catalogued by Ghahari et al. (2009a, 2009b, 2010a, 2010b, 2012a, 2012b, 2013a, 2013b, 2014, 2016), Ghahari & Moulet (2012, 2013), Ghahari & Heiss (2012) and Ghahari & Chérot (2014).

The aim of this paper is representing of ten species (19 specimens) of Heteroptera as new records for the fauna of Iran.

Material and methods

The specimens have been collected under stones, by hand, or by sweeping the vegetation and water in rivers, or by light trapping. The sampled regions were East Azarbaijan, Khuzestan, Fars, Isfahan, Sistan & Baluchestan, Northern Khorasan, Ardabil, and Golestan provinces between 2002 and 2012.

Collected materials were conserved in ethanol 75% and determined by R.E. Linnavuori and the second author (PM). Specific name, author, description date, locality date of collection, and number of specimens are provided. Classification, nomenclature, host plants

and distributional data provided by Aukema & Rieger (1995, 1996, 1999), and Aukema et al. (2013) have been followed.

List of new recorded species from Iran

Coreidae Leach, 1815

Prionotylus brevicornis (Mulsant & Rey, 1852)

Material examined: East Azarbaijan province, Yamchi, 1♂, August 2012.

General distribution: Western Europe, North Africa, Near East, Cyprus, Asia, Turkey, Iraq, Iran.

Comments: A species often found on the ground among little stones and sand, or under sand in sunny places, under *Galium* (Rubiaceae), *Thymus* (Lamiaceae) and several little Poaceae or under dried herbs. Often found in solitary condition (Moulet 1995).

Corixidae Leach, 1815

Micronecta (Micronecta) mesmini Poisson, 1939

Material examined: East Azarbaijan province: Kaleybar (Kardujin), 1♂, April 2002.

General distribution: Central Asia (Azerbaijan, Tajikistan, Uzbekistan).

Geocoridae Baerensprung, 1860

Henestaris laticeps laticeps (Curtis, 1836)

Material examined: Khuzestan province, Izeh (Bagh Ebrahim), 3♀♀, June 2010.

General distribution: Holomediterranean, Near East

(Syria, Iraq), Canary Archipelago, Djibouti.

Comments: *H. laticeps laticeps* lives in salty and sunny biotopes on the sea shores as well as inland under vegetation. Often collected on several *Plantago* spp. (Plantaginaceae), under *Limonium virgatum*, *Armeria maritima* (both Plumbaginaceae), *Arenaria* sp. (Caryophyllaceae), *Atriplex portulacoides* (Chenopodiaceae), or *Anthemis mixta* (Asteraceae) (Péricart 1998).

The other subspecies *H. l. wagneri* Lindberg, 1960 is only known from Canary Archipelago, and its validity is questionable according to Péricart (1998).

Lygaeidae Schilling, 1829

Kleidocerys resedae resedae (Panzer, 1797)

Material examined: Isfahan province, Najaf-Abad (Hasnijeh), 1♀, 1♂, July 2010.

General distribution: Holarctic.

Comments: The species is commonly found on Betulaceae (*Betula*, *Alnus*), *Rhododendron* (Ericaceae), several *Ledum* spp. (Ericaceae) or *Spiraea* spp. (Rosaceae). Under lab conditions it can live on sunflower seeds, soybeans, or corn seeds. Adults hibernate and are attracted by lights. This harmful species can be controlled by several Anthocoridae species predating eggs and larval stages (Péricart 1998).

Naucoridae Leach, 1815

Heleocoris minusculus (Walker, 1870)

Material examined: Khuzestan province, Arvandkenar, 1♀, 1♂, April 2002.

General distribution: Near East, Arabic Peninsula, United Arab Emirates.

Comments: In lakes, shallow pools, springs, brooks, rivers, streams; in submerged vegetation as well as in biotopes without plants (Linnavuori et al. 2011).

Notonectidae Latreille, 1802

Enithares lineatipes Horváth, 1889

Material examined: Sistan and Baluchestan province, Rask, 2 km North, valley of Sarbaz River, 1♀, 1♂, May 2006.

General distribution: India, United Arab Emirates; doubtful in China and Sumatra.

Comments: In pools and streams (Linnavuori et al. 2011).

Oxycarenidae Stål, 1862

Brachyplax tenuis (Mulsant et Rey, 1852)

Material examined: Northern Khorasan province, Raz (Qareh-Parchegh), 1♀, 1♂, September 2009.

General distribution: Turano-Mediterranean from Spain to Turkey, Maghreb, Near East, Caucasus and Central Asia.

Comments: *B. tenuis* feeds upon several Papaveraceae such as *Papaver rhoeas*, *P. dubium*, *P. arenarium*, *P. hybridum*; often also mentioned on *Ruta graveolens* (Rutaceae) (Péricart 1998).

Reduviidae Latreille, 1807

Ploiaria domestica Scopoli, 1786

Material examined: Ardabil province, Germe, 1♀, 1♂, September 2010; Guilan province, Astara, 1♂, August 2011.

General distribution: Euro-Mediterranean, Caucasus, Central Asia (Tadjikistan, Iran, Afghanistan).

Comments: *P. domestica* is a synanthropic species often found in houses and stables; outdoors it has been collected under stones, bundles, in straw, sawdust; cited in caves, nests, and under barks (Putshkov & Moulet 2010).

Metapterus linearis A. Costa, 1862

Material examined: Northern Khorasan province, Lojely, 2♂♂, June 2010.

General distribution: Turano-Mediterranean, Central Asia.

Comments: According to many observations *M. linearis* was considered as living in humid biotopes: peat-bogs, rivers shores, under *Tamarix* (Tamaricaceae), *Juncus* (Juncaceae), *Cyperus* (Cyperaceae), ferns in wet biotopes but was also cited in dry places (Putshkov & Moulet 2010).

Vachiria similis Poppius, 1909

Material examined: Golestan province, Golestan National Park, 1♀, 1♂, April 2011.

General distribution: Azerbaijan, Asian Kazakhstan, South Russia, Tajikistan, Turkmenistan.

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In memoriam Rauno Eino Linnavuori†

[1927–2019]

Rauno Eino Linnavuori [Saukkokuja 10, FIN-21220 Raisio, Finland], one of the most famous heteropterists in the Palaearctic, passed away on February 26, 2019 at the age of 92 years.

Rauno was born 10th December 1927 in Turku, Finland. He studied biology, achieved the M.Sc. degree (1952), and made his doctoral thesis (1959) at the University of Turku on the taxonomy of southern America and Pacific islands Auchenorrhyncha. He spent most of his lifetime collecting numerous insect specimens, primarily from Africa and the Middle East

(Wilson et al. 2017). His industrious work and contributions to science have influenced and helped many coleopterists, hemipterists and a lepidopterist who wished to acknowledge the collector of their African and Middle Eastern material.

In addition, hemipterists have wished to honour their friend and colleague for making the material of his collection so readily available to them (Kment & Lemaître 2017).

Linnavuori's described taxa of true bugs belong to 44 families of all the seven recognized infraorders, but most of them are from the Miridae family (44 genus- and 778 species-group taxa), followed by Pentatomidae (27 genus- and 167 species-group taxa), Rhyparochromidae (one genus, 75 species-group taxa), Cydidae (8 genus- and 60 species-group taxa), Coreidae (6 genus- and 56 species-group taxa), and Reduviidae (one genus, one subgenus, and 50 species-group taxa) (see all these taxa in the paper of Kment & Carapezza 2017).

Additionally, since his first publication in 1948, he published 306 taxonomic papers dealing with Heteroptera, Auchenorrhyncha and Coleoptera. The complete list was given by Kment & Wilson (2017). This amazing number means nearly 42 species described each year! For much of his life he worked extensively on both Heteroptera and Auchenorrhyncha, favouring Miridae in the Heteroptera and Cicadellidae in the Auchenorrhyncha.

Because of the number of described species and also publication record, Linnavuori is undoubtedly one of the greatest hemipterists of the past century (Wilson et al. 2017).

Linnavuori had several trips to parts of the Middle East and northern half of Africa; he travelled to Iran several times and sampled in various regions especially Guilan, Hormozgan, Khorasan, Khuzestan and adjacent provinces (e.g. Linnavuori 2004a, 2004b, 2004c, 2006, 2007a, 2007b, 2009, 2010, 2011, 2012; Linnavuori & Modarres Awal 1998).

The first author (HG) visited him twice in order to organize sampling trips. Linnavuori was very active although he was 75 years old, he was sweeping strongly in the field. In addition to his trips to Iran for samplings, he kindly identified numerous specimens for Iranian researchers and students, and of course he was always eager to receive specimens from the first author for identification.

It is to the first author honor that he published with him eleven papers on Iranian Heteroptera (see Moulet et al. 2008; Ghahari et al. 2009a, 2009b, 2010a, 2010b, 2010c, 2011a, 2011b, 2012a, 2012b, 2013).

The first author (HG) had numerous communications with R. Linnavuori regarding to works on Iranian Heteroptera, which one of the old emails is given below for memory.

| | |
|-----------------|--|
| From: | "Rauno Linnavuori" <rauno.linnavuori@kolumbus.fi> |
| To: | "hassan ghahhari" <h_ghahhari@yahoo.com> |
| Subject: | Re: materials |
| Date: | Sun, 14 May 2006 14:18:47 +0300 |

Dear Dr. Ghahari,
I already informed about getting your parcel. I got you material and try to check at least one part of it before my departure to Iran. Should I bring some part of it to you? Please use in the future true insect pins, since those pins used now have caused problems. I hope to meet you in Iran.

The best wishes
Rauno Linnavuori

Rauno has always been of great help for colleagues, young or not and always generous when loaning his material. The second author (PM) remembers that, when studying *Oncocephalus*, he asked Rauno for some identified material, and he received two great boxes full of insects!

The whole life and work of Dr. Linnavuori observed the attitude of an explorer, even perhaps at times when the appreciation for such approach was dwindling. Perseverance, tenacity and dedication helped Rauno E. Linnavuori to overcome the tribulations of his life. Integrity and honesty guided his actions and his work. His humanity and unquenchable interest in the systematic of Heteroptera endeared him to his colleagues. They will not forget him.

Acknowledgements

We thank P. Kment (Czech Republic) for editing the manuscript (in memoriam) and providing us the requested papers. This research was supported by Islamic Azad University (Yadegar-e-Imam Khomeini [RAH] Shahre Rey Branch) and Museum Requien (Avignon, France).

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Received: 8 April 2019
Accepted: 27 May 2019