

An annotated catalogue of the Iranian Nabidae (Hemiptera: Heteroptera)

Hassan GHAHARI¹⁾, Rauno E. LINNAVUORI²⁾,
Pierre MOULET³⁾ & Hadi OSTOVAN⁴⁾

¹⁾ Department of Agriculture, Islamic Azad University, Shahre Rey Branch, Tehran, Iran;
e-mail: hghahari@yahoo.com

²⁾ Saukkokuja 10, FIN-21220 Raisio, Finland; e-mail: rauno.linnavuori@kolumbus.fi

³⁾ Museum Requien, 67 rue Joseph Vernet, F-84000 Avignon, France;
e-mail: musee.requien@mairie-avignon.com

⁴⁾ Department of Entomology, Fars Science and Research Branch, Islamic Azad University, Marvdasht, Iran;
e-mail: ostovan2001@yahoo.com

Abstract. The Iranian fauna of the Nabidae is summarized in this paper. In total, four genera (*Alloeorhynchus* Fieber, 1860, *Himacerus* Wolff, 1811, *Nabis* Latreille, 1802 and *Prostemma* Laporte, 1832), 22 species and subspecies are listed from Iran. Three of these species are new for the Iranian fauna: *Nabis* (*Nabicula*) *flavomarginatus* Scholtz, 1847, *Nabis* (*Nabis*) *rugosus* (Linnaeus, 1758) and *Prostemma carduelis* Dohrn, 1858.

Key words. Heteroptera, Nabidae, catalogue, Iran, Palaearctic Region

Introduction

Damsel bugs (Heteroptera: Nabidae) have a worldwide distribution and include approximately 400 species in about 20 genera (KERZHNER 1981, 1996; KERZHNER & HENRY 2008). All known species are predators of adults and larvae of various stages and groups of insects, e.g., aphids, leafhoppers and lepidopteran eggs and young caterpillars. They may be commonly found on low herbaceous vegetation, shrubs and grasses (LATTIN 1989). They have not been used as biological control agents but are considered beneficial in natural biological control.

The classification of the Nabidae is conjectural. STÅL (1873) provided the first useful classification, recognising three tribes: Nabina, Coriscina and Pachynomina. REUTER & POPPIUS (1909) used similar groupings in their world revision. CARAYON (1970) recognised four subfamilies: Medocostinae, Velocipedinae, Nabinae and Prostematinae. This opinion was followed by KERZHNER (1981, 1996). SCHUH & ŠTYS (1991) did not support it and listed the first two subfamilies as separate families. They defined the nabids on the basis of labial and membrane venation characters and the presence of Ekblom's organ. Most recent workers



Figure 1. Map of Iran with boundaries of provinces.

accept the Velocipedidae and the Medocostidae as distinct families (e.g., SCHUH & SLATER 1995, VAN DOESBURG 2004, WYNIER 2008, SCHUH et al. 2009). KERZHNER (1981) recognised four tribes of the Nabinae (Arachnocorini, Carthasini, Gorpini and Nabini), united by the presence of moderately long labial segments and the lack of scutellar trichobothria. He identified two tribes of the Prostemmatinae (Prostemmatini and Phorticini), both of which possess scutellar trichobothria and have the posterior foramen of the pygophore in a caudal or ventral position. Of the four subfamilies, Nabinae include more than two thirds of the described damsel bug species (KERZHNER 1981, 1996, KERZHNER & HENRY 2008). The generic classification of the Nabinae, especially that of the largest genus *Nabis* Latreille, 1802, is controversial and was repeatedly revised (KERZHNER 1981, 1996). At present, the division of *Nabis sensu lato* into five genera (*Himacerus* Wolff, 1811, *Nabis* Latreille, 1802, *Stenonabis* Reuter, 1890, *Lasio-merus* Reuter, 1890, and *Hoplistoscelis* Reuter, 1890) (KERZHNER 1996, KERZHNER & HENRY 2008) rather than nineteen (KERZHNER 1981, PÉRICART 1987) is accepted.

The systematic position of the Nabidae within the Cimicomorpha is stable. They were originally considered to be related to reduviids (LATTIN 1989, REN 1998). CARAYON (1950) disputed this placement on the basis of genitalic and metathoracic scent gland characters. LESTON et al. (1954) classified the Nabidae in the Cimicomorpha, and KERZHNER (1981) placed them in the Cimicoidea. SCHUH & ŠTYS (1991) erected a new group, the Nabidoidea, containing the Medocostidae and the Nabidae, on the basis of wing and female abdominal characters.

Significant works on the Palaearctic Nabidae have been published over the last 30 years. KERZHNER (1981) revised the nabid fauna of the former USSR, PÉRICART (1987) reviewed and

keyed the fauna of Western Europe and north-western Africa, and REN (1998) monographed Chinese Nabidae. Palaearctic Nabidae were catalogued by KERZHNER (1996).

The Iranian fauna of the Nabidae has been poorly studied so far except an extensive paper by KERZHNER (1987), based mainly on the material collected by the Czechoslovak-Iranian expeditions of the National Museum in Prague in 1970s (HOBERLANDT 1974, 1981, 1983). This work has been conducted as a continuation of the first author's research on beneficial Heteroptera in Iran in collaboration with many other heteropterists.

This paper is a continuation of the series of annotated catalogue of Heteroptera of Iran (see GHAHARI et al. 2009a,b).

Results

A total of 22 damsel bug species and subspecies from four genera (*Alloeorhynchus*, *Himacerus*, *Nabis*, *Prostemma*) representing two subfamilies and two tribes (Nabinae: Nabini, Prostemmatinae: Prostemmatini) are listed from Iran. Of these, three species are new for Iran. The list of species, their distribution in Iran (listed according to provinces; see Fig. 1) and general distribution are given below. Only the synonyms found in the literature dealing with Iranian fauna are listed; for complete synonymy see KERZHNER (1996).

Subfamily Nabinae A. Costa, 1853

Tribe Nabini A. Costa, 1853

Genus *Himacerus* Wolff, 1811

Himacerus (Anaptus) major (A. Costa, 1842)

Distribution in Iran. Guilan (LINNAVUORI & HOSSEINI 2000).

General distribution. Holomediterranean, introduced into Canada and the USA (KERZHNER 1996, KERZHNER & HENRY 2008).

Comments. On the ground in dry places; known from salt marshes or river sides; laying eggs on grasses; predator of cicadas (PÉRICART 1987)

Himacerus (Aptus) maracandicus (Reuter, 1890)

Distribution in Iran. Golestan (KERZHNER 1981, 1987), Guilan (KERZHNER 1981, 1987), Khorasan (KERZHNER 1987, LINNAVUORI & MODARRES AWAL 1998), Qazvin (KERZHNER 1987), Semnan (KERZHNER 1981, 1987).

General distribution. Irano-Turanian (KERZHNER 1996).

Comments. On herbaceous plants in hilly habitats (LINNAVUORI & MODARRES AWAL 1998).

Himacerus (Aptus) mirmicoides (O. Costa, 1834)

Distribution in Iran. Ardabil (MODARRES AWAL 1987, 1997), East Azerbaijan (KERZHNER & RIEGER 1985), Golestan (KERZHNER 1963, 1981, 1987), Guilan (KERZHNER 1987, LINNAVUORI & HOSSEINI 2000), Mazandaran (KERZHNER & RIEGER 1985, KERZHNER 1987, LINNAVUORI & HOSSEINI 2000).

General distribution. European, extending to North Africa and Middle East (KERZHNER 1996).

Comment. Although larvae, especially early instars, have occasionally been found in ant nests, there is no evidence of a close association between these insects and such co-occurrences are probably accidental. Like all damsel bugs, this species is a predator and has been observed feeding on *Plagiognathus arbustorum* (Fabricius 1794) (Miridae), aphids and the eggs of the cabbage white butterfly (*Pieris rapae* (Linnaeus, 1758)) (KERZHNER 1981).

Himacerus (Aptus) transcausicus Kerzhner, 1981

Distribution in Iran. Fars (KERZHNER 1987), Golestan (KERZHNER 1981 (paratypes), KERZHNER 1987), Fars (KERZHNER 1987), Kohgiluyeh va Buyer Ahmad (KERZHNER 1987), Lorestan (KERZHNER 1987), Tehran (KERZHNER 1981 (paratypes), KERZHNER 1987).

General distribution. Asian part of Turkey, Armenia, Azerbaijan, Iran, and Iraq (KERZHNER 1996).

Comment. All specimens from southern Iran were collected in East Zagros Mts. at slopes with stands of *Quercus brantii*, various shrubs and steppe vegetation (KERZHNER 1987).

Genus *Nabis* Latreille, 1802

Nabis (Aspilaspis) indicus Stål, 1873

Distribution in Iran. Bushehr (KERZHNER 1987), Fars (KERZHNER 1987), Hormozgan (KERZHNER 1987, LINNAUORI 2004), Kerman (KERZHNER 1987), Khorasan (KERZHNER 1981, 1987; LINNAUORI & MODARRES AWAL 1998), Khuzestan (KERZHNER 1987), Sistan va Baluchestan (KERZHNER 1987).

General distribution. Eremian, extending from Africa (Tunisia, Sudan, Somalia) to Central Asia and the Oriental Region (north India) (KERZHNER 1996).

Comment. On *Tamarix* (e.g., LINNAUORI & HOSSEINI 2000).

Nabis (Aspilaspis) pallidus Fieber, 1861

Distribution in Iran. Khorasan (KERZHNER 1981, 1987), Sistan va Baluchestan (Zakhedan: KIRITSHENKO 1966, as *N. viridulus*; KERZHNER 1987)

General distribution. Irano-Turanian, distributed from Caucasus to Mongolia and north China (KERZHNER 1996).

Comment. On *Tamarix* (e.g., LINNAUORI & HOSSEINI 2000).

Nabis (Aspilaspis) viridulus Spinola, 1837

= *Nabis viridis* (Brullé, 1839)

Distribution in Iran. Esfahan (KERZHNER 1987), Fars (KERZHNER 1987), Golestan (KERZHNER 1987, HEISS 2002), Guilan (LINNAUORI & HOSSEINI 2000), Kerman (SEIDENSTÜCKER 1958, KERZHNER 1987), Khorasan (SEIDENSTÜCKER 1957, KERZHNER 1987, LINNAUORI & MODARRES AWAL 1998), Khuzestan (KERZHNER 1987), Markazi (MODARRES AWAL 1997), Mazandaran

(HEISS 2002), Sistan va Baluchestan (SEIDENSTÜCKER 1957, KERZHNER 1987), West Azerbaijan (KERZHNER 1987).

First recorded from 'north Iran, on *Tamarix*' by JAKOVLEV (1877). The record from Sistan va Baluchestan: Zakhedan (KIRITSHENKO 1966) belongs to *N. pallidus*. Seidenstücker's records (Sistan va Baluchestan: Iranshahr, Sangun, Kuh-e Taftan; Khorasan: Birdjant (SEIDENSTÜCKER 1957, as *Aspilaspis viridis*); Kerman: Anbarabad (SEIDENSTÜCKER 1958, as *Nabis viridis*)) may belong, at least partly, to *N. pallidus* or *N. indicus* (see KERZHNER 1987).

General distribution. Holomediterranean, extending to North Africa (Senegal, Sudan) and Central Asia (Tadjikistan, Uzbekistan) (KERZHNER 1996).

Comments. On *Tamarix* (e.g., LINNAVUORI & HOSSEINI 2000).

Nabis (Halonabis) sareptanus Dohrn, 1862

Distribution in Iran. Bushehr (KERZHNER 1987), East Azerbaijan (KERZHNER 1987), Fars (KERZHNER 1987), Golestan (KERZHNER 1987), Hormozgan (KERZHNER 1987, LINNAVUORI 2004), Kerman (SEIDENSTÜCKER 1958, KERZHNER 1987), Khorasan (KERZHNER 1987, LINNAVUORI & MODARRES AWAL 1998), Khuzestan (SEIDENSTÜCKER 1958, KERZHNER 1987), Mazandaran (HEISS 2002), Sistan va Baluchestan (HOBERLANDT 1955, 1959; KERZHNER 1987). Specimen from Tehran: Varamin mentioned by HOBERLANDT (1959) belongs to *Nabis punctatus punctatus* (see KERZHNER 1987).

General distribution. Irano-Turanian, extending from the Balkan Peninsula to Central Asia, China and Pakistan (KERZHNER 1996, REN 1998).

Comments. On and under halophytes such as *Suaeda*, *Salicornia*, *Atriplex* and *Artemisia* in salt marshes, deserts and semideserts (LINNAVUORI & MODARRES AWAL 1998, LINNAVUORI & HOSSEINI 2000, HEISS 2002, LINNAVUORI 2004).

Nabis (Nabica) flavomarginatus Scholtz, 1847

Material examined. Mazandaran: Savadkooh, 236 m a.s.l., 8.ix.2006, 1 ♂, H. Ghahari lgt., I. M. Kerzhner det. New record for Iran.

Distribution in Iran. Mazandaran (this paper).

General distribution. Holarctic, reaching southward to Turkey, Caucasus, and Kazakhstan (KERZHNER 1996, KERZHNER & HENRY 2008).

Comments. Often in humid biotopes (PÉRICART 1987). The specimen from Savadkooh was collected from kaki (*Diospyros kaki* L.).

[*Nabis (Nabis) ferus* (Linnaeus, 1758)]

General distribution. Euro-Siberian species, reaching to Caucasus, Central Asia, and Afghanistan (KERZHNER 1996).

Comment. The record of *Nabis ferus* from Keredj (= Karaj) near Tehran by LINDBERG (1938) was considered doubtful by KERZHNER (1987) and subsequent revision (KERZHNER 1988) revealed its identity as *N. punctatus*. Also the records from Hamedan (MIRAB-BALOU et al. 2007a,b, 2008; RASOULIAN et al. 2007), for which *N. ferus* is the only species mentioned, cannot be

accepted without revision. GHARAAT et al. (2009) listed two localities from West Azerbaijan, claiming erroneously that the specimens were identified or revised by R. Linnavuori. Currently, there is no verified record of *N. ferus* from Iran; see also LINNAVUORI & HOSSEINI (2000).

***Nabis (Nabis) palifer* Seidenstücker, 1954**

Distribution in Iran. Fars (KERZHNER 1987, ALEMANSOOR & AHMADI 1993), Golestan (KERZHNER 1981, 1987, GHAHARI & OSTOVAN 2006), Hormozgan (KERZHNER 1987, LINNAVUORI 2004), Isfahan (GHAHARI & HATAMI 2000), Kerman (KERZHNER 1987, ABD-RABOU & GHAHARI 2006), Khorasan (KERZHNER 1963, 1981, 1987; LINNAVUORI & MODARRES AWAL 1998; HAVASKARY et al. 2010), Lorestan (KERZHNER 1987), Mazandaran (HEISS 2002, GHAHARI et al. 2008), Qazvin (KERZHNER 1987), Sistan va Baluchestan (KERZHNER 1981, 1987), Tehran (KERZHNER 1981, 1987). The record from Feschar (= Feshar) at the Niriz (= Bakhtegan) lake in Fars is based on a single female, whose species identity was considered as uncertain already in the original paper (WAGNER 1961).

General distribution. Irano-Turanian, extending from the Balkan Peninsula to south-west China, north India and Nepal (KERZHNER 1996).

Comments. In moist habitats with Juncaceae and Cyperaceae (LINNAVUORI & MODARRES AWAL 1998, LINNAVUORI & HOSSEINI 2000). On undergrowth in a garden (LINNAVUORI 2004).

***Nabis (Nabis) pseudoferus* Remane, 1949**

Nabis (Nabis) pseudoferus pseudoferus Remane, 1949 ×
N. (N.) p. orientarius Remane, 1962

Distribution in Iran. East Azerbaijan (KERZHNER 1987), West Azerbaijan (KERZHNER 1987).

Comment. Transitional populations with intermediate appearance between both subspecies but also showing some resemblance to *N. (N.) p. transcaspicus* Remane, 1962 (see discussion and figures in KERZHNER (1987)).

Nabis (Nabis) pseudoferus orientarius Remane, 1962

Distribution in Iran. East Azerbaijan (Tabriz (paratype): REMANE (1962); KERZHNER (1987)), Esfahan (KERZHNER 1987), Fars (KIRITSHENKO 1966; KERZHNER 1981, 1987), Guilan (LINNAVUORI & HOSSEINI 2000), Kerman (KIRITSHENKO 1966, KERZHNER 1987), Tehran (REMANE 1962; KERZHNER 1981, 1987), Zanjan (ASKARI et al. 2009). Specimens of *N. pseudoferus* from East Azerbaijan by GHARAAT et al. (2009), HASSANZADEH et al. (2009a,b), SADEGHI et al. (2009) and ASKARI et al. (2009) probably belong to this subspecies.

General distribution. East Turkey, Cyprus, Lebanon, Iraq and Iran (KERZHNER 1996).

Nabis (Nabis) pseudoferus orientarius Remane, 1962 ×
N. (N.) p. transcaspicus Remane, 1962

Distribution in Iran. Guilan (KERZHNER 1987), Mazandaran (KERZHNER 1987).

Comment. Transitional populations, intermediate between both subspecies (see discussion and figures in KERZHNER (1987)).

Nabis (Nabis) pseudoferus transcaspicus Remane, 1962

Distribution in Iran. Ardabil (MODARRES AWAL 1987, LINNAVUORI & HOSSEINI 2000), East Azerbaijan (MODARRES AWAL 1997), Guilan (LINNAVUORI & HOSSEINI 2000), Golestan (KERZHNER 1981, 1987), Hamedan (ABD-RABOU & GHAHARI 2006), Khorasan (KERZHNER 1987, LINNAVUORI & MODARRES AWAL 1998, HEISS 2002, MODARRES AWAL 2008, HAVASKARY et al. 2010, as *N. pseudoferus*), Mazandaran (KERZHNER 1987, HEISS 2002), Semnan (Schachrud: REMANE 1962 (paratypes); KERZHNER 1981, 1987), Tehran (LINNAVUORI & HOSSEINI 2000).

General distribution. Turkmenistan and Iran (KERZHNER 1996).

Comment. In hilly meadows and on undergrowth at margins of mountain forest (LINNAVUORI & MODARRES AWAL 1998, LINNAVUORI & HOSSEINI 2000). *Nabis pseudoferus transcaspicus* is a powerful predator of *Eurygaster integriceps* in many regions of Iran, where this key pest is active in wheat fields.

Nabis (Nabis) punctatus punctatus A. Costa, 1847

Distribution in Iran. East Azerbaijan (KERZHNER 1987), Esfahan (KERZHNER 1987), Fars (KERZHNER 1987), Golestan (KERZHNER 1987), Guilan (KERZHNER 1987, LINNAVUORI & HOSSEINI 2000), Kerman (KERZHNER 1987), Kohgiluyeh va Buyer Ahmad (KERZHNER 1987), Khorasan (KERZHNER 1987, LINNAVUORI & MODARRES AWAL 1998), Markazi (KERZHNER 1987), Mazandaran (KERZHNER 1987), Qazvin (KERZHNER 1987), Semnan (KERZHNER 1987), Tehran (Keredj (= Karaj): LINDBERG (1938), misidentified as *N. fesus* (see KERZHNER 1988); Varamin: HOBERLANDT (1959), misidentified as *N. sareptanus* (see KERZHNER 1987); KERZHNER (1987)), West Azerbaijan (KERZHNER 1987). The record from Lahidschan (= Lahijan) in Guilan is based on a single female, whose identity was considered as uncertain already in the original paper (WAGNER 1961). The record from the Passargadae by MIYAMOTO (1963, as *N. pseudoferus*) is doubtful (see KERZHNER 1987).

General distribution. European, extending to north-west Africa and Central Asia. *Nabis p. mimoferus* Hsiao, 1964 is distributed from Kazakhstan and Afghanistan to Russian Far East and north India (KERZHNER 1996).

Comments. Iranian specimens differ from European *N. p. punctatus*, with the differences increasing towards south and east; however, the male genitalia are identical to *N. p. punctatus* (see KERZHNER (1987) for discussion and figures). They were collected on herbaceous plants in fields and gardens by LINNAVUORI & MODARRES AWAL (1998) and in hilly meadows (LINNAVUORI & HOSSEINI 2000).

Nabis (Nabis) rugosus (Linnaeus, 1758)

Material examined. Kermanshah: Kermanshah, 1267 m a.s.l., 29.v.2005, 1 ♂ 3 ♀♀, H. Ghahari lgt., I. M. Kerzhner det. New record for Iran.

Distribution in Iran. Kermanshah (this paper).

General distribution. European, reaching eastwards to Kazakhstan (Altai Mts.) and East Siberia (Yenisey basin) (KERZHNER 1996).

Comments. *Nabis (N.) rugosus* lives on shrubs and low vegetation near forests; it feeds on Hymenoptera (PÉRICART 1987).

***Nabis (Tropiconabis) capsiformis* Germar, 1838**

Distribution in Iran. Ardabil (LINNAVUORI & HOSSEINI 2000), Bushehr (KERZHNER 1987), East Azerbaijan (BAROUGH 1978, MODARRES AWAL 1997), Fars (KERZHNER 1987), Golestan (KERZHNER 1987, ABD-RABOU & GHAHARI 2006, GHAHARI & OSTOVAN 2006), Guilan (LINNAVUORI & HOSSEINI 2000), Hormozgan (KERZHNER 1987, LINNAVUORI 2004), Ilam (KERZHNER 1987), Kerman (SEIDENSTÜCKER 1958, WAGNER 1961, KIRITSHENKO 1966, KERZHNER 1987), Khorasan (SEIDENSTÜCKER 1957, LINNAVUORI & MODARRES AWAL 1998, HEISS 2002, MODARRES AWAL 2008), Khuzestan (SEIDENSTÜCKER 1958, KERZHNER 1987), Kohgiluyeh va Buyer Ahmad (KERZHNER 1987), Kordestan (KERZHNER 1987), Lurestan (KERZHNER 1987), Markazi (MODARRES AWAL 1997), Sistan va Baluchestan (HOBERLANDT 1955, SEIDENSTÜCKER 1957, KIRITSHENKO 1966, KERZHNER 1987), Tehran (KERZHNER 1987), West Azerbaijan (KERZHNER 1987).

General distribution. Cosmotropical (KERZHNER 1996, KERZHNER & HENRY 2008).

Comments. On shrubs and herbaceous plants in fields, gardens, meadows, deserts and semideserts (LINNAVUORI & MODARRES AWAL 1998, LINNAVUORI & HOSSEINI 2000, LINNAVUORI 2004).

Subfamily Prostematinae Reuter, 1890

Tribe Prostematini Reuter, 1890

Genus *Alloeorhynchus* Fieber, 1860***Alloeorhynchus (Alloeorhynchus) flavipes* (Fieber, 1836)**

Distribution in Iran. Golestan (KERZHNER 1981, 1987).

General distribution. Southern, central and eastern Europe, Turkey, Azerbaijan, Iran, and Israel (KERZHNER 1996).

Comments. On shrubs or on the ground at sunny or woody places; predator of small Lygaeidae (PÉRICART 1987)

Genus *Prostemma* Laporte, 1832***Prostemma (Prostemma) carduelis* Dohrn, 1858**

Material examined. Kerman: Jiroft (near a date-palm garden), 1176 m a.s.l., 19.vii.2003, 1 ♂ 1 ♀, H. Ghahari lgt., I. M. Kerzhner det. New record for Iran.

Distribution in Iran. Kerman (this paper).

General distribution. Oriental Region (Sri Lanka, India, Pakistan, Nepal) (KERZHNER & STROMMER 1990).

***Prostemma (Prostemma) guttula asiaticum* Kerzhner, 1968**

Distribution in Iran. Chahar Mahall va Bakhtiari, Kohgiluyeh va Buyer Ahmad, Tehran (KERZHNER 1968, 1981, 1987 (paratypes)).

General distribution. Near East and Central Asia; from Caucasus, Turkey, and Cyprus to Tadjikistan and Uzbekistan. Specimens from Turkey and the Near East are intermediate between the nominotypical subspecies *P. g. guttula* (Fabricius, 1787) and *P. g. asiaticum* (see KERZHNER 1996). *Prostemma g. guttula* occurs in Europe and north-western Africa (KERZHNER 1996).

Comment. *Prostemma g. guttula* feeds on pentatomoid species, which are at least twice as large as the predator (KOTT 1995). It would be interesting to see if *P. g. asiaticum* shows the same behaviour.

Prostemma sanguineum (Rossi, 1790)

= *Prostemma afghanicum* (Poppius, 1909) in REUTER & POPPIUS (1909)

Distribution in Iran. Golestan (KERZHNER 1981, 1987), Hamedan (WAGNER 1961, as *P. afghanicum*).

General distribution. Western Palaearctic species distributed from Western Europe and Morocco to Central Asia (KERZHNER 1996).

Comments. Lives in dry, hot and open biotopes or under stones and plants; predator of Lygaeidae (PÉRICART 1987).

Discussion

LATTIN (1989) gave an exhaustive review of the biology of nabids. They are active predators, found in leaf litter (Prostematinae) and on plants (Nabinae). Nabines are most often encountered on herbs, grasses and shrubs, and only a few species are known from trees. They are common in disturbed habitats. The larvae and adults are predaceous, although a few species are facultative plant feeders (STONER 1973). KERZHNER (1981) reported that the nabines feed on soft-bodied insects. Some nabines are natural enemies of agricultural pests. In Australia, the ubiquitous *Nabis kinbergii* Reuter, 1872 is a predator of the pestiferous moth *Helicoverpa punctigera* (Wallengren, 1860) and a potential agent for the dissemination of nuclear polyhedrosis virus (COOPER 1981). Prostematines feed on other Heteroptera and have narrow host ranges (LATTIN 1989, KOTT 1995). LATTIN (1989) listed species of the prostematine genera *Alloeorhynchus*, *Pagasa* Stål, 1862, and *Prostemma* as predators of lygaeoids belonging to the families Blissidae, Geocoridae and Rhyparochromidae.

In addition to faunistic surveys and ecological studies, molecular and cytogenetic studies have been started recently to help in reliable identification of species and subspecies. For example, cytogenetic data of 27 species of the Nabidae were analyzed by KUZNETSOVA et al. (2004). These invaluable works based on new taxonomic methods can gradually resolve present problems in the taxonomy of this family and ultimately lead to more reliable distribution data.

Although the Nabidae are beneficial in biological control of agricultural pests, the fauna of these powerful predators has been little studied in several countries including Iran. This study represents a step towards better knowledge of the family in Iran. The vast and geographically and climatically diverse territory of Iran (Fig. 1) will certainly yield other species of the Nabidae and many more regional records.

Acknowledgements

The authors are indebted to P. Kment (National Museum, Praha, Czech Republic), Dmitry A. Gapon (Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia) and H. Günther (Ingelheim, Germany) for providing necessary resources and editing the manuscript and to the late I. M. Kerzhner (Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia) for determining some specimens. The research was supported by Shahre Rey Islamic Azad University and Fars Science & Research Branch, Iran.

References

- ABD-RABOU S. & GHAHARI H. 2006: Predators of whiteflies (Homoptera: Aleyrodidae) in Iran. *Trends in Entomology* **5**: 41–46.
- ALEMANSOOR H. & AHMADIA. A. 1993: Natural enemies of cotton whitefly, *Bemisia tabaci* (Gennaadius) in Fars province. P. 106. In: *Proceeding of XI Iranian Plant Protection Congress*. Guilan University, Rasht, 300 pp.
- ASKARI O., POURABAD R. F. & KHAGANINIA S. 2009: Faunistic study of Heteroptera of Zanjanround region in Zanjan Province of Iran. *Munis Entomology and Zoology* **4**: 560–563.
- BAROUGH H. 1978: Etude de la fauna entomologique (Tabriz et environs), Partie II, order des Heteropteres. *University Tabriz, Faculty Agriculture* **12**: 1–33.
- CARAYON J. 1950: Caractères anatomiques et position systématique des Hémiptères Nabidae (note préliminaire). *Bulletin du Muséum National d'Histoire Naturelle (Paris), Serie 2* **22**: 95–101.
- CARAYON J. 1970: Étude des Alloeorhynchus d'Afrique centrale avec quelques remarques sur la classification des Nabidae (Hemiptera). *Annales de la Société Entomologique de France (N. S.)* **6**: 899–931.
- COOPER D. J. 1981: The role of predatory Hemiptera in disseminating a nuclear polyhedrosis virus of *Heliopsis punctiger*. *Journal of the Australian Entomological Society* **20**: 145–150.
- DOESBURG P. H. VAN 2004: A taxonomic revision of the family Velocipedidae Bergroth, 1891 (Insecta: Heteroptera). *Zoologische Verhandelingen (Leiden)* **347**: 5–100.
- GHAHARI H. & HATAMI B. 2000: (Study on natural enemies of whiteflies (Homoptera: Aleyrodidae) in Isfahan province). *Journal of Entomological Society of Iran* **20**: 1–24 (in Persian with English summary).
- GHAHARI H. & OSTOVAN H. 2006: (Predator arthropods' fauna of whiteflies (Homoptera: Aleyrodidae) in Mazandaran and Golestan Provinces and their feeding efficiency). *Journal of Agriculture and Natural Resources Science* **12(6)**: 171–180 (in Persian with English summary).
- GHAHARI H., CHÉROT F., OSTOVAN H. & SAKENIN H. 2008: Heteroptera from rice fields and surrounding grasslands of Northern Iran (Insecta), with special emphasis on predator species. *Journal of the Entomological Research Society* **10**: 13–25.
- 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., CHÉROT F., LINNAVUORI R. E. & OSTOVAN H. 2009b: Annotated catalogue of Iranian burrower bugs (Heteroptera, Pentatomoidea, Cydnidae). *ZooKeys* **26**: 1–31.
- GHARAAT M. A., HASSANZADEH M., SAFARALIZADEH M. H. & FALLAHZADEH M. 2009: Notes on the true bug (Heteroptera) fauna of Azerbaijan province, Iran. *Turkish Journal of Zoology* **33**: 421–431.
- HASSANZADEH M., POURABAD R. F. & SHAYESTE N. 2009a: An investigation on some Heteroptera in Marand region (Iran). *Munis Entomology and Zoology* **4**: 19–24.
- HASSANZADEH M., POURABAD R. F., GHARAAT M. A. & BEYKPOR A. R. 2009b: A study on the Heteroptera fauna of Shend Abad region and environ (Iran). *Munis Entomology and Zoology* **4**: 527–530.
- HAVASKARY M., HOSSAIN POUR F. & MODARRES AWAL M. 2010: Cimicomorpha and Pentatomomorpha (Heteroptera) of alfalfa from Mashhad and vicinity, NE Iran. *Munis Entomology and Zoology* **5**: 253–261.
- HEISS E. 2002: Beitrag zur Kenntnis der Wanzenfauna (Heteroptera) Irans, I. Pp. 87–97. In: GUTLEB B. & WIESER CH. (eds.): Ergebnisse einer Zoologischen Exkursion in den Nordiran, 2001. Arthropoda (Lepidoptera, Trichoptera, Neuroptera, Heteroptera, Coleoptera, Opiliones, Araneae, Decapoda) und Vertebrata (Amphibia, Reptilia, Aves, Mammalia). *Carinthia II* **192/112** (2001): 33–140.

- HOBERLANDT L. 1955: Hemiptera – Heteroptera from Iran, I. *Acta Entomologica Musei Nationalis Pragae* **29** (1954): 121–148.
- HOBERLANDT L. 1959: Hemiptera – Heteroptera from Iran, II. *Acta Entomologica Musei Nationalis Pragae* **33**: 497–523.
- HOBERLANDT L. 1974: Results of the Czechoslovak-Iranian entomological expedition to Iran 1970. No. 1: Introduction. *Acta Entomologica Musei Nationalis Pragae, Supplementum* **6**: 9–20 + 22 figures.
- HOBERLANDT L. 1981: Results of the Czechoslovak-Iranian entomological expeditions to Iran. Introduction to the Second expedition 1973. *Acta Entomologica Musei Nationalis Pragae* **40**: 5–32 + 42 photos.
- HOBERLANDT L. 1983: Results of the Czechoslovak-Iranian entomological expeditions to Iran. Introduction to the Third expedition 1977. *Acta Entomologica Musei Nationalis Pragae* **41**: 5–24 + 32 photos.
- JAKOVLEV V. E. 1877: Poluzhestkokrylya (Hemiptera Heteroptera) severnoy Persii. [True bugs (Hemiptera Heteroptera) of northern Iran]. *Trudy Russkago Entomologicheskago Obshchestva* **10**: 67–98 (in Russian).
- KERZHNER I. M. 1963: Beitrag zur Kenntnis der Unterfamilie Nabinae (Heteroptera: Nabidae). *Acta Entomologica Musei Nationalis Pragae* **35**: 5–61.
- KERZHNER I. M. 1968: Nove i maloizvestnye palearkticheskie poluzhestkokrylye semeystva Nabidae (Heteroptera). (New and little known Palaearctic bugs of the family Nabidae (Heteroptera)). *Entomologicheskoe Obozrenie* **47**: 848–863 (in Russian, English summary).
- KERZHNER I. M. 1981: *Poluzhestkokrylye semeystva Nabidae. Nasekomye khotomye*. [True bug of the family Nabidae. Hemiptera Heteroptera]. Fauna of the USSR, Vol. 13(2). Nauka, Leningrad, 326 pp (in Russian).
- KERZHNER I. M. 1987: Results of the Czechoslovak-Iranian entomological expeditions to Iran 1970, 1973 and 1977. Heteroptera, Nabidae. *Acta Entomologica Musei Nationalis Pragae* **42**: 379–390.
- KERZHNER I. M. 1988: Revision of the Nabidae (Heteroptera) mentioned in Lindberg's papers on the fauna of the Eastern and Southern Palaearctic. *Annales Entomologici Fennici* **54**: 135–137.
- KERZHNER I. M. 1996: Family Nabidae A. Costa 1983 – damsel bugs. Pp. 84–107. In: AUKEMA B. & RIEGER CH. (eds): *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 2*. The Netherlands Entomological Society, Amsterdam, xiv + 360 pp.
- KERZHNER I. M. & HENRY T. J. 2008: Three new species, notes and new records of poorly known species, and an updated checklist for the North American Nabidae (Hemiptera: Heteroptera). *Proceedings of the Entomological Society of Washington* **110**: 988–1011.
- KERZHNER I. M. & RIEGER CH. 1985: Wanzen aus Iran (Insecta: Heteroptera). *Senckenbergiana Biologica* **66**: 51–53.
- KERZHNER I. M. & STROMMER N. G. 1990: Oriental and Australian species of the genus *Prostemma* Laporte (Heteroptera: Nabidae). *Records of the South Australian Museum* **24**: 27–34.
- KIRITSHENKO A. N. 1966: Nastoyashchie poluzhestkokrylye (Hemiptera – Heteroptera), sobranye D. M. Shteynbergom v 1955 g. v Irane. (Hemiptera-Heteroptera collected by D. M. Steinberg in Iran in 1955). *Entomologicheskoe Obozrenie* **65**: 798–805 (in Russian, English title).
- KOTT P. 1955: Zur Biologie von *Prostemma guttula* F. (Heteroptera: Nabidae). *Mitteilungen des Internationalen Entomologischen Vereins* **20**: 31–49.
- KUZNETSOVA V. G., GROZEVA S. & NOKKALA S. 2004: New cytogenetic data on Nabidae (Heteroptera: Cimicomorpha), with a discussion of karyotype variation and meiotic patterns, and their taxonomic significance. *European Journal of Entomology* **101**: 205–210.
- LATTIN J. D. 1989: Bionomics of the Nabidae. *Annual Review of Entomology* **34**: 383–400.
- LESTON D., PENDERGRAST J. G. & SOUTHWOOD T. R. E. 1954: Classification of the terrestrial Heteroptera (Geocorisae). *Nature* **174**: 91–92.
- LINDBERG H. 1938: Einige Heteropterenfunde aus Nord-Persien. Beschreibung einer neuen Art, *Eurydema persicum*. *Notulae Entomologicae* **18**: 88–91.
- LINNAVUORI R. E. 2004: Heteroptera of the Hormozgan province in Iran. II. Nepomorpha, Gerromorpha, Leptopodomorpha, Cimicomorpha (Nabidae, Anthocoridae, Miridae). *Acta Universitatis Carolinae Biologica* **48**: 85–98.
- LINNAVUORI R. E. & MODARRES AWAL M. 1998: Studies on the Heteroptera of the Khorasan province in N.E.Iran. I. Nepomorpha, Gerromorpha, Leptopodomorpha, Cimicomorpha (Nabidae and Anthocoridae), and Pentatomorpha [sic!] (Coreoidea). *Entomologica Fennica* **9**: 237–241.

- LINNAVUORI R. E. & HOSSEINI J. 2000: *Heteroptera of Guilan with remarks on species of the adjacent areas. Part 1*. Guilan University Publication, Rasht, 94 pp.
- MIRAB-BALOU M., KHANJANI M. & ZOLFAGHARI M. 2007a: The preliminary study of true bugs (Hemiptera: Heteroptera) fauna in the alfalfa field of Hamedan province (Western Iran). *Pakistan Entomologist* **29**: 5–8.
- MIRAB-BALOU M., RASOULIAN GH. R., KHANJANI M. & SABAHİ G. 2007b: Study on the presence of phytophagous bugs of the family Miridae and the natural enemies of the tarnished plant bug in Hamadan alfalfa farms (Iran). Pp. 125–126. In: *4th European Hemiptera Congress, Ivrea (Turin, Italy), 10th–14th September 2007. Extended Abstracts*. Società Entomologica Italiana, 152 pp.
- MIRAB-BALOU M., RASOULIAN GH. R., KHANJANI M. & SABAHİ G. 2008: Study on taxonomy of phytophagous bugs of the family Miridae and introducing insects natural enemies of the alfalfa tarnished plant bug in Hamedan alfalfa farms (West of Iran). *Pakistan Entomologist* **30**: 55–60.
- MIYAMOTO S. 1963: Heteropterous Insects from Iran and Afghanistan. Pp. 89–92. In: UENO M. (ed.): *Results of the Kyoto University Scientific Expedition to the Karakorum and Hindukush, 1955. Vol. IV. Insect fauna of Afghanistan and Hindukush*. Kyoto University, Kyoto.
- MODARRES AWAL M. 1987: (Collecting and determining of the fauna of Heteroptera in Ardabil area and Research Station of University of Tabriz in Moghan). *Journal of Entomological Society of Iran* **9**: 15–28 (Persian) + 5–6 (English) (in Persian with separate English summary).
- MODARRES AWAL M. 1997: Nabidae (Heteroptera). P. 75. In: *List of agricultural pests and their natural enemies in Iran*. Ferdowsi University Press, 429 pp.
- MODARRES AWAL M. 2008: Contribution to Heteroptera fauna of Khorasan Razavi province of Iran. *Türkiye Entomoloji Dergisi* **32**: 243–253
- PÉRICART J. 1987: *Hémiptères Nabidae d'Europe occidentale et du Maghreb*. Faune de France, Vol. 71. Fédération Française des Sociétés de Sciences Naturelles, Paris, 169 pp.
- RASOULIAN GH. R., KHANJANI M., MIRAB-BALOU M. & SABAHİ G. 2007: The study of true bugs fauna in the alfalfa fields in Hamadan province (West of Iran). P. 139. In: *4th European Hemiptera Congress, Ivrea (Turin, Italy), 10th–14th September 2007. Extended Abstracts*. Società Entomologica Italiana, 152 pp.
- REMANE R. 1962: Zur Kenntnis der Gattung Nabis Latr. (Hem. Het. Nabidae). *Memorie della Società Entomologica Italiana* **41**: 5–14.
- REN SH.-ZH. 1998: *Hemiptera: Heteroptera Nabidae. Fauna Sinica, Insecta Vol. 13*. Science Press, Beijing, 251 pp + 6 pls (in Chinese with English abstract on pp. 220–239).
- REUTER O. M. & POPPIUS B. 1909: Monographia Nabidarum orbis terrestris. *Acta Societatis Scientiarum Fennicae* **37**(2): 1–62.
- SADEGHI R., POURABAD R. F., KAZEMI M. H. & HASSANZADEH M. 2009: Introduction of some Heteroptera of Qurigol (Iran). *Munis Entomology and Zoology* **4**: 498–500.
- SCHUH R. T. & SLATER J. A. 1995: *True bugs of the World (Hemiptera: Heteroptera). Classification and Natural History*. Cornell University Press, Ithaca, 337 pp.
- SCHUH R. T. & ŠTYS P. 1991: Phylogenetic analysis of Cimicomorphan family relationships (Heteroptera). *Journal of the New York Entomological Society* **99**: 298–350.
- SCHUH R. T., WEIRAUCH CH. & WHEELER W. C. 2009: Phylogenetic relationships within the Cimicomorpha (Hemiptera: Heteroptera): a total-evidence analysis. *Systematic Entomology* **34**: 15–48.
- SEIDENSTÜCKER G. 1957: Heteropteren aus Iran 1954. I. Teil Hemiptera-Heteroptera (ohne Fam. Miridae). *Jahreshefte des Vereins für Vaterländische Naturkunde im Württemberg* **112**: 66–73.
- SEIDENSTÜCKER G. 1958: Heteropteren aus Iran 1956, I. Hemiptera – Heteroptera (ohne Familie Miridae). *Stuttgarter Beiträge zur Naturkunde* **11**: 1–5.
- STÅL C. 1873: Enumeratio Hemipterorum. Bidrag till en förteckning öfver aller hittills kända Hemiptera, jemte systematiska meddelanden. 3. *Kungliga Svenska Vetenskaps-Akademiens. Handlingar* **11**(2): 1–163.
- STONER A. 1973: Plant feeding by Nabis, a predacious genus. *Economical Entomology* **1**: 557–558.
- WAGNER E. 1961: Beitrag zur Heteropteren-Fauna von Iran. Ergebnisse der Österreichischen Iran-Expeditionen 1949/1950 und 1956. *Anzeiger der Österreichischen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse* **1961**(10): 157–165.
- WYNIGER D. 2008: New records of *Scotomedes alienus sikkimensis* (Hemiptera: Heteroptera: Velocipedidae) from Nepal. *Acta Entomologica Musei Nationalis Pragae* **48**: 367–369.