

ZooNotes

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ISSN 1313-9916

2013 (37-50)

# ZooNotes



Университетско издателство "Паисий Хилендарски"  
Plovdiv University Press "Paisii Hilendarski"



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Plovdiv University Press “Paisii Hilendarski”

ZooNotes 2013 (includes ZooNotes 37 – 50)  
www.zoonotes.bio.uni-plovdiv.bg  
ISSN 1313-9916

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ZooNotes is peer-reviewed, open access, electronic journal in which scientific reports are quickly published by Bulgarian researchers or papers of foreign authors concerning the Bulgarian fauna. The papers are in the fields of taxonomy, faunistics, zoogeography and animal ecology. Bibliographies, check-lists and catalogs could also be published as Supplements.

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Plovdiv University Press “Paisii Hilendarski”

## СЪДЪРЖАНИЕ / Contents

Dilian GEORGIEV

First record of *Grossuana angelsekovi* Glöer & Georgiev, 2009 (Gastropoda: Risooidea) from Greece

..... **37: 1-4**

Venelin BESCHOVSKI

*Dolichopus* species (Diptera: Dolichopodidae) in the Entomological Collection of the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences

..... **38: 1-4**

Nedko NEDYALKOV

New records of some rare rodents (Mammalia: Rodentia) from South-East Bulgaria

..... **39: 1-4**

Venelin BESCHOVSKI

Additions and corrections to the species list of the Bulgarian Chloropinae (Diptera: Chloropidae)

..... **40: 1-4**

Lyuben DOMOZETSKI

New localities of Eastern Montpellier Snake – *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) from Southwestern Bulgaria

..... **41: 1-4**

Dilian GEORGIEV

Diet of the Stone marten (*Martes foina* Erxl.) in two large cities of the Upper Thracian Lowland, South Bulgaria

..... **42: 1-4**

Dilian GEORGIEV

Localities of valvatiform hydrobiids (Gastropoda: Hydrobiidae) in Bulgaria

..... **43: 1-4**

Hristo VALCHOVSKI

Contribution to the knowledge for distribution of *Criodrilus lacuum* (Annelida: Oligochaeta: Criodrilidae) from Bulgaria

..... **44: 1-3**

Yana PETROVA, Denis GRADINAROV New data on the distribution of <i>Hoplia stenolepis</i> (Scarabaeoidea: Melolonthidae) in Bulgaria .....	<b>45: 1-4</b>
Dilian GEORGIEV, Slaveya STOYCHEVA First records of <i>Cecilioides tumulorum</i> (Gastropoda: Ferussaciidae) in Bulgaria .....	<b>46: 1-6</b>
Liuben DOMOZETSKI Contribution to the butterfly species of Belasitsa Mountain (SW Bulgaria) and second record of <i>Gonepteryx cleopatra</i> (Linnaeus, 1767) from Bulgaria .....	<b>47: 1-5</b>
Dilian GEORGIEV, Peter GLÖER A record of <i>Viviparus syriacus</i> (Gastropoda: Viviparidae) in Turkey .....	<b>48: 1-3</b>
Milan DJURIĆ, Boženka HRIC On distribution area of <i>Asovia maoticaria</i> (Alphéraky, 1876) (Insecta, Lepidoptera, Geometridae) .....	<b>49: 1-2</b>
Atanas IRIKOV, Georgi GERDZHIKOV Mollusca (terrestrial and marine Gastropods et Bivalvia) from Morocco .....	<b>50: 1-5</b>

## First record of *Grossuana angeltsekovi* Glöer & Georgiev, 2009 (Gastropoda: Risooidea) from Greece

DILIAN GEORGIEV

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**Abstract.** In this paper it is reported the first finding of a representative of the genus *Grossuana* from the Greek Rhodopes Mts. – *Grossuana angeltsekovi* Glöer & Georgiev, 2009 which is and the first record of the species for this country. The locality is a karstic spring, Rodopi county, Papikio Oros, near Vronti (= 4 km N of Kerasia) (445 m a.s.l.). The material is stored in the Hungarian Natural History Museum, Budapest.

**Key words:** Balkans, Rhodopes, Hydrobiidae, malacofauna, springs.

### Introduction

The species richness of the Risooidea in Greece is one of the most diverse in Europe (Bank 2006) and very often new species and even genera are described from this country (Falniowski & Szarowska 2011, Szarowska & Falniowski 2011a). At the same time the spring localities of these minute freshwater snails are found to be disturbed and most of the Greek species seem to be endangered (Szarowska & Falniowski 2011b). According this fact every information on the Risooidea of Greece is of great importance for the species conservation.

The genus *Grossuana* Radoman, 1973 consists of species inhabiting springs and streams of the East Balkan Peninsula. There are 3 species known from Greece: *G. haesitans* (Westerlund, 1881) from the spring of the Louros River, *G. vurliana* Radoman, 1966 from Kamena Vurla spring near the road Larissa-Athens, and *G. delphica* (Radoman, 1973) from the spring Kastalia at Delphi (Radoman 1983, Szarowska *et al.* 2007). No any *Grossuana* or even a species of freshwater mollusc is known from the Greek part of the Rhodopes Mt (Bank 2006).

In this paper it is reported the first finding of a representative of the genus *Grossuana* from the Greek Rhodopes Mts. – *Grossuana angeltsekovi* Glöer & Georgiev, 2009 which is and the first record of the species for this country.

### Material and methods

The materials (preserved in 70% ethanol) were provided by the Hungarian Natural History Museum (HNHM), Budapest with the co-operation of Dr Zoltan Fehér. The drawings of the shell and the female genitalia were made by Marco Bodon and were kindly provided to the author for use.

The dissections and measurements were carried out by means of CETI stereo microscope and an eye-piece micrometer, and photographs were made with camera system with a digital adapter. The material is stored in the Hungarian Natural History Museum (HNHM), Budapest.

Abbreviations used: H - Shell height, W - shell width, AH - aperture height, AW = aperture width.

## Results and Discussion

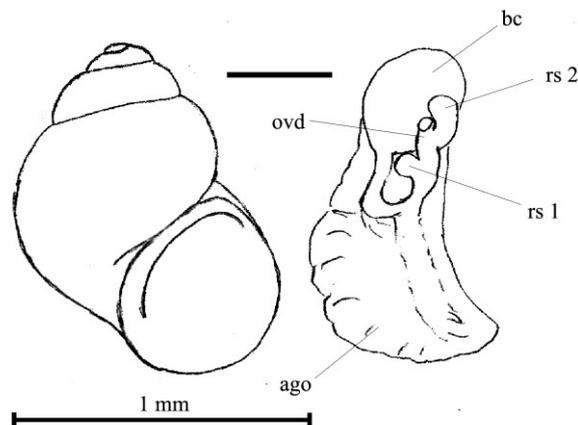
Genus *Grossuana* Radoman 1973

*Grossuana angeltsekovi* Glöer & Georgiev, 2009

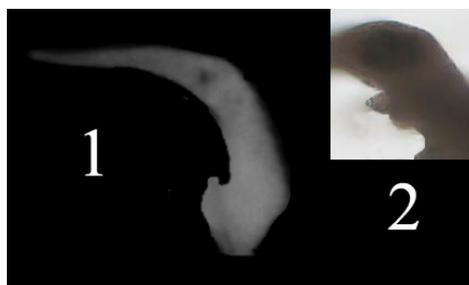
**Material examined:** 15 ex., Karstic spring, Rodopi county, Papikio Oros, near Vronti (= 4 km N of Kerasia) (445 m), leg. Dányi, Eröss, Fehér, Kontschán, Murányi, 2007.04.04.

**Description of the Greek specimens.** The shell and the penis morphology of the specimens from Greek Rhodopes were very similar to those mentioned by Glöer & Georgiev (2009). The elongated conical shell is whitish to light horn-colored and consists of 4-4.5 whorls that are slightly rounded with a weak suture. The apex is very small, the umbilicus is narrow. The aperture is oval and slightly angled at the top, with a sharp periostome, which is thickened at the columella. (Fig. 1) The penis is small, thin, with narrow base, and sharply pointed at the top, with a dark spot near the tip (Fig. 2).

In addition the female genitalia of the specimens from the Hungarian Natural History Museum is characterised by pear shaped bursa copulatrix and two seminal receptacles with short ducts (dissection results by Dr Marco Bodon).



**Fig. 1.** Shell (left) and female (right) genitalia of a specimen dissected by Marco Bodon (drawing by M. Bodon) from the same locality.



**Fig. 2.** Penis of *Grossuana angeltsekovi* from Greece: 1 – right side, 2 – light microscope picture of the outgrowth (40x).

### Discussion.

According Szarowska *et al.* (2007) the genera *Radomaniola* and *Grossuana* are not well defined but following Radoman (1983) we assign species to the first genus which have more triangular, smoothly pointed penis and well visible double lobe on its left side, and to the second – those with more conical penes, sharply pointed at the top, and bearing hardly visible single or double outgrowth. Also the female genitalia of our specimens is characterised by pear shaped bursa copulatrix and two seminal receptacles with short ducts. In *Radomaniola* the bursa copulatrix is of different shape and the ducts of the seminal receptacles are longer.

The finding of *Grossuana angeltsekovi* in the Greek Rhodopes was expected knowing that this species is widely distributed in this mountain in Bulgaria (Glöer & Georgiev, 2009 and unpublished data). It was considered by some authors (Radoman 1983, Angelov 2000) that on the Balkans dominate one species of *Grossuana* named *G. serbica* or *G. euxina* with a lot of subspecies.

Assuming the recent knowledge, we consider the specimens collected in Greece as *G. angeltsekovi* and not only according the relatively close localities of the Bulgarian populations of this species but analyzing and the specific shell and penis morphology. The characteristic narrow based penis with very long and thin apical part (“filament” considering Szarowska *et al.* 2007) is typical for *G. angeltsekovi*. At the same time on Balkans could exist and a vast variety of species from the *Grossuana/Radomaniola* group which cannot be defined by their morphology and anatomy, and only the molecular studies can provide some useful data on these “twin-species” as it was supposed by Falniowski *et al.* (2012).

**Acknowledgements.** I am grateful to Dr Zoltan Fehér (Hungarian Natural History Museum, Budapest) for sending me the materials to study. I express my thanks and to Dr Marco Bodon for the critical comments on the ms, and the drawings sent and allowed to use in this paper and to Peter Glöer (Biodiversity Research Laboratory, Hetlingen, Germany) for the literature sent.

### References

- Angelov, A. (2000) *Mollusca (Gastropoda et Bivalvia ) aquae dulcis, catalogus Faunae Bulgaicae*. Pensoft & Backhuys Publ., Sofia, Leiden, 54 pp.
- Bank, R (2006) Towards a catalogue and bibliography of the freshwater Mollusca of Greece. *Heldia*, 6(1/2):51-86.
- Falniowski, A. & Szarowska M. (2011) An unusual, flagellum bearing hydrobiid snail (Gastropoda: Rissooidea: Hydrobiidae) from Greece, with descriptions of a new genus and a new species. *Journal of Natural History*, 45:35-36.
- Falniowski, A., Szarowska, M., Glöer, P. & Pesic, V. (2012) Molecules vs morphology in the taxonomy of the *Radomaniola/Grossuana* group of Balkan Rissooidea (Mollusca: Caenogastropoda). *Journal of Conchology*, 41(1): 19-36.
- Glöer, P. & Georgiev, D. (2009) New Rissooidea from Bulgaria (Gastropoda: Rissooidea). *Mollusca*, 27(2): 123-136.
- Radoman, P. (1983) *Hydrobioidea a superfamily of Prosobranchia (Gastropoda). I. Systematics*. Monographs 547, Serbian Academy of Sciences and Arts, 256 pp.
- Reischütz, P. (1988) Drei bemerkenswerte Vertreter der Hydrobioidea aus Nordgriechenland (Gastropoda, Prosobranchia). *Malacologische Abhandlungen*, 13(11): 105-106.
- Szarowska, M. (2006) Molecular phylogeny, systematic and morphological character evolution in the Balkan Rissooidea (Caenogastropoda). *Folia Malacologica*, 14(3): 99-168.

- Szarowska, M., Grzmil, P., Falniowski, A. & Sirbu I. (2007) *Grossuana codreanui* (Grossu, 1946) and the phylogenetic relationships of the East Balkan genus *Grossuana* (Radoman, 1973) (Gastropoda: Risooidea). *Hydrobiologia*, 1-13.
- Szarowska, M. & Falniowski, A. (2011a) A new genus and new species of valvatiform hydrobiid (Risooidea; Caenogastropoda) from Greece. *Molluscan Research*, 31(3): 189-199.
- Szarowska, M. & Falniowski, A. (2011b) Destroyed and threatened localities of risoid snails (Gastropoda: Risooidea) in Greece. *Folia Malacologica*, 19(1): 35-40.
- Wagner, A. (1927) Studien zur Molluskenfauna der Balkanhalbinsel mit besonderer Berücksichtigung Bulgariens und Thraziens, nebst monographischer Bearbeitung einzelner Gruppen. *Annales Zoologici Musei Polonici Historiae Naturalis*, 6(4): 263-399.
- Zettler, M. (2008) Two records of the regional endemic hydrobiid snail *Grossuana codreanui* (Grossu, 1946) in Bulgaria (Dobrudja) and some nomenclatorial notes. *Mollusca*, 26: 163-167.

## **Dolichopus species (Diptera: Dolichopodidae) in the Entomological Collection of the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences**

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**Abstract.** Total 22 species are presented, 3 of which are not from Bulgaria (*D. austriacus* and *D. longicornis* from Slovakia, and *D. popularis* from Hungary); other 5 species except in Bulgaria are collected and from Slovakia (*D. argyrotarsis*, *D. plumipes* and *D. unguatus*), Romania (*D. diadema*) and Russia (*D. lepidus*).

**Key words:** *Dolichopus*, Palearctic.

### **Introduction**

The base of this publication is the Dipterological collection deposited in the ex Institute of Zoology included at the present time in the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences (IBER-BAN).

A part of this collection belong to family Dolichopodidae and was published in the past in different articles (Kechev 2005). An other part of this family including new data about structure and distribution of the *Dolichopus* species in Bulgaria are given here below. The material used for this publication is collected chiefly in the second half of the previous century by the author from different part of Bulgaria as far and from some West Palearctic countries.

The aim of this paper is to provide new data on the occurrence of *Dolichopus* species from the area of Bulgaria, and to present the list of the species conserved in the Institute.

The localities, date of collecting, number and sex of the specimens, character of habitat, height above sea level and geographic distribution are included in the faunistic information for every one species. A generalized geographical distribution of the species included are given by Fauna Europea. Only for the more rare species are given concrete European countries. A names of the collectors are given only in the cases when the specimens have been collected from other entomologists.

**Abbreviations:** **Distr.** - District, **G. D.** - Geographic Distribution in the world, **Loc.** - locality; **Mt.** - Mountain; **Vic.** - Vicinity (of); **Vill.** - Village.

### **Alphabetic list of the examined *Dolichopus* species**

#### ***Dolichopus arbustorum* Stannius, 1831**

**Bulgaria:** Vitosha Mt.: Bistritsa, in grass: 10.07.1976, 3♂, 1♀; 10.09.1974, 1♂; Zhelezmits (Gelezmitsa) Vill. near Sofia, meadow, 13.07.1974, 1♀.

**G. D.: Palearctic:** Europe and Near East.

***Dolichopus argyrotarsis* Wahlberg, 1850**

**Bulgaria:** Ossogovska Mt.: Dvete reki Loc., 1000 m, 8.06.1995, 1♂, leg. Manassieva.; Vitosha Mt.: Karkama Loc., 1700 m, Hicrophytes, 18.06.1972, 2♂.

**Slovakia:** Suilovski Sk., Zilin(Zhilin), 16.06.1974, 1♂, 3♀.

**G. D.: Europe:** Austria, Belgium, Britain I., Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Norway, Poland, Romania, Russia Central, Russia Northwest, Slovakia, Sweden, The Netherlands. Ukraine.

***Dolichopus austriacus* Parent, 1927**

**Slovakia:** Breslau, Lanzhot, 10.06.1974, 1♂.

**G. D.: Europe:** Austria, Estonia, Germany, Sweden. - **East Palaearctic:** East of the border line here defined.

***Dolichopus campestris* Meigen, 1824**

**Bulgaria:** Vitosha Mt., meadows: Bistritsa Vill., 4.07.1974, 1♂, 1♀; pool -1♂; Pantcharevo Vill., 4.07.1974, 1♂. - Central Stara Pl. Mt.: Dermenkaja Chalet, 1500 m, meadow, 17.07.1995, 1♂.

**G. D.: Palaearctic.**

***Dolichopus excisus* Loew, 1859**

**Bulgaria:** Danubian Plain.: Septemvrijtsi Vill., Mihajlovgrad Distr., meadow, 6.06.1987, 1♂.

Kneja, 26.05.1994, Camping loc. (on left side of rout to Cherven Bryag), 1♀; -

East Stara Planina Mt.: Sliven, hygrophyte, 4.06.1974, 1♂, 2♀; - Struma Valley: Drangovo Vill., Petritch Distr., swamp, 18.09.1973, 1♂.

**G. D.: Palaearctic:** Europe and Asia.

***Dolichopus diadema* Haliday, 1831**

**Bulgaria:** Black Sea Coast: Shabla, Touzlata, *Spergularia* sp., 29.08.1972, 2♂, 1♀.

**Romania:** Black Sea Coast, Mangalia, Doi Mai, 25.06.1972, 1♂, Chvala leg.,

**G. D.: West Palaearctic and Oriental region.**

***Dolichopus griseipennis* Stannius, 1831**

**Bulgaria:** Sacar Mt.: Manastir Sv.Troitsa, hygrophyte, 21.06.1985, 1♂; -The East Rhodopes Mts.: Senoklas Vill., 30.09.1995, 1♀ Manasieva Leg.

**G. D.: Palaearctic.**

***Dolichopus latelimbatus* (Macquart 1827)**

**Bulgaria:** Black Sea Coast: Shabla, Touzlata, 11.08.1993, 2♀; - Danubian Plain: Kneja, 26.05.1994, Camping loc. (on left side of rout to Cherven Bryag), 1♀.

**G. D.: Palaearctic and Oriental region.**

***Dolichopus lepidus* (Staeger, 1842)**

**Bulgaria:** Central Stara Pl. Mt.: Dermenkaja Chalet, 1500 m, *Juniperus* sp., 12.06.1995, 1♂; - Vitosha Mt.: Bistritsa Vill., meadow, 12.06.1982, 1♀.

**Russia:** Leningrad district: Repino, 6.06.1971, 1♂, 1♀.

**G. D.: Palaearctic and Oriental region.**

***Dolichopus litorellus* Zetterstedt, 1852**

**Bulgaria:** Vitosha Mt.: Bistritsa Vill., pool, 4.07.1974, 3♀.

**G. D.: North and East Europe; East Palaearctic; Oriental region.**

***Dolichopus longicornis* (Stann, 1831)****Slovakia:** Breslav Lanzhot, Quercus-forest, 10.06.1974, 1♀.**G. D.: Palaearctic:** Europe and Asia; **Oriental region.*****Dolichopus longitarsis* (Stann, 1831)****Bulgaria:** Plana Mt., grass, 17.07.1976, 1♂, 2♀.**G. D.: Palaearctic:** Europe and Asia.***Dolichopus nubilus* (Meigen, 2824)****Bulgaria:** Black Sea Coast: Shabla, grass, 4.05.1992, 1♂; *Phragmites* sp., 14.09.1992, 1♀. - Distr. Sofia: Tchelopetchene Vill., meadow, 29.06.1974, 1♂.**G. D.: Palaearctic:** Europe and Asia.***Dolichopus pennatus* (Meigen, 1824)****Bulgaria:** Vitosha, Karkama Loc., 1700 m, hygrophyte, 18.06.1972, 2♂.**G. D.: Palaearctic:** Europe, Asia; **Oriental region.*****Dolichopus phaeopus* Haliday, 1851****Bulgaria:** Pirin Mt.: Vassilashki Ezera Lake, 2000 m, 18.07.1975, 5♂, 1♀; - Rila Mt.: Belmeken loc., 2000 m, grass, 17.09.1996, 2♂, 2♀; - West Rhodopes Mts.: Tchehlevo, 1-7.08.1925, 8♂, 1♀, Drenski Leg.**G. D.: Europe:** Belgium, Britain I., Bulgaria, Czech Republic, France, Germany, Ireland, Poland, Romania, The Netherlands.***Dolichopus plumipes* (Scopoli, 1763)****Bulgaria:** Sredna Gora Mt.: Klissura, meadow, 27.05.1975, 6♂, 1♀; - Vitosha Mt.: Bistritsa Vill., meadow: 12.05.1982, 4♂; 4.07.1974, 2♂; - Pirin Mt.: Razlog, Sitnev Egreg Loc., Medicago-field, 13.05.1973, 1♀; Gotse Delchev, Karshilar Loc., 17.05.1973, Pshenitsa, 1♂, V. B., leg; Bansko, 21.09.1973, meadow, 1♂; - The West Rhodopes Mt.: Teshel Vill., 17.05.1973, livada, 1♂.**Slovakia:** Boubin, 800 m, 19.06.1974, 1♂.**G. D.: Palaearctic:** Europe, Asia; **Oriental region.*****Dolichopus picipes* (Meigen, 1824)****Bulgaria:** Central Stara Planina Mt.: Koupna Peak, 1600 m, hygrophytes, 19.07.19996, 1♂; 4♀.**G. D.: Palaearctic:** Europe, Asia.***Dolichopus popularis* (Wiedemann, 1817)****Hungary:** Bukk Mt., 20.06.1983, Forest, 2♀.**G. D.: Palaearctic:** Europe, Asia.***Dolichopus siculus* Loew, 1859****Bulgaria:** Struma Valley: Simitli, *Hordeum* sp., 20.05.1973, 1♀; Blagoevgrad, fishfarm, 14.05.1991, 2♂, 7♀.**G. D.: Bulgaria, France, Sicily.**

***Dolichopus signifer* Haliday, 1838**

**Bulgaria:** Black Sea Coast: Dourankoulashko Ezero Lake, hygrophites, 16.05.1972, 1♂; - Danubian Plain: Kneja, 26.05.1994, Camping(on left side of the rout to Cherven Bryag), 2♀; - Podbalkan Region: Zlatitsa, hygrophite, 11.05.1973, 1♂; Pirdop, *Agropyrum* sp., 24.09.1975, 1♂; - Belassitsa Mt.: Petritch, 11.07.1974, 1♂; - Struma Valley: Topolnitsa Vill., Petritch Vic., 10.07.1974, 1♂; - Thracian Lowland: Plovdiv, orchard, at light, 14.05.1974, 1♀, leg. Mitkov- Rouj Mt., distr. Perenik, Tran, 11.06.1970, 1♀.

**G. D.: Palaearctic.**

***Dolichopus simplex* (Meigen, 1824)**

**Bulgaria:** Vitosha Mt., meadows: Zheleznitsa, 28.05.1996, 1♂; Bistritsa, 12.06. 1982, 1♀; - Plana Mt., meadow, 13.06.1976, 2♂, 3♀; grass, 17.07.1976, 2♀.

**G. D.: Palaearctic:** Europe, Asia.

***Dolichopus ungulatus* (Linnaeus, 1758)**

**Bulgaria:** Vitosha Mt., meadows: Bistritsa, 4.07.1974, 2♂, 1♀; Zheleznitsa(Geleznitsa), 1200 m, 17.05.1973, 3♂, 2♀; 13.07. 1974, 1♂; 9.06.1983, 1000 m, 3♀, leg Dimitrova; 26.05.1996, 1♂, Manassieva leg.; Kladnitsa Loc., 1000 m, leg. B. Dimitrova: 19.05.1983, 1♂, 3♀ and 5.07.1983, 1♂.

**Slovakia:** Helicopeč, Hrybi, 12.06.1974, Fagus-forest, 2♀.

**G. D.: Palaearctic:** Europe, Asia.

Total 22 species are presented, 3 of which are not from Bulgaria (*D. austriacus* and *D. longicornis* from Slovakia, and *D. popularis* from Hungary). From the rest 19 taxa five species except in Bulgaria are collected and from Slovakia (*D. argyrotarsis*, *D. plumipes*, and *D. ungulatus*), Romania (*D. diadema*), and Russia (*D. lepidus*).

**References**

FAUNA EUROPAEA: [www.faunaeur.org/full\\_results.php?id=135530](http://www.faunaeur.org/full_results.php?id=135530).

Kechev, M. (2005) Check-list of Dolichopodidae (Diptera, Brachycera) species in Bulgaria. *Scientific Studies*, 26: 163-167.

## New records of some rare rodents (Mammalia: Rodentia) from South-East Bulgaria

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**Abstract.** New records of three rare rodent species from SE Bulgaria are reported, as follows: European Snow Vole (*Chionomys nivalis*) – Madzharovo Town, Eastern Rhodope Mountains (UTM MG01); Gray Dwarf Hamster (*Cricetulus migratorius*) –Matochina Village (UTM MG 63); and Roach's Mouse-tailed Dormouse (*Myomimus roachi*) –Malki Voden Village, Eastern Rhodope Mountains (UTM MG11). All three species were found in the food remains of two owl species: the Barn Owl (*Tyto alba*) and the Tawny Owl (*Strix aluco*), and the Eastern Imperial Eagle (*Aquila heliaca*).

**Key words:** *Chionomys nivalis*, *Cricetulus migratorius*, *Myomimus roachi*, *Tyto alba*, *Strix aluco*, *Aquila heliaca*, South-East Bulgaria.

### Introduction

Studying the food spectrum of owls is of particular interest to experts in ornithology, zoology, ecology, zoogeography, paleontology, etc. (Simeonov *et al.* 1998). Some prey species, considered extremely rare or extinct, were found and came back to “life” in owl pellets, The Katinka's Shrew *Crocidura katinka* (Bate, 1937), described from fossil material, made a “comeback” in an owl pellet (Hutterer & Kock 2002).

Examining owl pellets to assess small mammal species diversity is considerably more effective than traditional trapping methods (Bonvicino & Bezerra 2003, Torre *et al.* 2004).

Here I report new records of three rare rodent species – European Snow Vole (*Chionomys nivalis* Martins, 1842), Gray Dwarf Hamster (*Cricetulus migratorius* Pallas, 1773), and Roach's Mouse-tailed Dormouse (*Myomimus roachi* Bate, 1937) as part of the food of three species birds of prey from South-East Bulgaria.

## Materials and Methods

The investigation was based on the analyses of pellets contains and food remains of Barn Owl (*Tyto alba* Scopoli, 1769), Tawny Owl (*Strix aluco* Linnaeus, 1758), and Eastern Imperial Eagle (*Aquila heliaca* Savigny, 1809). The material was collected during the bird's breeding seasons in 2006 - 2009 in various regions of South-East Bulgaria. The pellets were dried up and then all prey remains (bones, skulls, jaws, etc.) were carefully cleaned. The small mammals were identified according to Peshev *et al.* (2004).

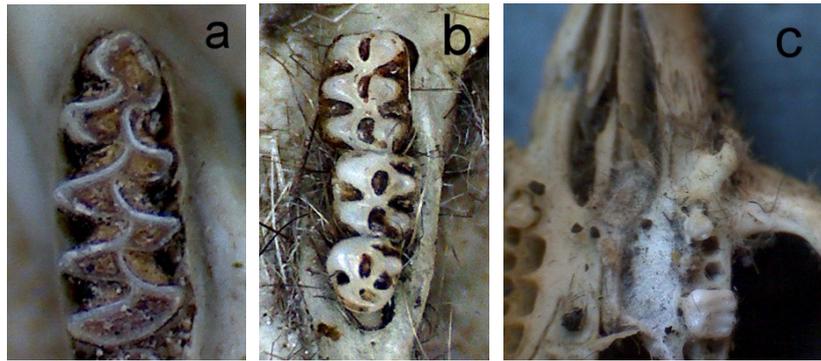
## Results and Discussion

**European Snow Vole (*Chionomys nivalis* Martins, 1842).** The analysis of food remains of a Tawny Owl (*Strix aluco*) from the vicinities of Madzharovo (UTM MG01) (Eastern Rhodopes) identified fifty-three specimens of small mammals including four specimens of European Snow Vole (*Chionomys nivalis*) (Fig. 1a). Being a petrophilous species, the European Snow Vole inhabits rocky areas, stone rivers, screes, etc., all found in the region of Madzharovo. This record provided the first evidence of the species' presence in the Eastern Rhodope Mountains (Minkova 2004). The nearest record of the species was some 70 km away, near Zlatograd Town (UTM LF38) (Peshev & Angelova 1967).

**Gray Dwarf Hamster (*Cricetulus migratorius* Pallas, 1773).** The collected material (August 20<sup>th</sup>, 2008) from a Barn Owl in Matochina Village (UTM MG 63) comprised fifty specimens of small mammals, including the skull and the mandible of an adult specimen of Gray Dwarf Hamster (Fig. 1b). The nearest records of this species were reported from Sladun Village (UTM MG53), Raykova Mogila Village, and Shtit Village (UTM MG 43), also found in Barn Owl pellets (Georgiev 2004).

Another adult specimen was found in the food remains of the Eastern Imperial Eagle (material collected by Dimitar Demerdzhiev, March 15<sup>th</sup>, 2008) in the vicinities of the city of Sliven (UTM MH32). This is an evidence for the presence of the Gray Dwarf Hamster, 45 years after the first record of the species in the food remains of a Long-eared Owl (*Asio otus* Linnaeus, 1758) (Simeonov 1963, 1964).

**Roach's Mouse-tailed Dormouse (*Myomimus roachi* Bate, 1937).** Bones, jaws, and a skull of an adult specimen (Fig. 1c) were identified among the remains from 70 small mammal specimens found in pellets of a Barn Owl (*Tyto alba*) collected on July 28<sup>th</sup>, 2007 in Malki Voden Village (UTM MG11) (Eastern Rhodopes). This is the second record of the species from the Eastern Rhodope region. The nearest records were reported from the vicinity of Svilengrad Town (UTM MG32) (Peshev *et al.*, 1960) and Ivaylovgrad Town (UTM MF29) (Peshev & Angelova 1967).



**Fig. 1.** **a** – First right lower molar of *Chionomys nivalis*; **b** – left maxilla of *Cricetulus migratorius*; **c** – part from cranium with left maxilla of *Myomimus roachi*, with clearly visible peculiarities – long *foramina icisivi* and separated *anteroloph* from *protoloph* on M2.

### Acknowledgements

This survey was supported by project No BG 051 PO001-3.3.04/41 and partially by No 02-303/18.12.2008. I am grateful to Dimitar Demerdziev for making available the food material from the Eastern Imperial eagle, to Yurii Kornilev and Krasimira Demerdzieva for having reviewed the English presentation of this paper.

### References

- Bonvicino, C. & Bereza, A. (2003) Use of regurgitated pellets of Barn owl (*Tyto alba*) for inventorying small mammals in the Cerrado of Central Brazil. *Studies on Neotropical fauna and Environment*, 38 (1): 1-5.
- Hutterer, R. & Kock, D. (2002) Recent and ancient records of shrews from Syria, with notes on *Crocidura katinka* Bate, 1937 (Mammalia: Soricidae). *Bonner zoologische Beiträge*, 50 (3): 249-258.
- Georgiev D. (2004) Conservation status of the small mammals (Mammalia: Insectivora, Lagomorpha, Rodentia) in Sakar Mountain (South-eastern Bulgaria). *Travaux scientifiques Université de Plovdiv "Paisii Hilendarski", Biologie, Animalia*, 40 (6): 153-164.
- Minkova, T. (2004) Small mammals of the Eastern Rodopes (Bulgaria). – In: Beron, P., Popov A. (eds). *Biodiversity of Eastern Rodopes (Bulgaria and Greece)*. Sofia, 895-906.
- Peshev, Ts., Peshev, D. & Popov, V. (2004) Fauna of Bulgaria: Mammalia. Academical Publishing House "Marin Drinov", BAS, Sofia, 632 pp. (in Bulgarian, English summary).

- Peshev, Ts., Dinev, T. & Angelova, V. (1960) *Myomimus personatus* Ogn. (Myoxidae) – A new species of rodent to the Fauna of Europe. *Bulletin Institute of Zoology*, 9, 305 – 313. (in Bulgarian, English summary)
- Peshev, Ts. & Angelova, V. (1967) Insectivora and Rodentia in Southern parts of Bulgaria. *Annuaire de L'Universite de Sofia, faculte de Biologie*, 61 (1): 89-98. (In Bulgarian)
- Simeonov, S., Milchev, B. & Boev, Z. (1998) Study of the Eagle Owl (*Bubo bubo* (L.)) (Aves: Strigiformes) in the Strandzha Mountain (Southwest Bulgaria). II. Food spectrum and trophic specialization. *Acta zoologica bulgarica*, 50(2/3): 87-100.
- Simeonov, S. (1963) Materials on food of Long-eared Owl (*Asio otus* L.) in some regions in Bulgaria. *Annuaire de L'Universite de Sofia, faculte de Biologie*, 57 (1): 107-115. (in Bulgarian)
- Simeonov, S. (1964) New record of *Cricetulus migratorius* Pall. in Bulgaria. *Annuaire de L'Universite de Sofia, faculte de Biologie*, 57 (1): 117-118. (in Bulgarian)
- Torre, I., Arrizabalaga, A & Flaquer, C. (2004) Three methods for assessing richness and composition of small mammal communities. *Journal of Mammalogy*, 85 (3), 254 – 530.

## Additions and corrections to the species list of the Bulgarian Chloropinae (Diptera: Chloropidae)

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**Abstract.** One genus (*Elachiptereicus*) and 8 Chloropinae species are reported for the first time for Bulgaria. With these new data total 20 genera with 81 species are established to subfamily Chloropinae in Bulgaria at the time being.

**Key words:** New species and localities, Bulgaria, *Elachiptereicus*.

### Introduction

A special article was published for the species diversity, new faunistic data and contemporaries nomenclature changes concerning Bulgarian Oscinellinae species (Beschovski 2008). A new data for Chloropinae are not summarized till now. The aim of this publication is to give short information about the new species for Bulgarian fauna as far and new nomenclature correction in the species names of the subfamily in the last decade (Nartshuk 2004, 2006).

### Results

#### I. New Chloropinae taxa for Bulgaria

##### *Chlorops (Chlorops) fasciatus* Meigen, 1830

*Chlorops (Chlorops) fasciatus* (*Ch. fasciatus*): Beschovski 1978: 401; - 1980: 19, 21; - 1985: 147 (as possible to be found in Bulgaria).

*Chlorops adjunctus*: Beschovski & Dimitrova, 1990: 155, 157 (erroneously).

**Localities:** Danubian Plain: Distr. Lovech, Leshmitsa Vill., 14.09.1982, meadow, 1♂, 2♀.- Middle Stara Planina Mt.: Kozya Stena Chalet, 1500 m, 14.06.1995, meadow, 1♀; Yavorova Laka Chalet, near Troyan, 3.06.1999, 1♀. - Sredna Gora Mt.: Klissura, 24.09.1981, meadow, 2♀. - Vitosha Mt. (Dimitrova leg.): Zheleznitsa (Geleznitsa) Vill., 9.05.1984, 1000 m. a. s. l., 1♀; Yarlovo locality, 24.06.1984, 1200 m. a. s. l. 1♀; Selimitsa Chalet, 10.07.1985, 1♂; Choujpetlovo (Tchuijpetlovo), 4.09.1983, 1400 m. pasture. - Plana Mt.: 1.06.1975, meadow, 1♀. - Pirin Mt.: Pirin Chalet, 6.08.1982, 1900 m, 1♂.

**Taxonomic notes.** The investigated specimens have a more light antennae, including and the 1-st flagellomer, yellow scutellum, and grey-brown clypeus. But the microtrichies of the 1-st flagellomer are longer than those of the arista.

**Habitat.** The species is collected in meadows; 190 - 1900 m; VI -IX.

**Zoogeography.** An Eurosiberian species, ranged in: Europe and Asia (Siberia, Mongolia, Kazakhstan, Transkaukasus).

***Neohaplegis obscuripennis* (Loew, 1874)**

The species is new and for the Balkan Peninsula.

**Localities:** The East Rhodopes Mts.: Distr. Haskovo, Southern from Ivailovgrad, Meden Buk Vill., 8-9.05.1996, 3♂, 3♀, leg. Manassieva.

**Habitat.** The specimens are collected with Maleise trap about 230 m (8-9.05.1996). V.

**Zoogeography.** An European species (East European-Central Asian), established at the present from: Europe: Bulgaria, Hungary, Russia (East and South), Ukraine; Asia (Kazakhstan).

***Elachiptereicus italicus* Duda, 1933**

Genus *Elachiptereicus* Becker, 1909 is new for Bulgaria too.

**Localities:** at the foot of Vlahina Mt.: Simitli, 20.05.1973, *Hordeum* sp., 1♀; -South Pirin Mt.: Petrich-Melnik, 20.05.1973, sand, 3♂, 2♀; Spatovo Vill., 18.05.1989, grass, 1♀. - Kozouh Mt.: Roupite Loc., 18.05.1989, grass, 1♀.

**Habitat.** The specimens are collected in the xerophilous grass vegetation, 140-430 m; V.

**Zoogeography.** A South European species at the present known from Bulgaria and Italy.

***Lasiosina intermedia* Dely-Draskovits, 1977**

The species is new for the Balkan Peninsula too.

**Localities:** Sredno Strumska Valley: Petrich Vic. (Petrichko), 14.04.1974, *Hordeum* sp., 1♀. - Black Sea Coast: Varna Distr.: Varnensko Ezero Lake, 25.06.1964, 1♀.

**Habitat.** The specimens are collected in hygrophilous vegetation. 0 – 160 m; IV, VI.

**Zoogeography.** An European species, reported from: Belarus, Britain Is., Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Latvia, Russia Central, Slovakia, Sweden, Switzerland.

***Meromyza meigeni* Nartshuk, 2006**

*Meromyza laeta* BESHOVSKI and auct. nec Meigen, 1830: Beschovski (partim): - 1982: 92; - 1985: 123-124; - 2006: 658.

**Localities:** Vitosha Mt.: (Dimitrova lg.) Struma river, 3.09.1983, 1900 m., meadow, 2♀; Vladaya, 4.09.1984, lawn, 1100 m, 1♂; - Pirin Mt.: Bunderitsa, 9.08.1982, meadow, 1♂, 1♀; - The West Rhodopes Mts.: Second Smolyan lakes, 21.07.1977, meadow, 1♂.

**Habitat.** The species is collected in meso- and hygrophilous laons and meadows at 1200-1900 m. VII-IX.

**Zoogeography.** An European species, known at the time being from European part of Russia, Ukraine, Kazakhstan, Bulgaria, Albania, Macedonia and Bosna.

***Meromyza mosquensis* Fedoseeva, 1960**

**Localities:** Middle Stara Planina Mt.: Beklemeto-Karnare, 22.07.1982, pasture, 9♂; Beklemeto, 17.08.1982, pasture, 1♀; Beklemeto-Troyan, 17.08.1982, meadow, 1♀; Karnare-Beklemeto, 17.08.1982, 2♂. - Rila Mt.: Eleshnitsa locality, 900 m., 24.08.1997, 1♀; Parangalirts Reserve, 1400 m, 18.08.1997, 1♂; - The West Rhodopes Mts.: Smolyanski ezera Lakes (on table: Smolyan Lakes), 21.07.1977, meadow, 2♂. -Black Sea Coast: Varna, Aladzha monastir Locality, 26.06.1978, loan, 1♂.

**Habitat.** The species is collected in pastures and meadows; 10 - 1400 m; VII, VIII.

**Zoogeography.** Europe.

***Meromyza ornata* (Wiedemann, 1817)**

*Meromyza sororcula* Fedoseeva, 1962 = *Meromyza ornata* (Wiedemann, 1817) (Nartshuk & Pakalniškiss 2004: 63).

**Localities:** Middle Stara Planina Mt.: Troyan District: Chiflik (Tchiflik) Vill., 4.08.1997, 800 m, 1♀; Beklemeto-Karnare, 22.07.1982, pasture, 2♂; - Vitosha Mt.: Boyansko blato, VIII.1987, 1♂.

**Habitat.** The species is collected in mesophylous meadows and pastures; 700 - 800 m; VII, VIII.

**Zoogeography.** An Eurosiberian species, occurring in: Europe and Asia: Siberia, Far East, Mongolia, Kazakhstan.

#### ***Thaumatomyia elongatula* (Becker, 1910)**

The species is new for Balkan Peninsula too.

**Localities:** South Pirin Mt.: Melnik-Rozhen, 11.08.1982, 1♂, 3♀ along the side of small stream.

**Habitats.** The specimens are collected on the psamo-hygrophylous gramineae on the sandy stream side; 500 m; VIII.

**Zoogeography.** An European species, announced from Austria, Corsica, Bulgaria, Czech Republic, France, Germany, Hungary, Italy, Moldova, Poland, Russia South, Slovakia, Switzerland, The Netherlands, Ukraine.

### **II. Established locality in Bulgaria for the species published with common information: “...Bulgaria or BG”**

#### ***Chlorops (Sclerophallus) limbatus* Meigen, 1830**

*Chlorops (Sclerophallus) brevimana* Loew, 1866: Beschovski 1980: 19, 23; - 1985: 145 (as possible to be found in this country).

*Chlorops (Sclerophallus) limbatus* Meigen, 1830: Narchuk 2004: “Bulgaria”.

**Localities:** Blagoevgrad, fish farm, 14.05.1991, 1♀.

**Habitat.** The specimen is collected in mesophylous vegetation. 360m.V.

**Zoogeography.** An Eurosiberian species ranged in Europe and Asia (Kazakhstan, Siberia, Far East, Japan).

### **III. Nomenclature change by the literature data**

***Meromyza athletica* Fedoseeva, 1974 = *M. variegata* sensu Beschovski, 1985, and auct.** (Nartshuk 2006: 181-182).

### **IV. Species excluded from the species list of Bulgaria**

#### ***Eutropha ruficornis* Hendel, 1931**

*Chlorops (European) fulvifrons ruficornis* Beschovski nec Hendel (Beschovski 1968), is simply a true *Eutropha fulvifrons* with more light antennae.

In a result of above-mentioned review one genus and 8 Chloropinae species are established for the first time in Bulgaria. With these new data total 20 genera with 81 species are established to subfamily Chloropinae in Bulgaria at the time being.

**References**

- Beschovski, V. (1968) Chloropidae (Diptera) unknown in the Fauna of Bulgaria. – *Bulletin de L'Institut de Zoologie et Musée*, 26: 33 – 38. (In Bulgarian; Summary: English).
- Beschovski, V. (1978) Faunistic and taxonomic investigations on the genus *Chlorops* Meigen, 1803 (Diptera, Chloropidae) from Bulgaria with description of a new subgenus. – *Nouv. Rev. Ent.* , 8: 397 - 402.
- Beschovski, V. (1980), (not 1979). On the taxonomic structure of the genus *Chlorops* Meigen, 1803 (Diptera, Chloropidae). – *Acta zoologica bulgarica*, 14: 19-31,
- Beschovski, V. 1982 (Beshovski). Chloropidae (Diptera) – new to the Bulgarian Fauna. – *Acta zoologica bulgarica*, 20: 89 -95.
- Beschovski, V. (1985) Frit flies (Diptera, Chloropidae). – *Fauna Bulgarica*, 14. Aedeabus Academie Scientiarum Bulgaricae, Sofia, 210 pp., (Bulgarian).
- Beschovski, V. (2006) Diptera Brachycera (Insecta) established in the Western Rhodopes Mountains (Bulgaria). In: Beron P.(ed.) *Biodiversity of Bulgaria. 3. Biodiversity of Western Rhodopes (Bulgaria and Greece)*. I. Pensift & Nat. Hist. Mus. Natur. Hist., Sofia: 617-674.
- Beschovski, V. (2008) Additional Record and Corrections on the Oscuinellinae Fauna (Diptera: Chloropidae) of Bulgaria - *Acta zoologica bulgarica*, 60(1): 51 - 59.
- Beschovski, V., Dimitrova, B. (1990) Frit flies (Insecta, Diptera, Cloropidae) from Vitosha. – *Fauna of Southwestern Bulgaria*, part 3, Sofia 1990: 154-160 (Bulgarian; Englysh summary).
- Nartshuk E. P. (2004) Fauna Europaea: Chloropidae. In Papp T. (ed.): Fauna Europaea: Diptera Brachycera. Fauna Europaea version 1.3. <http://www.faunaeur.org>. Last update 2007.
- Nartshuk E. P. (2006) A revision of Meigen's Chloropidae collection in the Museum National d'Historal Naturelle Paris (Diptera). – *Zoosystematica Rossica*, 15(1): 173- 184.
- Nartshuk E. P., Pakalniškis, S. (2004) Contribution to the knowledge of the Family Chloropidae (Dipterea, Muscomorpha) of Lathhuania. – *Acta zoological Lituanica*, 14(2): 56 – 66. (For Mer. Sororculs= M. ornate (Wiedemann, 1817).

## **New localities of Eastern Montpellier Snake – *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) from Southwestern Bulgaria**

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**Abstract.** The current report presents three new localities of the Eastern Montpellier Snake in Bulgaria. Two of them are situated along the valley of Mesta River whereas the third one is on the slopes of Belasitsa Mountain. The localities along Mesta River are of great interest, because they represent the valley as natural corridor for penetration and distribution of mediteranean species in Bulgaria. Two of the localities arouse interest because of their high altitude.

**Key words:** Eastern Montpellier Snake, new localities, Belasitsa Mountain, Mesta River.

The Eastern Montpellier Snake – *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) is a rare reptile species in Bulgaria with local distribution in the southern part of the country. It is included in Annex III of Biological Diversity Act, as well as in Annex III of Bern Convention (Biserkov *et. al.* 2007). The first record of the species in Bulgaria is from Strandzha Mountain (Buresh 1929 as *Coelopeltis monspessulanus*); later on new locations in Eastern Rodopes and Southern Black Sea Coast were discovered (Buresh 1929 as *Coelopeltis monspessulanus*). In 1960 the Eastern Montpellier Snake was recorded along the Struma Valley in the southern parts of Kresna Gorge (Beškov 1961 as *M. monspessulanus*). The contemporary distribution of the species ranges over Bulgaria is in the southern parts of Struma Valley north to Simitli Town, some places in Eastern Rodopes, southern parts of the Maritsa Valley, Derventski Hills, Strandzha Mountain and Southern Black Sea Coast north to Burgas Town (Beškov *et. al.* 1967, Beškov 1974, Beshkov 1984, Beshkov & Nanev 2002 as *M. monspessulanus*, Biserkov *et. al.* 2007, Stojanov *et al.* 2011 as *M. insignitus*).

The current report presents three new localities of the Eastern Montpellier Snake from Southwestern Bulgaria. Two of them are situated along the valley of Mesta River, whereas the third one is on the slopes of Belasitsa Mountain.

The localities along Mesta Valley are as follows:

1) Right shore of Mesta River, northeastern direction from the village of Beslen, N41°28'25.76", E23°58'45.29", an altitude of 443 m, with one individual 26,5 cm in total, caught by Lyuben Domozetski on 07.09.2012 (Fig. 1);

2) Beslen Village, N41°28'19.80", E23°57'53.55", an altitude of 704 m, with one individual 23 cm in total, caught by Lyuben Domozetski on 08.09.2012 (Fig. 2); Beslen Village, N 41°28'20.21", E 23°58'11.37", an altitude of 642 m, a skin shed of one individual 75 cm long, collected by Lyuben Domozetski on 08.09.2012.

These two localities belong to the square GL49 of the cartographic system UTM 10x10.

The first one is situated on the shore of the river in sandy area with lots of rocks and sparse bushwoods of *Carpinus betulus*, *Quesrcus* spp., *Populus alba*, *Platanus orientalis*,

*Salix alba* (Fig. 3 and 4). The following reptile species were registered in radius of 500 m of the locality of the Eastern Montpellier Snake: Hermann's Tortoise – *Testudo hermanni* (Gmelin, 1789), European Pond Turtle – *Emys orbicularis* (Linnaeus, 1758), Erhard's Wall



**Fig. 1.** *Malpolon insignitus*, Mesta Valley, Beslen, 08.09.2012.



**Fig. 2.** *Malpolon insignitus*, Mesta Valley, Beslen, 08.09.2012.



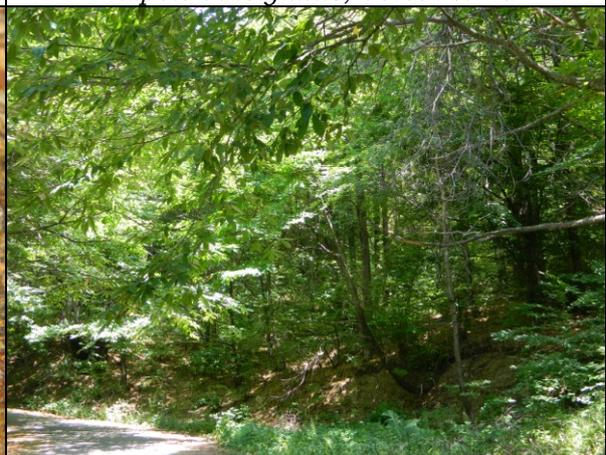
**Fig. 3.** Mesta Valley, habitat of *Malpolon insignitus*, 08.09.2012.



**Fig. 4.** Mesta Valley, habitat of *Malpolon insignitus*, 08.09.2012.



**Fig. 5.** *Malpolon insignitus*, Belasitsa Mt., 18.07.2012.



**Fig. 6.** Belasitsa Mt., habitat of *Malpolon insignitus*, 18.07.2012.

Lizard – *Podarcis erhardii* (Bedriaga, 1882), European Green Lizard – *Lacerta viridis* Laurenti, 1768, Dice Snake – *Natrix tessellata* (Laurenti, 1768), Horned Viper – *Vipera ammodytes* (Linnaeus, 1758), as well as moulted skin of Caspian Whipsnake – *Dolichophis*

*caspius* (Gmelin, 1779). The second locality is situated on the territory of the village of Beslen in an anthropogenized habitat.

The localities along Mesta River are of great interest, because they represent the valley as natural corridor for penetration and distribution of mediterranean species in Bulgaria (Petrov *et al.* 2006). Moreover, the second locality is one of the highest altitudinal records for Bulgaria so far (Stojanov *et al.* 2011).

The third locality is also interesting in respect to the altitude. It is situated on the northern slopes of Belasitsa Mountain near Belasitsa Hut, N41°22'05.45", E23°11'31.77", with an altitude of 692 m, with one individual with 25 cm length, caught by Lyuben Domozetski on 18.07.2012 (Fig. 5). This locality belongs to the square FL88 of the cartographic system UTM 10x10. It is situated in broadleaved mixed sweet chestnut and beech forest (Fig. 6). The following reptile and amphibian species were registered in radius of 500 m of the third locality: European Green Lizard – *Lacerta viridis* Laurenti, 1768, Common Wall Lizard – *Podarcis muralis* (Laurenti, 1768), Aesculapian Snake – *Zamenis longissimus* (Laurenti, 1768), Agile Frog – *Rana dalmatina* Bonaparte, 1840 and Fire Salamander – *Salamandra salamandra* (Linnaeus, 1758).

Several authors reported that the Eastern Montpellier Snake is found mostly in lower, warm and dry areas in sandy and rocky habitats, whereas in Eastern Bulgaria it is also found in forest meadows and openings in sparse broadleaved forests (Beshkov 1984, Beshkov & Nanev 2002, Biserkov *et al.* 2007). The new localities show that in the western part of the country the species is found in broadleaved forests, as well as in anthropogenized habitats.

## References

- Beshkov, V. (1984) The Effect of the Balkan Range on the Distribution of the Herpetofauna in Bulgaria. *Acta zoologica bulgarica*, 25: 9-15 (in Bulgarian, Russian and English Summary).
- Beshkov, V. & Nanev, K. (2002) *Amphibians and reptiles in Bulgaria*. Pensoft, Sofia, 120 pp. (In Bulgarian).
- Beškov, V. (1961) Beitrag zur zoogeografischen Untersuchung der Herpetofauna in Bulgarien. *Bulletin de l'institut de zoologie et musée, Académie bulgare des sciences*, 10: 373-383 (in Bulgarian, Russian and German Summary).
- Beškov, V. (1974) Die Höhenverteilung der Schlangen in Einer Ihrer Artenvielfältigkeit nach Spezifischen Region von Südostbulgarien. *Bulletin de l'institut de zoologie et musée, Académie bulgare des sciences*, XL: 167-173 (in Bulgarian, Russian and German Summary).
- Beškov, V., Undshian E., Simeonov, S. & Darackiev, A. (1967) Neue Angaben über die Verbreitung Einiger Amphibian und Reptilian in Bulgarien. *Bulletin de l'institut de zoologie et musée, Académie bulgare des sciences*, XXV: 5-10 (in Bulgarian, Russian and English Summary).
- Biserkov, V., Naumov, B., Tzankov, N., Stoyanov, A., Petrov, B., Dobrev, D. & Stoev, P. (2007) *A Field Guide to Amphibians and Reptiles of Bulgaria*. Green Balkans, Sofia, 196 pp. (In Bulgarian).
- Buresch, I. (1929) Zwei für die Fauna Bulgariens neue Schlangen. *La revue de l'académie bulgare des sciences*, XL: 119-139 (in Bulgarian, German Summary).
- Buresch, I. & Zonkow, J. (1934) Untersuchungen über die Verbreitung der Reptilien und Amphibien in Bulgarien und auf der Bualkanhalbinsel, II Teil: Schlangen (Serpentes). *Mitteilunge aus den Königlichen naturwissenschaftlichen Insituten in Sofia – Bulgarien*, VII: 106-188 (in Bulgarian, German Summary).

- Petrov, B. & Beshkov, V. (2001) Amphibians and Reptiles (Amphibia&Reptilia) in Kresna Gorge. In: Beron P. (ed.). *Biodiversity of Kresna gorge (SW Bulgaria)*. Edition of National Museum of Natural History (Sofia), Institute of Zoology, Bulgarian Academy of Sciences, Sofia, pp. 297-303 (In Bulgarian, English Summary).
- Petrov, B., Tzhanov, N., Strijbosch, N., Popgeorgiev, G. & Beshkov, V. (2006) *The herpetofauna (Amphibia and Reptilia) of the Western Rhodopes mountain (Bulgaria and Greece)*. In Beron P. (ed.). *Biodiversity of Western Rhodopes (Bulgaria and Greece)*. Edition of National Museum of Natural History (Sofia), Institute of Zoology, Bulgarian Academy of Sciences, Sofia, pp. 863-912.
- Stojanov, A., Tzhanov, N. & Naumov, B. (2011) *Die Amphibien und Reptilien Bulgariens*. Edition Chimaira. Frankfurt am Main, pp. 480-487.

## Diet of the Stone marten (*Martes foina* Erxl.) in two large cities of the Upper Thracian Lowland, South Bulgaria

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**Abstract.** The fruits of domestic and wild plants comprise the main food of the urban Stone martens. The secondary food varied during seasons. Insects, birds and mammals (small and bone remains of large mammals) occurred in the feces. Amphibians and reptiles were eaten occasionally.

**Key words:** Mustelidae, urban areas, diet.

### Introduction

The Stone marten (*Martes foina* Erxl.) is one of the most widespread mustelid in Europe having a high ecological plasticity and inhabiting even the big cities. In Bulgaria it is also the among the commonest carnivores at the whole territory of the country. The adult animals have a home range up to 80 ha which is marked by feces deposited on various well visible sites. They can be easily recognized by their smell, shape and position, especially at low altitude anthropogenic sites where the very similar species, the Pine marten (*Martes martes* L.) does not occur in Bulgaria (Macdonald & Barret 1993, Popov & Sedefchev 2003).

Even the diet of these small carnivores is well studied at the whole of the species range the papers concerning their diet at the urban areas are scarce (Sidorovich 1995).

Present paper provides some information on the food of the Stone Marten in the urban areas of South Bulgaria, which are unexplored till now.

### Material and methods

The Stone marten diet was studied by analyzing feces content. Samples (N = 67) were collected at the two largest cities in the Upper Thracian Lowland: Plovdiv and Stara Zagora between 1.6.2005 and 14.12.2006 (Table 1). Food items were determined using a reference collection of bones, feathers and fruit remains, deposited/kept at the collection of the author. In this study the minimal number of preys was considered and their percentage among all preys in a particular season found in the diet was calculated. For the calculations the computer program Biodiversity Professional, Version 2, 1997 was used.

### Results and Discussion

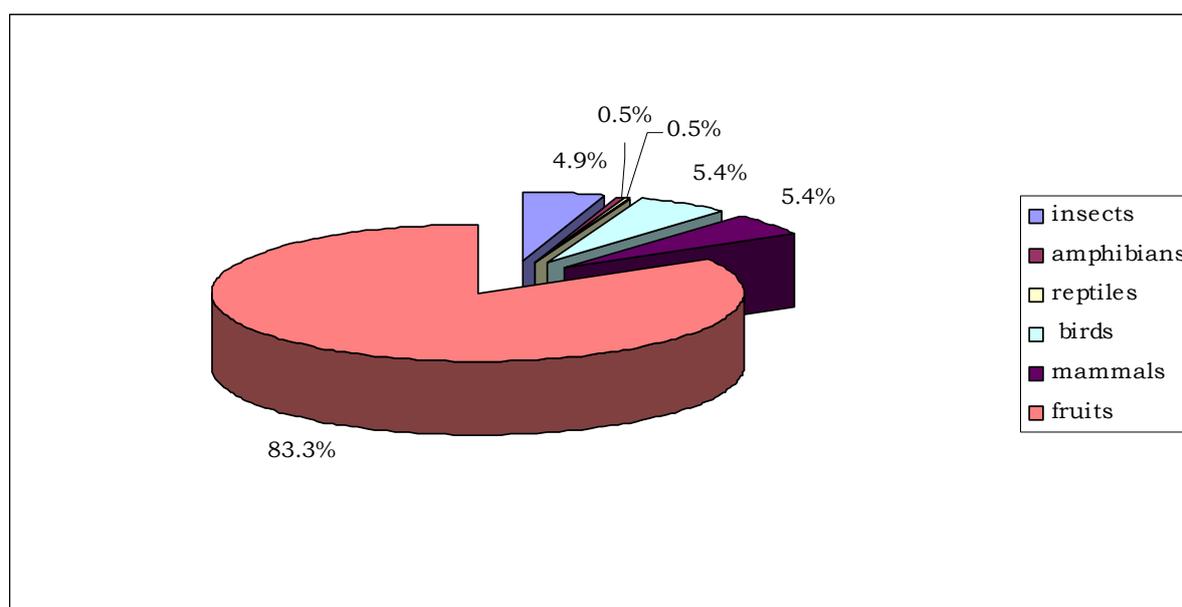
The fruits of domestic and wild plants varying from 65.8 to 94.0% in different seasons represent the main food of the urban Stone martens were (Table 2, Figure 1). Total of 9 species were used as a main food source. In spring cherries (*Cerasus sativa*) and mulberries (*Morus* sp.) were mainly taken, in summer – wild plums (*Prunus cerasifea*) and grapes (*Vitis vinifera*), in autumn – blackberries (*Rubus* sp.) and grapes (*Vitis vinifera*), and in winter – wild briars (*Rosa* sp.). The secondary food varied during seasons. In different proportions insects, birds and mammals (small and bones of large mammals) occurred in

the feces. As a whole the amphibians and reptiles were taken occasionally as it is typical for this species (Lode 1994, Vasileva *et al.* 2005, Georgiev 2009).

The species is largely frutivorous in some areas of its range (Macdonald & Barret 1993). Also its foot spectrum can be a result of individual preferences or opportunistic behavior (Sidorovich 1995). Knowing that in the cities a lot of garbage remains are easy to scavenge by the urban Stone Martens it is very possible that the fruit eating due to a preference neither to opportunistic behavior.

**Table 1.** Dates and areas of sample collections with number of feces studied.

Date	Locality	Samples
1.6.2005	Stara Zagora, Park Bedechka	6
30.8.2005	Stara Zagora, Park Bedechka	1
8.9.2005	Stara Zagora, Zora area	2
11.9.2005	Stara Zagora, Park Bedechka	1
15.9.2005	Plovdiv, vicinities, Trakia area	11
16.9.2005	Plovdiv, north vicinities, near Fishfarms	7
19.9.2005	Plovdiv, vicinities, west	1
12.12.2005	Plovdiv, near railway bridge, Maritza River	1
13.12.2005	Plovdiv, vicinities, Trakia area	15
31.1.2006	Plovdiv, north vicinities, near Fishfarms	2
16.2.2005	Plovdiv, vicinities, Trakia area	12
16.5.2006	Plovdiv, north vicinities, near Fishfarms	2
18.5.2006	Plovdiv, vicinities, Trakia area	4
2.12.2006	Stara Zagora, ZZU area	1
14.12.2006	Plovdiv, vicinities, Trakia area	1
Total number of samples		<b>67</b>



**Fig. 1.** Proportions of the different food items in the diet of the Stone marten in the two cities studied as a whole.

**Table 2.** Diet of the Stone marten in the study area during the seasons. Legend: N – minimal number of specimens or fruits taken.

Species	Spring		Summer		Autumn		Winter	
	N	%	N	%	N	%	N	%
Coleoptera indet.	4	10.5	1	1.0	0	0.0	0	0.0
Orthoptera indet.	0	0.0	1	1.0	0	0.0	0	0.0
Insecta indet.	2	5.3	1	1.0	0	0.0	1	5.6
<b>Total insects</b>	6	15.8	3	3.1	0	0.0	1	5.6
Anura indet.	0	0.0	1	1.0	0	0.0	0	0.0
<b>Total amphibians</b>	0	0.0	1	1.0	0	0.0	0	0.0
Lacertilia indet.	1	2.6	0	0.0	0	0.0	0	0.0
<b>Total reptiles</b>	1	2.6	0	0.0	0	0.0	0	0.0
<i>Sturnus vulgaris</i>	1	2.6	0	0.0	0	0.0	0	0.0
<i>Gallus gallus</i> f. <i>domestica</i> - egg	0	0.0	0	0.0	0	0.0	1	5.6
Passeriformes indet.	0	0.0	4	4.1	0	0.0	0	0.0
Aves indet.	2	5.3	1	1.0	1	2.0	1	5.6
<b>Total birds</b>	3	7.9	5	5.2	1	2.0	2	11.1
<i>Mus</i> sp.	1	2.6	0	0.0	0	0.0	0	0.0
Mammalia indet. - small	1	2.6	3	3.1	1	2.0	3	16.7
Mammalia indet. - large (carcass)	1	2.6	0	0.0	1	2.0	0	0.0
<b>Total mammals</b>	3	7.9	3	3.1	2	4.0	3	16.7
<i>Cerasus sativa</i>	12	31.6	0	0.0	0	0.0	0	0.0
<i>Malus</i> sp.	0	0.0	0	0.0	2	4.0	0	0.0
<i>Prunus cerasifera</i>	0	0.0	16	16.5	5	10.0	0	0.0
<i>Prunus domestica</i>	0	0.0	4	4.1	0	0.0	0	0.0
<i>Pyrus</i> sp.	0	0.0	5	5.2	3	6.0	0	0.0
<i>Rosa</i> sp.	0	0.0	0	0.0	17	34.0	12	66.7
<i>Rubus</i> sp.	0	0.0	9	9.3	6	12.0	0	0.0
<i>Vitis vinifera</i>	0	0.0	51	52.6	14	28.0	0	0.0
<i>Morus</i> sp.	13	34.2	0	0.0	0	0.0	0	0.0
<b>Total fruits</b>	25	65.8	85	87.6	47	94.0	12	66.7
<b>Total specimens/fruits</b>	38	100.0	97	100.0	50	100.0	18	100.0
<b>Simpsons diversity</b>	0.216		0.313		0.209		0.451	

## References

- Georgiev, D. (2009) A record of Horned viper *Vipera ammodytes* (L.) in the diet of the Stone marten *Martes foina* (Erxl.) (Mammalia: Mustelidae) in Bulgaria. *ZooNotes*, 5: 1-2.
- Lode, T. (1994) Feeding habits of the Stone marten *Martes foina* and environmental factor in Western France. *Z. Säugetierkunde*, 59: 189-191.
- Macdonald, D. & Barret. P. (1993) *Mammals of Britain and Europe*. Harper Collins Publishers, 312 pp.

- Popov, V. & Sedefchev, A. (2003) *The Mammals of Bulgaria*. Sofia. Vitosha Publ., 291 pp. (In Bulgarian).
- Sidorovich, V. (1995) *Minks, otter, weasel and other Mustelids*. Uradzhay, Minsk, 191 pp. (In Russian).
- Vasileva, S., Zlatanova, D. & Racheva V. (2005) The food of the Red fox (*Vulpes vulpes* L.) and the Marten (*Martes foina*, Erxl) in the spring-summer period in Osogovo mountain. In: Gruev, B., M. Nikolova and A. Donev (Eds.), Proceedings of the Balkan Scientific Conference of Biology in Plovdiv (Bulgaria) from 19th till 21st of May 2005, pp. 481-488.

## Localities of valvatiform hydrobiids (Gastropoda: Hydrobiidae) in Bulgaria

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**Abstract.** In this paper three new localities of unidentified valvatiform hydrobiids are reported in Bulgaria: Glava Panega Spring (Zlatna Panega Town), Rushovata Cave (near Glogovo Village), and Mandrata Cave (near Chavdartsii Village).

**Key words:** stygobiont, aquatic, snails.

### Introduction

The European valvatiform hydrobiids are diverse group of the minute Risoid freshwater snails related to about 26 different genera but all with more or less similar shell shape. Most species were described from 3 genera: *Hauffenia* Pollonera, 1898, *Horatia* Bourguignat, 1887, and *Islamia* Radoman, 1973 (Bodon *et al.* 2001). Some of the valvatiform hydrobiids live in underground waters and having not very numerous populations and very small sizes, so it makes their study very hard and sometimes even impossible. Sampling of only single live specimens or even shells is very often (Eross & Petró 2008). Also for new species descriptions good series and anatomical investigations are needed for identification (Haase 1992, Bodon *et al.* 2001).

From Bulgaria only the species *Hauffenia lucidula* (Angelov, 1967) was described from a deep well in North-east Bulgaria at the Black Sea Coast (Angelov 1967).

In this paper three new localities of unidentified valvatiform hydrobiids are reported according the needs of further, detailed research on the Bulgarian rich freshwater snail fauna.

### Material and Methods

Shells were collected by sieving subterranean river deposits by 1x1 and 2x2 mm mesh width sieves. The material from the smaller meshed sieve was then brought to the laboratory and dried. After it was again put into water and the floating shells were collected by a strainer or sieve 1x1 mm and a small brush. One live specimen was collected by hand and preserved in 75% ethanol.

The measurements of the shell were carried out by means of CETI stereo microscope and an eye-piece micrometer; the photographs were made with camera system with a digital adapter. The material is stored in the collection of the author.

Abbreviations: H – shell height, AH – aperture height, D – shell diameter, U – umbilicus width.

## Results

### Locality 1

Material examined: 3 highly eroded shells without operculums, 03.12.2010, Glava Panega Spring, Zlatna Panega Town, Pre-Balkan, North Bulgaria, N43 05 17.3 E24 09 23.0, 233 m a.s.l.

Description: Shell: valvatiform, aperture oval, whorls convex, with well visible growth lines. Measurements one of most preserved shell: H = 1.50 mm, AH = 0.86 mm, D = 1.91 mm, U = 0.40 mm.

### Locality 2

Material examined: 2 shells with operculums, 19.01.2011, Rushovata (Gradeshniskata) Cave, near Glogovo Village, Teteven Town area, Stara planina Mts., N42 59 00.30 E 24 15 71.30; Dilian Georgiev leg., coll.

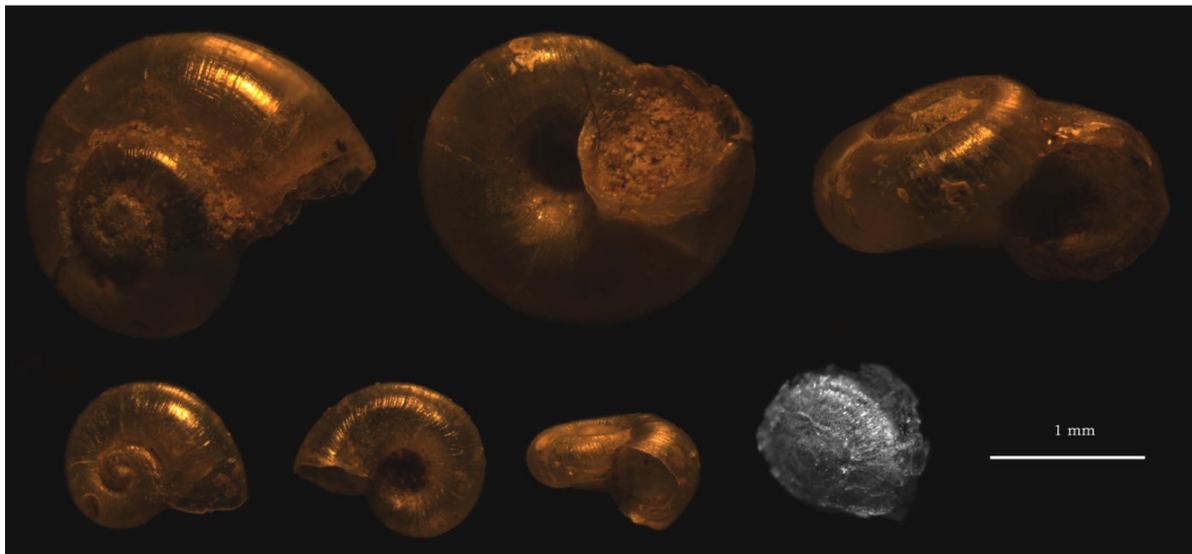
Description: Shell: valvatiform, thin, translucent, yellowish, with well visible growth lines, aperture round, operculum without peg-like structure. Measurements: specimen 1: H = 0.76 mm, AH = 0.53 mm, D = 1.22 mm, U = 0.23 mm; specimen 2: H = 1.65 mm, AH = 0.97 mm, D = 2.26 mm, U = 0.53 mm.

Remark: Both shells are different in size and morphology (Fig. 1) so it can be supposed that they belong to different species or sexes, or one is adult, and the other - juvenile.

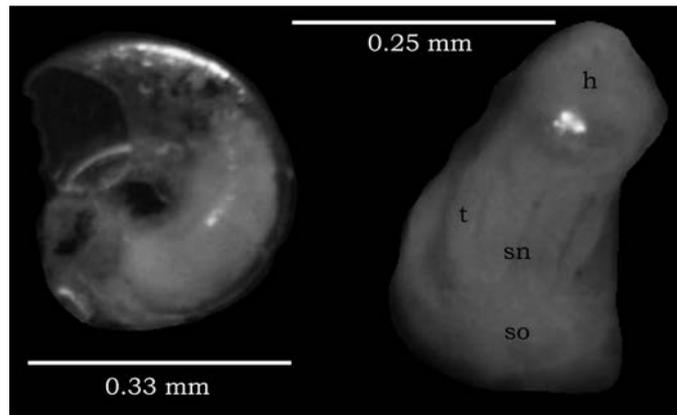
### Locality 3

Material examined: 1 live specimen, 05.06.2011, Mandrata Cave, near Chavdarts Village, Lovech Town area, N43 14 32.2 E24 58 08.8, 100-200 m a.s.l., Slaveya Stoycheva, Stanimira Deleva leg.

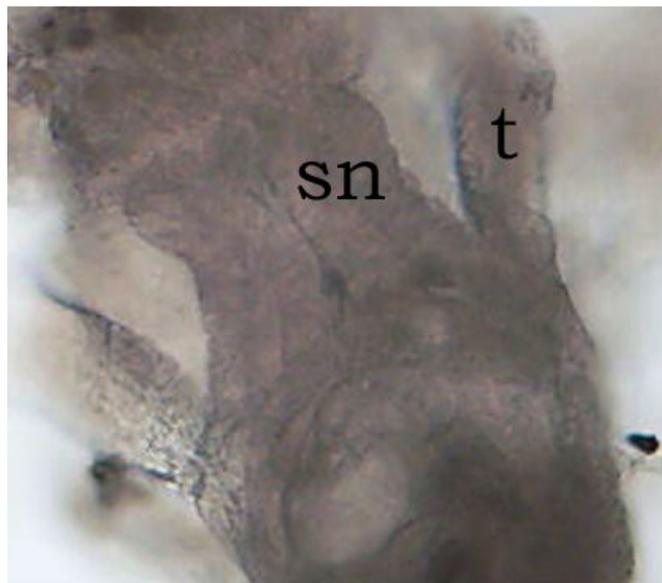
Description: Shell: very small, valvatiform, thin, translucent, spire slightly raised, aperture oval, whorls convex, smooth and finely striated. Measurements: D = 0.43 mm, U = 0.08 mm. Soft body: unpigmented, tentacles almost as long as the snout, without eye spots (Fig. 2, 3).



**Fig. 1.** The larger shell (up) and its inner side of the operculum (down right, black and white picture) and the smaller shell (down) found in Rushovata Cave near Gradeshnitsa Village.



**Fig. 2.** Umbilical side view of the shell of the valvatiform hydrobiid found in Mandrata Cave near Chavdarts Village (left) and head of the specimen (right), h – head, t – tentacle, sn – snout, so – sole.



**Fig. 3.** Light microscope picture of the specimen from Mandrata Cave near Chavdarts village, (40x), t – tentacle, sn – snout.

### Discussion

According to Bodon *et al.* (2001) one of the diagnostic characters of the genus *Hauffenia* is the presence of peg-like structure on the inner side of the operculum, so it can be stated that the specimens from Rushovata Cave cannot be related to this genus.

According to their highly eroded surface the shells collected from the Glava Panega Spring can be supposed to be brought there by subterranean waters from a population situated underground somewhere in the mountain massif above. These shells resembling on some characters those from Rushovata Cave situated about 15 km up the mountain and possible connection of the waters of both localities can be proposed.

The live specimen from Mandrata Cave was accidentally collected while probably was attached on the shell surface of the other hydrobiid described from this cave – *Devetakia mandrica* Georgiev, 2012, found by S. Stoychena and S. Deleva. Its umbilicus is looking a little bit narrower than those of the specimens from the other two localities, and its shell

surface is smoother. Considering the lack of eyes and body pigmentation it can be stated that this species is stygobiont.

### References

- Angelov, A. (1967) *Horatia (Hauffenia) lucidulus* n. sp., ein neuer Vertreter der Molluskenfauna Bulgariens. *Archiv für Molluskenkunde*, 96(3/6): 145-148.
- Bodon, M., Manganelli, G. & Giusti, F. (2001) A survey of the European valvatiform Hydrobiid genera, with special reference to *Hauffenia* Pollonera, 1898 (Gastropoda: Hydrobiidae). *Malacologia*, 43(1-2): 103-215.
- Eross, Z. & Petró, E. (2008). A new species of the valvatiform hydrobiid genus *Hauffenia* from Hungary (Mollusca: Caenogastropoda: Hydrobiidae). *Acta Zoologica Scientarum Hungaricae*, 54(2): 159-167.
- Haase, M. (1992) A new, stygobiont, valvatiform, hydrobiid gastropod from Austria (Caenogastropoda: Hydrobiidae). *Journal of Molluscan Studies*, 58: 207-214.

## Contribution to the knowledge for distribution of *Criodrilus lacuum* (Annelida: Oligochaeta: Criodrilidae) from Bulgaria

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**Abstract.** All known records of Criodrilidae earthworms in the country were presented. The current knowledge for distribution of family Criodrilidae in Bulgaria was summarized. In this paper we report new locality of *Criodrilus lacuum* Hoffmeister, 1845. Surprisingly this species was found in one of the parks in Sofia Town. New data confirm its presence in Sofia Plane. Also information about ecology, habitat type locality and short description of *Criodrilus lacuum* was provided.

**Keywords:** Criodrilidae, new record, distribution, Sofia, Bulgaria.

### Introduction

First data of this species for Bulgaria is in 1963 by Russev. In next years Mihailova (1968) cited new localities of *Criodrilus lacuum* in Northern Bulgaria. Uzunov (1980, 1981, 1998, 2006 and 2010) have the major impact of investigation for aquatic oligochaetes. He explores many localities and found most of the records for *Criodrilus lacuum* in Bulgaria.

### Materials and methods

The study was carried out in October, 2012 from Dragalevska River in Loven Park, Sofia. The specimens were collected in areas of 0.5 m<sup>2</sup> through formaldehyde method (Raw 1959), combined by digging and hand sorting. The oligochaetes were washed out from the mud and were separated from roots of aquatic weed. The earthworms were killed in 75% ethanol, preserved in 4% formalin and after several days transferred to 75% ethanol. Identification was carried out using a binocular magnifier. The studied materials were deposited in private collection of Hristo Valchovski (**pcHV**).

### Results

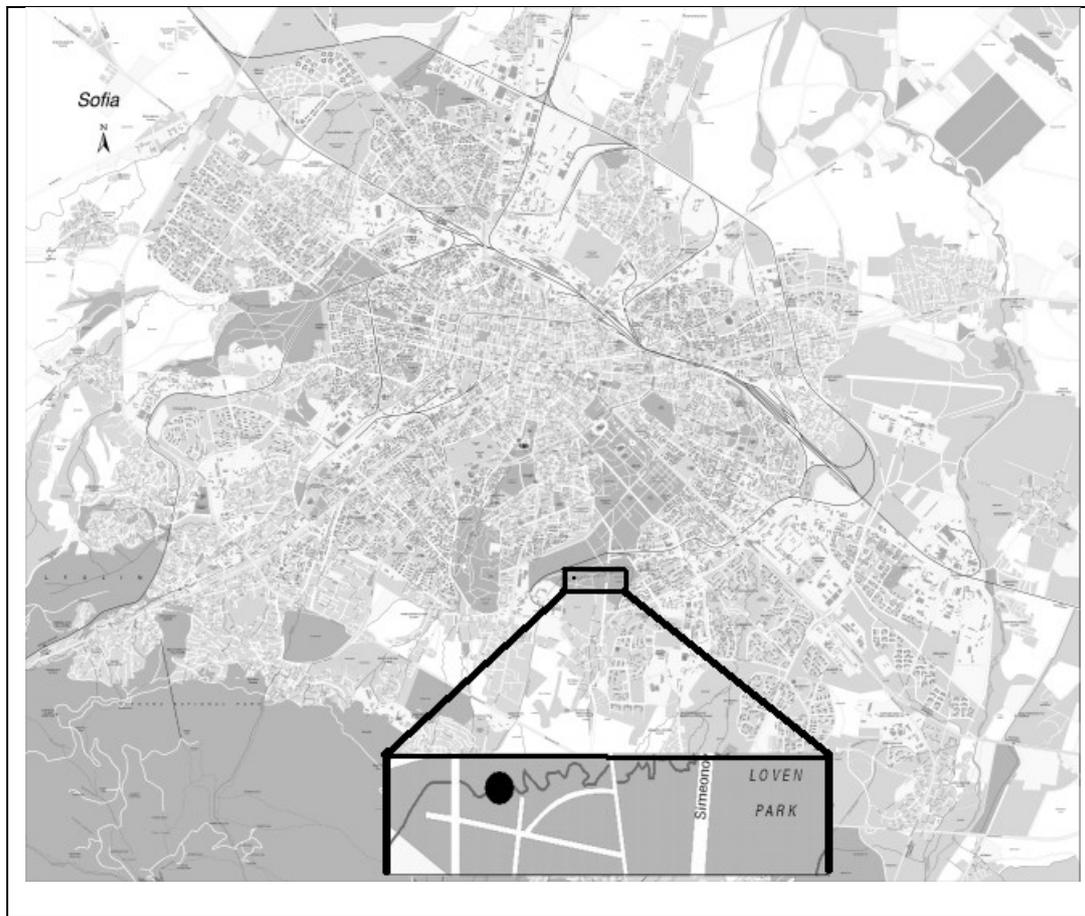
**Family Criodrilidae Vejdovsky, 1884**

***Criodrilus lacuum* Hoffmeister, 1845**

Type locality: Tegel-See, Berlin, Germany.

**Material examined:** 4 ex. Labeled ‘pcHV/14’, Bulgaria/ Sofia / Loven (=Game) Park/ in mud sediments on riverbank of Dragalevska River / 42°39.47’N, 23°19.48’E / 19.10.2012, alt. 597m / H. Valchovski leg.’ (Fig.1).

**Ecology and habitat.** Aquatic oligochaete. Found in mud and roots of aquatic plants in brackish and fresh running waters. In cold weather the species dig deep in the river sediments.



**Figure 1.** Distribution map of *Criodrilus lacuum* in Sofia (black circle indicate new locality of species in Dragalevska River crossing Loven Park).

**Discussion.** New localities of *Criodrilus lacuum* is in Dragalevska River. This small river crosses the Loven Park. In this region Dragalevska River is highly polluted with industrial wastes. Besides that, population of *Criodrilus lacuum* is concentrate in curves of the river, where are accumulate organic mud sediments. Obviously, this species could survive in highly polluted area.

**Distribution in Bulgaria.** Danube River at village of Dolni Vadim; Ogosta River at village of Martinovo and at village of Kobilyak; Skut River at village of Galiche; Iskar River downstream at Svoge and at Oriachovitsa; Blato River at Kostinbrod; Vit River at Komarevo; Beli Vit River upstream near village of Ribaritsa; Ossam River upstream and downstream at Lovetch, at village of Letnitca, and downstream at Levski; Yantra River downstream at Gabrovo, at village of Dolna Oriachovitsa, at Draganovo, at village of Radanovo and at village of Polsko Kossovo; Beli Lom River upstream at Razgrad; Provadiiska River at village of Razdelna; Glavnitsa River at village of Bozveliysko; Madara River downstream at village of Madara; Goliama Kamchiya moth in Black Sea, at village of Grozdyovo, at mouth of Ticha River and at village of Yankovo; Skorpilovska River upstream at village of Shkorpilovtsi; Tundzha River at village of Zimnitsa, upstream at Zrebchevo Dam, at village of Konevets and at village of Radovets; Kalnitca River at village of Boyadzhik; Maritsa River downstream at

Pazardzhik and upstream at Plovdiv; Mirkovska River upstream of mouth Topolnitsa River; Arda River at village of Paspal and downstream of Ivaylovgrad Dam (Uzunov 2010).

### References

- Hoffmeister, W. (1845) *Übersicht aller bis jetzt bekannten Arten aus der Familie der Regenwürmer*. Friedrich Vieweg and Sohn, Braunschweig, 43 pp.
- Mihailova, P. (1968) Belezki vrhu njakoj lumbricidni vidove v Bulgaria. (Notes about some earthworm species in Bulgaria) *Annuaire de Université de Sofia* (Годишник на Софийски университет) 60(1): 129–138 (in Bulgarian, Russian summary).
- Raw, F. (1959) Estimating earthworm population by using formalin. *Nature*, 184: 1661-1662.
- Russev, B. (1963) Antropogene lithoreophile biozoonose im bulgarischen Donauabschnitt (Antropogenic lithoreophile biotopes in Bulgarian part of Danube river). *Comptes rendus academie bulgare des sciences* (Proceeding of the Bulgarian Academy of Sciences), 16 (5): 545-548 (In German).
- Uzunov, Y. (1980) Water oligocets (Oligochaeta Limicola) from some Bulgarian rives, frequency and domination. *Hidrobiology*, 12: 79-89.
- Uzunov, Y. (1981) Aquatic oligochaeta from the Maritsa river. *Hidrobiology*, 14: 31-50.
- Uzunov, Y. (1998) Class Oligochaeta. In: Georgiev, B. *et al.* (Eds.), *Biodiversity of Srebarna biospere reserve*, Ministry of environment and water publisher, Sofia, 65 pp.
- Uzunov, Y. (2006) Review of aquatic oligochets (Oligochaeta Limicola) from water bodies of the Rhodopes Mountains (Bulgaria). In: Beron, P. (Ed.), *Biodiversity of Bulgaria*. 3. *Biodiversity of Western Rhodopes (Bulgaria and Greece)*. Pensoft and Natural Museum of Natural Hystory publishers, Sofia, 227-247.
- Uzunov, Y. (2010) Aquatic Oligochets (Oligochaeta Limicola). In: Deltchev, C., Hubenov, Z. & Dobrev, D. (Eds.), *Catalogus Faunae Bulgaricae*. Professor Marin Drinov Academic Publising House, Sofia, №7, 118 pp.
- Vejdovsky, F. (1884) *System und Morphologie der Oligochaeten*. Franz Rivnác, Prague, 172 pp.



## New data on the distribution of *Hoplia stenolepis* (Scarabaeoidea: Melolonthidae) in Bulgaria

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**Abstract.** The Balkan endemic species *Hoplia stenolepis* Apfelbeck, 1912 is reported from two localities in Kresna and Zemen Gorge, SW Bulgaria. The Zemen Gorge locality is the most northern for the species in Bulgaria to date. At the Zemen Gorge the species is found in numerous aggregations of male specimens on different grasses. No feeding or mating activity was observed.

**Key words:** *Hoplia stenolepis*, Scarabaeoidea, distribution, biology.

### Introduction

The species *Hoplia stenolepis* Apfelbeck, 1912 is Balkan endemic species, described from Albania (town of Valona, loc. typ.) and later reported for Montenegro, Macedonia and Bulgaria (Rössner 1997). In Bulgaria it is reported from Struma River valley – villages of Kresna, Lebnica, Strumjani, Sklave, Melnik and Tzarevo towns (last at the Southern Black Sea coast) (Kral & Maly 1993, Rössner 1997). In this paper some new localities of *H. stenolepis* and original data on the species biology are reported.

### Materials and methods

The material was collected in three consequent years (2011, 2012, 2013) at the Zemen Gorge by hand and sweep netting. Several specimens from Kresna Gorge were also studied. For identification the key to genus *Hoplia* (Baraud, 1992) and the original description by Apfelbeck (1912) were used. The specimens are deposited in the collection of the Department of Zoology and Anthropology, Faculty of Biology, Sofia University and in the collection of the first author. The pictures (Figs. 3, 4) were taken with digital color camera Olympus Color View I and stereomicroscope Olympus SZ61.



**Fig. 1.** Locality 2 (Zemen Gorge).



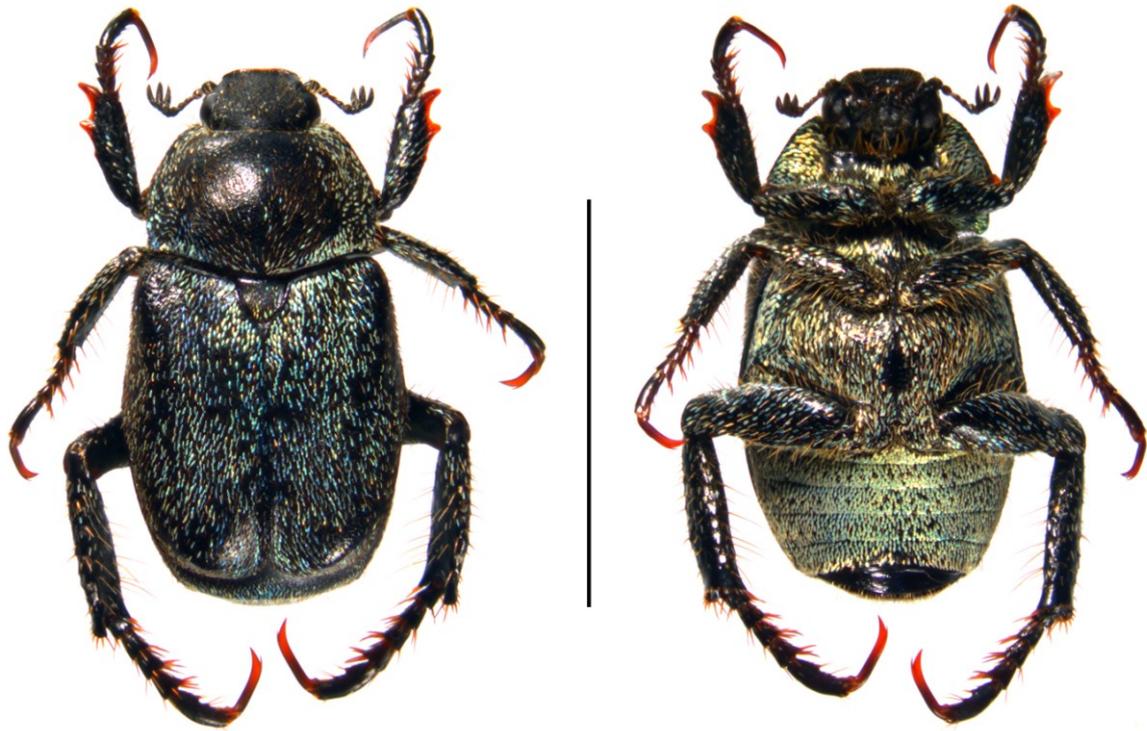
**Fig. 2.** Males of *Hoplia stenolepis* on *Rhinanthus wagneri*. Locality 2.

### Results and discussion

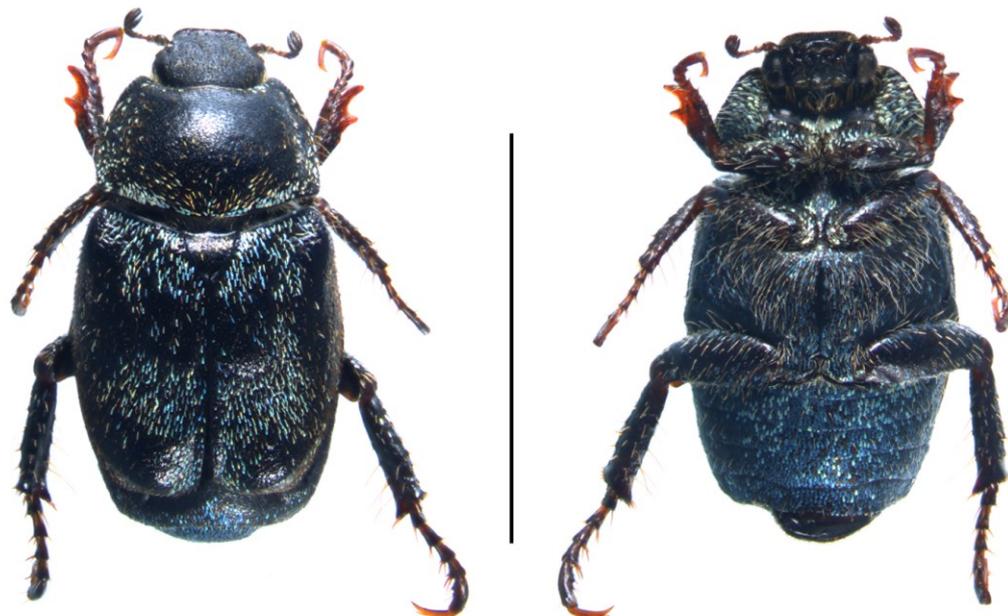
The species *Hoplia stenolepis* (Fig. 2 - 4) was found in two localities – Kresna (locality 1) and Zemen Gorge (locality 2) of Struma River. The species has previously been reported from Kresna Gorge region (Kral & Maly 1993, Rössner 1997) with no exact locations; the locality in Zemen Gorge is new and is the most northern known locality for *H. stenolepis* in Bulgaria.

**Material examined.** Locality 1: SW Bulgaria, Kresna Gorge, Sheytan Dere, near Oshtava Riv., N 41° 45' 36", E 23° 09' 20", 200 m alt.: 12.05.2001, 7♂♂ ex., leg. S. Dimitrov. Locality 2: SW Bulgaria, Zemen Gorge, near Zemen, left bank of Struma Riv., N 42° 28' 01", E 22° 43' 13", 580 m alt., riverside meadow (Fig. 1): 04.06.2011, 42♂♂ ex., sweep netting and hand collection on grasses, at noon (12:00h), sunny weather, leg. D. Gradinarov; 05.06.2011, 3♂♂ ex., hand collection on grasses, 14:30h p.m., sunny weather, leg. D. Gradinarov; 03.06.2012, 65♂♂ ex., hand collection on grasses, 13:30h p.m., sunny weather, leg. D. Gradinarov, G. Hristov; 17.05.2013, 8♂♂ ex., hand collection on grasses, 15:30h p.m., leg. D. Gradinarov; 26.05.2013, 3♂♂ ex., hand collection on grasses, 14:30h p.m., at a strong wind weather, leg. D. Gradinarov; 26.05.2013, 6♂♂ ex., hand collection on grasses, at night (23:45 h), leg. D. Gradinarov, O. Sivilov; 27.05.2013, 14♂♂ ex., hand collection on grasses, 14:30h p.m., leg. D. Gradinarov; 05.06.2013, 3♂♂, 1♀ ex., hand collection on grasses, 14:30h p.m., during rainfall, leg. D. Gradinarov.

At Zemen Gorge locality individuals of *H. stenolepis* were observed and collected mainly on flowers and leaves of *Koeleria macrantha* (Ledeb.) Schult., *Dactylis glomerata* L. (Poaceae), *Rhinanthus wagneri* Deg. (Scrophulariaceae), *Euphorbia seguieriana* Neck., (Euphorbiaceae), rarely on *Poa bulbosa* var. *vivipara* Koel., *Festuca* sp. (Poaceae), *Knautia arvensis* (L.) Coult. (Dipsacaceae), *Ranunculus acris* L. (Ranunculaceae), *Onobrychis alba* (Waldst. & Kit.) Desv. (Fabaceae) and *Salvia nemorosa* L. (Lamiaceae), gathered in groups (Fig. 2), or individually. No feeding or mating was observed.



**Fig. 3.** *Hoplia stenolepis* ♂. Zemen Gorge, 27.05.2013, leg. D. Gradinarov. Scale bar: 5 mm.



**Fig. 4.** *Hoplia stenolepis* ♀. Zemen Gorge, 05.06.2013, leg. D. Gradinarov. Scale bar: 5 mm.

Data about the biology of *H. stenolepis* in the literature are scarce. According to Apfelbeck the species is found on blackberries (“brombeersträuchern”) at the dunes (Apfelbeck, 1912) in Albania. Miksic (1957) observed numerous specimens on Poaceae (“gramineen”) at Vardar River bank in Mazedonia. Kral & Maly (1993) reported many specimens found on branches and flowers of *Tamariscus* sp. [sic!] (probably *Tamarix* sp.: Tamaricaceae), at the regions of Lebница and Strumjani. At the Zemen Gorge locality we

found individuals of *H. stenolepis* on herbaceous plants from different families. The connection with these plants seems not to be trophic or directly connected with the mating behavior. According to Kral & Maly (1993) the beetles stand on the plants at 9 to 11h a.m., then buried in sand. Our observations show that individuals of *H. stenolepis* can also be found on the plants after 12h a.m., as well at night, with no clear dependence of the weather conditions. At adverse conditions, when resting, Hopliinae species stand on plants (Medvedev, 1952). The aggregation of male individuals on plants, with no obvious activity, observed by us, very resembles such kind of behavior.

Reports of Kral & Maly (1993) and Rössner (1997) lack data on the gender of the specimens of *H. stenolepis* which they examined. At the same time, out of 125 exemplars in our collections, only one is female. This prevalence of males in multiple findings appears to be due to specific reproductive behavior.

The data available indicate that for the Bulgarian part of the Struma River valley, the species *H. stenolepis* can be observed from late April to early June. Findings in the southern localities are from the end of April to the end of May (Kral & Maly, 1993, Rössner, 1997), and from mid-May to early June for the northern locality in Zemen Gorge.

### Acknowledgements

The authors would like to thank to Dr. Rossen Tzonev (Sofia University) for identification of plant species, Ognyan Sivilov (Sofia University), Georgi Hristov (IBER-BAS) and Stojan Dimitrov, for assistance in collecting part of the material.

### References

- Apfelbeck, V. (1912) Fauna insectorum balcanica. V. I. Neue Höhlenkäfer aus Bosnien-Herzegowina und Montenegro. II. Neue Koleopteren von der Balkanhalbinsel. *Wissenschaftliche Mitteilungen aus Bosnien und der Herzegowina*, 12: 642–664.
- Baraud, J. (1992) *Coléoptères Scarabaeoidea d'Europe. Faune de France* 78. Fédération Française des sociétés de sciences naturelles, Société Linnéenne de Lyon. Paris, 856 pp.
- Kral, D. & Maly, V. (1993) New records of Scarabaeoidea (Coleoptera) from Bulgaria. *Acta Societatis Zoologicae Bohemicae*, 57: 17-29.
- Medvedev, S. I. (1952) *Scarabaeidae. Subfam. Melolonthinae. Part 2 (chafers). Coleoptera. Fauna of USSR, N.S., 52, Vol. 10(2)*. Izdatel'stvo Akademii Nauk SSSR, Moskva, Leningrad, 276 pp. (in Russian).
- Mikšič, R. (1957) Zweiter Nachtrag zur „Fauna Insectorum Balcanica - Scarabaeidae“ (Coleoptera Lamellicornia). *Acta Musei Macedonici Scientiarum Naturalium*, 4: 139-214.
- Rössner, E. (1997) Die Arten der Gattung *Hoplia* Illiger, 1803 in Bulgarien (Col., Scarabaeoidea, Melolonthidae). *Entomologische Nachrichten und Berichte*, 41(3): 190-194.

## First records of *Cecilioides tumulorum* (Gastropoda: Ferussaciidae) in Bulgaria

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**Abstract.** First records of *Cecilioides tumulorum* (Bourguignat, 1956) in Bulgaria were reported: 1. deposits of Karabayska River, near village of Sladun, Sakar Mountain; 2. deposits of Stara Reka River, near Peshtera town, Western Rhodopes Mountain; 3. deposits of Byala Reka River, near village of Mandritza, Eastern Rhodopes Mountain; 4. Ivaylovgrad town, Eastern Rhodopes Mountain. After this report, the known species from the genus *Cecilioides* in Bulgaria are: *C. acicula*, *C. janii*, *C. spelaeus* and *C. tumulorum*.

**Key words:** *Cecilioides*, localities, Balkans.

### Introduction

The genus *Cecilioides* (Müller 1774) consists of small elongate-conical shelled and unpigmented snails. On the Balkans there are 5 species from the genus found: *Cecilioides acicula* (Müller, 1774) (all over the area), *Cecilioides tumulorum* (Bourguignat, 1856) (in Turkey, Cyprus, Greece and Albania), *Cecilioides michoniana* (Bourguignat, 1864) (in Turkey, Cyprus and Greece), *Cecilioides janii* (De Betta & Martinati, 1855) (according Welter-Schultes (2012) = *C. veneta* (Strobel, 1855)) (in Slovenia and Bulgaria), and *Cecilioides spelaeus* (A. Wagner, 1914) (in Bulgaria, Croatia, Hercegovina and Montenegro) (Wächtler 1929; Damyanov & Likharev 1975; Schütt 1996; Dhora & Welter-Schultes 1996; Welter-Schultes 1998, 2012). The last of the species is with unclear taxonomical status (Damyanov & Likharev 1975).

As it was evident 3 species of *Cecilioides* were reported for the territory of Bulgaria. The most widely distributed in the country is *C. acicula* (met up to 1000 m a.s.l.): Danube River Valley, Stara planina Mountains, Black Sea Coast (Damyanov & Likharev 1975; Hubenov 2005), Upper Thracian Lowland (Irikov & Georgiev 2002), Sakar (Georgiev 2005a), Sredna Gora (Georgiev 2005b), and Rhodope Mountains (Irikov & Dedov 2004; Irikov & Mollov 2006). The second species, *C. janii* is known from the south of the country in deposits of Maritza River at Plovdiv city, Upper Thracian Lowland (Wagner 1927), Black Sea Coast at the mouth of Veleka River, and from west at Struma and Mesta Valleys (Damyanov & Likharev 1975). In north Bulgaria this species was reported from the deposits of Yantra River at Veliko Tarnovo town, Stara planina Mountains (Urbański 1960). The third species was registered in few localities of Bulgaria: deposits of Maritza River in Plovdiv city (Wagner 1927), “possibly the northern low limestone areas of the Rhodopes Mountain” (Damyanov &

Likharev 1975), Stara Zagora city in the Upper Thracian Lowland (Irikov & Georgiev 2002), and Sarnena Sredna Gora Mountain (Georgiev 2005b).

All over the warm, southern parts of Bulgaria where the Mediterranean climate influence is high both of the Mediterranean species which were not found in Bulgaria till now could be expected: *C. michoniana* and *C. tumulorum*. In this paper we represent the first localities of the second species in the country.

### Material and Methods

Terrestrial gastropod shells were collected by examination of river deposits using a system of two sieves (2x2 and 1x1 mm). Four rivers were investigated: 1. 03 May 2006, Karabayska River (Sakar Mountain, near village of Sladun, Southern Bulgaria, near the Turkish border), 2. 20 May 2006, Stara Reka River, near Peshtera town (West Rhodopes Mountain), 3. 02 May 2008, Byala Reka River, near Mandritza village, and 4. a small river passing through Ivaylovgrad town (both in the Eastern Rhodopes Mountain, close to the Greek border). Some of the material was deposited in the Malacological Museum Haus der Natur Cismar (Germany), and the rest (with all the collection of D. Georgiev of terrestrial snails till 2013) in the Regional Natural History Museum (Plovdiv, Bulgaria).

Determination of the material was done following Wagner (1927), Damyanov & Likharev (1975), Kerney et al. (1983), Schütt (1996), and Welter-Schultes (2012).

Abbreviations: H – shell height, D – shell diameter, AH – aperture height, LH – last whorl height.

### Results

According to the literature *C. tumulorum* has a glossy and shining spindle-shaped shell, with blunt apex, and pear-shaped aperture. The shell of *C. tumulorum* differs from those ones of *C. janii* and *C. spelaeus* by its smaller aperture, and more elongate shape. It is most similar to this one of *C. acicula*. Both shells of these species are thin and elongate, often with relatively rounded whorls and much or less deep suture. *C. tumulorum* differs from *C. acicula* by its longer (up to 8.0 mm), and wider shell (> 1.2 mm). The height of the aperture is larger than in *C. acicula* shells of the same shell height.

Shells with such morphology described above and refer to *C. tumulorum* we found in Bulgaria in some localities of its southern part (Fig. 2).

### Locality № 1

Material examined: 03 May 2006, 1 shell (Fig. 1), deposits of Karabayska River, near village of Sladun, Sakar Mountain, about 3 km north from the Turkish border, N41° 51', E26° 27', UTM-grid: MG53, 100-150 m a. s. l.

Because the shell of the registered specimen was found in river bank deposits no habitat information was available. The closely situated dominating habitats were dry *Quercus* spp. forests and bushy grasslands occupied by *Carpinus orientalis*, *Jasminum fruticans* and *Paliurus spina-cristii*, with patches of small river bank forests of *Salix* spp. All these vegetation complexes were on limestone terrains.

Shell measurements: H = 4.8 mm, D = 1.5 mm, AH = 2.1 mm, LH = 3.3 mm.

Other terrestrial gastropod species found in the locality: *Carychium minimum* O. F. Müller, 1774, *Cochlicopa lubricella* (Rossmässler, 1835), *Vertigo antivertigo* (Draparnaud, 1801), *Vertigo pygmaea* (Draparnaud, 1801), *Truncatellina cylindrica* (Ferussac, 1821), *Vallonia costata* (O. F. Müller, 1774), *Vallonia pulchella* (O. F. Müller, 1774), *Mastus rosmaessleri* (L. Pfeiffer, 1846), *Succinea oblonga* (Draparnaud, 1801), *Cecilioides acicula* (O. F. Müller, 1774), *Vitrea neglecta* Damjanov et Pinter, 1969, *Vitrea pygmaea* (O. Boettger, 1880), *Vitrea vereae* Irikov, Georgiev et Riedel, 2004, *Oxychilus inopinatus* (Uličný, 1887), *Punctum pygmaeum* (Draparnaud, 1801), *Monacha ovularis* (Bourguignat, 1855).

Remark: All these species were published in the paper of Georgiev (2005a). The specimen of *C. tumulorum* was wrongly identified and reported as *Cecilioides spelaeus* by the author.

### Locality № 2

Material examined: 20 May 2006, 3 shells, deposits of Stara Reka River, near Peshtera town, Western Rhodopes Mountain, N42° 01' E 24° 16', UTM-grid: KG75, about 500 m a.s.l.

The closely situated habitats were *Quercus* spp. and *Carpinus betulus* forest with small patches of dry grassy areas, and a river bank forest dominated by *Salix* sp. and *Alnus glutinosa*, all on a limestone terrain.

Shell measurements: №1 - H = 4.6 mm, D = 1.4 mm, AH = 1.9 mm, LH = 3.1 mm, №2 - H = 4.5 mm, D = 1.3 mm, AH = 1.8 mm, LH = 3.0 mm, №3 - H = 4.4 mm, D = 1.3 mm, AH = 1.8 mm, LH = 2.9 mm.

Other terrestrial gastropod species found in the locality: *Carychium* sp., *Cochlicopa lubricella* (Rossmässler, 1835), *Cochlicopa lubrica* (O. F. Müller, 1774), *Pyramidula pusilla* (Vallot, 1801), *Vertigo pusilla* O. F. Müller, 1774, *Truncatellina claustralis* (Gredler, 1856), *Truncatellina cylindrica* (Ferussac, 1821), *Pupilla sterri* (Voith, 1838), *Agardhiella parreyssii* (L. Pfeiffer, 1884), *Agardhiella rumelica* (Hesse, 1916), *Sphyradium doliolum* (Bruguier, 1792), *Vallonia costata* (O. F. Müller, 1774), *Vallonia pulchella* (O. F. Müller, 1774), *Vallonia enniensis* (Gredler, 1856), *Acanthinula aculeata* (O. F. Müller, 1774), *Merdigera obscura* (O. F. Müller, 1774), *Bulgarica denticulata* (Olivier, 1801), *Euconulus fulvus* (O. F. Müller, 1774), *Vitrea neglecta* Damjanov et Pinter, 1969, *Vitrea pygmaea* (O. Boettger, 1880), *Daudebardia rufa* (Draparnaud, 1801).

### Locality № 3

Material examined: 02 May 2008, 1 shell, deposits of Byala Reka River, near village of Mandritza, East Rhodopes Mountain, N41° 23' 37.1" E26° 07' 40.4", UTM-grid: MF28, 56.4 m a.s.l.

The closely situated habitats were *Quercus* spp. and *Carpinus orientalis* forest, bushy pasture lands with *Juniperus* sp., and *Paliurus spina-christi*, and a river bank forest dominated by *Platanus orientalis*, *Salix* sp., and *Alnus glutinosa*, all on a volcanic base rock.

Shell measurements: H = 5.3 mm, D = 1.6 mm, AH = 2.4 mm, LH = 3.4 mm.

Other terrestrial gastropod species in the locality: *Carychium minimum* O. F. Müller, 1774, *Cochlicopa lubricella* (Rossmässler, 1835), *Pyramidula pusilla* (Vallot, 1801), *Vertigo pygmaea* (Draparnaud, 1801), *Truncatellina cylindrica* (Ferussac, 1821), *Vallonia costata* (O. F. Müller, 1774), *Vallonia pulchella* (O. F. Müller, 1774), *Vallonia enniensis* (Gredler, 1856), *Acanthinula aculeata* (O. F. Müller, 1774), *Mastus rossmaessleri* (L. Pfeiffer, 1846), *Bulgarica denticulata* (Olivier, 1801), *Cecilioides acicula* (O. F. Müller, 1774), *Euconulus fulvus* (O. F. Müller, 1774), *Vitrea riedeli* Damjanov et Pinter, 1969, *Vitrea pygmaea* (O. Boettger, 1880), *Balcanodiscus frivaldskyanus* (Rossmässler, 1848), *Oxychilus inopinatus* (Uličný, 1887), *Daudebardia rufa* (Draparnaud, 1801), *Punctum pygmaeum* (Draparnaud, 1801), *Lindholmiola girva* (Frivaldszky, 1835), *Monachoides incarnatus* (O. F. Müller, 1774), *Monacha carascaloides* (Bourguignat, 1855), *Monacha solidior* (Mousson, 1863).

### Locality №4 (?)

For Albania Dhora & Welter-Schultes (1996) reported a form of *Cecilioides* which had shell characteristics similar both to *C. acicula* and *C. tumulorum*. The authors supposed that it was a hybrid form. In this locality we found a shell with morphology more like the first species but with a larger size than it, specific to the second. The maximal shell width of *C.*

*acicula* is 1.1 or 1.2 mm considering various authors (Damyanov & Likharev 1975). The shell of the specimen we found was wider such dimensions.

Material examined: 02 May 2008, 1 shell, alluvium soil of a small river passing through Ivaylovgrad town, Eastern Rhodopes Mountain, N41° 31' 29.3" E26° 07' 32.8", UTM-grid: MF29, 141 m a.s.l.

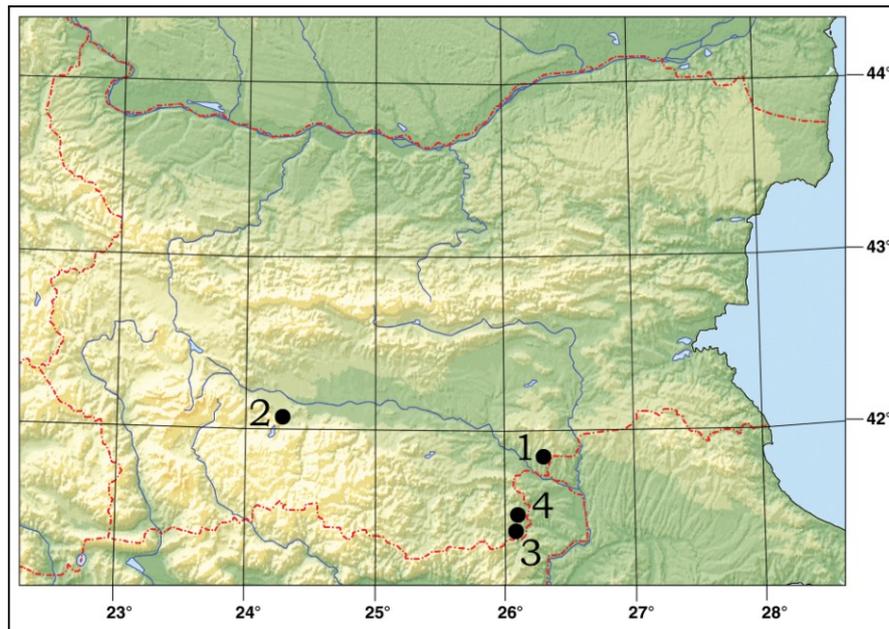
Habitat: river bank forest dominated by *Salix* sp. and *Juglans regia*, densely occupied by *Rubus* sp. The surrounding habitats were urbanized grass terrains of the Ivaylovgrad town. The base rock was a limestone.

Shell measurements: H = 4.4 mm, D = 1.3 mm, AH = 1.6 mm, LH = 2.8 mm.

Other terrestrial gastropod species in the locality: *Pomatias elegans* (O. F. Muller, 1774), *Agardhiella rumelica* (Hesse, 1916), *Vallonia pulchella* (O. F. Müller, 1774), *Oxychilus urbanskii* Riedel, 1963, *Zonitoides nitidus* (O. F. Müller, 1774), *Daudebardia rufa* (Draparnaud, 1801), *Tandonia kusceri* (H. Wagner, 1931), *Deroceras thersites* (Simroth, 1886), *Cepaea vindobonensis* (Ferussac, 1821), *Helix lucorum* Linnaeus, 1758, *Cernuela virgata* (da Costa, 1778), *Monacha carascaloides* (Bourguignat, 1855).



**Fig. 1.** Shells of the species from the genus *Cecilioides* known in Bulgaria: **A** - *C. tumulorum*, Sakar Mountain, near village of Sladun, **B** - *C. acicula*, Stara Zagora city, **C** - *C. jani*, Plovdiv city, **D**, **E** - *C. spelaeus*, Stara Zagora city (**D** - adult shell with broken periphery of the aperture, and **E** - enlarged subadult shell with fragmented apex, view on the aperture shape).



**Fig. 2.** Known localities of *Cecilioides tumulorum* in Bulgaria (locality numbers correspond with those in the text).

**Acknowledgements:** We are grateful to Dr. Francisco Welter-Schultes (Zoologisches Institut, Goettingen) for sharing his own experiences on the *Cecilioides* species from Greece and Turkey, which were very useful for preparing this paper. We also thank and to Alena Mikovcová (Charles University, Prague) for the literature sources.

### References

- Damyantov, S. & Likharev, I. (1975) *Terrestrial snails (Gastropoda terrestria)*. Fauna Bulgarica, 5., Marin Drinov Publ., Sofia, 425 pp. (in Bulgarian).
- Dhora, D. & Welter-Schultes, F. (1996) List of species and atlas of the non-marine molluscs of Albania. *Schriften zur Malakozoologie*, 9: 90-197.
- Georgiev, D. (2005a) The mollusks (Mollusca: Gastropoda et Bivalvia) of Sakar Mountain (Southern Bulgaria): A Faunal Research. *Scientific Studies of the University of Plovdiv, Biology, Animalia*, 41: 5-12.
- Georgiev, D. (2005b) Species diversity and habitat distribution of the malacofauna (Mollusca: Bivalvia, Gastropoda) of Surnena Sredna Gora Mountain (Southern Bulgaria). In: Gruev B., Nikolova M., Donev M. (Eds.), *Proceedings of the Balkan Scientific Conference of Biology in Plovdiv (Bulgaria) from 19th till 21st of May 2005*: 428-435.
- Hubenov, Z. (2005) Malacofaunistic diversity of Bulgaria. In: Petrova A. (Ed.), *Current state of Bulgarian biodiversity – problems and perspectives*, Bulgarian Bioplatform, Sofia, 199-246. (in Bulgarian).
- Kerney, M., Cameron, R. & Jungbludgh, J. (1983) *Die Landschnecken Nord-und Mitteleuropas*. Hamburg & Berlin, Verlag Paul Parey, 384 pp.
- Irikov, A. & Dedov, I. (2004) Contribution to the knowledge of the terrestrial gastropod fauna (Mollusca: Gastropoda) of the Eastern Rhodopes (Bulgaria). In: Beron P. (ed). *Biodiversity of Bulgaria. 2. Biodiversity of Western Rhodopes (Bulgaria and Greece) I.*, Pensoft & Nat. Mus. Natur. Hist., Sofia: 787-790.

- Irikov, A. & Georgiev, D. (2002) Species composition, habitat distribution, zoogeographical structure and origin of the malacofauna in town Stara Zagora (Bulgaria). *Scientific Studies of University of Plovdiv, Biology, Animalia*, 38 (6): 5-16. (in Bulgarian).
- Irikov, A. & Mollov, I. (2006) Terrestrial gastropods (Mollusca: Gastropoda) of the Western Rhodopes (Bulgaria). In: *Beron P. (ed). Biodiversity of Bulgaria. 3. Biodiversity of Western Rhodopes (Bulgaria and Greece) I*. Pensoft & Nat. Mus. Natur. Hist., Sofia: 753-832.
- Schütt, H. (1996) *Landschnecken der Türkei*. Verlag Natur & Wissenschaft Harro Hieronimus & Dr. Jürgen Schmidt, Postfach, 497 pp.
- Urbański, J. (1960) Beiträge zur Molluskenfauna Bulgariens (excl. Clausiliidae), (Systematische, zoogeographische und ökologische Studien über die Mollusken der Balkan-Halbinsel VI.). *Bulletin Societe des Amis des Sciences et Lettres de Poznan*, 1: 113-149.
- Wächtler, W. (1929) Anatomie und Biologie der augenlosen Landlungenschnecke *Caecilioides acicula* Müll. *Zeitschrift für Morphologie und Ökologie*, 13 (3/4): 359-462.
- Wagner, A. (1927) Studien zur Molluskenfauna der Balkanhalbinsel mit besonderer Berücksichtigung Bulgariens und Traziens, nebst monographischer Bearbeitung einzelner Gruppen. *Annales zoologici Musei Polonici*, 6 (4): 263-399.
- Welter-Schultes, F. (1998) Die Landschnecken der griechischen Insel Gávdos, der südlichsten Insel Europas. *Schriften zur Malakozoologie*, 12: 1-120.
- Welter-Schultes, F. (2012) *European non-marine molluscs, a guide for species identification*. Planet Poster Editions, Göttingen, 674 pp.

## Contribution to the butterfly species of Belasitsa Mountain (SW Bulgaria) and second record of *Gonepteryx cleopatra* (Linnaeus, 1767) from Bulgaria

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**Abstract.** At present, according to the literature data for Belasitsa Mountain are published 139 butterfly species. This article contributes to the knowledge of the butterfly fauna of the mountain by adding five more species. With this supplement the number of the butterflies' fauna of Belasitsa Mountain increase to 144 species. This article also presents information about the second record of *Gonepteryx cleopatra* (Linnaeus, 1767) in Bulgaria.

**Key words:** Belasitsa Mountain, Alibotoush Mountain, Rupite locality, *Gonepteryx cleopatra*, butterflies, faunistic data.

### Introduction

Belasitsa Mountain is a mountain range in the central part of the Balkan Peninsula. Currently the southern slope of the mountain belongs to the territory of Greece, the southwestern slope to Republic of Macedonia and the southeastern slope – to Bulgaria. The considerable displacement, the specific geographical location and the distinctive climate are the main reasons which determine the diverse butterflies' fauna of Belasitsa Mt. Unlike any other borderline areas (for example the Vlahina Mountain), the butterflies of Belasitsa Mt. are studied very well.

### Material and methods

The current report presents a summary of the published faunistic data of butterfly taxa inhabiting the Bulgarian section of Belasitsa Mt. (Fig. 1). In addition, 5 species, not registered before in Belasitsa Mt. are reported here with locations, data of records, number and sex of specimens. Short faunistic analysis is made based on the comparison between the butterflies of Belasitsa Mt. and those of Alibotoush (Slavyanka) Mountain. Of a great interest is the record of *Gonepteryx cleopatra* (Linnaeus, 1767) in the lower parts of Belasitsa Mt. Short comment about the distribution of this species is given, as well as a review of the previous record.

### Discussion

The main work dedicated to the Belasitsa' butterflies is by Slivov and Nestorova (1988), who listed 134 butterfly species in total. Several other species were added later: *Melitaea aurelia* Nickerl, 1850 (Abadjiev 1995), *Pseudochazara geyeri* (Herrich-Schäffer, [1846]) (Slivov & Abadjiev 1999), *Muschampia proto* (Ochsenheimer, 1818) (Abadjiev 2001), *Hipparchia syriaca* (Staudinger, 1871) (Abadjiev 2001 revised Drenowsky 1920 and Drenovski 1921), *Apatura iris* (Linnaeus, 1758) (Abadjiev & Beshkov 2007), *Neptis sappho* (Pallas, 1771), *Tarucus balcanicus* (Freyer, [1844]) and *Lampides boeticus* (Linnaeus, 1767) (Domozetski 2009).



**Fig. 1.** Map of the Bulgarian section of Belasitsa Mt.

The species *Muschampia proto* and *Pseudochazara geyeri* are mentioned for the Belasitsa Mt. only in the context of revised specimens from the collections of the former Institute of Zoology (now the Institute for Biodiversity and Ecosystem Research, Sofia) at the Bulgarian Academy of Sciences. However, a serious doubt exists regarding these findings and the case is probably a case of wrongly labeled specimens (Kolev 2002). *Muschampia proto* and *Pseudochazara geyeri* have never been reported for Belasitsa Mt. for a second time and for that reason they should not be counted to the Lepidoptera species typical for this region, or even to Bulgaria. Acceptable explanation how such wrong data appeared in the literature is given in Ignatov, Wetton and Beshkov, 2013 (unlabeled specimens donated to Slivov from colleagues abroad).

Furthermore, Slivov and Nestorova (1988) reported three species from the genus *Colias* in this region: *Colias crocea* (Fourcroy, 1785), *Colias hyale* (Linnaeus, 1758) and *Colias australus* Veity, 1911 (syn. *Colias alfacariensis* Ribbe, 1905). Abadjiev (2001) rightfully includes only *Colias crocea* and *Colias alfacariensis*, excluding *Colias hyale*. Making a difference between *Colias alfacariensis* and *Colias hyale* is very hard, especially with females and this species are readily separable in larval stage (Tolman & Lewington 1997). The habitat of these species is also different and *C. hyale* has no place in Belasitsa. For example, it has been established that all the specimens from NMNHS collection previously reported as *Colias hyale* actually represent *Colias alfacariensis*, and the only reliable record of *Colias hyale* from Bulgaria is based on the specimens from a single locality in Ludogorie (Abadjiev 2001).

Up to now the number of the butterfly species in Belasitsa Mt. is 139 according to the data in the literature. The current article contributes to this by adding five more (with locations, data of records, number and sex of specimens) species as follows:

*Erynnis marloji* (Boisduval, [1843]): 2 km SW of Razhdak Village, 03.04.2013, 1 ♀.

*Carcharodus orientalis* Reverdin, 1913: between Gabrene Village and Skrat Village, 08.06.2012, 1 ♂.

*Gonepteryx cleopatra* (Linnaeus, 1767): 1 km NE of Kolarovo Village, 22.06.2013, 1 ♂; Gabrene Village, 23.06.2013, 1 ♂ (Fig. 2).

*Araschnia levana* (Linnaeus, 1758): Kamena Village, 12.08.2011, 1 ♀ and 1 ♂; Klyuch Village, 17.07.2012, 1 ♂; Yavornitsa Village, 17.07.2012, 1 ♀.

*Hipparchia fatua* Freyer, [1844]: 500 m NE of Kolarovo Village, 10.10.2009, 1 ♂; Kolarovo Village, 16.07.2012, 1 ♀.



**Fig. 2.** *Gonepteryx cleopatra*, Gabrene Village, 23.06.2013.

With this supplement the number of the butterflies' fauna of Belasitsa Mt. increase to 144 species. Typical of the butterflies' fauna of Belasitsa Mt. is the small percentage of mountain species. Of great interest is the comparison between the butterflies of Belasitsa Mt. and those of Alibotoush (Slavyanka) Mountain. These two mountains are located on almost the same latitude and they extend a maximum altitude of over 2000 m (Radomir Top in Belasitsa Mt. – 2029 m; Gotsev Top in Alibotoush Mt. – 2212 m). Alibotoush Mt. is connected with Pirin Mountain (Vihren Peak – 2914m) to the North and with Cherna Gora Mountain (Cherna Gora Top – 1653 m) and Sengelska Mountain (Chal Top – 1330 m) to the South. Belasitsa Mt. is connected only with Plavush Mountain (Plavush Top – 997 m) and Krousha Mountain (Krousha Top – 860). Alibotoush Mt. is characterized by a large number of mountain species, such as *Parnassius apollo* (Linnaeus, 1758), *Plebeius dardanus* (Freyer, [1844]), *Polyommatus nephohiptamenos* (Brown & Coutsis, 1978), *Coenonympha rhodopensis* Elwes, 1900, *Erebia ottomana* Herrich-Schäffer, [1847], *Erebia melas* (Herbst, 1796), *Boloria graeca* (Staudinger, 1870) completely absent from Belasitsa Mt. The presence of these species in Alibotoush Mt. is partly explicable by its connection to the higher Pirin Mt. and the penetration of certain mountain species from Pirin Mt. to Alibotoush Mt. is conceivable. In the relatively isolated by high mountains Belasitsa Mt. such processes are not possible. Even the S Europe mountain genus *Erebia* in Belasitsa Mt. is represented by 3 species only, the most widely distributed species of this genus in Bulgaria. Certainly the connection between Alibotoush Mt. and Pirin Mt., and the insularity of Belasitsa Mt. are not the only reasons for the distribution of mountain species in Alibotoush Mt. and their absence in Belasitsa Mt. The differences in the geomorphological structure of both the mountains and the specifics of vegetation also play an important role in the formation of their butterflies' fauna. For example, on Belasitsa there is no coniferous zone and the pseudosubalpine zone is just above the *Fagus* forest. In Alibotoush coniferous belt is well presented.

Another characteristic of butterflies of Belasitsa Mt. is the large percentage of thermophilic species of southern origin in the lower parts of the mountain. These are *Erynnis marloyi* (Boisduval, [1843]), *Anthocharis gruneri* Herrich-Schäffer, [1851], *Pontia chloridice* (Hübner, [1813]), *Tarucus balkanicus* (Freyer, [1844]), *Lycaena ottomana* (Lefebvre, [1830]), *Hipparchia fatua* Freyer, [1844], *Pseudochazara anthelea* (Hübner, [1824]), *Polygonia egea* (Cramer, [1775]), specific for the southern parts of Strouma Valley. *Pontia chloridice* is not even known from the Strouma Valley and in SW Bulgaria this species is distributed only on the slopes of Belasitsa Mt.

Of great interest is the record of *Gonepteryx cleopatra*. This species is distributed on the Canary Islands, Madeira, Northwest Africa, South Europe, Turkey and the Middle East (Tolman & Lewington 1997). The first and single published record of this species in Bulgaria is from the Northeastern slope of Rila Mountain near Kostenets (Ganev 1989). It is probably a case of migrant specimen because the species have never been recorded again in Rila Mt. or Bulgaria in general. Here it should be mentioned one record of *Gonepteryx cleopatra* from the region of Rupite locality (SW Bulgaria), near the church of St. Petka, 10.03.2013, 1 ♂. Considering that the region of Rupite with the adjacent Kozhuh Hill are one of the most visited places for butterflies' monitoring in Bulgaria, undoubtedly it is a case of migrant specimen and not a permanently residing species. Nevertheless, even in the case of migrant one, the records of *Gonepteryx cleopatra* from Belasitsa Mt. and Rupite are particularly interesting in zoogeographical point of view. There are some more still unpublished observations of *G. cleopatra* from lower parts of Alibotoush and from Southern Pirin Mt., even from Northern Pirin, which supports the opinion for wandering specimens.

## References

- Abadjiev, S. (1995) *Butterflies of Bulgaria, Volume 3, Nymphalidae: Apaturinae & Nymphalinae*. Published by the author, Sofia, 159 pp.
- Abadjiev, S. (2001) *An Atlas of the Distribution of the Butterflies in Bulgaria (Lepidoptera: Hesperioidea & Papilionoidea)*. Pensoft, Sofia – Moscow, 335 pp.
- Abadjiev, S. & Beshkov, S. (2007) *Prime Butterfly Areas in Bulgaria*. Pensoft, Sofia – Moscow, 222pp.
- Buresch, I. & Iltschew, D. (1921) Driter Beitrag zur Erforschung der Lepidopterenfauna von Trazien und Mazedonien. *Travaux de la Société Bulgare des Sciences Naturelles*, 9: 61 – 86 (In Bulgarian, German Summary).
- Buresch, I. & Tuleschkow, K. (1929) Die horizontale Verbreitung der Schmetterlinge (Lepidoptera) in Bulgarien. *Mitteilungen aus den Königlichen naturwissenschaftlichen Instituten in Sofia – Bulgarien*, 2: 145–250 (In Bulgarian).
- Buresch, I. & Tuleschkow, K. (1930) Die horizontale Verbreitung der Schmetterlinge (Lepidoptera) in Bulgarien II. *Mitteilungen aus den Königlichen naturwissenschaftlichen Instituten in Sofia – Bulgarien*, 3: 145–248 (In Bulgarian).
- Domozetski, L. (2009) New records of rare butterfly species (Lepidoptera) from Southwestern Bulgaria. *Historia naturalis bulgarica*, 20: 79 – 85.
- Drenowsky, A (1920) Ein Beitrag zur Schmetterlingsfauna des Pirin-, Maleschewska- und Belasitza-Gebirges in West-Trazien. *Zeitschrift für wissenschaftliche Insektenbiologie*, 15 (10 – 12): 231 – 246.
- Drenovski, A. (1921) Contribution à la faune des Lépidoptères de Pirine planina, Maléchevska planina et Bélassitza planina. *La revue de l'académie bulgare des sciences*, 23: 111 – 154 (In Bulgarian).
- Ganev, J. (1989) First record of *Gonepteryx cleopatra* (Linnaeus, 1767 [sic]) in Bulgaria (Lepidoptera: Pieridae). *Phegea*, 17 (4): 143.

- Ignatov, A. Wetton P. & Beshkov, S. (2013) *Chilades trochylus* (Freyer, [1845]) (Lep.: Lycaenidae) confirmed for the Bulgaria fauna and doubt cast on earlier records of this and other species. - *Entomologist's Rec. J. Var.*, 125 :119-122.
- Kolev, Z. (2002) Critical notes on some recent butterfly records (Lepidoptera: Papilionoidea & Hesperioidea) from Bulgaria and their source collection. *Phegea*, 30 (3): 95 – 101.
- Slivov, A. & Nestorova, E. (1988) Butterflies (Lepidoptera, Rhopalocera) from the Belasitsa Mountain. In: Botev, B. (ed.) . *Fauna of Southwestern Bulgaria. Part 2*. Publishing house of the Bulgarian Academy of Sciences, Sofia, pp. 115 – 121 (In Bulgarian, Russian and English Summary).
- Slivov, A. & Abadjiev, S. (1999) Two *Pseudochazara* species, new for Bulgaria (Lepidoptera, Bynphalidae: Satyrinae). *Phegea*, 27 (4): 145 – 146.
- Tolman, T. & Lewington, R. *Butterflies of Britain & Europe*. Harper Collins Publishers, London – Glasgow – New York – Sydney – Auckland – Toronto – Johannesburg, 320 pp.



## A record of *Viviparus syriacus* (Gastropoda: Viviparidae) in Turkey

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**Abstract.** First record of the fossil species *Viviparus syriacus* from Turkey was reported: deposits of the Asi Nehri river north of Antioch town, about 20 km west of the Syrian border, N36 14 54.0 E36 11 59.3, 127 m alt.

**Key words:** *Viviparus*, new locality, Turkey.

### Introduction

The species *Viviparus syriacus* Pallary, 1939 is known from fossil remains of the Pliocene of Greece and the Pleistocene of the North-West Arabian Peninsula (Starobogatov 1985). In this short note we report first finding of this species in Turkey by empty shells of the Asi Nehri River north of Antioch town, about 20 km west of the Syrian border. The age of these shells was not known but considering some near dated finds (in Syria, Israel and Lebanon) (Pallary 1930, 1939; Pikard 1965) their Pleistocene origin could be supposed.

### Material and Methods

Freshwater gastropod shells were collected by examination of river deposits of Asi Nehri River, Turkey, about 20 km west of the Syrian border on 14.08.2009.

Abbreviations: H – shell height.

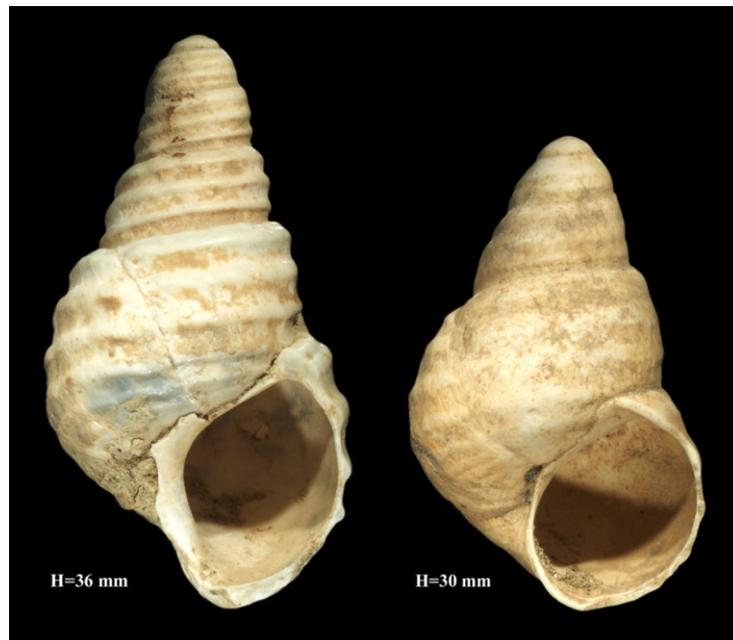
### Results

#### ***Viviparus syriacus* (Pallary, 1939)**

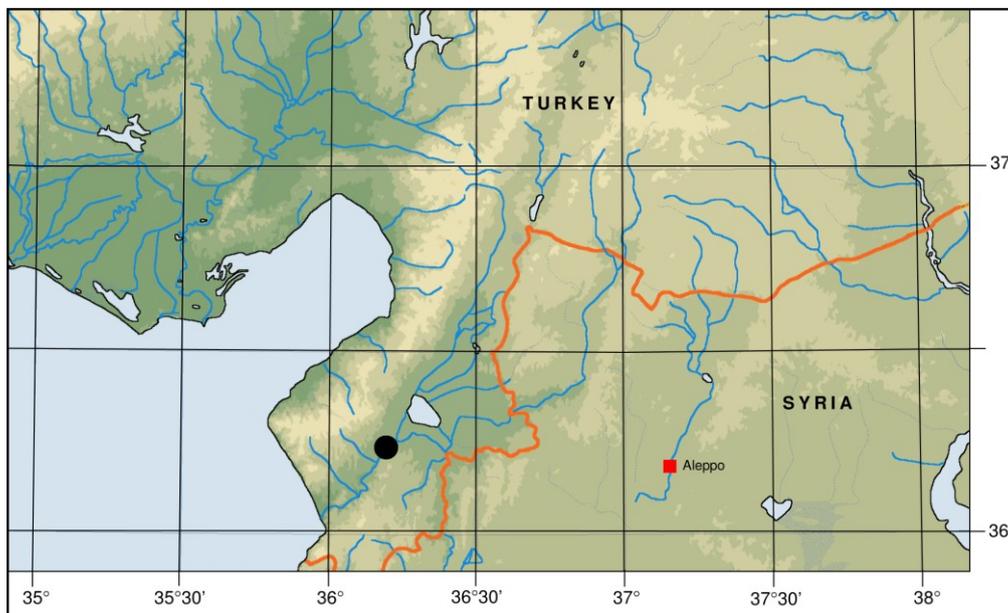
**Diagnosis.** Shell turreted with three spiral knobby carinae on the periphery of the whorls; on the last whorl two more sub-basal and four to five basal carinae are added; the umbilicus is closed, the mouth has a rounded parietal-palatal angulation (Pallary 1939, Starobogatov 1985).

**Known distribution.** Pliocene of Eastern Greece and the Rhodes Island, Pleistocene of Syria, Lebanon, Israel (Pallary, 1939, Starobogatov, 1985).

**Material examined.** Four shells, D. Georgiev leg.: 2 spec. coll. D. Georgiev, 2 spec. coll. P. Glöer (Fig.1), 14.08.2009, the Asi Nehri River north of Antioch town, N36 14 54.0 E36 11 59.3, 127 m alt (Fig. 2).



**Fig. 1.** Shells of two specimens of *Viviparus syriacus* collected at the Asi Nehri river deposits, Turkey (coll. P. Glöer).



**Fig. 2.** Collection locality of *Viviparus syriacus* in Turkey.

### References

Starobogatov, Y. (1985) Generic Composition of the Family Viviparidae (Gastropoda Pectinibranchia Vivipariformes). *Transactions of the Zoological Institute, Russian Academy of Sciences*, 135: 26-32. (In Russian).

- Picard, L. (1965) The Geological Evolution of the Quaternary in the Central-Northern Jordan Graben, Israel. *Geological Society of America Special Papers*, 84: 337-366.
- Pallary, P. (1930) Mollusques Aquatiques Nouveaux du Levant. *Bulletin du Muséum National d'Historie Naturelle*, 2(2): 286-290.
- Pallary, P. (1939) *Mémoires Présentés à l'Institut d'Égypte et Publiés Sous Auspices de sa Majesté Farouk I<sup>er</sup> Roi d'Égypte*. Le Caire Imprimerie de l'Institut Français d'Archéologie Orientale, 141 pp.



## On distribution area of *Asovia maeoticaria* (Alphéraky, 1876) (Insecta: Lepidoptera: Geometridae)

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**Abstract.** Species *Asovia maeoticaria* (Alphéraky, 1876) was described from southeast Ukraine and subsequently recorded in Bulgaria, Greece, European part of Russia, parts of Turkey and southeast Romania. That led to the conclusion it has Ponto-Mediterranean distribution. Authors discovered the species on 7 June 2013 in the village of Kamenica, SE Serbia, making that conclusion doubtful since the location is distant from any seashore.

**Key words:** *Asovia maeoticara*, Geometridae, distribution, southeast Serbia.

### Introduction

Data on infrequently recorded species are rare and make insufficient foundation for exact conclusions. In the case of *Asovia maeoticaria* so far assumptions were made it has Turanian or Ponto-Mediterranean distribution, because all the records came from Turkey or vicinity of the Black Sea (Stanescu, 1994) and from Greece (Karsholt & Nieuwerkerken, 2011). In Bulgaria, however this species is well present even in the western part of the country, close to the border to Serbia – Vidin, Montana, Vratsa, Kostinbrod and Dragoman surroundings in limestone areas up to 975m alt. in several generations from beginning of April to the end of August (S. Beshkov, pers. comm.).

Serbia is a landlocked country, far away from seas. Family Geometridae is moderately studied, and the only available check-list has 400 species in it (Hric & Djurić, 2013). The discovery of *Asovia maeoticaria* will make that number 401, and that certainly is not final figure. NGO HabiProt maintains a database on insects of Serbia, and that database currently has 1827 moth species in it, for some moth families were not sufficiently studied.

### Discussion

A single specimen of *Asovia maeoticaria* was noticed and photographed in the village of Kamenica, being attracted by the light. The species has a very characteristic pattern on its wings, so no further check was required.

Village of Kamenica (0653838E, 4777501N) is situated on the slopes of western Stara Planina at an altitude of 806 meters. Presence of certain termophile species was recorded, but in no way can be described as having Mediterranean climate. That's why this new record comes as a surprise and invites for further studies of distribution of *Asovia maeoticaria*.



**Fig. 1.** *Asovia maeoticaria* photographed in Kamenica on 7 June 2013 (photo: M. Djurić).

### References

- Hric, B. & Djurić, M. (2013) HabiProt: Noćni leptiri Srbije/Moths of Serbia. Available at: [http://www.habiprot.org.rs/Moths/Moths\\_of\\_Serbia.html](http://www.habiprot.org.rs/Moths/Moths_of_Serbia.html) (Accessed on 11 November 2013).
- Karsholt, O. & Nieuwerkerken, van E. (2011) Fauna Europaea: Geometridae. In: Karsholt, O. & Nieuwerkerken, van E. (Eds.), Fauna Europaea: Lepidoptera. Fauna Europaea version 2.4. Available at: <http://www.faunaeur.org> (Accessed on 11 November 2013).
- Stanescu, M. (1994) New data concerning the distribution of the species *Asovia maeoticaria* Alphéracky, 1876 (Lepidoptera: Geometridae) in Romania. *Trav. Mus. Hist. nat, "Grigore Antipa"*, vol. XXXIV: 117-124.

## Mollusca (terrestrial and marine Gastropods et Bivalvia) from Morocco

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**Abstract.** Fifteen samples with molluscs are collected from various habitats and regions of Morocco, located in the seashore zone, as well as the central and the eastern parts of the country. We recorded 21 terrestrial and 15 marine species of molluscs. New localities and new species for the fauna of Morocco and the African continent are reported for the first time.

**Key words:** Mollusca, Morocco, new location and species.

### Introduction

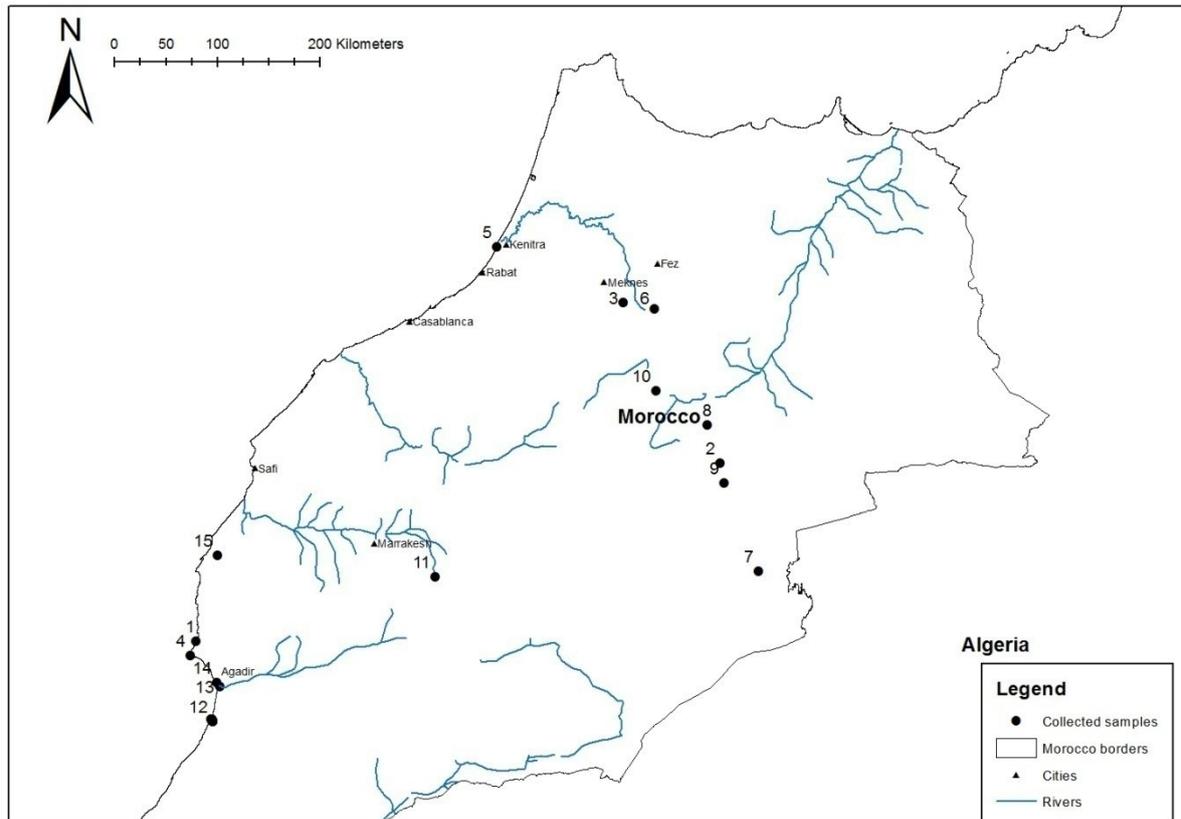
There isn't a lot available data about the malacofauna of Morocco. Most of the reports concern separate species from the western and northern parts of the country. Gittenberger & Ripken (1987), published for the first time summarized data about the systematics and distribution of the genus *Theba* (Risso, 1826). Shafee (1989) reports on breeding individuals from the species *Perna picta* Pallary, 1900 in the west coast of Morocco, near Rabat. Mortaji et al. (2011), report on the presence of *Stramonita haemastoma* (Linnaeus, 1767) in different regions of the Atlantic and the Mediterranean coast of Morocco as an indicator species for tributyltin (TBT) – organic compound which is widely used in paint preventing the growth of periphyton on the hulls of ships. *Cermea virgata* (Da Costa, 1778) is reported as a pest and invasive species in the whole Mediterranean region in the paper of Michigan State University's invasive species factsheets ([http://www.ipm.msu.edu/uploads/files/Forecasting\\_invasion\\_risks/vineyardSnail.pdf](http://www.ipm.msu.edu/uploads/files/Forecasting_invasion_risks/vineyardSnail.pdf)).

During the current study, we collected fifteen samples with molluscs from various habitats and regions of Morocco, located in the seashore zone, as well as the central and the eastern parts of the country (fig. 1). Among the studied habitats are marine shores, riparian, semi-deserts and deserts, which differ greatly with their environmental conditions. The aim of the study is to obtain new data about the distribution and species composition of the malacofauna of Morocco. We recorded 21 terrestrial and 15 marine species of molluscs. Some of the registered species are perhaps introduced for Morocco. Part of the material remained unidentified, due to lack of quantitative and qualitative comparative material.

### Material and Methods

The whole material is collected by Georgi Gerdzhikov in the period 25.03-4.04.2010. For this purpose, various habitats from the seashore and inland parts of Morocco are

surveyed. The localities of the collected material are displayed on the map of Morocco (fig. 1). The number of samples in the text corresponds to the numbers on the map. The molluscs are identified to species and families, they are described and mapped. Most of the species are identified conchologically using catalogs and data from publications. The material is deposited in the personal collection of A. Irikov.



**Figure 1.** Localities of the collected samples on the territory of Morocco.

## Results

In the current study, we identified 36 species from 21 families - 21 terrestrial and 15 marine species.

### TERRESTRIAL GASTROPODA

#### Family Helicidae Rafinesque, 1815

**1.** *Tingitana tingitana* (Paladihe, 1875) – this species was found near to El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.

**2.** *Cepaea vindobonensis* (Ferussac, 1821) - this species was found near to El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.

The species probably has wider distribution in Morocco, but until now we did not find data about specific localities. **New to the fauna of Morocco.**

**3.** *Cernuella virgata* ssp. (Da Costa, 1778) – this species is registered at two localities – near El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.; along the shores of Lake Dayet Aoua, in the Central Atlas mountains (sample 6).

The distribution of the species includes the whole Mediterranean, Atlantic shore of Europe and the Black sea. The material from Morocco is a well-distinguished variety from the European forms. Having in mind the great variability of the shells and the lack of anatomical description of the studied animals, we restrain ourselves from describing new local subspecies.

4. *Otala punctata* (Müller, 1774) - this species was found near to El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.

There are no specific localities of this species so far and its distribution in Morocco remains unknown. It is possible that this species is introduced to Morocco, as it was in Italy, Algeria and Tunisia. **Relatively accepted as New to the fauna of Morocco, possibly introduced.**

5. *Theba subdentata meridionalis* Sacchi, 1955 – the species is found nearby to estuary of Oued Massa River (sample 12); Cape Rhir (sample 4); Lake Lac de Sidi Boughaba (sample 5); Oued Sous River, near to estuary (sample 13); High way on 15 km Northeast from Essaouira city (sample 15).

6. *Otala lactea* (Müller, 1774) – species is collected in different places: on 3,5 km north from Tamri village, on a coastal rock (sample 1); Ziz River valley near to Rich town (sample 2); in borders of Lake Lac de Sidi Boughaba (sample 5); Oued Sous River, near to estuary (sample 13); High way on 15 km Northeast from Essaouira city (sample 15).

7. *Theba arinagae* Gittenberg & Ripken (1987) – the species is found on different places main to coastal areas: nearby to estuary of Oued Massa River (sample 12); on 3,5 km north from Tamri village, on a coastal rock (sample 1); on the beach of Cape Rhir (sample 4).

This species was described based on found fossil shells in sand dunes on the Canary Islands by Gittenberg & Ripken (1987). In the current study, for the first time, non-fossil shells are found on the territory of Morocco and the African continent. This fact is rather surprising, having in mind that most island species are endemic in nature. **New to the fauna of Morocco and African continent.**

8. *Theba andalusica* Gittenberg & Ripken, 1987 – species is collected in semi desert areas between Arfoud town and Merzouga village (sample 7). **New to the fauna of Morocco.**

9. *Theba subdentata helicella* (Wood, 1828) – this subspecies was found in three places: on 3,5 km north from Tamri town on a coastal rock (sample 1); on a beach on Cape Rhir (sample 4); and in a High Atlas Mountain in Tizi n'Tichka pass from Marrakech to the city Ouarzazate (sample 11).

10. *Theba subdentata dehnei* (Rossmässler, 1846) - this subspecies was found on 3,5 km north from Tamri town on a coastal rock (sample 1).

11. *Xerophila emmae* (Pallary, 1901) – this species is collected in Ziz River valley near to Rich town (sample 2); and on 20 km north from Errachidia city (sample 9).

12. *Xerophila aderoualensis* Pallary, 1923 – the species is found at semi desert areas on a 15 km NW from Zeida town (sample 10).

13. *Xerotricha apiciana* Lamarck, 1822 - the species is found at semi desert areas on a 15 km NW from Zeida town (sample 10).

#### **Family Parmacellidae** Cuvier, 1804

14. *Parmacella valencienni* (Webb & Van Beneden, 1836) - this species was found near to El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.

The species' distribution probably has fragmentary "island"-like pattern. It is possible that this species is introduced in Morocco. **New to the fauna of Morocco, possibly introduced.**

#### **Family Ferrussaciidae** Bourgoignat, 1883

**15.** *Rumina decolata* (Linnaeus, 1758) – this species is common in Morocco. It was found in very different habitats and places – near to El Hajeb (sample 3), Central-Northern Morocco. The shells are collected from agricultural land, bordered with a small rock complex at about 1.5 km north from the town.; on 3,5 km north from Tamri town on a coastal rock (sample 1); Lake Lac de Sidi Boughaba (sample 5); Oued Sous River, near to estuary (sample 13); in rocky terrain between Midelt town and Rich town (sample 8).

**16.** *Rumina saharica* (Pallary, 1901) – the species is found in semi desert areas between Arfoud town and Merzouga town; In High Atlas Mountains in Tizi n'Tichka pass from Marrakech to the city Ouarzazate (sample 11); Oued Sous River, near to estuary (sample 13).

**17.** *Ferussacia moreleti* (Pallary, 1898) – the species is found on Oued Sous River, near the estuary (sample 13).

**Family Hygromiidae** Tryon, 1866

**18.** *Xerophyla aderoualensis* (Pallary, 1898) – the species is found in semi desert areas between Arfoud town and Merzouga town (sample 7); Lake Lac de Sidi Boughaba (sample 5); in rocky terrain between Midelt town and Rich town (sample 8).

**Family Pomatiidae** Newton, 1891

**19.** *Leonia mamillaris compacta* (Pallary, 1927) – species was found on a beach of Cape Rhir (sample 4).

**Family Cochlicellidae** Schileyko, 1972

**20.** *Cochlicella acuta* (O.F. Müller, 1774) – species was collected in borders of Lake Lac de Sidi Boughaba (sample 5); Oued Sous River, near the estuary (sample 13).

**21.** *Cochlicella barbara* (Linnaeus, 1758) – the species is found in rocky terrains between Midelt town and Rich town (sample 8); Oued Sous River, near to estuary (sample 5), in boarders of Lake Lac de Sidi Boughaba (sample 13).

**MARINE BIVALVIA AND GASTROPODA**

**Family Mytilidae** Lamarck, 1819

**22.** *Perna picta mauritanica* Pallary, 1900 = *P. perna* (Linnaeus, 1758) – species was found in estuary of Oued Massa River (sample 12); on a beach of Cape Rhir (sample 4).

It is considered, that the species is spread at Moorish province, but there is no data about specific localities and its distribution in Morocco remains unknown.

**Family Semelidae** Stoliczka, 1819

**23.** *Scrobicularia plana* (Da Costa, 1778) – species was found in estuary of Oued Massa River (sample 12).

**Family Cardiidae** Lamarck, 1809

**24.** *Cerastoderma glaucum* (Poiret, 1789) = (*C. glaucum* Brugière, 1789) – the species is found in estuary of Oued Massa River (sample 12); Oued Sous River, near to estuary (sample №13); Central Beach in Agadir city (sample 14).

**Family Muricidae** Da Costa, 1776

**25.** *Stramonita haemastoma haemastoma* (Linnaeus, 1767) = (*S. haemastoma* Linnaeus, 1767) – it was found in estuary of Oued Massa River (sample 12); on 3,5 km north from Tamri town on a coastal rock (sample 1); on the beach of Cape Rhir (sample 4).

**Family Patellidae** Rafinesque C.S., 1815

**26.** *Cymbula nigra* Da Costa 1771 = [*Cymbula nigra* (Da Costa, 1771)] – the species is found on 3,5 km north from Tamri town on a coastal rock (sample 1); on the beach of Cape Rhir (sample 4); Central Beach in Agadir city (sample 14).

**Family Trochidae** Rafanisque C.S., 1815

**27.** *Osilinus lineatus* Da Costa, 1778 = [(*Phorcus lineatus* Da Costa, 1778)] – species was found on the beach of Cape Rhir (sample 4).

**Family Cerithidae** Fleming C.A., 1822

28. *Sepiola atlantica* Orbigny 1839 - species was found on the beach of Cape Rhir (sample 4).

**Family Ellobiidae** Adams, 1855

29. *Myosotella myosotis* Monterosato, 1906 = (*M. myosotis* Draparnaud, 1906) – the species is found at Oued Sous River, near to estuary (sample 13).

**Family Arcidae** Lamarck, 1809

30. *Anadara inaequivalvis* Bruguiere, 1789 = [(*A. inaequivalves* Bruguiere, 1789)] – the species is found at Central Beach in Agadir city (sample 14).

It is considered, that in some areas the species is moved passively and is probably invasive in some parts. **Possibly introduced species.**

**Family Veneridae** Rafinesque, 1815

31. *Chamelea gallina* Linnaeus, 1758 = [(*Chamelea gallina* Linnaeus, 1758)] – the species is found at Central Beach in Agadir city (sample 14).

**Family Mactridae** Lamarck, 1809

32. *Spisula subtruncata* (Da Costa, 1778) – the species is found at Central Beach in Agadir city (sample 14).

**Family Donacidae** Fleming, 1828

33. *Donax trunculus* (Linnaeus, 1758) = (*Donax trunculus* Linnaeus, 1758) – the species is found at Central Beach in Agadir city (sample 14).

**Family Solenidae** Lamarck, 1809

34. *Solen marginatus* Pulteney, 1799 – the species is found at Central Beach in Agadir city (sample 14).

**Family Cerithiidae** Fleming C.A., 1822

35. *Bittium reticulatum* (Da Costa, 1778) – the species is found at Central Beach in Agadir city (sample 14).

**Family Anomiidae** Rafinesque, 1815

36. *Anomia ephippium* Linnaeus, 1758 – the species is found at Central Beach in Agadir city (sample 14).

## Discussion

During the current study, a new data about the molluscs of Morocco was obtained. We registered new localities of previously reported species, registered 5 new species for the fauna of Morocco, from which 1 is new for the African continent. The fact that we recorded new species for the country speaks that it is not studied well in this regard. The presence of many specific habitats suggests that there are maybe species with local distribution. In our opinion, future studies are needed to research the biodiversity of molluscs, as well as the registering of introduced and invasive species.

## References

- Gittenberger, E., & Ripken, Th. E. J. (1987) The Genus *Theba* (Mollusca: Gastropoda: Helicidae) systematics and distribution. *Zoologische verhandelingen*, 241: 3-59.
- Michigan State University's invasive species factsheets. Available at: [http://www.ipm.msu.edu/uploads/files/Forecasting\\_invasion\\_risks/vineyardSnail.pdf](http://www.ipm.msu.edu/uploads/files/Forecasting_invasion_risks/vineyardSnail.pdf).
- Mortaji, H. El, Elkhiti, N., Benhra, A., Haimeur, B. El, Bouhallaoui, M., Benbrahim, S., Kabine, M. & Ramdani, M. (2011) Imposex in *Stramonita haemastoma* (Gastropoda & Muricidae) along the Atlantic and Mediterranean coast of Morocco. *Bulletin de l'Institut Scientifique*, Rabat, section Sciences de la Vie, 33 (1): 13-18.
- Shafee, S. M. (1989). Reproduction of *Perena picta* (Mollusca: Bivalvia) from the Atlantic coast of Morocco. *Marine Ecology Progress Series*. 53: 235-245.