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## **A faunal study of plant bugs (Hemiptera: Miridae) in Ghorveh and its counties (Kurdistan province, Iran)**

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### **Abstract**

The fauna of plant bugs (Hemiptera: Miridae) was studied in Ghorveh and its counties, Kurdistan province, Iran. A total of 21 plant bugs species belonging to 11 genera, from the subfamilies of Deraeocorinae, Mirinae, and Phylinae were collected from different host plants and identified. Among collected specimens, 5 species were predaceous and 16 species were plant feeder.

Key words: Miridae, Fauna, Ghorveh, Kurdistan, Iran.

### **Zusammenfassung**

Die Fauna der Weichwanzen (Hemiptera: Miridae) von Ghorveh und dessen Umland in der iranischen Provinz Kurdistan wird dargestellt. 21 Arten aus 11 Gattungen der Unterfamilien Deraeocorinae, Mirinae und Phylinae konnten nachgewiesen werden, aufgeteilt auf 5 Räuber und 16 Pflanzensauger.

## Introduction

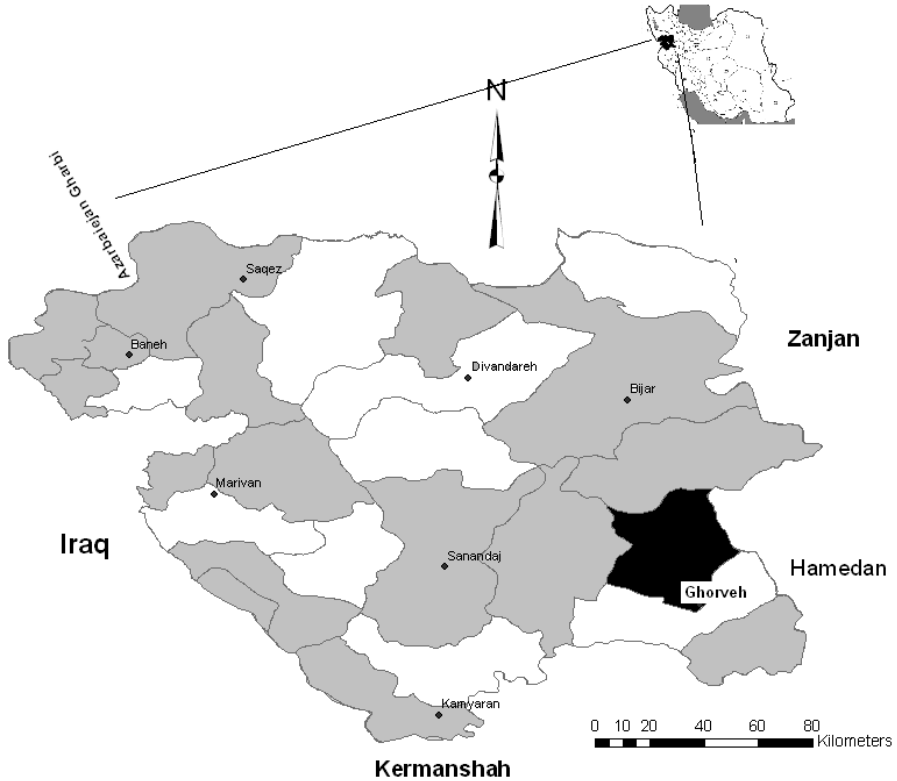
Plant bugs which belong to the Miridae family are the biggest family of Hemiptera that have about 1.200 genera and more than 10.000 species. The body length of these insects varies between 2-15 mm (SCHUH & SLATER 1995). All the plant bugs in the Miridae family can be categorized under eight subfamilies including: Bryocorinae, Cylapinae, Deraeocorinae, Mirinae, Isometopinae, Phylinae, Psallopinae and Orthothylidae. The members of the Miridae family can be distinguished from the other families by distinct obvious Cuneus in the front wings and also lack of Ocelli (except in the Isometopinae subfamily) (ROSS et al. 1982, WHEELER 2001). Their antenna and beak have usually four segments. Some of the family members are Brachypterus and in some, sexual dimorphism can be seen. The species of this family appear in nature on different kinds of host plants from spring to fall. The existing species of this family have a wide range of hosts including those which are plant feeder or predaceous (SLATER & BARANOWSKI 1978). Many of plant feeders in this family like *Lygus* HAHN and *Adelphocoris* REUTER can directly damage the generative organs of plants, shoots and fruits by feeding from plants sap and also indirectly damage them by potentially transferring plant pathogens. Species in *Deraeocoris* KIRSCHBAUM genus are predaceous and by feeding on some pests such as aphids can decrease the population of them. Some of predaceous species in this family have also been used for biological control of pests. Using of *Macrolophus caliginosus* (ALOMAR et al. 2006) and *Nesidiocoris tenuis* (PERDIKIS et al. 2009) to control whiteflies in greenhouse and fields are some examples of successful biologic control in this family.

The plant bugs fauna of Iran has poorly been studied. There are number of publications on Iranian plant bugs in different regions (HOSSEINI 1997; LINNAVUORI & HOSSEINI 1998, 1999, 2000; HOSSEINI et al. 2001, 2003; YARMAND et al. 2004; LINNAVUORI 2006, 2007, 2009; MIRAB BALOO 2008, ARKANI 2009). Because of the importance of mirid bugs in different concepts of biology, faunal study of them is essential and need to be elucidated. In the current study, 21 plant bugs species including 5 predaceous and 16 plant feeder species are reported from Ghorveh, Kurdistan province, Iran. The information on distribution and host plants for each Mirid bug species is also provided.

## Some Information about Kurdistan Province and City of Ghorveh

Kurdistan province covers an area of 28.235 km<sup>2</sup> which encompasses 1.7% of Iran. It is the 16<sup>th</sup> province among provinces of Iran. It is located in the west of Iran between the latitude 34°44'00"N to 36°30'00"N and the longitude 45°31'00" to E48°16'00" E. This province is bounded by West Azerbaijan and Zanjan provinces on the north, the province of Kermanshah on its south, Zanjan and Hamadan provinces on the east and Iraq on the west (Fig. 1). It is a mountainous region located mostly on Zagros Mountains and therefore has special features in the terms of geographical and climate. Topographically, Kurdistan province has different kinds of topology including high mountains, deep valleys, mountainside, flat plains and flat and low lands (THE GENERAL BUREAU FOR TEXTBOOKS PRINTING AND DISTRIBUTION 2011).

Ghorveh is one of the cities in Kurdistan province that is located in the eastern part of Sanandaj (capital city of Kurdistan). It is restricted from the north to Bijar, the west to the suburb of Sanandaj, the east to Kabodrahang (Hamadan Province) and the south-southwest to Asadabad (Hamadan Province) and Songhor (Kermanshah Province). It is located between the longitude 47°14'00"E and 35°23'00"N in a large plain of 4.349 km<sup>2</sup>. Its altitude is 1.900 meters. Based on Meteorological data, Ghorveh has a cold and dry climate with long cold and freezing winters with little rainfall and snowfall (THE GENERAL BUREAU FOR TEXTBOOKS PRINTING AND DISTRIBUTION 2011)



**Fig. 1:** Map of Kurdistan province, its adjacent provinces and position in Iran. Black area shows the position of Ghorveh among other cities of Kurdistan.

## Materials and Methods

In order to study the fauna of plant bugs in Ghorveh of the Kurdistan province, the specimens were collected from different locations during 2009-2010. Collection of the Mirid bugs was done randomly from gardens and fields on different host plants. Collecting of plant bugs was performed via an ordinary insect net (45cm diameter and 75cm length) or a bush net, by sweeping on vegetations in different habitats or beating the trees' branches inside the bush net. Collected specimens were transferred into the small containers containing 70 % alcohol. From the males, genitalia were separated and mounted on slides by using Canada balsam as the permanent mounting medium. The identified insects were deposited at Insects collection of Department of Entomology, College of Agriculture, Islamic Azad University, Arak Branch (Arak, Iran) and Natural Museum of Guilan University (Rasht, Iran).

## Results

### Collected predators

#### Subfamily: *D e r a e o c o r i n a e*

##### *Deraeocoris lutescens* (SCHILLING 1837)

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Khandan abad, 2345 m, N =35° 04' 21" , E=47° 47' 10" , 21.ix.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holomediterranean (LINNAVUORI 2007) Europe, North Africa and Asia (AUKEMA & RIEGER 1999).

##### *Deraeocoris punctulatus* (FALLEN 1807)

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Vihaj, 2250 m, N = 35° 04' 53" , E = 47° 44' 21" , 22.iiiv. 2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Sangin Abad, 2140 m, N = 35° 08' 03" , E = 47° 51' 13" , 22.iiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Toghan Miham, 1947 m, N = 35° 04' 43" , E = 47° 53' 44" , 24.iiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Miham Olia, 2174 m, N = 35° 02' 28" , E = 47° 50' 05" , 24.iiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Khandan abad, 2345 m, N =35° 04' 21" , E = 47° 47' 10" , 29.iiiv.2009, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Shahabdin, 2051 m, N = 34° 59' 26" , E = 47° 60' 31" , 4. ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Shahabdin, 2053 m, N = 34° 60' 32" , E = 47° 60' 33" , 4. ix.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Ghorveh: 1900 m, N = 35° 14' 38" , E = 47° 50' 28" , 5. ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Mejin, 1979 m, N = 35° 10' 41" , E = 47° 56' 31" , 8. ix. 2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Sangin Abad, 2139 m, N = 35° 07' 06" , E = 47° 55' 14" , 11. ix.2009, ex: *Vicia* sp. (Leguminosae), (A. Ebrahimi); Kako, 2050 m, N = 35° 03' 43" , E = 47° 26' 16" , 9.iv.2010, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Dashkasan, 1893 m, N = 35° 10' 16" , E = 48° 04' 59" , 12.iv.2010, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Kazem Abad, 1840 m, N = 35° 14' 10" , E = 47° 32' 59" , 1.iiv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Avangan, 1908 m, N = 35° 11' 55" , E = 47° 41' 26" , 13.iiv.2010, ex: *Chenopodium album* (Chenopodiaceae), (A. Ebrahimi); Kharila, 1973 m, N = 35° 11' 24" , E = 47° 55' 49" , 20.iiv.2010, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Kharila, 1971 m, N = 35° 13' 26" , E = 47° 58' 50" , 20.iiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Delbaran, 1949 m, N = 35° 12' 60" , E = 47° 57' 52" , 27.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Sarabghaht, 1801 m, N = 35° 09' 20" , E = 47° 53' 49" , 1.iiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Dyvezand, 1980 m, N = 35° 10' 18" , E = 47° 53' 10" , 9.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Haji Abad, 1820 m, N = 35° 24' 60" , E = 47° 44' 51" , 23.iiiv.2010, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Serich Abad, 1969 m, N = 35° 15' 23" , E = 47° 47' 25" , 1.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Shanevare, 1942 m, N = 35° 10' 06" , E = 47° 40' 56" , 12.ix.2010, ex: *C. album* (Chenopodiaceae), (A. Ebrahimi); Shikhjafar, 1890 m, N = 35° 13' 04" , E = 47° 52' 47" , 21.ix.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holarctic (LINNAVUORI 2009), Europe, North Africa and Asia (AUKEMA & RIEGER 1999).

### ***Deraeocoris serenus* (DOUGLAS & SCOTT)**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Ghasem Abad, 1818 m, N = 35° 09' 20", E = 47° 53' 49", 10.ix.2009, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Balvane Motamadi, 2042 m, N = 35° 08' 49", E = 47° 35' 16", 21.ix.2009, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 40", E = 47° 50' 30", 12.iv.2010, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 38", E = 47° 50' 28", 12.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Khoshke marud, 1843 m, N = 35° 19' 43", E = 47° 38' 12", 12.iiiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Shikh taghe, 1910 m, N = 35° 16' 07", E = 47° 40' 12", 13.iiiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holomediterranean, extending to Central Europe and Central Asia (LINNAUVUORI 2009), Europe, North Africa and Asia (AUKEMA & REIGER 1999).

### ***Deraeocoris pallens* (REUTER 1904)**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Vei haj, 2250 m, N = 35° 04' 53", E = 47° 44' 21", 23.iiiiv.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Toghan miham, 1947 m, N = 35° 04' 43", E = 47° 53' 44", 24.iiiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Zivieh, 1972 m, N = 35° 13' 14", E = 47° 48' 23", 26.iiiiv.2009, ex: Leguminosae, (A. Ebrahimi); Mozafar Abad, 1990 m, N = 35° 13' 23", E = 47° 46' 39", 3.iv.2009, ex: *Echinochloa crusgalli* (Graminae), (A. Ebrahimi); Ghasem Abad, 1818 m, N = 35° 09' 20", E = 47° 53' 49", 10.ix.2009, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Ngin Abad, 2140 m, N = 35° 08' 03", E = 47° 51' 13", 11.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Dashkasan, 1893 m, N = 35° 10' 16", E = 48° 04' 59", 12.ix.2009, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Kangare, 2031.2 m, N = 35° 07' 39", E = 47° 32' 23", 16.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Gharebolaghe Panje, 2390 m, N = 35° 07' 27", E = 47° 28' 04", 16.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ahmad Abad pange, 2040 m, N = 35° 08' 45", E = 47° 30' 18", 16.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Amin Abad, 1963 m, N = 35° 12' 55", E = 47° 50' 46", 20.ix.2009, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Zale job, 1920 m, N = 35° 03' 30", E = 47° 54' 20", 25.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Miham sofla, 1941 m, N = 35° 03' 31", E = 47° 53' 56", 25.ix.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Gharme khani, 1884 m, N = 35° 02' 25", E = 47° 55' 48", 25.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Kameshgaran, 1909 m, N = 35° 16' 11", E = 47° 34' 19", 29.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Kameshgaran, 1908 m, N = 35° 17' 13", E = 47° 35' 20", 29.ix.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Orieh, 2069 m, N = 35° 07' 33", E = 47° 43' 25", ex: meadows, (A. Ebrahimi); Selseleh, 1932 m, N = 35° 08' 30", E = 47° 27' 13", 31.x.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Laleie, 1935 m, N = 35° 11' 39", E = 47° 48' 56", 3.x.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Sartip Abad, 2143 m, N = 35° 06' 16", E = 47° 46' 48", 5.iv.2010, ex: *Cyperus* sp. (Cyperaceae), (A. Ebrahimi); Kako, 2050 m, N = 35° 03' 43", E = 47° 26' 16", 9.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Chagher Bolaq, 2048 m, N = 35° 03' 58", E = 47° 27' 07", 9.iv.2010, ex: meadows, (A. Ebrahimi); Delbaran, 1949 m, N = 35° 12' 60", E = 47° 57' 52", 15.iv.2010, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Ghezal jakand, 1896 m, N = 35° 19' 23", E = 47° 58' 10", 15.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Maloje, 1907 m, N = 35° 18' 04", E = 47° 57' 60", 15.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Pirbabali, 2030 m, N = 35° 07' 23", E = 47° 38' 16", 25. iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Narenjak, 1849 m, N = 35° 06' 51", E = 48° 29' 08", 2.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Dosar, 1831 m, N = 35° 06' 04", E

= 48° 01' 50", 2.ii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Asef Abad, 2249 m, N = 35° 04' 51", E = 47° 45' 22", *Sycemberium* sp. (Crusifera), (A. Ebrahimi); Avangan, 1908 m, N = 35° 11' 55", E = 47° 41' 26", 12.ix.2010, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Ghale, 1904 m, N = 35° 15' 45", E = 47° 51' 34", 18.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghalelan, 2399 m, N = 35° 06' 08", E = 47° 37' 36", 22.ix.2010, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Porbishe, 2030.2 m, N = 35° 06' 19", E = 47° 36' 55", 23.ix.2010, ex: *O. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Italy, Afghanistan, Turkey (Asian part), Iran, Iraq, Israel and Syria (AUKEMA & RIEGER 1999).

### ***Deraeocoris pilipes* (REUTER 1879)**

**Material examined:** Iran, Kurdistan, Ghorveh: Toghan Miham, 1947 m, N = 35° 04' 43", E = 47° 53' 44", 24.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Miham Olia, 2174 m, N = 35° 02' 28", E = 47° 50' 05", 24.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Miham sofla, 1941 m, N = 35° 03' 31", E = 47° 53' 56", 30.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Gharme khani, 1884 m, N = 35° 02' 25", E = 47° 55' 48", 30.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Zale job, 1920 m, N = 35° 03' 30", E = 47° 54' 20", 25.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Vali Abad, 2490 m, N = 35° 03' 30", E = 47° 49' 10", 18.iv.2010, *Cyperus* sp. (Cyperaceae), (A. Ebrahimi); Zalejob, 1920 m, N = 35° 03' 30", E = 47° 54' 20", 6.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Afghanistan, Turkey (Asian part), China, Iran, Kirgizia, Tadzhikistan, Turkmenistan, Uzbekistan (AUKEMA & RIEGER 1999), Irano-Turanian (LINNAVUORI 2007).

## **Collected plant feeders**

### **Subfamily: M i r i n a e**

#### ***Stenodema calcarata* (FALLEN 1807)**

**Material examined:** Iran, Kurdistan, Ghorveh: Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iii.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Zivieh, 1972 m, N = 35° 13' 14", E = 47° 48' 23", 16.iv.2010, ex: *Echinochloa crusgalli* (Graminae), Serish Abad, 1969 m, N = 35° 15' 23", E = 47° 47' 25", 11.iii.2010, ex: *Glycyrrhiza glabra* (Leguminosae), (A. Ebrahimi).

**Distribution:** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa (AUKEMA & RIEGER 1999).

#### ***Stenodema laevigatum* (LINNAEUS 1758)**

**Material examined:** Iran, Kurdistan, Ghorveh: Veihaj, 2250 m, N = 35° 04' 53", E = 47° 44' 21", 10.iv.2010, ex: *Triticum sativum* (Graminae), (A. Ebrahimi); Veihaj, 2251 m, N = 35° 06' 55", E = 47° 45' 23", 10.iv.2010, ex: *Cynodon dactylon* (Graminae), (A. Ebrahimi); Zivieh, 1972 m, N = 35° 13' 14", E = 47° 48' 23", 16.iv.2010, ex: *Hordeum vulgare* (Graminae), (A. Ebrahimi); Shanevareh, 1942 m, N = 35° 10' 06", E = 47° 40' 56", 19.iv.2010, ex: *Triticum sativum* (Graminae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 40", E = 47° 50' 30", 1.iv.2010, ex: *Triticum sativum* (Graminae), (A. Ebrahimi).

**Distribution:** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa (AUKEMA & RIEGER 1999).

***Stenodema turanicum* REUTER 1904**

**Material examined:** Iran, Kurdistan, Ghorveh: Veihaj, 2250 m, N = 35° 04' 53", E = 47° 44' 21", 10.iv.2010, ex: *Triticum sativum* (Graminae), (A. Ebrahimi); Shahabdin, 2051 m, N = 34° 59' 26", E = 47° 60' 31", 14.iiv.2010, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Dashkasan, 1893 m, N = 35° 10' 16", E = 48° 04' 59", 18.iiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Chomoghlo, 1832 m, N = 35° 14' 19", E = 47° 36' 41", 20.iiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Europe, Asia (AUKEMA & RIEGER 1999), Irano-Turanian (LINNAVUORI 2009).

***Notostira popiusi* REUTER 1911**

**Material examined:** Iran, Kurdistan, Ghorveh: Asef Abad, 2249 m, 35° 04' 51", E = 47° 45' 22", 10.iv.2010, ex: *Cynodon dactylon* (Graminae), (A. Ebrahimi); Zivieh, 1972 m, N = 35° 13' 14", E = 47° 48' 23", 16.iv.2010, ex: *Cyperus* sp. (Cypraceae), (A. Ebrahimi).

**Distribution:** Irano-Turanian (LINNAVUORI 2009), Asia (AUKEMA & RIEGER 1999).

***Trigonotylus pulchellus* (HAHN 1834)**

**Material examined:** Iran, Kurdistan, Ghorveh: Ghasem Abad, 1818 m, N = 35° 09' 20", E = 47° 53' 49", 21.iv.2010, ex: *Pisum sativum* (Leguminosae), (A. Ebrahimi); Sangin Abad, 2140 m, N = 35° 08' 03", E = 47° 51' 13", 16.iiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** West-Palaeartic (LINNAVUORI 2007), Europe, Asia, North Africa (AUKEMA & RIEGER 1999).

***Polymerus cognatus* (FIEBER 1858)**

**Material examined:** Iran, Kurdistan, Ghorveh: Miham sofla, 1941 m, N = 35° 03' 31", E = 47° 53' 56", 29.iiiv.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Pirbabali, 2030 m, N = 35° 07' 23", E = 47° 38' 16", 25.iv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghasem Abad, 1818 m, N = 35° 09' 20", E = 47° 53' 49", 21.iv.2010, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Khoshke marud, 1843 m, N = 35° 19' 43", E = 47° 38' 12", 12.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Shikh taghe, 1910 m, N = 35° 16' 07", E = 47° 40' 12", 13.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa and North America (AUKEMA & RIEGER 1999).

***Polymerus vulneratus* (PANZER 1805)**

**Material examined:** Iran, Kurdistan, Ghorveh: Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iiiv.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Pirbabali, 2030 m, N = 35° 07' 23", E = 47° 38' 16", 25.ix.2009, ex: *M. sativa*

(Leguminosae), (A. Ebrahimi); Kako, 2050 m, N = 35° 03' 43", E = 47° 26' 16", 9.iv.2010, ex: *Avena fatua* (Graminae), (A. Ebrahimi); Shikh taghe, 1910 m, N = 35° 16' 07", E = 47° 40' 12", 13.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Chomoghlo, 1832 m, N = 35° 14' 19", E = 47° 36' 41", 20.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Kameshgaran, 1909 m, N = 35° 16' 11", E = 47° 34' 19", 22.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Asgar Abad zarin, 2030 m, N = 35° 18' 54", E = 47° 51' 15", 11.iii.2010, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Alahiari, 2020 m, N = 35° 19' 40", E = 47° 51' 39", 11.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Serich Abad, 1969 m, N = 35° 15' 23", E = 47° 47' 25", 11.iii.2010, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa and North America (AUKEMA & RIEGER 1999).

### ***Orthops* sp. aff *campestris* (LINNAEUS 1758)**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Shikh taghe, 1910 m, N = 35° 16' 07", E = 47° 40' 12", 13.iii.2010, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Porbishe, 2030.2 m, N = 35° 06' 19", E = 47° 36' 55", 14.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** West-Palaeartic (LINNAVUORI 2007), Asia and North Africa (AUKEMA & RIEGER 1999).

### ***Lygus gemellats* (HERRICH-SCHAEFFER 1835)**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Veihaj, 2250 m, N = 35° 04' 53", E = 47° 44' 21", 23.iii.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Toghyan miham, 1947 m, N = 35° 04' 43", E = 47° 53' 44", 24.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Amin Abad, 2299 m, N = 35° 05' 06", E = 47° 46' 59", 26.iii.2009, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi); Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iii.2009, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Shadi Abad, 2302 m, N = 35° 30' 14", E = 47° 29' 33", 7.ix.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Abdol Abad, 2300 m, N = 35° 28' 31", E = 47° 46' 07", 7.ix.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Shokoh Abad, 1818.2 m, N = 35° 48' 39", E = 47° 39' 29", 26.ix.2009, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Galali, 1972 m, N = 34° 59' 21", E = 47° 54' 36", 30.ix.2009, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Shirvaneh, 2068 m, N = 34° 58' 54", E = 47° 52' 40", 30.ix.2009, ex: *Pisum sativum* (Leguminosae), (A. Ebrahimi); Shoja Abad, 1945 m, N = 35° 17' 07", E = 47° 34' 41", 6.iv.2010, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Yalghozaghaj, 1840 m, N = 35° 17' 11", E = 47° 36' 10", 6.iv.2010, ex: *Turaenialati folia* (Leguminosae), (A. Ebrahimi); Hasan khan, 1743 m, N = 35° 26' 09", E = 47° 41' 18", 14.ii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Vali Abad, 2490 m, N = 35° 03' 30", E = 47° 49' 10", ex: *T. folia* (Leguminosae), (A. Ebrahimi); Zalejob, 1920 m, N = 35° 03' 30", E = 47° 54' 20", 6.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Gilaklo, 1820.1 m, N = 35° 27' 01", E = 47° 43' 19", 11.iii.2010, ex: Leguminosae, (A. Ebrahimi); Porbishe, 2030.2 m, N = 35° 06' 19", E = 47° 36' 55", 14.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Avangan, 1908 m, N = 35° 11' 55", E = 47° 41' 26", 12.ix.2010, ex: *S. tuberosum* (Solanaceae), (A. Ebrahimi); Avangan, 1906 m, N = 35° 13' 60", E = 47° 45' 28", 12.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa, North India, Nepal, Pakistan (AUKEMA & RIEGER 1999).



***Lygus pratensis* (LINNAEUS 1758)**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Toghan miham, 1947 m, N = 35° 04' 43", E = 47° 53' 44", 24.iiiv.2009, ex: *Triflium* sp. (Leguminosae), (A. Ebrahimi); Amin Abad, 2299 m, N = 35° 05' 06", E = 47° 46' 59", 26.iiiv.2009, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Yalghozaghaj, 1840 m, N = 35° 17' 11", E = 47° 36' 10", 6.iv.2010, ex: *Dacus carota* (Umbeliferae), (A. Ebrahimi); Yalghozaghaj, 1840 m, N = 35° 17' 11", E = 47° 36' 10", 6.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Amin Abad, 2299 m, N = 35° 05' 06", E = 47° 46' 59", 7.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Maloje, 1907 m, N = 35° 18' 04", E = 47° 57' 60", 15.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Ghezal jakand, 1896 m, N = 35° 19' 23", E = 47° 58' 10", 15.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Hasan khan, 1743 m, N = 35° 26' 09", E = 47° 41' 18", 14.iiiv.2010, ex: *Pisum sativum* (Leguminosae), (A. Ebrahimi); Serich Abad, 1969 m, N = 35° 15' 23", E = 47° 47' 25", 1.ix.2010, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Ghaslan, 1969 m, N = 35° 15' 23", E = 47° 47' 25", 11.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Yalghozaghaj, 1840 m, N = 35° 17' 11", E = 47° 36' 10", 12.iiiv.2010, ex: *Dacus carota* (Umbeliferae), (A. Ebrahimi); Fakhr Abad, 1842 m, N = 35° 20' 32", E = 47° 36' 17", 13.iiiv.2010, ex: *Chenopodium album* (Chenopodiaceae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 38", E = 47° 50' 28", 18.ix.2010, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Ganji, 1828 m, N = 35° 13' 04", E = 47° 36' 33", 29.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Gilaklo, 1820.1 m, N = 35° 27' 01", E = 47° 43' 19", 31.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holopalaeartic (LINNAVUORI 2007), Europe, Asia, North Africa, India (AUKEMA & RIEGER 1999).

***Lygus ruglipennis* POPPIUS 1911**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Amin Abad- Ghaslan, 2299 m, N = 35° 05' 06", E = 47° 46' 59", 26.iiiv.2009, ex: *Triflium* sp. (Leguminosae), (A. Ebrahimi); Vinesar, 2042 m, N = 35° 01' 17", E = 48° 04' 23", 27.iiiv.2009, ex: *Solanum tuberosum* (Solanaceae), (A. Ebrahimi); Gandab-bala, 1990 m, N = 35° 01' 47", E = 48° 04' 36", 30.iiiv.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Narenjak, 1849 m, N = 35° 06' 51", E = 48° 29' 08", 30.iiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Asef Abad, 2249 m, N = 35° 04' 51", E = 47° 45' 22", 31.iiiv.2009, ex: *Pirus malus* (Rosaceae), (A. Ebrahimi); Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iiiv.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Abdol Abad, 2300 m, N = 35° 28' 31", E = 47° 46' 07", 7.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Selseleh, 1932 m, N = 35° 08' 30", E = 47° 27' 13", 3.x.2009, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Lalei, 1935 m, N = 35° 11' 39", E = 47° 48' 56", 3.x.2009, ex: *Pirus malus* (Rosaceae), (A. Ebrahimi); Sartip Abad, 2143 m, N = 35° 06' 16", E = 47° 46' 48", 5.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghezal jakand, 1896 m, N = 35° 19' 23", E = 47° 58' 10", 15.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Pirbali, 2030 m, N = 35° 07' 23", E = 47° 38' 16", 25. iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Kazem Abad, 1840 m, N = 35° 14' 10", E = 47° 32' 59", 1.iiiv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Kazem Abad, 1840 m, N = 35° 14' 10", E = 47° 32' 59", 1.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Dosar, 1831 m, N = 35° 06' 04", E = 48° 01' 50", 2.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Kharila, 1973 m, N = 35° 11' 24", E = 47° 55' 49", 20.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Haji Abad, 1820 m, N = 35° 24' 60", E = 47° 44' 51", 27.iiiv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Shikh Jafar, 1890 m, N = 35° 13' 04", E = 47° 52' 47", 1.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Avangan, 1908 m, N = 35° 11' 55",

E = 47° 41' 26", 12.ix.2010, ex: *S. tuberosum* (Solanaceae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 38", E = 47° 50' 28", 18.ix.2010, ex: *S. tuberosum* (Solanaceae), (A. Ebrahimi).

**Distribution:** Holopalaeartic (LINNAUORI 2007), Europe, Asia, North America (AUKEMA & RIEGER 1999).

### ***Eurystylus bellevoeyi* (REUTER 1879)**

**Material examined:** Iran, Kurdistan, Ghorveh: Garne khani, 1884 m, N = 35° 02' 25", E = 47° 55' 48", 30.iii.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Eremian with a wide distributional range in the Holomediterranean and Sudanese subregions (LINNAUORI 2009), Europe, Asia, Afrotropical regions and Oriental (AUKEMA & RIEGER 1999).

### ***Adelphocoris lineolatus* (GOEZE 1778)**

**Material examined:** Iran, Kurdistan, Ghorveh: Miham Olia, 2174 m, N = 35° 02' 28", E = 47° 50' 05", 24.iii.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Miham sofla, 1941 m, N = 35° 03' 31", E = 47° 53' 56", 30.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Taz abad Orieh, 2244 m, N = 35° 05' 18", E = 47° 41' 26", 31.iii.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 38", E = 47° 50' 28", 5.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Kangare, 2031.2, N = 35° 07' 39", E = 47° 32' 23", 16.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghaslan, 1969 m, N = 35° 14' 45", E = 47° 49' 23", 20.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Balvane motamadi, 2042 m, N = 35° 08' 49", E = 47° 35' 16", 21.ix.2009, ex: *Onobrychis sativa* (Leguminosae), (A. Ebrahimi); Shirvaneh, 2068 m, N = 34° 58' 54", E = 47° 52' 40", 30.ix.2009, ex: *O. sativa* (Leguminosae), (A. Ebrahimi); Galali, 1972 m, N = 34° 59' 21", E = 47° 54' 36", 30.ix.2009, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Ghorveh, 1900 m, N = 35° 14' 38", E = 47° 50' 28", 18.ix.2009, ex: *Triflium* sp. (Leguminosae), (A. Ebrahimi); Delbaran, 1949 m, N = 35° 12' 60", E = 47° 57' 52", 15.iv.2010, ex: *S. tuberosum* (Solanaceae), (A. Ebrahimi); Vali Abad, 18.iv.2010, ex: *Chenopodium album* (Chenopodiaceae), (A. Ebrahimi); Pirbabali, 2030 m, N = 35° 07' 23", E = 47° 38' 16", 25.iv.2010, ex: *T. sp.* (Leguminosae), (A. Ebrahimi); Shadi Abad, 2302 m, N = 35° 30' 14", E = 47° 29' 33", 4.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Serich Abad, 1969 m, N = 35° 15' 23", E = 47° 47' 25", ex: *Dacus carota* (Umbeliferae), (A. Ebrahimi); Asgar Abad zarin, 2030 m, N = 35° 18' 54", E = 47° 51' 15", 11.iii.2010, ex: *Triflium* sp. (Leguminosae), (A. Ebrahimi); Shikh Jafar, 1890 m, N = 35° 13' 04", E = 47° 52' 47", 1.ix.2010, ex: *Juglans* sp. (Juglandaceae), (A. Ebrahimi); Sangin Abad, 2140 m, N = 35° 08' 03", E = 47° 51' 13", 18.ix.2010, ex: *Pirus malus* (Rosaceae), (A. Ebrahimi); Porbishe, 2030.2 m, N = 35° 06' 19", E = 47° 36' 55", 14.ix.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**Distribution:** Holopalaeartic (LINNAUORI 2007), Europe, Asia, North Africa, Pakistan, Kashmir and North America (AUKEMA & RIEGER 1999).

## Subfamily: P h y l i n a e

### ***Campylomma diversicornis* REUTER 1878**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Vinsar, 2042 m, N = 35° 01' 17", E = 48° 04' 23", 27.iii.2009, ex: *Helianthus annuus* (Compositae), (A. Ebrahimi); Shanevare, 1942 m, N = 35° 10' 06", E = 47° 40' 56", 8.ix.2009, ex: *H. annuus* (Compositae), (A. Ebrahimi); Kamal Abad-Shahabye, 1908 m, N = 35° 15' 36", E = 47° 38' 30", 8.ix.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Sartip Abad, 2143 m, N = 35° 06' 16", E = 47° 46' 48", 5.iv.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi); Sangin Abad, 2140 m, N = 35° 08' 03", E = 47° 51' 13", 16.iv.2010, ex: *Cucurbita maxima* (Cucurbitaceae), (A. Ebrahimi); Asgar Abad zarin, 2030 m, N = 35° 18' 54", E = 47° 51' 15", 11.iii.2010, ex: *Trifolium* sp. (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Irano-Turanian (LINNAVUORI 2007), Europe, Asia, North Africa, Pakistan, (AUKEMA & RIEGER 1999).

### ***Campylomma verbasci* (MEYER-DUER) 1843**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Toghan miham, 1947 m, N = 35° 04' 43", E = 47° 53' 44", 24.iii.2009, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi); Shanevare, 1942 m, N = 35° 10' 06", E = 47° 40' 56", 8.ix.2009, ex: *Helianthus annuus* (Compositae), (A. Ebrahimi); Karim abad-Alivardi, 1840 m, N = 35° 22' 07", E = 47° 36' 55", 13.iii.2010, ex: *M. sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** Holarctic (LINNAVUORI 2007), Europe, Asia, North Africa and North America (AUKEMA & RIEGER 1999).

### ***Oncotylus setulosus* (HERRICH-SCHAEFFER) 1839**

**M a t e r i a l e x a m i n e d :** Iran, Kurdistan, Ghorveh: Kazem Abad, 1840 m, N = 35° 14' 10", E = 47° 32' 59", 1.iv.2010, ex: *Medicago sativa* (Leguminosae), (A. Ebrahimi).

**D i s t r i b u t i o n :** North Africa (LINNAVUORI 2007), Europe and Asia (AUKEMA & RIEGER 1999).

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## Buchbesprechungen

MARTIN K. & C. ALLGAIER: **Ökologie der Biozönosen**. Springer-Verlag, Berlin-Heidelberg, 2011. 370 S.

Zehn Jahre nach Erscheinen der ersten Auflage hat sich einiges – weltweit – in der Zusammensetzung und Dynamik von Biozönosen verändert. Zahlreiche neue Arten sind eingewandert (nicht nur durch klimatische Bedingungen bzw. Veränderungen) und haben sich etabliert. Wesentliche Veränderungen ergaben sich in den letzten Jahren auch im Verständnis der direkten und indirekten Abwehrmechanismen bei Pflanzen. So wurden die entsprechenden Kapitel umfassend neu gestaltet und auf den aktuellen Stand des Wissens gebracht.

Prädation, Konkurrenz und Mutualismus bestimmen die vielfältigen Wechselbeziehungen zwischen Pflanzen, Tieren und Mikroorganismen in ihren Lebensräumen. Zahlreiche Fallbeispiele zeigen dem Leser konkrete Situationen auf, die im Zusammenleben der Arten auftreten. Nach einer kurzen Einführung werden Phytophagie, Wechselbeziehungen zwischen Pflanzen und Phytophagen, Prädation, Interspezifische Konkurrenz, Mutualismus, Intraspezifische Interaktionen, die Struktur von Biozönosen, Interaktionen in Biozönosen und die Kontrolle der trophischen Ebenen behandelt. Grundlagen und jüngste Forschungsergebnisse werden unter Verwendung vieler Fallbeispiele und etlicher Zeichnungen bzw. Grafiken erläutert.

Eine kompakte, verständliche und aktuelle Übersicht zu dieser Thematik für Studierende und Lehrende.

R. Gerstmeier

LADLE R.J. & R.J. WHITTAKER (eds): **Conservation Biogeography**. – Wiley-Blackwell, Chichester, 2011. 301 S.

Biogeographie und Naturschutz stehen heute mehr denn je unter dem - dramatisch zunehmenden - Einfluss von Einwanderungs- und Aussterbeprozessen, klimatischen Veränderungen, invasiven Pflanzen- und Tierarten sowie der weiterhin kritischen Fragmentierung von Ökosystemen und Habitaten.

Das Ziel dieses Buches lässt sich am besten anhand des Originalzitates aus dem Vorwort beschreiben: "Our aim in this book is therefore to expand the scope and agenda of conservation biogeography, to identify critical gaps and weaknesses, and to provide an introduction to the toolbox of concepts and methods - and thereby to produce a broad-based text for university courses and programmes." Dieser Ansatz ist absolut gelungen; die Herausgeber und Autoren legen hier ein modernes Standardwerk zur "Conservation Biogeography" vor, welches alle Aspekte informativ und hochaktuell durchleuchtet, ohne historisches Wissen und Basisgrundlagen zu unterschlagen. Wesentliche Kapitel sind "Social values and conservation biogeography", "Baselines, patterns and process", "Basic biogeography: estimating biodiversity and mapping nature", "The shaping of the global protected area estate", "Systematic conservation planning", "Planning for persistence in a changing world", "Applied island biogeography", "Biological invasions" sowie "Prospects and challenges".

Eine gut durchdachte, sehr empfehlenswerte Darstellung, die sich gut in einem Master-Studiengang einbauen lässt.

R. Gerstmeier



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