

ON A COLLECTION OF HETEROPTERA (INSECTA: HEMIPTERA) FROM IRAN

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On a collection of Heteroptera (Insecta: Hemiptera) from Iran. – Sakenin H., Jehamalar E., Samin N., Bolu H., Kushwaha S. – In this faunistic paper, the fauna of Heteroptera was studied in some regions of Iran. Totally, 18 species within eight families were collected and identified: Berytidae (two species, two genera), Coreidae (two species, two genera), Hebridae (one species), Miridae (three species, three genera), Piesmatidae (one species), Reduviidae (four species, three genera), Rhyparochromidae (two species, two genera), and Tingidae (three species, three genera). Three species, *Galeatus affinis* (Herrich-Schaeffer, 1835) (Tingidae), *Hebrus* (*Hebrus*) *liliimacula* Horváth, 1929 (Hebridae) and *Parapiesma salsolae* (Becker, 1867) (Piesmatidae) are new records for the fauna of Iran.

Key words: Heteroptera, true bug, species diversity, new records, Iran

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До питання знахідок Heteroptera (Insecta: Hemiptera) з Ірану. – Сакенін Г., Єгамалар Е., Самін Н., Болу Г., Кушвага С. – У роботі представлені результати вивчення фауни Heteroptera в різних провінціях Ірану протягом 2010-2016 років. Загалом в ході фауністичних досліджень було зібрано та ідентифіковано 18 видів, що належать до восьми родин: Berytidae (2 види, 2 роди), Coreidae (2 види, 2 роди), Hebridae (1 вид), Miridae (3 види, 3 роди), Piesmatidae (1 вид), Reduviidae (4 види, 3 роди), Rhyparochromidae (2 види, 2 роди) та Tingidae (3 види, 3 роди). Незважаючи на той факт, що фауна Heteroptera Ірану досліджена порівняно добре, з поміж ідентифікованих нами видів три – *Galeatus affinis* (Herrich-Schaeffer, 1835) (Tingidae), *Hebrus* (*Hebrus*) *liliimacula* Horváth, 1929 (Hebridae) і *Parapiesma salsolae* (Becker, 1867) (Piesmatidae) – є новими для фауни Ірану. Більша частина зібраного матеріалу зберігається у колекціях Г. Сакенін і Н. Самін, а також у колекції Р.Е. Ліннавуорі (Турку, Фінляндія).

Ключові слова: Heteroptera, справжні клопи, видове різноманіття, нові знахідки, Іран.

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Introduction

Heteroptera with more than 40,000 described species are known worldwide within 75 families (Weirauch, Schuh 2011), are important group among the insect orders not only for its numbers of species but also for their distribution and food preference (Henry 2009). Most of the heteropteran species are serious plant pests which feed on plants or plant material such as seeds, fruits or pollen. On the other hand, some of them are predators, catch

other insects and mites, reduce the population density of agricultural pests, and may be used in biological control (Schuh, Slater 1995; Schaefer, Panizzi 2000; Panizzi, Grazia 2015).

The fauna of Iranian Heteroptera was studied rather well and most of the families have been catalogued (see Ghahari et al. 2009a; 2009b; 2010a; 2010b; 2012a; 2012b; 2013a; 2013b; 2014; 2016; Ghahari, Moulet 2012a; 2012b; 2013; Ghahari, Heiss 2012; Ghahari, Cherot 2014;

Ostovan et al. 2017). Due to the economic importance of Heteroptera, the present study has been carried out and recorded 18 species, of which three species turned out new records to Iran.

Material and methods

The studied materials of Heteroptera have been collected from different provinces of Iran between the years 2010 and 2016. Classification, nomenclature, host plants and distributional data provided by Aukema and Rieger (1995; 1996; 1999), Aukema et al. (2013) and CPH (2020) (Online Catalogue of Palaearctic Heteroptera) have been followed. Most of the materials are preserved in the collections of the first and third authors, and some others in the collection of late R.E. Linnavuori (Turku, Finland).

Results

In total, 18 species of Heteroptera in 17 genera are listed in this paper, which were collected from different regions of Iran. Three species, *Galeatus affinis* (Herrich-Schaeffer, 1835) (Tingidae), *Hebrus (Hebrus) liliimacula* Horváth, 1929 (Hebridae) and *Parapiesma salsolae* (Becker, 1867) (Piesmatidae) are newly recorded from Iran.

**Infraorder CIMICOMORPHA Leston,
Pendergrast and Southwood, 1954
Superfamily MIROIDEA Hahn, 1833**

Family MIRIDAE Hahn, 1833

Subfamily Bryocorinae Baerensprung, 1860

Genus *Dicyphus* Fieber, 1858

Subgenus *Dicyphus* Fieber, 1858

***Dicyphus (Dicyphus) hyalinipennis* (Burmeister, 1835)**

1835. *Phytocoris hyalinipennis* Burmeister, Hand. Ent. Berlin: 268.

Material examined: Kermanshah province, Javanrud, 34°81' N, 46°49' E, 1♀, August 2016.

Distribution outside Iran: Algeria, Andorra, Armenia, Austria, Bulgaria, Croatia, Cyprus, Czech Republic, France, Germany, Greece, Hungary, Iraq, Italy, Jordan, Liechtenstein, Luxembourg, Madeira, Malta, Morocco, Portugal, Romania, Russia, Serbia, Slovakia, Spain, Switzerland, Turkey, Ukraine (Aukema, Rieger 1999; CPH 2020).

Subfamily Orthotylinae Van Duzee, 1916

Genus *Dimorphocoris* Reuter, 1890

Subgenus *Dimorphocoris* Reuter, 1890

***Dimorphocoris (Dimorphocoris) tristis* (Fieber, 1861)**

1861. *Orthocephalus tristis* Fieber, Die euro. Hem.: 292.

Material examined: West Azarbaijan province, Makoo, 39°29' N, 44°44' E, 1♀, September 2014.

Distribution outside Iran: Algeria, Cyprus, Greece, Portugal, Spain, Tunisia, Turkey (Aukema, Rieger 1999; CPH 2020).

Subfamily Phylinae Douglas & Scott, 1865

Genus *Opisthotaenia* Reuter, 1901

Subgenus *Opisthotaenia* Reuter, 1901

***Opisthotaenia (Opisthotaenia) fulvipes* Reuter, 1901**

1901. *Opisthotaenia fulvipes* Reuter, Öfv. Fin. Vet.- Soc. Förh., 43(B): 182.

Material examined: Kordestan province, Bijar, 35°89' N, 47°62' E, 1♂, 1♀, September 2011.

Distribution outside Iran: Albania, Armenia, Azerbaijan, Bulgaria, Greece, Iraq, Macedonia, Turkey, Ukraine (Aukema, Rieger 1996; CPH 2020).

Family TINGIDAE Laporte, 1832

Subfamily Tinginae Laporte, 1832

Genus *Copium* Thunberg, 1822

***Copium clavicorne clavicorne* (Linnaeus, 1758)**

1758. *Cimex clavicornis* Linnaeus, Systema naturae: 442.

Material examined: Mazandaran province, Tonekabon, Jangal-e 3000, 1♀, September 2013.

Distribution outside Iran: Albania, Armenia, Austria, Azerbaijan, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Liechtenstein, Luxembourg, Macedonia, Moldavia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Switzerland, Turkey, Ukraine, Yemen (Aukema, Rieger 1996; CPH 2020).

Genus *Galeatus* Curtis, 1833

***Galeatus affinis* (Herrich-Schaeffer, 1835)**

1835. *Tingis affinis* Herrich-Schaeffer, Nomen. Ent. Ver. euro. Ins.: 58.

Material examined: Chaharmahal & Bakhtiari province, Shalamzar, 32°05' N, 50°82' E, 2♂♂, August 2012. New record for Iran.

Distribution outside Iran: Afghanistan, Albania, Austria, Bulgaria, Byelorussia, China, Croatia, Czech Republic, Kazakhstan, Germany, Hungary, Italy, Japan, Kazakhstan, Kirgizia, Korea, Latvia, Lithuania, Macedonia, Mongolia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Switzerland, Ukraine, United States of America (Aukema, Rieger 1996; CPH 2020).

Genus *Tingis* Fabricius, 1803

Subgenus *Tropidocheila* Fieber, 1844

***Tingis (Tropidocheila) caucasica* (Jakovlev, 1880)**

1880. *Monanthia (Tropidocheila) caucasica* Jakovlev, Ann. Hist.-Nat. Mus. Nat. Hung., 4: 136.

Material examined: Guilan province, Talesh, Gisum forest, 2♀♀, 1♂, July 2015.

Distribution outside Iran: Armenia, Azerbaijan, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Macedonia, Moldavia, Romania, Russia, Turkey, Ukraine (Aukema, Rieger 1996; CPH 2020).

Superfamily REDUVIOIDEA Latreille, 1807

Family REDUVIIDAE Amyot & Serville, 1843

Subfamily Emesinae Amyot & Serville, 1843

Genus *Gardena* Dohrn, 1860

***Gardena muscicapa* (Bergroth, 1906)**

1906. *Lutevopsis muscicapa* Bergroth, Verhand. Zool-Bot. Ges. Wien., 56: 311.

Material examined: Kerman province, Jiroft, 28°67' N, 57°74' E, 1♀, May 2016.

Distribution outside Iran: Congo, France (Réunion Island), Indonesia (Borneo, Java, Sumatra), India, Japan, Malaysia, New Guinea, Philippines, South Africa, Taiwan, Uganda, (Aukema, Rieger 1996; Rédei, Tsai 2010).

Subfamily Harpactorinae Amyot & Serville, 1843

Genus *Rhynocoris* Hahn, 1833

***Rhynocoris punctiventris* (Herrich-Schaeffer, 1846)**

1846. *Harpactor punctiventris* Herrich-Schaeffer, Die wanzenartigen Insecten, 8: 85.

Material examined: Lorestan province, Noor-Abad, 34°07' N, 47°97' E, 3♀♀, 2♂♂, August 2015.

Distribution outside Iran: Albania, Armenia, Azerbaijan, Bulgaria, Crete, Cyprus, Georgia, Greece, Iraq, Israel, Jordan, Lebanon, Macedonia, Syria, Turkey, Ukraine (Crimea) (Putshkov, Moulet 2010; CPH 2020).

Genus *Vachiria* Stål, 1859

***Vachiria insignis* Jakovlev, 1903**

1903. *Vachiria insignis* Jakovlev, Rev. Russ. Ent., 6(3): 200.

Material examined: Razavi Khorasan province, Dargaz, 37°44' N, 59°11' E, 1♂, June 2010.

Distribution outside Iran: Kazakhstan, Mongolia, Turkmenistan, Uzbekistan (Aukema, Rieger 1996).

***Vachiria similis* Poppius, 1909**

1909. *Vachiria similis* Poppius, Öfv. Fin. Vet.- Soc. Förh., 51A(20): 4.

Material examined: Ardabil province, Aslanduz, 39°44' N, 47°43' E, 3♀♀, September 2011.

Distribution outside Iran: Azerbaijan, Kazakhstan, Tadjikistan, Turkmenistan, Russia (south) (Aukema, Rieger 1996).

Infraorder PENTATOMOMORPHA Leston,

Pendergrast and Southwood, 1954

Superfamily COREOIDEA Leach, 1815

Family COREIDAE Leach, 1815

Subfamily Coreinae Leach, 1815

Genus *Gonocerus* Berthold, 1827

***Gonocerus patellatus* Kiritshenko, 1916**

1916. *Gonocerus patellatus* Kiritshenko, Nas. pol. (Ins., Hem.), 6(2): 150.

Material examined: East Azarbaijan province, Arasbaran forest, 1♀, September 2013.

Distribution outside Iran: Afghanistan, Kazakhstan, Kirgizia, Tadjikistan, Turkey (Asia), Turkmenistan, Uzbekistan (Aukema, Rieger 2001; Aukema et al. 2013; CPH 2020).

Subfamily Pseudophloeinae Stål, 1868

Genus *Bathysolen* Fieber, 1860

***Bathysolen nubilus* (Fallén, 1807)**

1807. *Bathysolen nubilus* Fallén, Mono. Cimi. Svec.: 58.

Material examined: Golestan province, Maraveh-Tappeh, 37°91' N, 55°96' E, 2♀♀, October 2014.

Distribution outside Iran: Albania, Armenia, Austria, Azerbaijan, Belgium, Bosnia-Herzegovina, Bulgaria, Byelorussia, Croatia, Czech Republic, Denmark, Estonia, France, Georgia, Germany, Great Britain, Greece, Hungary, Israel, Italy, Kazakhstan, Kirgizia Latvia, Lithuania, Luxembourg, Macedonia, Moldavia, Montenegro, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tadjikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan (Moulet 1995; Aukema, Rieger 2001; CPH 2020).

Superfamily LYGAEOIDEA Schilling, 1829

Family BERYTIDAE Fieber, 1851

Subfamily Berytinae Fieber, 1851

Genus *Neides* Latreille, 1802

***Neides aduncus* Fieber, 1859**

1859. *Neides aduncus* Fieber, Wien. Ent. Monat., 3(7): 202.

Material examined: Guilan province, Rudsar, 37°14' N, 50°28' E, 1♀, June 2010.

Distribution outside Iran: Albania, Algeria, Bosnia-Herzegovina, Bulgaria, Canary Islands, Crete, Croatia, France, Greece, Israel, Italy, Macedonia, Montenegro, Morocco, Portugal, Serbia, Spain, Tunisia, Turkey (Asia), Ukraine (Aukema, Rieger 2001; CPH 2020).

Subfamily Metacanthinae Douglas & Scott, 1865

Genus *Metatropis* Fieber, 1859

***Metatropis rufescens* (Herrich-Schaeffer, 1835)**

1835. *Berytus rufescens* Herrich-Schaeffer, Verz. euro. Ins.: 43.

Material examined: West Azarbaijan province, Ourmieh, km 6 Seroo Road, 37°72' N, 44°64' E, 2♂♂, July 2011.

Distribution outside Iran: Albania, Armenia, Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Byelorussia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Japan (Asia), Latvia, Liechtenstein, Lithuania, Luxembourg, Moldavia, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey (Asia), Ukraine (Aukema, Rieger 2001; Aukema et al. 2013; CPH 2020).

Family PIESMATIDAE Amyot and Audinet-Serville, 1843

Genus *Parapiesma* Péricart, 1974

***Parapiesma salsolae* (Becker, 1867)**

1867. *Zosmenus salsolae* Becker, Bull. Soc. Imp. Nat. Moscou, 40(1): 113.

Material examined: Qazvin province, Taleghan, 36°18' N, 50°76' E, 3♀♀, July 2010. New record for Iran.

Distribution outside Iran: Armenia, Austria, Azerbaijan, Bulgaria, Byelorussia, Crete, Czech, China Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Moldavia, Mongolia, Netherlands, Romania, Russia, Serbia, Slovakia, Spain, Turkey, Ukraine, former Yugoslavia (Heiss, Péricart 2007; Ghahari, Moulet 2012b; CPH 2020).

Family RHYPAROCHROMIDAE Amyot & Serville, 1843

Subfamily Rhyparochrominae Amyot & Serville, 1843

Genus *Gastrodes* Westwood, 1840

***Gastrodes grossipes grossipes* (De Geer, 1773)**

1773. *Cimex grossipes* De Geer, Mém. pour serv. hist. Ins., 3: 308.

Material examined: Lorestan province, Sarab Doreh, 33°55' N, 48°03' E, 3♀♀, 1♂, October 2012. Distribution outside Iran: Andorra, Armenia, Austria, Azerbaijan, Azores, Belgium, Bosnia-Herzegovina, Bulgaria, Byelorussia, China, Croatia, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Great Britain, Germany,

Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Moldavia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine (Péricart 1998; Aukema, Rieger 2001; CPH 2020).

Genus *Thaumastopus* Fieber, 1870

***Thaumastopus marginicollis* (Lucas, 1849)**

1849. *Rhyparochromus marginicollis* Lucas, Trois. Hém. Zool. Paris, 3: 75.

Material examined: East Azarbaijan province, Jolfa, 38°94' N, 45°63' E, 1♀, September 2010.

Distribution outside Iran: Algeria, Armenia, Azerbaijan, Bulgaria, Cyprus, Crete, Georgia, Greece, Israel, Italy, Malta, Morocco, Russia, Spain, Switzerland, Syria, Tunisia, Turkey, Ukraine (Péricart 1998; Aukema, Rieger 1996; CPH 2020).

Infraorder GERROMORPHA Popov, 1971
Superfamily HEBROIDEA Amyot and Serville, 1843

Family HEBRIDAE Amyot and Serville, 1843

Subfamily Hebrinae Amyot & Serville, 1843

Genus *Hebrus* Curtis, 1833

Subgenus *Hebrus* Curtis, 1833

***Hebrus (Hebrus) liliimacula* Horváth, 1929**

1929. *Hebrus liliimacula* Horváth, Ann. Hist.-Natur. Mus. Nat. Hung., 26: 314.

Material examined: Ardabil province, Aslanduz, 39°44' N, 47°43' E, 1♀, September 2011. New record for Iran.

Distribution outside Iran: Armenia, Azerbaijan, Georgia (Kanyokova 1997; Aukema, Rieger 2001).

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AUKEMA, B., RIEGER, C. (1995) *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 1. Enicocephalomorpha, Dipsocoromorpha, Gerromorpha and Leptopodomorpha*. The Netherlands Entomological Society, Amsterdam.

AUKEMA, B., RIEGER, C. (1996) *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 2. Cimicomorpha I*. The Netherlands Entomological Society, Amsterdam.

AUKEMA, B., RIEGER, C. (1999) *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 3*.

- Cimicomorpha* II. The Netherlands Entomological Society, Amsterdam.
- AUKEMA, B., RIEGER, C. (2001) *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 4. Pentatomomorpha I*. The Netherlands Entomological Society, Amsterdam.
- AUKEMA, B., RABITSCH, W., RIEGER, C. (2013) *Catalogue of the Heteroptera of the Palaearctic Region. VI. Supplement*. The Netherlands Entomological Society, Amsterdam.
- CPH (2020) *Catalogue of the Palaearctic Heteroptera*. Aukema, B. (Ed.) Available from: https://catpalhet.linnaeus.naturalis.nl/linnaeus_ng/app/views/highertaxa/taxon.php?id=1 (accessed 17.11.2020).
- GHAHARI, H., CARPINTERO, D.L., OSTOVAN, H. (2009a) An annotated catalogue of the Iranian Anthocoridae (Hemiptera: Heteroptera: Cimicomorpha). *Acta Entomologica Musei Nationalis Pragae*, 49: 43–58.
- GHAHARI, H., CARPINTERO, D.L., MOULET, P., LINNAVUORI, R.E., OSTOVAN, H. (2010a) Annotated catalogue of the Iranian broad-headed bugs (Hemiptera: Heteroptera: Alydidae). *Acta Entomologica Musei Nationalis Pragae*, 50(2): 425–436.
- GHAHARI, H., CHEROT, F. (2014) An annotated catalog of the Iranian Miridae (Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa*, 3845(1): 1–101.
- GHAHARI, H., CHEROT, F., LINNAVUORI, R.E., OSTOVAN, H. (2009b) Annotated catalogue of Iranian burrower bugs (Heteroptera, Pentatomoidea, Cydnidae). *ZooKeys*, 26: 1–31.
- GHAHARI, H., HEISS, E. (2012) Annotated catalog of Iranian Aradidae (Hemiptera: Heteroptera: Pentatomomorpha: Aradoidea). *Zootaxa*, 3571: 81–86.
- GHAHARI, H., LINNAVUORI, R.E., MOULET, P., OSTOVAN, H. (2010b) An annotated catalogue of the Iranian Nabidae (Hemiptera: Heteroptera). *Acta Entomologica Musei Nationalis Pragae*, 50: 33–44.
- GHAHARI, H., MONTEMAYOR, S.I., MOULET, P., LINNAVUORI, R.E. (2012a) An annotated catalogue of the Iranian Tingidae (Hemiptera: Heteroptera). *Zootaxa*, 3207: 22–39.
- GHAHARI, H., MOULET, P. (2012a) An annotated catalog of the Iranian Lygaeoidea (excluding Berytidae and Piesmatidae) (Hemiptera: Heteroptera: Pentatomomorpha). *Zootaxa*, 3408: 1–33.
- GHAHARI, H., MOULET, P. (2012b) An annotated catalog of the Iranian Berytidae and Piesmatidae (Hemiptera: Heteroptera: Pentatomomorpha: Lygaeoidea). *Zootaxa*, 3547: 35–45.
- GHAHARI, H., MOULET, P. (2013) An annotated catalog of the Iranian Pyrrhocoridae (Hemiptera: Heteroptera: Pentatomomorpha: Pyrrhocoroidea). *Zootaxa*, 3609(3): 335–342.
- GHAHARI, H., MOULET, P., CAI, W., KARIMI, J. (2013b) An annotated catalog of the Iranian Reduvidae (Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa*, 3718(3): 201–238.
- GHAHARI, H., MOULET, P., LINNAVUORI, R., OSTOVAN, H. (2012b) An Annotated Catalog of the Iranian Coreidae, Rhopalidae, and Stenocephalidae (Hemiptera: Heteroptera: Pentatomomorpha: Coreoidea). *Zootaxa*, 3519: 1–31.
- GHAHARI, H., MOULET, P., OSTOVAN, H. (2016) An annotated catalog of the Iranian Cimicidae and Largidae (Hemiptera: Heteroptera) and in memoriam Carl Walter Schaefer (1934–2015). *Zootaxa*, 4111(2): 194–200.
- GHAHARI, H., MOULET, P., OSTOVAN, H., LINNAVUORI, R.E. (2013a) An annotated catalog of the Iranian Dipsocoromorpha, Enicocephalomorpha, Gerromorpha, Leptopodomorpha and Nepomorpha (Hemiptera: Heteroptera). *Zootaxa*, 3641(4): 301–342.
- GHAHARI, H., MOULET, P., RIDER, D.A. (2014) An annotated catalog of the Iranian Pentatomoidea (Hemiptera: Heteroptera: Pentatomomorpha). *Zootaxa*, 3837(1): 1–95.
- HEISS, E., PÉRICART, J. (2007) *Hémiptères Aradidae, Piesmatidae et Dipsocoromorphes euro-méditerranéens*. Faune de France, 91. Fédération Française des Sociétés de Sciences Naturelles, Paris.
- HENRY, T.J. (2009) Chapter 10. Biodiversity of Heteroptera. In: Footit, R.G., Adler, P.H. (Eds.) *Insect biodiversity: Science and society*. Wiley-Blackwell, Chichester and Hoboken, pp. 233–263.
- KANYUKOVA, E.V. (1997) Hebridae from Russia and adjacent countries (Heteroptera). *Zoosystematica Rossica*, 6: 223–236.
- MOULET, P. (1995) *Hémiptères Coreoidea euro-méditerranéens*. Faune de France, 81. Fédération Française des Sociétés de Sciences Naturelles, Paris.
- OSTOVAN, H., GHAHARI, H., MOULET, P. (2017) Updated catalogue of Iranian Anthocoridae (Hemiptera: Heteroptera: Cimicomorpha). *Zootaxa*, 4311(4): 451–479.
- PANIZZI, A.R., GRAZIA, J. (2015) Chapter 1. Introduction to true bugs (Heteroptera) of the Neotropics, In: Panizzi, A.R., Grazia, J. (Eds.) *True bugs (Heteroptera) of the Neotropics*. Springer, Netherlands, pp. 3–20.
- PERICART, J. (1998) *Hémiptères Lygaeidae euro-méditerranéens*. Faune de France, 84a, 84b, 84c. Fédération Française des Sociétés de Sciences Naturelles, Paris.
- PUTSHKOV, P.V., MOULET, P. (2010) *Hémiptères Reduviidae d'Europe occidentale*. Faune de France, 92. Fédération Française des Sociétés de Sciences Naturelles, Paris.
- REDEI, D., TSAI, J.F. (2010) A survey of the emesine assassin bugs of the tribes Collartidini, Leistarchini, Emesini, and Metapterini of Taiwan (Hemiptera, Heteroptera, Reduviidae). *Deutsche Entomologische Zeitschrift*, 57(1): 11–36.

SCHAEFER, C.W., PANIZZI, A.R. (2000) *Heteroptera of economic importance*. CRC Press, Boca Raton, USA.

SCHUH, R.T., SLATER, J.A. (1995) *True bugs of the world (Hemiptera, Heteroptera)*. Classification and

natural history. Cornell University Press, Ithaca, London.

WEIRAUCH, C., SCHUH, R.T. (2011) Systematics and evolution of Heteroptera: 25 years of progress. *Annual Review of Entomology*, 56: 487–510.