



Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 38, Heft 10: 193-212

ISSN 0250-4413

Ansfelden, 2. Januar 2017

Preferred host plants species by Miridae (Hemiptera: Heteroptera) species in Erzurum Province of Turkey

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Abstract

In this study, the family Miridae (Hemiptera: Heteroptera) species on some plants was investigated in Erzurum province of Turkey during 2011-2014. Totally, 90 species from Miridae family were determined belonging to five subfamilies and 45 genera. Preferred host plants species by Miridae species were given in this work. As a result, it has been revealed that the variety of Miridae fauna in this region depends on the rich wild plant flora. Besides, the high host specificity observed among the major of species *Adelphocoris lineolatus* (GOEZE, 1778), *A. vandalicus* (ROSSI, 1790), *Calocoris angularis* FIEBER, 1864, *Lygus gemellatus* (HERRICH-SCHAEFFER, 1835), *L. rugulipennis* POPPIUS, 1911, *Orthops (Orthops) kalmii* (LINNAEUS, 1758), *Plagiognathus bipunctatus* REUTER, 1883 and *P. chrysanthemi* (WOLFF, 1804). In addition, insects maximum *Achillea millefolium* L., *Carum carui* L., *Falcaria vulgaris* L., *Galium verum* L., *Medicago sativa* L., *Melilotus officinalis* (L.), *Sanguisorba minor* (SCOP.), *Salvia verticillata* L. and *Vicia cracca* L. of their choice and contrast *Crepis foetida* L., *Lythrum salicaria* L., *Malabaila dasyantha* (C. KOCH) GROSSH., *Ononis spinosa* L., *Papaver rhoeas* L., *Rumex sextatus* L. and *Senecio vernalis* WALDST. & KIT. are determined that they are less preferred.

Zusammenfassung

In dieser Studie wird die Familie Miridae (Hemiptera: Heteroptera) auf einigen Pflanzen in der türkischen Provinz Erzurum zwischen 2011 mit 2014 erforscht. Insgesamt wurden 90 Arten aus 5 Unterfamilien in 45 Gattungen nachgewiesen. Die bevorzugten Futterpflanzen der Miridae werden angeführt. Die Vielfalt an Miridae dieser Region basiert auf ihrer reichen Wildpflanzenflora. Eine hohe Spezifizierung wurde bei den meisten Arten festgestellt wie *Adelphocoris lineolatus* (GOEZE, 1778), *A. vandalicus* (ROSSI, 1790), *Calocoris angularis* FIEBER, 1864, *Lygus gemellatus* (HERRICH-SCHAEFFER, 1835), *L. rugulipennis* POPPIUS, 1911, *Orthops (Orthops) kalmii* (LINNAEUS, 1758), *Plagiognathus bipunctatus* REUTER, 1883 and *P. chrysanthemi* (WOLFF, 1804). Das Maximum an Insekten wurde an *Achillea millefolium* L., *Carum carui* L., *Falcaria vulgaris* L., *Galium verum* L., *Medicago sativa* L., *Melilotus officinalis* (L.), *Sanguisorba minor* (SCOP.), *Salvia verticillata* L. und *Vicia cracca* L. nachgewiesen, während *Crepis foetida* L., *Lythrum salicaria* L., *Malabaila dasyantha* (C. KOCH) GROSSH., *Ononis spinosa* L., *Papaver rhoeas* L., *Rumex sextatus* L. und *Senecio vernalis* WALDST. & KIT. weniger bevorzugt werden.

Introduction

The Plant bugs (Hemiptera: Miridae) are the most populated family of Hemiptera order, with approximately 11.020 described species (CASSIS & SCHUH 2012). Size variation in Mirid bugs is from 1 to 15 mm. This family comprising eight subfamilies Isometopinae, Psallopinae Cylapinae, Orthotylinae, Bryocorinae, Deraeocorinae, Mirinae, and Phylinae, which among them subfamilies Mirinae and Phylinae are the most diverse. The Mirinae is the largest subfamily of Miridae with 6 tribe and more than 4000 described species (CASSIS & SCHUH 2012). The Miridae, like the suborder to which they belong are often assumed to be ancestrally phytophagous. Adding to a plant-feeding bias might be the common name "Plant bugs"; that phytophagy is dominant in the family can lead to a common-equals-primitive assumption (WHEELER 2001). Miridae are mostly phytophagous, but some species are predacious or with mixed feeding (zoophytophages); most phytophagous species prefer generative organs of plants (flowers, ovaries and fruits), some may feed on mature seeds (LEHR 1988). Among the plant feeders, apparently the greater number of species are limited to a single host, or to a genus of plants, while a very few, such as *Lygus oblineatus* (SAY) and *Halticus bracteatus* (SAY), have a wide range of food plants. Even among species which always breed on a single host plant, a general dispersal of individuals usually takes place. Even among species which always breed on a single host plant, a general dispersal of individuals usually takes place. Following the time of emergence and mating, individual females of *Lygus*, *Lopidea* and *Tropidostepes* have been found scattering to various plants near the host where they developed (KNIGHT 1968). Many Miridae are host specific, much of the list matches a single mirid with a single host. In some genera such as *Lygus* HAHN, the number of recorded hosts is sometimes very large and exhaustive listings are not attempted, although in a few cases more exhaustive listings are available in the literature (SCHUH 1995).

Turkey is biogeographically one of the most interesting countries in the West Palaearctic region. Some faunistic studies on this family in the Erzurum province have been made by ÖZBEK & ALAOĞLU (1987), YILDIRIM & ÖZBEK (1992), GÜÇLÜ et al. (1995 a, b), YILDIRIM et al. (1999) and YILDIRIM (2002). The aim of this study was to determine Miridae and its host plants in Erzurum Province of Turkey.

Materials and Methods

The insect materials were collected by sweeping insects net from the Erzurum province during 2011-2014 years. The insect samples were killed in ethyl asetate and brought to the laboratory. The Miridae species were identified. Undetermined specimens were identified by Dr. Rauno LINNAVUORI (FINLAND), Dr. Chérot FRÉDÉRIC (BELGIUM) and Prof. Dr. Jacek GORCZYCA (POLAND). The materials mentioned in this study were deposited in the Entomology Museum, Erzurum, Turkey (EMET). Plant specimens were collected by hand and were pressed and they were deposited at the Herbarium of Plant Protection Department. Plant specimens were identified by Prof. Dr. Yusuf KAYA (TURKEY) and Assoc. Prof. Dr. İrfan ÇORUH (TURKEY). The study was supported by the Atatürk University Scientific Research Fund (Project Number: 2009/23) and is a partial summary of Gülten YAZICI's PhD thesis (Atatürk University, Institute of Science, Department of Plant Protection), adopted on 11.05.2015.

Result and Discussion

Studies were carried out to determine of species of the family of Miridae in Erzurum province of Turkey during the seasons of spring, summer and autumn of 2011-2014. In this study, 90 species were determined belonging to five subfamilies and 45 genera of the Miridae (Hemiptera: Heteroptera) from Erzurum province. A list of the species is presented below together with host plants and a map is provided the coordinates of the place made fieldwork in 2011-2012 years in their direction in Erzurum province (Table 1). As a result, it has been revealed that the variety of Miridae fauna in this region depends on the rich wild plant flora. Besides, the high host specificity observed among the major of species *Adelphocoris lineolatus* (GOEZE, 1778), *A. vandalicus* (ROSSI, 1790), *Calocoris angularis* FIEBER, 1864, *Lygus gemellatus* (HERRICH-SCHAEFFER, 1835), *L. rugulipennis* POPPIUS, 1911, *Orthops (Orthops) kalmii* (LINNAEUS, 1758), *Plagiognathus bipunctatus* REUTER, 1883 and *P. chrysanthemii* (WOLFF, 1804). In addition, insects maximum *Achillea millefolium* L., *Carum carui* L., *Falcaria vulgaris* L., *Galium verum* L., *Medicago sativa* L., *Melilotus officinalis* (L.), *Sanguisorba minor* (SCOP.), *Salvia verticillata* L. and *Vicia cracca* L. of their choice and contrast *Crepis foetida* L., *Lythrum salicaria* L., *Malabaila dasyantha* (C. KOCH) GROSSH., *Ononis spinosa* L., *Papaver rhoeas* L., *Rumex sextatus* L. and *Senecio vernalis* WALDST. & KIT. are determined that they are less preferred. There are studies on Miridae in the research area, Erzurum province and its districts having

various biotopes and climatically conditions. At the end of this study, the fauna of this region has been demonstrated considerably and added many species to the present fauna Miridae of Turkey.

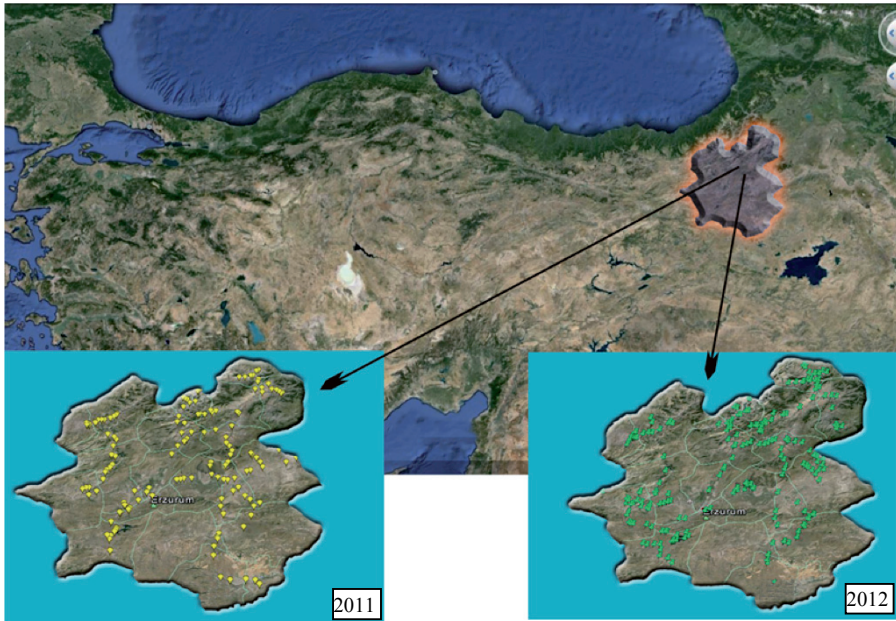


Figure 1: Map showing the coordinates of the place made fieldwork in 2011-2012 years in Erzurum (Turkey).

Table 1: Preferred host plants species by Miridae species

	Miridae Species	Host Plant Species
1.	<i>Acetropis carinata</i> (HERRICH-SCHAEFFER, 1841)	<i>Medicago sativa</i> L. <i>Salvia nemorosa</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Turgenia latifolia</i> (L.) <i>Achillea biebersteini</i> AFAN. <i>A. filipendulina</i> LAM. <i>A. millefolium</i> L. <i>Anchusa leptophylla</i> ROEMER&SCHULTES <i>Anthemis tinctoria</i> L. <i>Arabis caucasica</i> WILLD. <i>Arenaria gypsophiloides</i> L. <i>Astragalus ponticus</i> PALL. <i>Astrodaucus orientalis</i> (L.) <i>Bupleurum rotundifolium</i> L. <i>Cardaria draba</i> (L.) <i>Carum carui</i> L. <i>Centaurea depressa</i> L. <i>C. polypodiifolia</i> (BOISS.) <i>C. solstitialis</i> L. <i>C. virgata</i> LAM. <i>Cichorium intybus</i> L. <i>Consolida orientalis</i> (J. GAY) <i>Coronilla varia</i> L. <i>Crepis tectorum</i> L. <i>Daucus carota</i> L. <i>Echium italicum</i> L. <i>Echium vulgare</i> L. <i>Epilobium hirsutum</i> L. <i>Epilosum angustifolium</i> L. <i>E. longifolium</i> L. <i>Euphorbia amygdaloides</i> L. <i>E. palustris</i> L. <i>E. virgata</i> WALDST. &KIT. <i>Falcaria vulgaris</i> BERNH. <i>Ferulago campestris</i> L. <i>Ferula orientalis</i> L. <i>Galium verum</i> L. <i>Gypsophila bicolor</i> (FREYN. ET SINT.) <i>Helichrysum pallasii</i> (SPRENGEL) <i>Helichrysum plicatum</i> D.C. <i>Inula oculus-christi</i> L. <i>Lotus corniculatus</i> var. <i>tenuifolius</i> L. <i>Lythrum salicaria</i> L. <i>Malabaila dasyantha</i> (C. KOCH) GROSSH. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Mentha longifolia typhoides</i> (BRIQ.) <i>Mentha pulegium</i> L. <i>Ononis spinosa</i> L. <i>Onobrychis viciifolia</i> SCOP.
2.	<i>Adelphocoris lineolatus</i> (GOEZE, 1778)	

2.	<i>Adelphocoris lineolatus</i> (GOEZE, 1778) (continuing)	<i>Papaver rhoeas</i> L. <i>Peganum harmala</i> L. <i>Phlomis pungens</i> WILLD. <i>Rochelia disperma</i> L. <i>Salvia nemorosa</i> L. <i>S. verticillata</i> L. <i>S. verticillata</i> subsp. <i>amasiaca</i> (FREYN & BORNM) <i>Sanguisorba minor</i> (SCOP.) <i>Scabiosa caucasica</i> M.BIEB. <i>Silene alba</i> (MILLER) <i>Sinapis arvensis</i> L. <i>Sophora alopecuroides</i> L. <i>Stachys annua</i> L. <i>Tanacetum balsamita</i> L. <i>Teucrium orientale</i> L. <i>Turgenia latifolia</i> HOFFMN. <i>Verbascum phlomoides</i> L. <i>Verbascum speciosum</i> SCHRAD <i>Vicia cracca</i> L. <i>Xeranthemum annuum</i> L.
3.	<i>Adelphocoris seticornis</i> (FABRICIUS, 1775)	<i>Astragalus penduliflorus</i> L. <i>Campanula rapunculoides</i> L. <i>Carum carui</i> L. <i>Echium italicum</i> L. <i>Medicago sativa</i> L.
4.	<i>Adelphocoris vandalicus</i> (ROSSI, 1790)	<i>Astragalus penduliflorus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Carum carui</i> L. <i>Centaurea solstitialis</i> L. <i>Centranthus longiflorus</i> L. <i>Convolvulus arvensis</i> L. <i>Crepis foetida</i> L. <i>Echium italicum</i> L. <i>E. vulgare</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Inula oculus-christi</i> L. <i>Lotus corniculatus</i> var. <i>tenuifolius</i> L. <i>Lythrum salicaria</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Salvia nemorosa</i> L. <i>S. verticillata</i> L.
5.	<i>Alloeonotus fulvipes</i> (SCOPOLI, 1763)	<i>Coronilla varia</i> L. <i>Onobrychis vicifolia</i> SCOP.
6.	<i>Aphanosoma italicum</i> A. COSTA, 1842	<i>Astragalus mukusiensis</i> RECH.FIL. <i>Coronilla varia</i> L. <i>Medicago sativa</i> L. <i>Salvia verticillata</i> subsp. <i>amasiaca</i> (FREYN & BORNM) <i>Sanguisorba minor</i> SCOP.
7.	<i>Apolygus lucorum</i> (MEYER DUR, 1843)	<i>Artemisia absinthium</i> (L.)
8.	<i>Atomoscelis onustus</i> (FIEBER, 1861)	<i>Melilotus officinalis</i> (L.)
9.	<i>Brachycoleus decolor</i> REUTER, 1887	<i>Achillea millefolium</i> L.

		<p><i>Arenaria gypsophiloides</i> L. <i>Artemisia absinthium</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Bupleurum rotundifolium</i> L. <i>Cardaria draba</i> (L.) <i>Centaurea depressa</i> L. <i>Coronilla varia</i> L. <i>Coronilla varia</i> L. <i>Epilosum angustifolium</i> L. <i>Euphorbia amygdaloides</i> L. <i>Gypsophila bicolor</i> (FREYN. ET SINT.) <i>Inula oculus-christi</i> L. <i>Isatis candolleana</i> BOISS. <i>Medicago sativa</i> L. <i>Onobrychis viciifolia</i> SCOP. <i>Rhinanthus angustifolius</i> C. C. GMELIN <i>Salvia nemorosa</i> L. <i>S. verticillata</i> L. <i>Sanguisorba minor</i> SCOP. <i>Vicia cracca</i> L.</p>
10.	<i>Brachycoleus lineellus</i> JAKOVLEV, 1884	<p><i>Achillea filipendulina</i> LAM. <i>A. millefolium</i> L. <i>Arenaria gypsophiloides</i> L. <i>Artemisia alosin</i> (L.) <i>Bupleurum rotundifolium</i> L. <i>Centranthus longiflorus</i> L. <i>Galium verum</i> L. <i>Hypericum hyssopifolium</i> CHAIX. <i>Knautia involucrata</i> SOMMIER & LEVIER <i>Lepidium campestre</i> L. <i>Salvia syriaca</i> L. <i>Sanguisorba minor</i> SCOP. <i>Tanacetum balsamita</i> L. <i>Vicia cracca</i> L.</p>
11.	<i>Brachynotocoris puncticornis</i> REUTER, 1880	<p><i>Astrodaucus orientalis</i> (L.)</p>
12.	<i>Calocoris angularis</i> FIEBER, 1864	<p><i>Achillea filipendulina</i> LAM. <i>A. millefolium</i> L. <i>Anthemis tinctoria</i> L. <i>Arabis caucasica</i> WILLD. <i>Arenaria gypsophiloides</i> L. <i>Artemisia alosin</i> (L.) <i>Astragalus ponticus</i> PALL. <i>Bupleurum rotundifolium</i> L. <i>Campanula glomerata</i> L. <i>Cardaria draba</i> L. <i>Consolida orientalis</i> (J. GAY) <i>Coronilla varia</i> L. <i>Crambe orientalis</i> L. <i>Echium italicum</i> L. <i>Falcaria vulgaris</i> L. <i>Ferulago campestris</i> (BESSER) <i>Galium verum</i> L. <i>Hypericum hyssopifolium</i> CHAIX <i>Inula oculus-christi</i> L. <i>Isatis candolleana</i> BOISS.</p>

12.	<i>Calocoris angularis</i> FIEBER, 1864 (continuing)	<i>Juncus effusus</i> L. <i>Knautia involucrata</i> SOMMIER & LEVIER <i>Lepidium campestre</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Onobrychis viciifolia</i> SCOP. <i>Salvia syriaca</i> L. <i>Sanguisorba minor</i> SCOP. <i>Silene alba</i> (MILLER) <i>Stachys annua</i> L. <i>Tanacetum balsamita</i> L. <i>Teucrium orientale</i> L. <i>Trifolium ranonicum</i> L. <i>Vicia cracca</i> L.
13.	<i>Calocoris nebulosus</i> FIEBER, 1864	<i>Ferula orientalis</i> L. <i>Galium verum</i> L.
14.	<i>Calocoris roseomaculatus</i> (DE GEER, 1773)	<i>Achillea filipendulina</i> LAM. <i>Hypericum hyssopifolium</i> CHAIX. <i>Knautia involucrata</i> SOMMIER & LEVIER <i>Vicia cracca</i> L. <i>Centaurea polypodiifolia</i> (BOISS.) <i>Echium italicum</i> L. <i>Medicago sativa</i> L. <i>Verbascum phlomoides</i> L.
15.	<i>Capsus ater</i> (LINNAEUS, 1758)	<i>Achillea biebersteini</i> L. <i>Melilotus officinalis</i> (L.) <i>Papaver rhoeas</i> L. <i>Salvia verticillata</i> L.
16.	<i>Charagochilus gyllenhalii</i> (FALLÉN, 1807)	<i>Galium verum</i> L. <i>Medicago sativa</i> L. <i>Rhinanthus angustifolius</i> C. C. GMEL.
17.	<i>Chlamydatus pullus</i> (REUTER, 1870)	<i>Anchusa leptophylla</i> ROEMER & SCHULTES <i>Astrodaucus orientalis</i> (L.) <i>Carum carui</i> L. <i>Conium maculatum</i> L. <i>Echium vulgare</i> L. <i>Falcaria vulgaris</i> L. <i>Medicago sativa</i> L.
18.	<i>Chlorillus pictus</i> (FIEBER, 1864)	<i>Salvia nemorosa</i> L. <i>Carum carui</i> L.
19.	<i>Closterotomus histrio</i> REUTER, 1877	<i>Falcaria vulgaris</i> Bernh. <i>Marrubium parviflorum</i> FISCH. ET MEY. <i>Medicago sativa</i> L. <i>Salvia verticillata</i> L. <i>Sanguisorba minor</i> (SCOP.)
20.	<i>Closterotomus norvegicus</i> (GMELIN, 1790)	<i>Centaurea polypodiifolia</i>
21.	<i>Creontiades pallidus</i> (RAMBUR, 1839)	<i>Achillea biebersteini</i> AFAN.
22.	<i>Criocoris crassicornis</i> (HAHN, 1834)	<i>Conium maculatum</i> L.
23.	<i>Europiella alpina</i> (REUTER, 1875)	<i>Echium vulgare</i> L. <i>Mentha pulegium</i> L. <i>Salvia aethiopsis</i> L.

24.	<i>Eurycolpus aureolus</i> SEIDENSTUCKER, 1961	<i>Centaurea depressa</i> BIEB.
25.	<i>Euryopicoris nitidus</i> (MEYER-DUR, 1843)	<i>Salvia aethiopsis</i> L. <i>Carum carui</i> L.
26.	<i>Globiceps fulvicollis</i> JAKOVLEV, 1877	<i>Epilobium hirsutum</i> L. <i>Medicago sativa</i> L. <i>Vicia cracca</i> L.
27.	<i>Grypocoris fieberi</i> DOUGLAS & SCOTT, 1868	<i>Vicia cracca</i> L.
28.	<i>Halticus apterus</i> (LINNAEUS, 1758)	<i>Epilobium hirsutum</i> L. <i>Medicago sativa</i> L.
29.	<i>Halticus luteicollis</i> (PANZER, 1804)	<i>Melilotus officinalis</i> (L.)
30.	<i>Horistus orientalis</i> (GMELIN, 1790)	<i>Medicago sativa</i> L.
31.	<i>Leptopterna euxina</i> VINOKUROV, 1982	<i>Achillea millefolium</i> L. <i>Artemisia absinthium</i> L. <i>Artemisia alosin</i> (L.) <i>Campanula rapunculoides</i> L. <i>Cardaria draba</i> (L.) <i>Crepis tectorum</i> L. <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Helichrysum plicatum</i> D.C. <i>Hypericum hyssopifolium</i> CHAIX <i>Knautia involucrata</i> SOMMIER & LEVIER <i>Medicago sativa</i> L. <i>Salvia nemorosa</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Silene alba</i> (MILLER) <i>Sinapis arvensis</i> L. <i>Tanacetum balsamita</i> L.
32.	<i>Leptopterna ferrugata</i> (FALLÉN, 1807)	<i>Helichrysum pallasii</i> (SPRENGEL) <i>Epilobium hirsutum</i> L.
33.	<i>Liocoris tripustulatus</i> (FABRICIUS, 1781)	<i>Falcaria vulgaris</i> L. <i>Medicago sativa</i> L. <i>Mentha longifolia</i> L.
34.	<i>Lygus gemellatus</i> (HERRICH-SCHAEFFER, 1835)	<i>Achillea biebersteini</i> L. <i>A. millefolium</i> L. <i>Amaranthus retroflexus</i> L. <i>Anchusa leptophylla</i> ROEMER&SCHULTES <i>Artemisia alosin</i> (L.) <i>Astragalus penduliflorus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Carum carui</i> L. <i>Caucalis platycarpus</i> L. <i>Centaurea depressa</i> BIEB. <i>C. polypodiifolia</i> (BOISS.) <i>Centranthus longiflorus</i> L. <i>Cichorium intybus</i> L. <i>Convolvulus arvensis</i> L. <i>Conyza canadensis</i> (L.) <i>Crambe orientalis</i> L. <i>Crepis foetida</i> L. <i>C. tectorum</i> L. <i>Epilosum angustifolium</i> L. <i>Euphorbia amygdaloides</i> L.

34.	<i>Lygus gemellatus</i> (HERRICH-SCHAEFFER, 1835)	<p><i>E. virgata</i> WALDST.&KIT. <i>Falcaria vulgaris</i> BERNH. <i>Ferula orientalis</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Onobrychis montana</i> L. <i>Rochelia disperma</i> L. <i>Sanguisorba armena</i> BOISS. <i>Sophora alopecuroides</i> L. <i>Tanacetum balsamita</i> L. <i>Verbascum phlomoides</i> L. <i>V. speciosum</i> SCHRAD. <i>Xeranthemum annuum</i> L.</p>
35.	<i>Lygus pratensis</i> (LINNAEUS, 1758)	<p><i>Cardaria draba</i> (L.) <i>Carum carui</i> L. <i>Cichorium intybus</i> L. <i>Falcaria vulgaris</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Salvia verticillata</i> L. <i>Sinapis arvensis</i> L. <i>Sonchus arvensis</i> L. <i>Vicia cracca</i> L.</p>
36.	<i>Lygus rugulipennis</i> POPPIUS, 1911	<p><i>Achillea biebersteini</i> AFAN. <i>A. millefolium</i> L. <i>Amaranthus retroflexus</i> L. <i>Anchusa leptophylla</i> L. <i>Artemisia alosin</i> (L.) <i>Astragalus penduliflorus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Bupleurum rotundifolium</i> L. <i>Carum carui</i> L. <i>Centranthus longiflorus</i> L. <i>Cichorium intybus</i> L. <i>Consolida orientalis</i> J. GAY. <i>Convolvulus arvensis</i> L. <i>Crepis tectorum</i> L. <i>Daucus carota</i> L. <i>Echium italicum</i> L. <i>E. vulgare</i> L. <i>Epilosum angustifolium</i> L. <i>Euphorbia palustris</i> L. <i>Falcaria vulgaris</i> L. <i>Ferula orientalis</i> L. <i>Isatis candolleana</i> BOISS. <i>Lepidium campestre</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> (L.) <i>Rochelia disperma</i> L. <i>Salvia nemorosa</i> L. <i>S. verticillata</i> L. <i>Sanguisorba armena</i> BOISS. <i>Sinapis arvensis</i> L. <i>Turgenia latifolia</i> (L.)</p>

		<i>Verbascum phlomoides</i> L. <i>V. speciosum</i> SCHRAD. <i>Vicia cracca</i> L. <i>V. sativa</i> L.
37.	<i>Macrotylus herrichi</i> (REUTER, 1873)	<i>Epilosum angustifolium</i> L.
38.	<i>Malacocoris chlorizans</i> (PANZER, 1794)	<i>Melampyrum arvense</i> L.
39.	<i>Megalocoleus molliculus</i> (FALLEN, 1807)	<i>Achillea biebersteini</i> AFAN. <i>A. millefolium</i> L. <i>Conium maculatum</i> L. <i>Echium vulgare</i> L. <i>Gypsophila bicolor</i> (FREYN. ET SINT.) <i>Helichrysum pallasii</i> (SPRENGEL) <i>Inula oculus-christi</i> L. <i>Ranunculus arvensis</i> L. <i>Solanum nemorosa</i> L.
40.	<i>Nanopsallus carduellus</i> (HORVATH, 1888)	<i>Melilotus officinalis</i> (L.)
41.	<i>Notostira elongata</i> (GEOFFROY, 1785)	<i>Arabis caucasica</i> WILLD. <i>Astrodaucus orientalis</i> (L.) <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Helichrysum plicatum</i> D.C. <i>Lepidium campestre</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Sanguisorba minor</i> SCOP. <i>Tanacetum balsamita</i> L. <i>Vicia cracca</i> L.
42.	<i>Notostira erratica</i> (LINNAEUS, 1758)	<i>Achillea millefolium</i> L. <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Medicago sativa</i> L. <i>Onobrychis viciifolia</i> SCOP.
43.	<i>Notostira poppiusi</i> REUTER, 1911	<i>Achillea millefolium</i> L. <i>Arabis caucasica</i> WILLD. <i>Helichrysum plicatum</i> D.C. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Salvia nemorosa</i> L.
44.	<i>Oncotylus (Cylindromelus) setulosus</i> (HERRICH-SCHAEFFER, 1837)	<i>Centaurea virgata</i> LAM. <i>Euphorbia amygdaloides</i> L. <i>Tanacetum balsamita</i> L.
45.	<i>Oncotylus (Oncotylus) punctipes</i> REUTER, 1875	<i>Achillea millefolium</i> L. <i>Anchusa arvensis</i> L. <i>Anthemis tinctoria</i> L. <i>Coronilla varia</i> L. <i>Hypericum hyssopifolium</i> CHAIX. <i>Lepidium campestre</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Onobrychis viciifolia</i> SCOP. <i>Salvia nemorosa</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Silene alba</i> (MILLER) <i>Vicia cracca</i> L.

46.	<i>Oncotylus (Oncotylus) pyrethri</i> (BECKER, 1864)	<i>Achillea millefolium</i> L.
47.	<i>Oncotylus (Oncotylus) viridiflavus</i> (GOEZE, 1778)	<i>Amaranthus retroflexus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Cardaria draba</i> (L.) <i>Centaurea depressa</i> BIEB. <i>C. polypodiifolia</i> (BOISS.) <i>C. solstitialis</i> L. <i>C. virgata</i> LAM. <i>Conyza canadensis</i> (L.) <i>Falcaria vulgaris</i> L. <i>Phlomis pungens</i> WILLD. <i>Salvia verticillata</i> L. <i>Sanguisorba armena</i> BOISS. <i>Tanacetum balsamita</i> L. <i>Xeranthemum annuum</i> L.
48.	<i>Opisthotaenia fulvipes</i> REUTER, 1901	<i>Anchusa leptophylla</i> ROEMER & SCHULTES <i>Astragalus fraxinifolius</i> D.C. <i>Echium italicum</i> L. <i>E. vulgare</i> L. <i>Mentha pulegium</i> L. <i>Papaver rhoeas</i> L. <i>Rhinanthus angustifolius</i> C.C.GMELIN <i>Rochelia disperma</i> L. <i>Teucrium orientale</i> L. <i>Verbascum phlomoides</i> L.
49.	<i>Orthocephalus saltator</i> (HAHN, 1835)	<i>Achillea biebersteini</i> L. <i>Anthemis tinctoria</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Onobrychis vicifolia</i> SCOP.
50.	<i>Orthops (Montanorthops) forelii</i> FIEBER, 1858	<i>Carum carui</i> L. <i>Daucus carota</i> L. <i>Melilotus officinalis</i> (L.)
51.	<i>Orthops (Montanorthops) montanus</i> (SCHILLING, 1838)	<i>Carum carui</i> L.
52.	<i>Orthops (Orthops) basalis</i> (A. COSTA, 1853)	<i>Arenaria gypsophiloides</i> L. <i>Astragalus penduliflorus</i> L. <i>Carum carui</i> L. <i>Caucalis platycarpus</i> L. <i>Falcaria vulgaris</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Salvia verticillata</i> subsp. <i>amasiaca</i> (FREYN & BORNM) <i>Turgenia latifolia</i> (L.)
53.	<i>Orthops (Orthops) frenatus</i> HORVATH, 1894	<i>Falcaria vulgaris</i> L. <i>Rochelia disperma</i> L.
54.	<i>Orthops (Orthops) kalmii</i> (LINNAEUS, 1758)	<i>Amaranthus retroflexus</i> L. <i>Astragalus penduliflorus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Cardaria draba</i> (L.) <i>Carum carui</i> L. <i>Caucalis platycarpus</i> L.

		<p><i>Centaurea depressa</i> BIEB. <i>Centranthus longiflorus</i> L. <i>Cichorium intybus</i> L. <i>Conium maculatum</i> L. <i>Daucus carota</i> L. <i>Epilobium angustifolium</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Ferulago campestris</i> (BESSER) <i>Ferula orientalis</i> L. <i>Galium verum</i> L. <i>Helichrysum pallasii</i> (SPRENGEL) <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Onobrychis montana</i> L. <i>Scabiosa caucasica</i> M. BIEB. <i>Stachys annua</i> L. <i>Turgenia latifolia</i> (L.) <i>Verbascum speciosum</i> SCHRAD. <i>Xeranthemum annuum</i> L.</p>
55.	<i>Orthotylus (Melanotrichus) flavosparsus</i> (C.R. SAHLBERG, 1841)	<p><i>Amaranthus retroflexus</i> L. <i>Astrodaucus orientalis</i> (L.) <i>Epilobium hirsutum</i> L. <i>Falcaria vulgaris</i> L. <i>Ferula orientalis</i> L.</p>
56.	<i>Orthotylus (Orthotylus) marginalis</i> REUTER, 1883	<p><i>Achillea biebersteini</i> AFAN. <i>A. millefolium</i> L. <i>Artemisia absinthium</i> L. <i>Centaurea polyodiifolia</i> (BOISS.) <i>Gypsophila bicolor</i> (FREYN. ET SENT.) <i>Melampyrum arvense</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Turgenia latifolia</i> HOFFM.</p>
57.	<i>Orthotylus (Orthotylus) obscurus</i> REUTER, 1875	<p><i>Hypericum hyssopifolium</i> CHAIX.</p>
58.	<i>Paredrocoris pectoralis</i> REUTER, 1878	<p><i>Achillea biebersteini</i> L. <i>A. millefolium</i> L. <i>Galium verum</i> L. <i>Inula oculus-christi</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> L. <i>Salvia nemorosa</i> L. <i>Tanacetum balsamita</i> L.</p>
59.	<i>Phoenicocoris obscurellus</i> (FALLEN, 1829)	<p><i>Pinus sylvestris</i> L.</p>
60.	<i>Phytocoris (Leptophytocoris) ustulatus</i> HERRICH-SCHAEFFER, 1835	<p><i>Falcaria vulgaris</i> L. <i>Sanguisorba minor</i> L.</p>
61.	<i>Plagiognathus bipunctatus</i> REUTER, 1883	<p><i>Achillea biebersteini</i> L. <i>A. filipendulina</i> LAM. <i>A. millefolium</i> L. <i>Amaranthus retroflexus</i> L. <i>Anchusa leptophylla</i> L. <i>Arabis caucasica</i> WILLD.</p>

61.	<i>Plagiognathus bipunctatus</i> REUTER, 1883 (continuing)	<p> <i>Artemisia alosin</i> (L.) <i>Astragalus fraxinifolius</i> D.C. <i>A. ponticus</i> PALL. <i>Astrodaucus orientalis</i> (L.) <i>Bupleurum rotundifolium</i> L. <i>Campanula glomerata</i> L. <i>C. rapunculoides</i> L. <i>Cardaria draba</i> (L.) <i>Carum carui</i> L. <i>Centaurea depressa</i> BIEB. <i>C. polypodiifolia</i> (BOISS.) <i>Cichorium intybus</i> L. <i>Conium maculatum</i> L. <i>Consolida orientalis</i> J. GAY. <i>Convolvulus arvensis</i> L. <i>Crambe orientalis</i> L. <i>Crepis foetida</i> L. <i>C. tectorum</i> L. <i>Daucus carota</i> L. <i>Echium italicum</i> L. <i>E. vulgare</i> L. <i>Epilobium hirsutum</i> L. <i>Epilosum angustifolium</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Ferula orientalis</i> L. <i>Ferulago campestris</i> (BESSER) <i>Galium verum</i> L. <i>Gypsophila bicolor</i> (FREYN. ET SINT.) <i>Helichrysum pallasii</i> (SPRENGEL) <i>Helichrysum plicatum</i> D.C. <i>Hypericum hyssopifolium</i> CHAIX <i>Inula oculus-christi</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Mentha longifolia typhoides</i> (BRIQ.) <i>Mentha pulegium</i> L. <i>Onobrychis montana</i> L. <i>O. viciifolia</i> Scop. <i>Ranunculus arvensis</i> L. <i>Salvia aethiopsis</i> L. <i>S. nemorosa</i> L. <i>S. verticillata</i> L. <i>Sanguisorba armena</i> BOISS. <i>S. minor</i> (Scop.) <i>Scabiosa caucasica</i> M.BIEB. <i>Senecio vernalis</i> WALDST. & KIT. <i>Silene alba</i> (MILLER) <i>Sinapis arvensis</i> L. <i>Tanacetum balsamita</i> L. <i>Teucrium orientale</i> L. <i>Trifolium ranonicum</i> L. <i>Turgenia latifolia</i> HOFFM.N. <i>Verbascum speciosum</i> SCHRAD. <i>Vicia cracca</i> L. <i>Xeranthemum annuum</i> L. </p>
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62.	<i>Plagiognathus chrysanthemi</i> (WOLFF, 1804)	<i>Achillea millefolium</i> L. <i>Artemisia absinthium</i> (L.) <i>Astragalus fraxinifolius</i> D.C. <i>Campanula glomerata</i> L. <i>C. rapunculoides</i> L. <i>Cardaria draba</i> (L.) <i>Centaurea elaprase</i> L. <i>Cichorium intybus</i> L. <i>Convolvulus arvensis</i> L. <i>Crepis tectorum</i> L. <i>Echium italicum</i> L. <i>E. vulgare</i> L. <i>Epilobium hirsutum</i> L. <i>Epilosum angustifolium</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Helichrysum plicatum</i> D.C. <i>Hypericum hyssopifolium</i> CHAIX. <i>Inula oculus-christi</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Onobrychis montana</i> L. <i>Salvia aethiopsis</i> L. <i>S. nemorosa</i> L. <i>S. verticillata</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Sinapis arvensis</i> L. <i>Solanum tuberosum</i> L. <i>Sonchus arvensis</i> L. <i>Teucrium orientale</i> L. <i>Trifolium ranonicum</i> L. <i>Turgenia latifolia</i> (L.) <i>Verbascum cheiranthifolium</i> BOISS.
63.	<i>Plagiognathus fulvipennis</i> (KIRSCHBAUM, 1856)	<i>Convolvulus arvensis</i> L. <i>Onobrychis montana</i> L.
64.	<i>Polymerus (Poeciloscytus) cognatus</i> (FIEBER, 1858)	<i>Achillea millefolium</i> L. <i>Anchusa leptophylla</i> L. <i>Arabis caucasica</i> WILLD. <i>Caucalis platycarpus</i> L. <i>Centranthus longiflorus</i> L. <i>Falcaria vulgaris</i> L. <i>Lepidium campestre</i> L. <i>Medicago sativa</i> L. <i>Melilotus officinalis</i> (L.) <i>Mentha longifolia</i> L. <i>Rhinanthus angustifolius</i> C. C. GMEL. <i>Rumex sextatus</i> L. <i>Sanguisorba armena</i> BOISS. <i>Sinapis arvensis</i> L. <i>Turgenia latifolia</i> (L.)
65.	<i>Polymerus (Poeciloscytus) microphthalmus</i> WAGNER, 1951	<i>Medicago sativa</i> L.

66.	<i>Polymerus (Poeciloscytus) unifasciatus</i> (FABRICIUS, 1794)	<i>Artemisia absinthium</i> L. <i>Galium verum</i> L. <i>Helichrysum plicatum</i> D.C. <i>Sanguisorba minor</i> (SCOP.)
67.	<i>Polymerus (Poeciloscytus) vulneratus</i> (PANZER, 1806)	<i>Anchusa leptophylla</i> L. <i>Bupleurum rotundifolium</i> L. <i>Centaurea depressa</i> BIEB. <i>Cichorium intybus</i> L. <i>Echium vulgare</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Medicago sativa</i> L. <i>Ranunculus arvensis</i> L. <i>Sinapis arvensis</i> L. <i>Xeranthemum annuum</i> L.
68.	<i>Stenodema (Brachystira) calcarata</i> (FALLEN, 1807)	<i>Artemisia absinthium</i> (L.) <i>Astragalus mukusiensis</i> RECH.FIL. <i>Galium verum</i> L. <i>Hypericum hyssopifolium</i> CHAIX. <i>Ranunculus polyanthemos</i> L. <i>Salvia verticillata amasiaca</i> (FREYN & BORNM)
69.	<i>Stenodema (Brachystira) pilosa</i> (JAKOVLEV, 1889)	<i>Coronilla varia</i> L. <i>Sinapis arvensis</i> L.
70.	<i>Stenodema (Brachystira) trispinosa</i> REUTER, 1904	<i>Hypericum hyssopifolium</i> CHAIX. <i>Sanguisorba minor</i> SCOP. <i>Vicia cracca</i> L.
71.	<i>Stenodema (Stenodema) laevigata</i> (LINNAEUS, 1758)	<i>Achillea millefolium</i> L. <i>Sinapis arvensis</i> L.
72.	<i>Stenodema (Stenodema) turanica</i> REUTER, 1904	<i>Medicago sativa</i> L. <i>Sinapis arvensis</i> L.
73.	<i>Stenodema (Stenodema) virens</i> (LINNAEUS, 1767)	<i>Cardaria draba</i> (L.) <i>Galium verum</i> L. <i>Hypericum hyssopifolium</i> CHAIX. <i>Sinapis arvensis</i> L. <i>Stachys annua</i> L. <i>Vicia cracca</i> L.
74.	<i>Stenotus binotatus</i> (FABRICIUS, 1794)	<i>Campanula rapunculoides</i> L. <i>Cardaria draba</i> (L.) <i>Cichorium intybus</i> L. <i>Crepis tectorum</i> L. <i>Euphorbia amygdaloides</i> L. <i>Falcaria vulgaris</i> L. <i>Galium verum</i> L. <i>Medicago sativa</i> L. <i>Melampyrum arvense</i> L. <i>Sanguisorba minor</i> (SCOP.) <i>Silene alba</i> (MILLER) <i>Sinapis arvensis</i> L. <i>Turgenia latifolia</i> (L.) <i>Vicia cracca</i> L.
75.	<i>Sihenarus roseri</i> (HERRICH-SCHAEFFER, 1838)	<i>Achillea millefolium</i> L.
76.	<i>Strongylocoris leucocephalus</i> (LINNAEUS, 1758)	<i>Campanula rapunculoides</i> L. <i>Hypericum hyssopifolium</i> CHAIX. <i>Medicago sativa</i> L.

77.	<i>Strongylocoris niger</i> (HERRICH-SCHAEFFER, 1835)	<i>Cardaria draba</i> (L.) <i>Carum carui</i> L. <i>Centaurea depressa</i> BIEB. <i>Epilosum angustifolium</i> L. <i>Rochelia disperma</i> L. <i>Sanguisorba minor</i> (SCOP.)
78.	<i>Trigonotylus pulchellus</i> (HAHN, 1834)	<i>Artemisia alosin</i> (L.) <i>Carum carui</i> Linn. <i>Epilobium hirsutum</i> L. <i>Galium verum</i> L. <i>Knautia involucrata</i> SOMMIER & LEVIER. <i>Medicago sativa</i> L. <i>Tanacetum balsamita</i> L. <i>Vicia cracca</i> L.
79.	<i>Trigonotylus ruficornis</i> (GEOFFROY, 1785)	<i>Astrodaucus orientalis</i> (L.)
70.	<i>Trigonotylus tenuis</i> REUTER, 1893	<i>Galium verum</i> L.

Acknowledgments

We would like to thank Dr. Rauno Linnavuori (FIN-21220 Raisio, Saukkokuja 10, FINLAND), Dr. Chérot Frédéric (Service Public de Wallonie, DGO3, DEMNA, Av. Maréchal Juin, 23, BE-5030 Gembloux, BELGIUM) and Prof. Dr. Jacek Gorczyca (Department of Zoology, University of Silesia, Bankowa 9, 40-007 Katowice, POLAND) for the Miridae identification and Prof. Dr. Yusuf Kaya, Atatürk University, Faculty of Science, Department of Biology) and Assoc. Prof. Dr. İrfan Çoruh (Atatürk University, Faculty of Agriculture, Department of Plant Protection) for plant identifications. The study was supported by the Atatürk University Scientific Research Fund (Project Number: 2009/23).

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Druck, Eigentümer, Herausgeber, Verleger und für den Inhalt verantwortlich:
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Jahr/Year: 2017

Band/Volume: [0038](#)

Autor(en)/Author(s): Yazici Gülten, Yildirim Erol

Artikel/Article: [Prefered host plants species by Miridae \(Hemiptera: Heteroptera\) species in Erzurum Province of Turkey 193-212](#)