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## **On the tribe Dicyphini (Hemiptera: Heteroptera: Miridae: Bryocorinae) in Guilan province and adjacent area (Iran)**

**Reza HOSSEINI**

### **Abstract**

This paper is continuing of a series of synoptic taxonomic treatments on the Miridae known from Guilan province, Iran. In the tribe Dicyphini (Bryocorinae) four genera are known from Guilan province including *Campyloneuropsis*, *Dicyphus*, *Macrolophus* and *Nesidiocoris*. Among them an extensive study has been done before on the genus *Dicyphus*. Hence, in this paper we provide diagnoses, host-plant information, distribution data, and illustrated keys to three other genera (5 species). For most species, illustrations of the adults, selected morphological characters are provided to facilitate identification.

### **Zusammenfassung**

Diese Arbeit setzt die Serie übersichtlicher taxonomischer Bearbeitungen der Miriden, die aus der Provinz Guilan (Iran) bekannt sind, fort. Vom Tribus Dicyphini (Bryocorinae) sind aus der Provinz Guilan vier Genera bekannt, eingeschlossen *Campyloneuropsis*, *Dicyphus*, *Macrolophus* und *Nesidiocoris*. Vorher wurde eine umfangreiche Studie über die Gattung *Dicyphus* durchgeführt. In dieser Arbeit werden Diagnosen, Informationen betreffend Wirtspflanzen, Verbreitungsdaten und illustrierte Schlüssel von drei weiteren Gattungen (5 Arten) gegeben. Für die meisten Arten sind Illustrationen adulter Tiere, sowie ausgewählte, morphologische Merkmale, die die Bestimmung erleichtern angefügt.

## Introduction

Plant bugs of Miridae (Hemiptera: Heteroptera) are one of the most species rich families of insects, with approximately 11020 described species. This family comprising eight subfamilies Isometopinae, Psallopinae, Cylapinae, Orthotylinae, Bryocorinae, Deraeocorinae, Mirinae, and Phylinae, which among them Bryocorinae subfamily is a heterogeneous subfamily with three tribes (CASSIS & SCHUH 2012). Species in this subfamily are either harmful or beneficial. The harmful bugs are those that suck the plant sap and injure the plant or damage the reproductive organ such as *Distantiella theobroma* (DISTANT) and *Pycnoderes quadrimaculatus* (GUÉRIN-MÉNEVILLE) (WHEELER 2001). In contrast some species are effective predators useful in biological control programs which *Macrolophus melanotoma* COSTA as an example is commercially available biocontrol agent (ENKEGAARD et al. 2001; ALOMAR et al. 2003). In the tribe Dicyphini four genera are known from Guilan province including *Campyloneuropsis*, *Dicyphus*, *Macrolophus* and *Nesidiocoris*. Among them an extensive study has been done before on the genus *Dicyphus* (LINNAVUORI & HOSSEINI 1999). This work is continuing of a series of synoptic taxonomic treatments on the Miridae known from Guilan province, Iran. In this paper following information including diagnoses, host-plant information, distribution data, and illustrated keys to three other genera (5 species) are provided. For most species, illustrations of selected morphological characters are provided to facilitate identification.

## Materials and methods

### Collection of specimens

The beating stick and bush net (50 cm diameter) was used for collecting mirids on branches of trees and by sweeping on vegetation the bugs felt on the net were quickly picked off by an aspirator. Collected specimens were killed promptly in a small tube contains Ethyl acetate. Specimens after transferring to the laboratory were mounted on rectangular cards using water resolvable glue. Identification was done by relevant taxonomic keys (WAGNER 1974, WAGNER & WEBER 1964). Identified species were confirmed by Heteroptera specialist Dr. R.E. Linnavuori (Finland). All species are kept in the insect collection of the Natural Museum of University of Guilan.

## Results and Discussion

### Key to the genera of Bryocorinae found in Guilan province

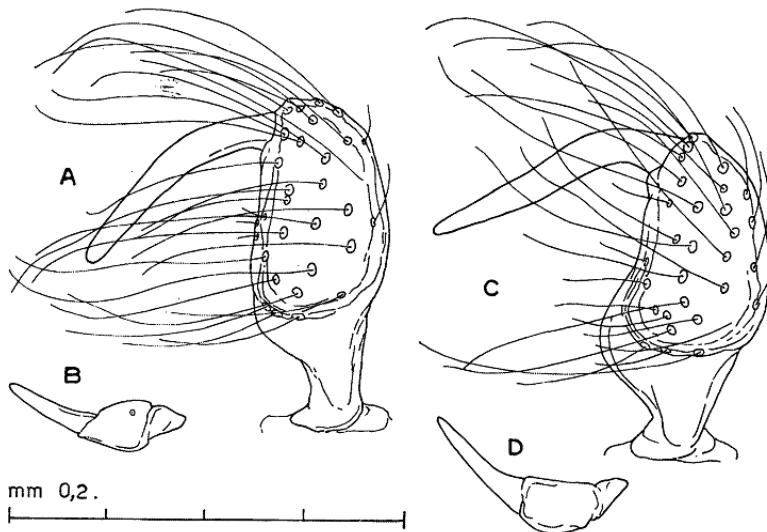
- 1 Calli on the pronotum very distinct, behind them a deep transverse furrow. The rostrum reaches to the hind legs ..... *Dicyphus*  
 1' Calli on the pronotum indistinct, slightly convex ..... 2

- 2 The head appears pentagonal. Parallel sides of the head behind the eyes usually with black macula and first antennal segment usually black..... *Macrolophus*
- 2' Head oval. Not as above. Basis of tibia dark..... 3
- 3 Sides of head converging behind the eyes and without the black macula. The rostrum reaches to the middle legs ..... 3'
- 3' On the edge of the lower genital opening of genital segment of males there is a long forked-like appendage (Fig.4 A). Left paramers are very slim ..... *Nesidiocoris*
- 4' Genital opening of male genital segment not as above (Fig. 4 B), Left paramers short and thick ..... *Campyloneuropsis*

**Genus *Macrolophus* FIEBER 1858**

Species in the genus *Macrolophus* are small and slender. Head pentagonal. The distance between the eye and the front edge of the pronotum about as long as the width of the eye from lateral view. Sides behind eyes almost parallel. Calluses of pronotum indistinct. Always macropterous species. *Macrolophus* constitute a group of eight species in Palaearctic region (KERZHNER & JOSIFOV 1999). Compare to other genera of Bryocorinae: Dicyphini, *Macrolophus* has very simple morphology and characters. The lack of discontinuous morphological characters makes them difficult to identify. The paramers of the male genitalia that is valuable and commonly used character for species identification in Hemiptera, are similar among the different *Macrolophus* species (JOSIFOV 1992) and could not be considered as a valid identification factor (e.g. Fig.1 shows paramers in *M. melanotoma* and *M. pygmaeus* where it was believed that it could be a valuable taxonomic character! (TAMANINI 1981)).

This issue lends itself to the use of molecular data for differentiating this difficult taxonomic species. PERDIKIS et al. (2003) made a first attempt to differentiate *M. melanotoma* and *M. pygmaeus* using restriction fragment length polymorphism (RFLP) and restriction amplified polymorphic DNA-Polymerase chain reaction (RAPD-PCR) and MARTINEZ-CASCALES et al. (2006) used the morphology and the sequence variation of mtDNA of these two species for their identification. They concluded that the shape of the black macula behind the eye may be used as a diagnostic character to differentiate *M. melanotoma* from *M. pygmaeus* with some degree of confidence.



**Fig. 1:** Left (A,C) and right (B,D) parameres in *M. melanotoma* (A,B) and *M. pygmaeus* (C,D) (After TAMANINI 1981).

**Key to the species of *Macrolophus* species**

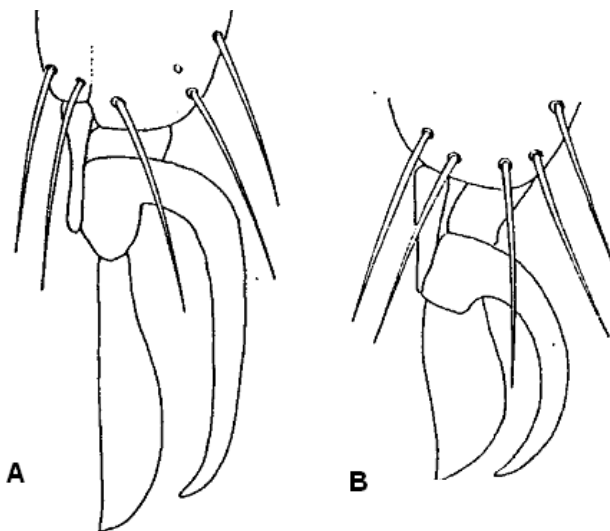
- 1 Behind the eyes has no macula ..... *M. epilobii*
- 1' Behind the eyes has macula ..... 2
- 2 The macula behind the eyes usually broad and with the margins parallel and less well-Defined..... *M. pygmaeus*
- 2' The macula narrow or broad and most of the times the margins are convergent .....  
..... *M. melanotoma*

***Macrolophus epilobii* V. G. PUTSHKOV 1978**

**Material examined:** Guilan: Deylaman (36°53'05" N, 49°54'26" E, elev. 141 m), 20.VII.1996, 16.viii.1998; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 29.-30.vii.2003; Tutkabor–Rudbar (36°53'30" N, 49°31'43" E, elev. 181 m), 29.v.-28.vi.1995.

**Diagnosis:** Body Size 3.35 (♂)-3.8mm (♀). Ocular index: 3-3.2 (♂) and 3.6-4.2 (♀). Shape of claws differs from two other species (Fig. 2). Black marking on head and scutellum has not been seen in this species (Fig. 3 A).

**Comments:** On *Epilobium hirsutum*. Known from Armenia, Azerbaijan and the Khorasan province in Iran (KERZHNER & JOSIFOV 1999, LINNAVUORI 2007).



**Fig. 2:** Pretarsal claw. (A) *M. epilobii* and (B) *M. melanotoma* (after HEISS & RIBES 1998).

***Macrolophus pygmaeus* (RAMBUR 1839)**

**Material examined:** Guilan province: Darreh Dasht (36°48'10" N, 49°38'24" E, elev. 1144 m), 27.v.-20.vi.1995, 25.-28.viii.1998; Dasht-e-Veel (36°50'48" N, 49°35'32" E, 293 m), 25.-26.viii.1998, 8.-9.x.2000, 6.vi.-29.vii.2002; Jirandeh (36°42'00" N, 49°47'28" E, 1343 m), 21.-23.ix.2000; Manjil (36°44'25" N, 49°24'03" E, 302 m), 16.v.-14.vi.1995, 8.-10.v.2001; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 29.-30.vii.2000, 25.-26.vi.2004; Rasht, iv.-vi.1995, vi.-viii.1996; Rudbar-Tutkabon (36°53'30" N, 49°31'43" E, elev. 181 m), 10.-12.v.2000; Rustam Abad-Salan Sar (36°54'36" N, 49°26'20" E, elev. 741 m), 10.ix.2000, 6.-9.v.2001; Sang Rud (36°39'59" N, 49°42'06" E, 1338 m), 30.vi.-1.vii.2003. Ardabil province: Ghareh Ghashlagh (39°19'30" N, 47°55'39" E, elev. 320 m), 27.-28.iii.1904; Ganjgah (37°42'26" N, 48°16'06" E, 1271 m), 9.-10.viii.2002; near Khalkhal (37°37'57" N, 48°30'33" E, elev. 1765 m), 9.-11.viii.1998; 25 km E of Givi (37°41'08" N, 48°23'02" E, 1479 m), 7.-9.vii.2002.

**Diagnosis:** Body size 3.37(♂)-3.51 mm (♀). Ocular index: 2-2.3 (♂) and 2.5-2.7 (♀). *Macrolophus pygmaeus* could be distinguished from *M. melanotoma* by the dorsal longitudinal dark stripe behind each eye being usually broad, and having upper and lower edges almost always parallel, fuzzy and not well-defined or sharply in focus. First antennal segment usually completely black (rarely paler in middle) (Fig. 3 B).

**Comments:** In this research it was collected on Cucumber plant. In meadows on herbs such as *Stachys*. JOSIFOV (1974) has reported it on *Geranium* sp. and *Saponaria* sp. West-Palaeartic. This species has been reported from Mazandaran province (Hasan Abad, 15.-16.vii.2002), Zanjan province (Abbar, 12.-14.v.2001; Gilankesh 15 km NW of Gilvan, 26.-27.vi.2004; 8-15 km W of Gilvan, 31.vii.-1.viii.2004; Mamalan, 29.ix.-1.x.2000, 4.-6.vi.2002; Mamalan-Abbar, 20.-21.vii.2002; Zanjan, 13.-14.vii.2004), Tehran province (Asara, 13.vii.2002; Evin, 14.-18.vii.1995; Shahrestanak, 10.-12.vii.1995), Alborz province (5 km N of Karaj, 13.-14.vii.2002; Kordan, 14.vii.2002) by LINNAVUORI (2007).

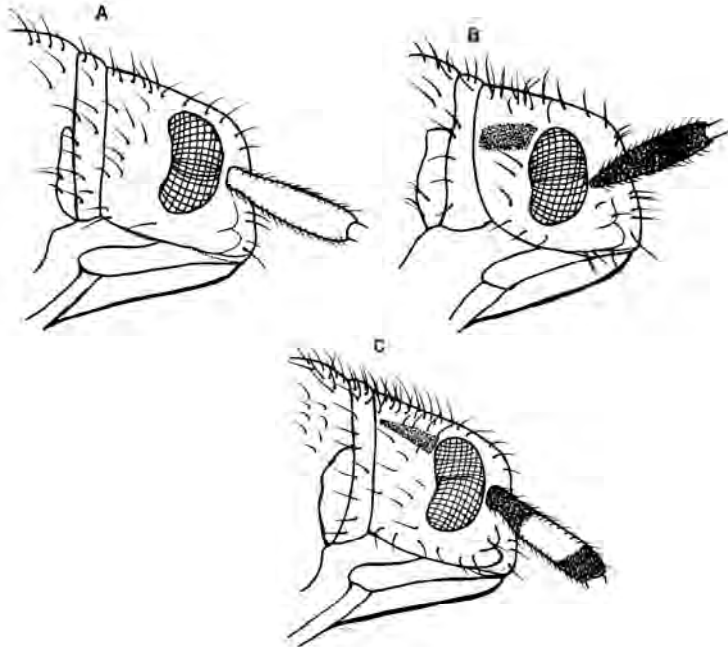
***Macrolophus melanotoma* (A. COSTA 1853)**

**M a t e r i a l e x a m i n e d :** Guilan: Dasht-e-Veel (36°50'48" N, 49°35'32" E, 293 m), 20.-25.viii.1998; Lowshan (36°38'09" N, 49°29'26" E, 323 m), 18.-20.viii.2002; Manjil (36°44'25" N, 49°24'03" E, 302 m), 30.x.-1.ix.2000; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 29.-30.vii.2003, 24.-26.vi.2004; Rustam Abad (36°53'47" N, 49°30'28" E, 164 m), 13.v.1995, 23.viii.1998, 6.-8.v.2001; Tutkabon-Rudbar (36°53'30" N, 49°31'43" E, elev. 181 m) 6.-8.vi.2002.

**D i a g n o s i s :** Body size 3.36 (♂)- 3.86 mm (♀). Ocular index (3.1-3.5 (♂) and 3.7-3.8 (♀)) The dark stripe behind the eye has the upper and lower edges well-defined and sharply in focus, and almost always converging from anterior to posterior. First antennal segment with variable coloration including whole segment black, base and apex of segment black and pale in the middle, base of segment back and the rest pale (Fig. 3 C).

**C o m m e n t s :** This species was being known as *Macrolophus caliginosus* WAGNER (1951) but CARAPEZZA (1995) by designing a Lectotype made *M. caliginosus* as a synonym of *M. melanotoma*. This species can be found on undergrowth in deciduous forests. Holomediterranean. This species has been reported from Zanjan province (Gilankesh 10 km NW of Gilvan, 26.-27.vi.2004; Mamalan-Abbhar, 20.-21.vii.2002) and Alborz province (Karaj, 12.-13.vii.2002) by LINNAVUORI (2007).

**Note:** *Campyloneuropsis* and *Nesidiocoris* that were considered as subgenus of the genus *Cyrtopeltis*, based on new taxonomical modification, have been removed from it as two separate genera.



**Fig. 3:** Head in *Macrolophus epilobii* (A), *Macrolophus pygmaeus* (B), *Macrolophus melanotoma* (C).

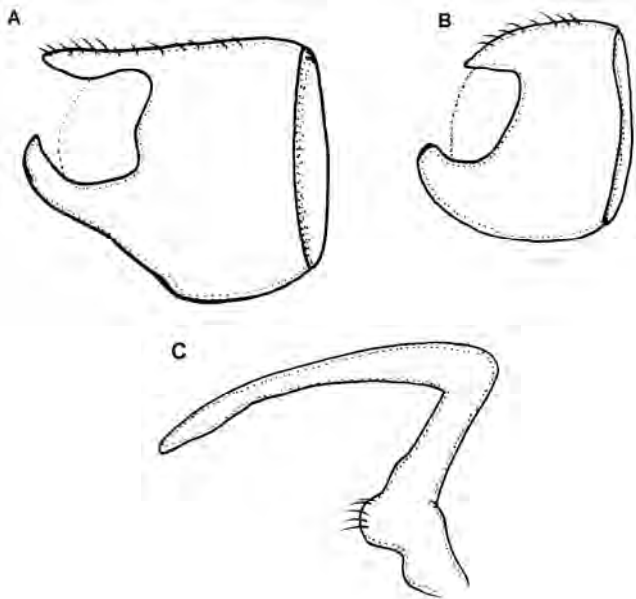
***Nesidiocoris tenuis* (REUTER 1898)**

**Material examined:** Guilan province: Asalem forest (37°41'09" N, 48°49'21" E, 428 m), 13.-15.ix.1997; Anzali (37°27'44" N, 49°28'16" E, -28 m), 30.viii.-1.ix.1998; Dasht-e-Veel (36°50'48" N, 49°35'32" E, 293 m), 8.-9.ix.2000; Jirandeh (36°42'00" N, 49°47'28" E, 1343 m), 21.-23.ix.2000; Lowshan (36°38'09" N, 49°29'26" E, 323 m), 18.-20.viii.2002; Manjil (36°44'25" N, 49°24'03" E, 302 m), 15.-17.ix.2000; Rustam Abad-Salan Sar (36°54'36" N, 49°26'20" E, elev. 741 m), 8.-10.ix.2000; Sang Rud (36°39'59" N, 49°42'06" E, 1338 m), 19.-20.viii.2000. Ardabil province: Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 9.-11.viii.2002.

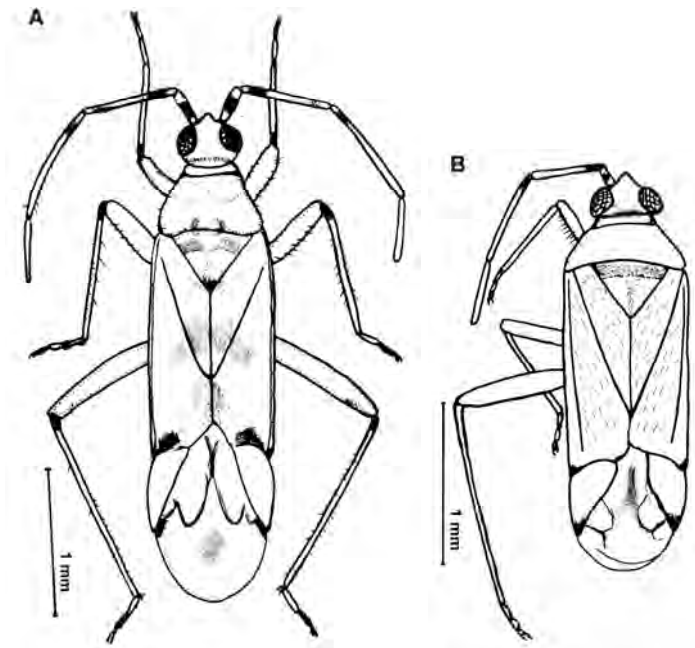
**Diagnosis:** Body size 3-3.3 mm. Pale whitish green. Ocular index: 1.3-1.5. Left Paramer very slender, strongly curved sickle-shaped (Fig. 4c). Middle of the first and base of the second segment of antenna black. Apex of the 2nd antennal segment with dark ring, 3rd and 4th segment brown. At the rear edge of the corium and the tip of the cuneus each a small dark brown spot. Membrane gray, veins brown. Base of the tibia (knee) narrowly black (Fig. 5A).

**Comments:** The species lives in many herbs (Solanaceae) and is often harmful to crops. On plants such as Asteraceae, Cucurbitaceae (SCHUH 2008). Palaetropical. Reported from Mediterranean to North Africa, Japan, Australia, Pacific Islands, North America, Cuba and Venezuela (KERZHNER & JOSIFOV 1999).

This species has been reported from Zanjan province (Jilan Keshe, 9.-13.x.2000; Mamalan-Abbhar, 29.ix.-1.x.2000, 20.-21.vii.2002) and Alborz province (Kordan, 14.vii.2002) by LINNAVUORI (2007).



**Fig. 4:** Genital segment in *Nesidiocoris tenuis* (A) and *Campyloneuropsis pygmaea* (B), Left paramer in *Nesidiocoris tenuis* (C).



**Fig. 5:** *Nesidiocoris tenuis* (A), *Campyloneuropsis pygmaea* (B).

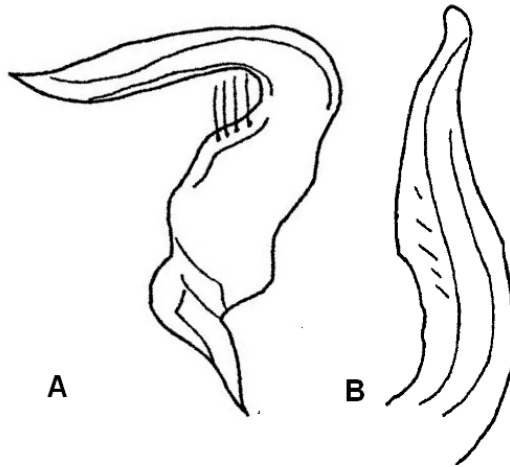
***Campyloneuropsis pygmaea* (WAGNER 1956)**

**Material examined:** Guilan province: Dasht-e-Veel (36°53'47" N, 49°30'28" E, 164 m), 20.-25.vii.1998.

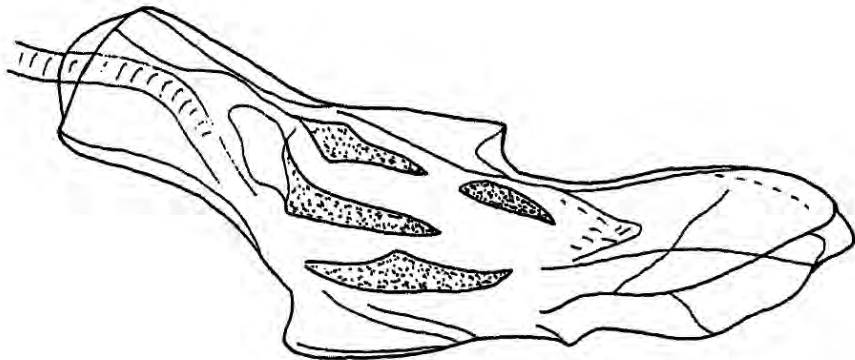
**Diagnosis:** Body size: 2.0-2.75 mm (♂), 2.75-3.2 mm (♀) (Fig. 5B) Shape of left paramer: hypophysis always long, blade-like (Fig. 6A-B). Structure of vesica: always with four spicula (Fig. 7).

**Comments:** In gardens, e.g. on *Hyoscyamus* sp. and *Trichodesma africanum*. Eremian, known from Egypt, Israel, Syria, Iraq, Iran, Saudi Arabia, Yemen, and Sudan (LINNAVUORI 1995). This species has been reported from Zanzibar province (Abbhar, 29.ix.-9.x.2000) by LINNAVUORI (2007).





**Fig. 6:** *Campyloneuropsis pygmaea* (WAGNER), (A) Left paramer (B) Hypophysis of left paramer (after LINNAVUORI 1995).



**Fig. 7:** *Campyloneuropsis pygmaea* (WAGNER), Aedeagus with four specula (after LINNAVUORI 1995).

### Acknowledgment

I wish to thank Dr. Rauno E. Linnavuori (Finland) for confirmation of the identified species.

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Author's address:

Reza HOSSEINI

Department of Plant Protection, College of Agricultural Sciences,  
University of Guilan, Rasht, Iran

E-mail: Rhosseini@guilan.ac.ir, R\_hosseini@yahoo.com

### Buchbesprechung

LOVITCH D.: **How to Be a Better Birder**. – Princeton University Press, Princeton, 2012.  
192 S.

Wenn sich jemand als Twitcher ein neues Hobby aufbauen möchte, dann ist dieses Buch von Derek Lovitch (Hochschul-Spitzname "Vogelmann") genau das Richtige. Denn die leidenschaftlichen, in blumige und amüsante Plaudereien verpackten Botschaften dieses hervorragenden Feldornithologen sind einfach: Vogelarten sammeln macht Spass (8 Kapitel), und, zum exzellenten "birder" wird man nur durch "ganzheitliche", sorgfältig protokollierte Vogelstudien und Übung, Übung, Übung! Ganzheitlich bedeutet dabei: Achte nicht nur auf Bestimmungsmerkmale und Proportionen von Vögeln, sondern setze alles in Beziehung zum Lebensraum bzw. zu den Art-Verbreitungsarealen in den verschiedenen Jahreszeiten und, vor allem, beobachte die Vögel. Nur dann wirst du lernen, Suchkulissen für Arten zu entwickeln, sie sozusagen zu "riechen" und typische Erscheinungs- und Verhaltensmuster zu verinnerlichen. Ganz wichtig ist dies vor allem bei den "kleinen grünbraungrauen Jobs" wie diversen amerikanischen Ammern oder Tyrannen. Erst wenn man in der Lage ist, in den Sekundenbruchteilen, die man dafür Zeit hast, nervöse Arten in dichtbelaubten Baumkronen, aus hohem Gras aufgeschreckte Kleinvögel oder auf Autofahrten im Augenwinkel erscheinende Greifvögel zu bestimmen, ist man ein "Better Birder".

Und das macht dann Twitchen, einer sich dem Artensammeln verschriebenen Sportart, bei der jede neu entdeckte Art einen Kick auslöst, zu einem echten Genuss. Die Stärke dieses Kicks hängt dabei von der Seltenheit der Art und von der Schwierigkeit der Bestimmung ab und ist besonders stark bei Irrgästen oder "mega-rarities, kurz megas genannt". Gut sind auch Bastarde oder kurz vor der Aufspaltung stehende Arten (hier vorausschauend Unterformen protokollieren, sonst hat man schnell ein Erfolgserlebnis weniger).

Wie man nun zu möglichst vielen dieser Kicks kommt, dazu leitet dieses Buch in perfekter Weise an. Am einfachsten ist natürlich die Teilnahme an geführten "rarity roundups" oder "bird races" mit versierten Ornithologen (wer in 24 h die meisten Vogelarten hat ist Sieger), aber mehr hat man von persönlichen Strategien, weil man dann nur mit Freunden zur richtigen Zeit am richtigen Ort seine Erlebnisse teilen kann und eventuell sogar unbekannte "Arten-hotspots" entdeckt. Empfohlen wird auch das Anlegen vieler Bezugslisten, von der Lebens-, Landes-, Einzelgebiets-, Hausgarten- oder Jahreszeitenliste bis hin zur Liste der bei der Kopulation beobachteten Arten, da hier

selbst Allerweltsarten den Sammler-Kick auslösen können. Wichtig ist zudem eine Orientierung am Wettergeschehen und an geografischen Gegebenheiten. Im Nordosten Amerikas z.B. sind die Erfolgsaussichten frühmorgens nach Schlechtwetter und Sturm an Küstenspornen oder in Zeiten intensiven Vogelzuges besonders gut, wobei letzterer über frei im Netz zugängliche Radarbilder verfolgt werden kann (mit detaillierter Anleitung!).

Das Buch ist reich bebildert, zum Teil mit sehr guten Vogelaufnahmen (wichtig zur Dokumentation von Seltenheiten!). In die verschiedenen Kapitel eingearbeitet ist neben bekannten amerikanischen Beobachtungsorten (ohne Detailkarten) auch das Gros der amerikanischen Bestimmungsliteratur (nicht nur zu Vögeln; man kann auch Baumarten sammeln) bzw. die im Netz verfügbaren Informationen (Birder-Plattformen, Vogelschutz-, Vogelforschungsorganisationen). Ein Kapitel befasst sich zudem mit "zweckgebundenem" Artensammeln in Monitor- oder Atlasprogrammen.

H. Utschick

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Maximilian SCHWARZ, Konsulent f. Wissenschaft der Oberösterreichischen Landesregierung, Eibenweg 6, A-4052 Ansfelden, E-Mail: maximilian.schwarz@liwest.at.

Redaktion: Erich DILLER, ZSM, Münchhausenstraße 21, D-81247 München;  
Roland GERSTMEIER, Lehrstuhl f. Tierökologie, H.-C.-v.-Carlowitz-Pl. 2, D-85350 Freising  
Fritz GUSENLEITNER, Lungitzerstr. 51, A-4222 St. Georgen/Gusen;  
Wolfgang SPEIDEL, MWM, Tengstraße 33, D-80796 München;  
Thomas WITT, Tengstraße 33, D-80796 München.

Adresse: Entomofauna, Redaktion und Schriftentausch c/o Museum Witt, Tengstr. 33, 80796 München, Deutschland, E-Mail: thomas@witt-thomas.com; Entomofauna, Redaktion c/o Fritz Gusenleitner, Lungitzerstr. 51, 4222 St. Georgen/Gusen, Austria, E-Mail: f.gusenleitner@landesmuseum.at

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