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A contribution to the Tingidae (Heteroptera) from north and northwestern Iran

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Abstract

The fauna of lace bugs (Heteroptera: Tingidae) from north and northwestern Iran is studied in this paper. In a total 14 species from 7 genera (including, *Agramma* STEPHENS, *Corythucha* STÅL, *Dictyla* STÅL, *Monosteira* COSTA, *Stephanitis* STÅL, *Tingis* FABRICIUS and *Dictyonota* CURTIS) and 2 tribes (Tingini LAPORTE and Ypsotingini DRAKE & RUHOFF) were collected. Synonymies and distributional data are given for all the species.

K e y w o r d s : Heteroptera, Tingidae, Fauna, Iran.

Zusammenfassung

Vorliegende Arbeit behandelt die Netzwanzen (Heteroptera: Tingidae) des nördlichen und nordwestlichen Irans. 14 Arten aus 7 Gattungen (*Agramma* STEPHENS, *Corythucha* STÅL, *Dictyla* STÅL, *Monosteira* COSTA, *Stephanitis* STÅL, *Tingis* FABRICIUS und *Dictyonota* CURTIS) und zwei Triben (Tingini LAPORTE und Ypsotingini DRAKE & RUHOFF) konnten nachgewiesen werden. Synonyme und Verbreitungsangaben werden den genannten Arten beigefügt.

Introduction

Lace bugs (Heteroptera: Tingidae) are phytophagous and they always feed on the same plant or on a group of closely related ones. This group is distributed worldwide and consists of approximately 2600 species (ZHANG et al. 2005). Adults and nymphs are usually found on the undersides of leaves, where they feed on the sap of living plants by piercing the epidermis of the leaves with their very slender stylets. These stylets are protrusile and retractile, and can easily penetrate the cellular tissue to extract the sap. Their feeding activities may cause great injury to and plasmolysis of the foliage. Many cultivated and wild plants of prime importance in agriculture and horticulture are seriously affected by the feeding activities of these insects (DRAKE & RUHOFF 1965; MONTEMAYOR & COSCARON 2005). Most lace bugs have one to two generations per year, but some species have multiple generations. Most overwinter as adults but some species overwinter as eggs or nymphs. This group has incomplete metamorphosis in that the immature stages resemble the adults, except that the immatures are smaller and do not have wings. However, wing pads appear in the second and third instar and increase in size as the nymph matures. Depending on the species, lace bugs have four (few) or five (most) instars (PERICART 1983; FROESCHNER 1996). The fauna of Iranian Tingidae was poorly studied so far (MODARRES AWAL 1997; SAKENIN et al. 2011). The objective of this paper is determining of tingids' fauna in north and northwestern Iran.

Material and Methods

The specimens were collected by sweeping of vegetation and by light traps methods from various cultivated plants and weeds in different locations of Iran. Detailed information about synonymies and distribution of quoted species are available in the bibliography. Classification, nomenclature and distributional data of Tingidae suggested by PÉRICART (1983) and AUKEMA & RIEGER (1996, 1999) have been followed.

Results

In a total 14 species from 7 genera were identified from north and northwestern Iran. The list of species is given below.

Subfamily T i n g i n a e LAPORTE

Tribe T i n g i n i LAPORTE

Genus *A g r a m m a* STEPHENS 1829

***Agramma* (*Serenthia*) *atricapillum* (SPINOLA 1837)**

Serenthia atricapilla SPINOLA 1837. *Agramma atricapilla* FIEBER 1844. *Serenthia antricapilla* [sic] HORVÁTH 1906a. *Agramma atricapillum* DRAKE & RUHOFF 1965.

M a t e r i a l : East Azarbaijan province: Jolfa, 2 specimens, September 2004.

Distribution outside Iran: Holomediterranean extending to Central Asia. Albania, Algeria, Bulgaria, Corsica, Crete, Egypt, France, Greece, Hungary, Italy, Iraq, Israel, Morocco, Portugal, Rumania, Sardinia, Sicily, Slovenia, Spain, Tunisia, Turkey, U.S.S.R. (Caucasus, Ukraine, Crimea, Turkestan), former Yugoslavia.

Agramma laetum (FALLÉN 1807)

Tingis laeta FALLÉN 1807. *Agramma laeta* STEPHENS 1829. *Piesma tricolor* LAPORTE 1833. *Piesma laetum* BURMEISTER 1835. *Serenthia laeta* HERRICH-SCHAEFFER 1838. *Agramma laetum*: VOLLENHOVEN 1878. *Serenthia* (*Agramma*) *laeta* WAGNER 1941.

Material: Golestan province: Golestan National Park, 4 specimens, September 2005.

Distribution outside Iran: Euro-Siberian, Austria, Belgium, Corsica, former Czechoslovakia, Denmark; England, Finland, France, Germany, Greece, Hungary, Italy, Mongolia Republic, Netherlands, Norway, Poland, Portugal, Sardinia, Spain, Sweden, Switzerland, Trieste, U.S.S.R. (Caucasus, Siberia), Wales, former Yugoslavia.

Agramma minutum HORVÁTH 1847

Agramma minutum HORVÁTH 1874a. *Agramma depressa* JAKOVLEV 1874. *Serenthia depressa* PUTON 1876. *Serenthia minuta* HÜEBER 1893. *Serenthia* (*Serenthiella*) *minuta* WAGNER 1941. *Agramma minuta* WAGNER 1958. *Agramma* (*Agramma*) *minutum* REDEI & HUFNAGEL 2003.

Distribution outside Iran: Pontomediterranean, extending to Central Asia. Austria, Bulgaria, former Czechoslovakia, France, Germany, Hungary, Rumania, Slovenia, U.S.S.R. (Siberia, Caucasus, Ukraine).

Genus *Corythucha* STÅL 1873

Corythucha arcuata (SAY 1832)

Tingis arcuata SAY 1832. *Corythucha arcuata* STÅL 1873. *Corythuca ciliata* (not SAY) PROVANCHER 1886. *Corythuca juglandis* (not FITCH) PROVANCHER 1886. *Corythucha polygrapha* LINTNER 1888. *Corythuca arquata* [sic] VAN DUZEE 1889. *Corythuca polygraphia* [sic] BANKS 1910. *Corythucha mali* GIBSON 1918. *Corythucha piercei* GIBSON 1918. *Corythucha arcuata* var. *mali* DRAKE 1921. *Corythuca arcuata* var. *mali* BLATCHLEY 1926.

Material: West Azarbayjan: Ourmieh (1370m), 1 specimen, September 2005.

Distribution outside Iran: Canada, Caucasus, Italy, North America, Switzerland, Turkey and U.S.

Genus *D i c t y l a* STÅL 1874

Dictyla echii (SCHRANK 1782)

Cimex clavkornis (not LINNAEUS) SCHRANK 1781. *Cimex echii* SCHRANK 1782. *Acanthia aim* SCHRANK 1801. *Tingis humuli* (not FABRICIUS) FALLÉN 1807. *Tingis echii* HERRICH-SCHAEFFER 1835. *Monanthia humuli* BURMEISTER 1835. *Monanthia echii* HERRICH-SCHAEFFER 1837. *Monanthia clavicornis* AMYOT & SERVILLE 1843. *Monanthia* (*Physatocheila*) *wolffii* FIEBER 1844. *Monanthia* (*Tropidocheila*) *wolffii* SAHLBERG 1848. *Monanthia wolffii* MAYR 1858. *Dictyla echii* DRAKE & RUHOFF 1960.

M a t e r i a l : West Azarbayjan province: Ourmieh, 3 specimens, July 2006.

D i s t r i b u t i o n o u t s i d e I r a n : Albania, Algeria, Austria, Belgium, Bulgaria, China, Corsica, Crete, Cyprus, former Czechoslovakia, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Israel, Italy, Morocco, Netherlands, Norway, Poland, Portugal, Rumania, Sardinia, Scandinavia, Slovenia, Spain, Sweden, Switzerland, Syria, Tunisia, Turkey, U.S.S.R. (Latvia, Estonia, Siberia, Turkestan, Transcaucasus, Caucasus, Armenia) and former Yugoslavia.

Dictyla triconula (SEIDENSTÜCKER 1954)

Monanthia triconula SEIDENSTÜCKER 1954. *Dictyla triconula* DRAKE & RUHOFF 1960.

M a t e r i a l : East Azarbayjan province: Arasbaran (826m), 2 specimens, June 2004.

D i s t r i b u t i o n o u t s i d e I r a n : Turkey and Caucasus.

Genus *M o n o s t e i r a* COSTA 1863

Monosteira discoidalis (JAKOVLEV 1883)

Monanthia (*Monosteira*) *discoidalis* JAKOVLEV 1883. *Monosteira discoidalis* LETHIERRY & SEVERIN 1896.

M a t e r i a l : Ardabil province: Pars-Abad, 2 specimens, June 2008.

D i s t r i b u t i o n o u t s i d e I r a n : Kazakhstan, South European Territory of Russia, Afghanistan, Northwestern Territory of China, Iraq, Kirgizia, Mongolia, Tadzhikistan, Turkmenistan, Turkmenistan, Uzbekistan, Pakistan, Irano-Turanian, U.S.S.R. (Turkestan, Turkmen).

Monosteira inermis HORVÁTH 1899

Monosteira inermis HORVÁTH 1899.

M a t e r i a l : Guilan province: Lahijan, 1 specimen, August 2007, on Tamarisk.

D i s t r i b u t i o n o u t s i d e I r a n : Middlle Asia: Turkmenistan, U.S.S.R. (Turkestan).

Monosteira lobulifera REUTER 1888

Monosteira lobulifera REUTER 1888. *Monostira lobulifera* [sic] PRIESNER & ALFIERI 1953.

M a t e r i a l : Mazandaran province: Ramsar, Chalus (14m), 3 specimens, October 2001.

Distribution outside Iran: Egypt, Greece, Israel, Syria, Turkey, U.S.S.R. (Transcaucasus).

Monosteira unicostata (MULSANT & REY 1852)

Monanthia unicostata MULSANT & REY 1852. *Monanthia aliena* FIEBER 1861. *Monosteira unicostata* COSTA 1863. *Monanthia* (*Monosteira*) *unicostata* PUTON 1879. *Monosteira unicostata* HORVÁTH 1906b.

Material: Mazandaran province: Behshahr, 6 specimens, March 2006, on *Populus alba*.

Distribution outside Iran: Holomediterranean. Albania, Algeria, Bulgaria, Cyprus, former Czechoslovakia, France, Greece, Hungary, Italy, Morocco, Portugal, Rumania, Sardinia, Sicily, Spain, Syria, Tunisia, Turkey, U.S.S.R. (Armenia, Caucasus, Turkmen, Transcaucasus) and former Yugoslavia.

Genus *Stephanitis* STÅL 1873

Stephanitis pyri (FABRICIUS 1775)

Acanthia pyri FABRICIUS 1775. *Cimex appendiceus* FOURCROY 1785. *Cimex pyri* GMELIN 1790. *Tingis pyri* FABRICIUS 1803. *Tingis marginata* LAMARCK 1816. *Tingis appendicea* Le PELETIER & SERVILLE 1828. *Stephanitis pyri* STÅL 1873. *Stephanitis piri* [sic] BÖRNER 1935. *Stephanitis oschanini* VASILIEV 1935. *Phyllontocheila schoutedeni* (not DISTANT) GOMEZ-MENOR 1956. *Maecenas pyri* DRAKE & RUHOFF 1960.

Material: East Azarbayjan province: Abshahmad, 3 specimens, October 2008, on apple and apricot trees.

Distribution outside Iran: Albania, Austria, Belgium, Bulgaria, Cyprus, former Czechoslovakia, England, France, Germany, Greece, Hungary, Iraq, Israel, Italy, Morocco, Netherlands, Poland, Portugal, Rumania, Sardinia, Sicily, Slovenia, Spain, Sweden, Switzerland, Syria, Turkey, U.S.S.R. (Caucasus, Armenia, Turkestan) and former Yugoslavia.

Genus *Tingis* FABRICIUS 1803

Tingis (*Neolasiotropis*) *pilosa* HUMMEL 1825

Tingis pilosa HUMMEL 1825. *Monanthia angusticollis* HERRICH-SCHAEFFER 1836. *Tingis cardui* (not LINNAEUS) SCHILLING 1838. *Derephysia angusticollis* HERRICH-SCHAEFFER 1838. *Monanthia* (*Tropidocheila*) *pilosa* FIEBER 1844. *Monanthia* (*Tropidocheila*) *angusticollis* HERRICH-SCHAEFFER 1850. *Monanthia pilosa* MAYR 1858. *Lasiotropis pilosa* STÅL 1874. *Monanthia* (*Tropidochila*) *angusticollis* PUTON 1879. *Monanthia* (*Tropidochila*) *pilosa* JAKOVLEV 1880. *Tropidochila angusticollis* REUTER 1885. *Tingis* (*Tropidocheila*) *pilosa* HORVÁTH 1906a. *Tingis* (*Tropidochila*) *pilosa* OSHANIN 1908. *Phyllonthocheila* [sic] *angusticollis* REICHENSPERGER 1920. *Tingis pilosa* HEISS 1978.

Material: East Azarbayjan province: Arasbaran (778m), 1 specimen, September 2005.

Distribution outside Iran: Austria, Belgium Bulgaria, China, former Czechoslovakia, France, Germany, Greece, Hungary, Italy, Morocco, Netherlands,

Poland, Portugal, Rumania, Slovenia, Spain, Switzerland, Turkey, U.S.S.R. (Caucasus, Transcaucasus, Turkestan, Turkmen, Siberia) and former Yugoslavia.

Tingis (*Tingis*) *auriculata* (COSTA 1847)

Monanthia cardui (not LINNAEUS) HERRICH-SCHAEFFER 1838. *Monanthia* (*Phyllontocheila*) *sinuata* FIEBER 1844. *Catoplatus auriculatus* COSTA 1847. *Monanthia sinnata* MAYR 1858. *Monanthia unicolor* GARBIGLIETTI 1869. *Monanthia* (*Platychila*) *auriculata* PUTON 1879. *Monanthia auriculata* CHICOTE 1880. *Phyllontochila auriculata* LETHIERRY & SEVERIN 1896. *Phyllontocheila auriculata* HORVÁTH 1901. *Tingis auriculata* HORVÁTH 1905. *Tingis* (*Tingis*) *auriculata* LINNAVUORI & MODARRES AWAL 1999. *Tingis necopina* MCATEE 1923.

M a t e r i a l : East Azarbayjan province: Ahar, 1 specimen, September 2004.

D i s t r i b u t i o n o u t s i d e I r a n : Holomediterranean extending to Middle Asia. Albania, Algeria, Austria, Bulgaria, Corsica, Cyprus, former Czechoslovakia, France, Germany, Greece, Hungary Israel, Italy, Morocco, Portugal, Rumania, Sardinia, Sicily, Slovenia, Spain, Switzerland, Syria, Turkey, U.S., U.S.S.R. (Armenia, Ukraine, Turkestan, Caucasus) and former Yugoslavia.

Tribe Y p s o t i n g i n i DRAKE & RUHOFF

Genus *D i c t y o n o t a* CURTIS 1827

Dictyonota opaca (LINNAVOURI 1965)

Biskria opaca LINNAVUORI 1965. *Biskria josifovi* SEIDENSTUCKER 1968. *Dictyonota opaca* GOLUB 1975.

M a t e r i a l : Mazandaran province: Savadkooh, 2 specimens, August 2006, on *Suaeda monoica* (Chenopodiaceae). East Azarbaijan province: Horand, 1 specimen, June 2008.

D i s t r i b u t i o n o u t s i d e I r a n : Eremian, known from Algeria, Yemen, Saudi Arabia, Palestine, Iraq, Turkmenistan.

Discussion

The results of this research indicated that there is diverse fauna of Tingidae in north and northwestern Iran. Northwestern Iran is a large area included Arasbaran which contains very diverse flora and fauna. Arasbaran is an important region in East Azarbayjan province. This biosphere reserve is situated in the north of Iran at the border to Armenia and Azerbaijan and belongs to the Caucasus Iranian Highlands. In between the Caspian, Caucasus and Mediterranean region, the area covers mountains up to 2,200 meters, including high alpine meadows, semi-arid steppes, rangelands and forests, rivers and springs. The location of Arasbaran is 38°40' to 39°08'N; 46°39' to 47°02'E and its elevation (meters above sea level) is +250 to +2,887.

The traditional classification for lace bugs was proposed by DRAKE & RUHOFF (1960). They consider that the family Tingidae is composed by three subfamilies. The subfamily Tinginae, later divided into the tribes Ypsotingini, Litadeini, and Tingini (DRAKE & RUHOFF 1965); the subfamily Cantacaderinae with two tribes, Cantacaderini and

Phatnomatini; and the subfamily Vianaidinae. This classification has been widely accepted, although several authors have considered Vianaidinae to be a family by itself (KORMILEV 1955; ŠTYS & KERZHNER 1975; FROESCHNER 1996; LIS 1999; GUILBERT 2001). This classification has been revisited by LIS (1999) on the basis of morphological characters. Her analysis leads to a new classification where Cantacaderini are raised to family level and Phatnomatini are considered closer to Tinginae than to Cantacaderini, forming a new subfamily that together with Tinginae constitute the family Tingidae. Some details of classification were discussed by MONTEMAYOR & COSCARON (2005). In the most recent phylogenetic analysis (GILBERT 2001), which was made on the basis of lace-like hemelytral and pronotal structures, Cantacaderinae are clearly included among the Tingidae and Phatnomatini are the sister group of Cantacaderini. But the relationship of this last subfamily within the rest of the Tingids is not resolved and its taxonomic position is not clear. Due to the lack of congruence between the phylogenetic analyses of LIS (1999) and GUILBERT (2001), we prefer to follow the traditional classification, excluding the Vianaidinae, until these matters are resolved.

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