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## TICK SPECIES (ACARI: IXODOIDEA) DISTRIBUTION, SEASONALITY AND HOST ASSOCIATIONS IN ROMANIA

ELENA CLAUDIA COIPAN, ALEXANDRU FILIP VLADIMIRESCU,  
OCTAVIAN CIOLPAN, IRINA TEODORESCU

**Abstract.** By integrating the literature data with those derived from personal investigations, the authors present the distribution of the 27 tick species (25 ixodids and 2 argasids) identified up to now in Romania, as well as some aspects regarding their abundance, seasonality and host associations. Altogether, 1439 tick records (of which 256, covering 25 counties, belong to the authors themselves) were georeferenced using EpiMap (an ArcView®-compatible GIS) from CDC's EpiInfo™ software package (v. 3.5.1), on a level 2 LAU (Local Administrative Units) shapefile. The resultant distribution maps and the data on seasonality and host associations may prove to be a useful reference system for subsequent studies on different tick species' distribution, ecology and biology, as well as a predictive tool for human and veterinary medicine, bearing in mind the vectorial role that ticks play in some dangerous diseases for man and livestock.

**Résumé.** En intégrant les données de la littérature avec les résultats d'enquêtes personnelles, les auteurs présentent la distribution des 27 espèces de tiques (25 ixodides et deux argasides) identifiées en Roumanie à ce jour, et quelques données sur l'abondance, la saisonnalité et l'association avec l'hôte. Tous les 1439 enregistrements (dont 256 de 25 comtés, appartiennent aux auteurs) ont été cartographiés, à l'aide de EpiMap (un système d'information géographique compatible avec ArcView®) du logiciel EpiInfo™ (v. 3.5.1) lancée par CDC, sur un fichier vectoriel niveau LAU2 (Unités Administratives Locales). Les cartes de distribution résultées, les données de saisonnalité et celles de l'association avec l'hôte, peuvent alors être utiles en tant que système de référence pour des futures études sur la répartition, l'écologie et biologie des différentes espèces de tiques, ainsi que comme outils de prévision pour la médecine humaine et vétérinaire, compte tenu du rôle des tiques dans la transmission des maladies dangereuses pour l'homme et les animaux d'intérêt économique.

**Key words:** Ixodidae, Argasidae, distribution, tick hosts, tick seasonality, Romania.

### INTRODUCTION

Romania is located between 43°37'07" and 48°15'06" Latitude North and 20°15'44" and 29°41'24" Longitude East. It is divided into 41 counties (with 2685 communes) plus the capital of București (Bucharest).

Out of the 357 habitat types (comprising 7 classes and 24 subclasses of the Palaearctic habitats classification system) described in Romania (Doniță et al., 2005) those that are suitable for tick development make up ~ 50 % of the country's surface (29 % forest and woodland and 21 % permanent pastures). Furthermore, the main forest types in Romania are the broad-leaved ones with *Quercus pubescens*, *Q. frainetto* and *Q. cerris* in the plains from the southern part of the country; *Quercus* sp., *Carpinus* sp., *Fraxinus* sp. and *Tilia* sp. in plains from other parts of the country;

*Q. petraea* in hilly areas; and *Fagus* sp. and *Pinus* sp. in the mountains. Deciduous forests with oak-tree are known to sustain higher densities of ticks (Estrada-Peña, 2001) through the agency of the numerous vertebrate hosts they shelter (Ostfeld, 1997).

As a result of increased anthropogenic changes in the natural habitats of ticks, the humans tend to come into contact with these arthropods more often and thus, the risk of contracting tick-borne diseases increases also. Under these conditions tick distribution maps could prove to be useful tools in preventing and predicting major tick infestations and outbreaks of tick-borne diseases.

## MATERIAL AND METHODS

### *Source of historical data*

Historical tick data were collected from scientific papers, dating back as far as 1890. Most of the papers indicated only the presence of a particular tick species in one site, without any further investigations on the population dynamics. All records have been computerized and digital maps produced.

### *Tick collection*

In authors' investigations, ticks were collected monthly from vegetation, by dragging technique, and from animal hosts (mostly domestic animals), between 2004 and 2008. The sites were randomly selected and represented forested and ecotone areas, from 25 of the 41 counties. Ticks were preserved in alcohol or RNAlater® (Ambion®, Applied Biosystems) solution until identification.

### *Mapping the distribution*

The distribution of ticks was mapped using EpiMap software from EpiInfo 3.5.1 package using a LAU2 (Local Administrative Units) level shapefile (vector layer obtained from geo-spatial.org <http://earth.unibuc.ro>) in the Coordinate Reference System Dealul Piscului 1970 (Stereo 70).

### *Seasonality data*

Data regarding the seasonal distribution were derived both from historical data and personal investigations conducted monthly at 28 sites in 25 counties.

### *Host associations*

Hosts were classified into several groups: human, companion animal, livestock, rodent, insectivore, chiropteran, lagomorph, mustelid, carnivore, cervid, avian and reptile.

## RESULTS

Published records date back as far as the end of the 19<sup>th</sup> century (Leon, 1890). Many researches were made in the 20<sup>th</sup> century (Cernăianu, 1925; Leon, 1925; Ciurea & Stephănescu, 1929; Pârvulescu, 1940; Opreescu, 1950; Mețianu, 1951; Georgescu & Brătescu, 1953; Georgescu & Ciolca, 1953; Georgescu et al., 1955; Marcu, 1957; Feider, 1959, 1965 – the monograph “Acaromorpha, Suprafamilia

Ixodoidea (Căpușe)”; Feider & Mironescu, 1958, 1961; Feider et al., 1958, 1964, 1968; Bădescu, 1966, 1967, 1968, 1969; Călinescu & Petrescu, 1972; Schirer, 1972; Voiculescu, 1972; Voiculescu et al., 1972; Ionescu et al., 1991; Popa, 1992, 1997, 1998) and are continued in the 21<sup>st</sup> (Teodorescu & Popa, 2002; Ardeleanu, 2003; Ioniță, 2003; Chițimia, 2006; Coipan et al., 2006; Široky et al., 2006; Chițimia et al., 2009).

In Romania, 27 tick species are known to occur, 25 of them belonging to Ixodidae family (*Dermacentor marginatus* Sulzer, 1776; *Dermacentor reticulatus* Fabricius, 1794; *Haemaphysalis concinna* Koch, 1844; *Haemaphysalis inermis* Birula, 1895; *Haemaphysalis parva* Neumann, 1897; *Haemaphysalis punctata* Canestrini & Fanzago, 1878; *Haemaphysalis sulcata* Canestrini & Fanzago, 1878; *Hyalomma aegyptium* (Linnaeus, 1758); *Hyalomma detritum scupense* Schulze, 1918; *Hyalomma marginatum marginatum* Koch, 1844; *Ixodes apronophorus* Schulze, 1924; *Ixodes arboricola* Schulze & Schlottke, 1930; *Ixodes crenulatus* Koch, 1844; *Ixodes hexagonus* Leach, 1815; *Ixodes laguri* Olenov, 1931; *Ixodes redikorzevi* Olenov, 1927; *Ixodes ricinus* Linnaeus, 1758; *Ixodes rugicollis* Schulze & Schlottke, 1930; *Ixodes simplex* Neumann, 1906; *Ixodes trianguliceps* Birula, 1895; *Ixodes vespertilionis* Koch, 1844; *Rhipicephalus annulatus* Say, 1821; *Rhipicephalus bursa* Canestrini & Fanzago, 1878; *Rhipicephalus rossicus* Yakimov & Kol-Yakimova, 1911; *Rhipicephalus sanguineus* Latreille, 1806) and only two to Argasidae family (*Argas persicus* (Oken, 1818) and *Argas reflexus* (Fabricius, 1794)).

Altogether, we collected 1439 records, covering 1278 communes from all over the country (all 41 counties plus Bucharest), of which 256 were personal records, covering 25 counties. The species with the highest number of records were *Ixodes ricinus* (543 records in 465 communes), *Haemaphysalis punctata* (187 records in 167 communes), *Hyalomma marginatum* (172 records in 149 communes), *Rhipicephalus bursa* (152 records in 139 communes) and *Dermacentor marginatus* (141 records in 123 communes). By mapping these records we obtained 13 maps, four for individual species (due to their high number of records; figs 3, 6, 8, and 12) and nine with species grouped by genus (figs 1, 2, 4, 5, 7, 9, 10, 11, and 13).

Regarding the distribution patterns, we can ascertain that most of the ticks are present throughout the country, while just few are restricted to the southern part, and these include *Hyalomma* species (which are known to occur in the drier and warmer regions of southern Europe), *Haemaphysalis parva*, *Ixodes simplex*, *Rhipicephalus annulatus* and *Rh. rossicus*.

*Argas reflexus* and *Ixodes crenulatus* were only collected in the North-Eastern part of the country.

For *Ixodes apronophorus*, *I. arboricola*, *I. hexagonus* and *I. rugicollis* we found only one record each and can not therefore envisage a distribution pattern.

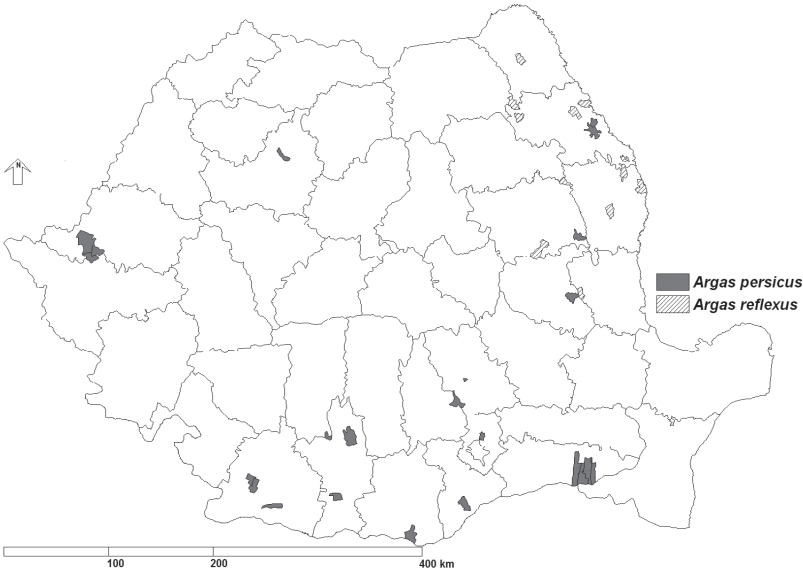


Fig. 1 - Distribution map for *Argas persicus* and *A. reflexus*.

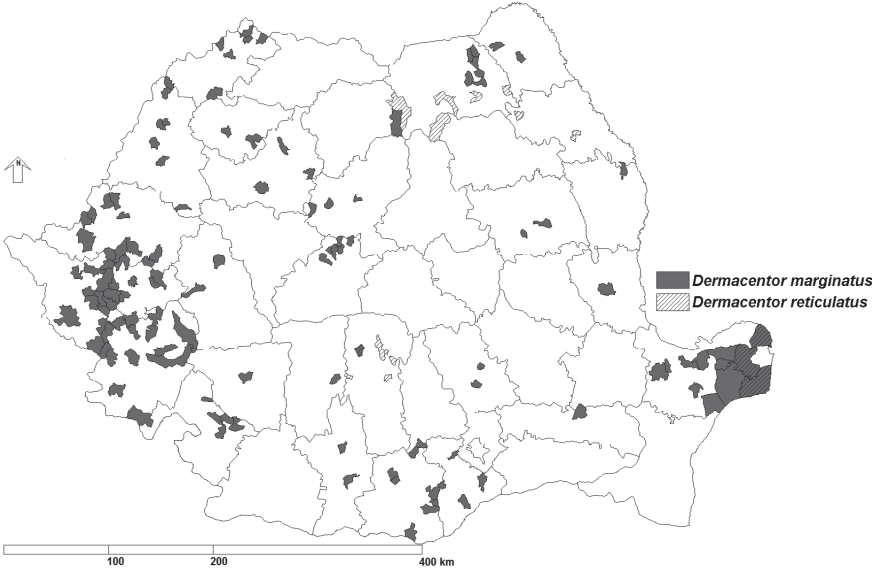


Fig. 2 - Distribution map for *Dermacentor marginatus* and *D. reticulatus*.

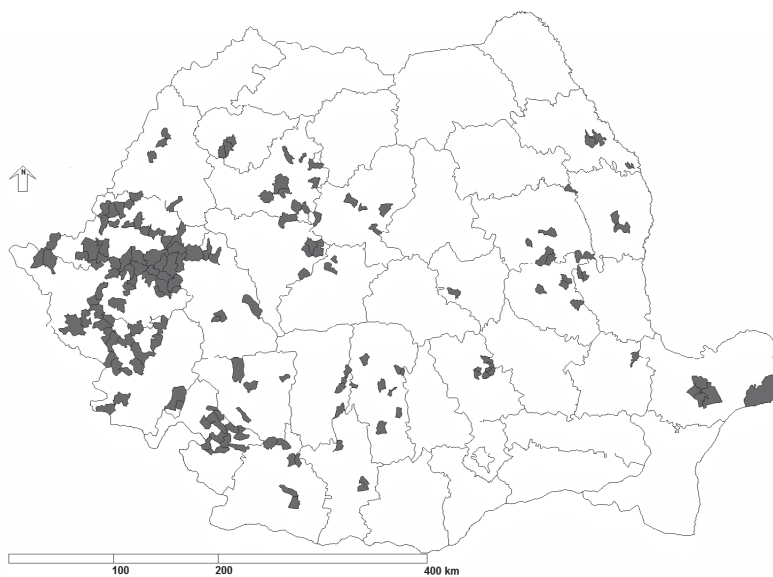


Fig. 3 - Distribution map for *Haemaphysalis punctate*.



Fig. 4 - Distribution map for *Haemaphysalis concinna* and *H. sulcata*.

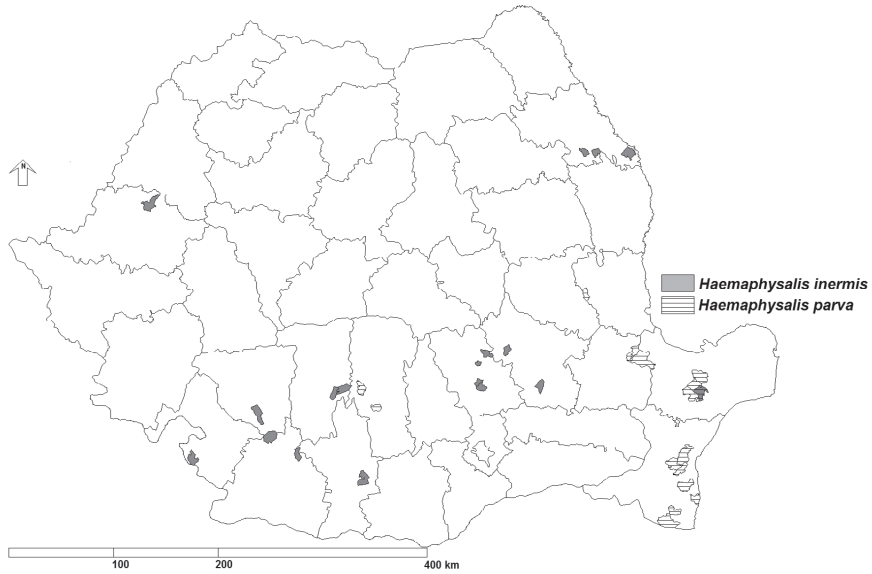


Fig. 5 - Distribution map for *Haemaphysalis inermis* and *H. parva*.

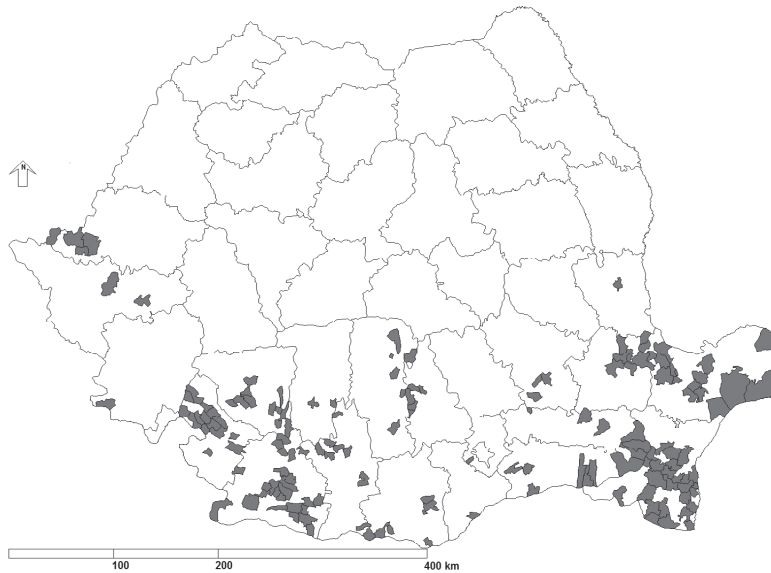


Fig. 6 - Distribution map for *Hyalomma marginatum*.



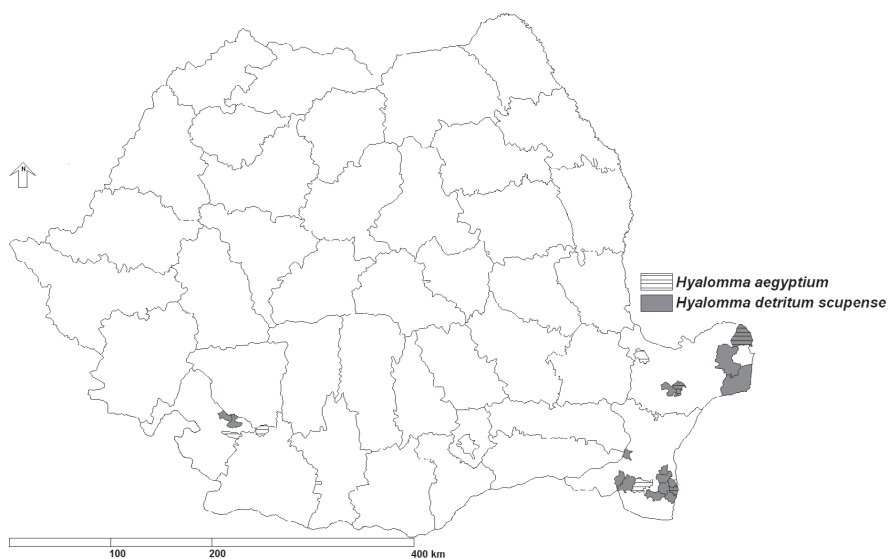


Fig. 7 - Distribution map for *Hyalomma aegyptium* and *H. detritum scupense*.



Fig. 8 - Distribution map for *Ixodes ricinus*.

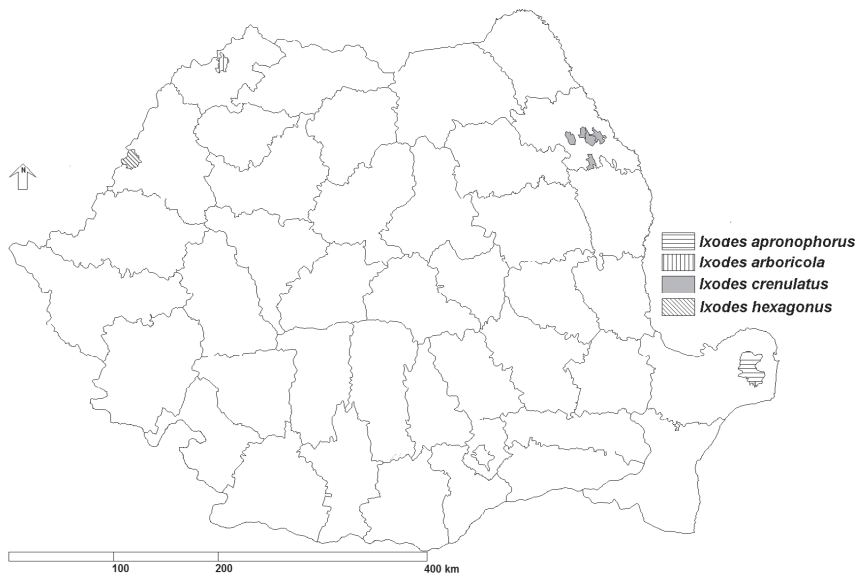


Fig. 9 - Distribution map for *Ixodes apronophorus*, *I. arboricola*, *I. crenulatus*, and *I. hexagonus*.

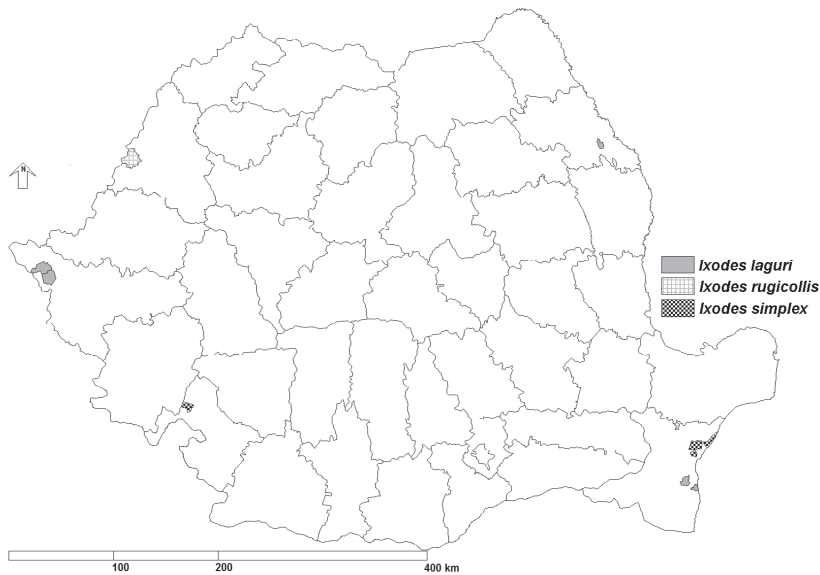


Fig. 10 - Distribution map for *Ixodes laguri*, *I. rugicollis*, and *I. simplex*.

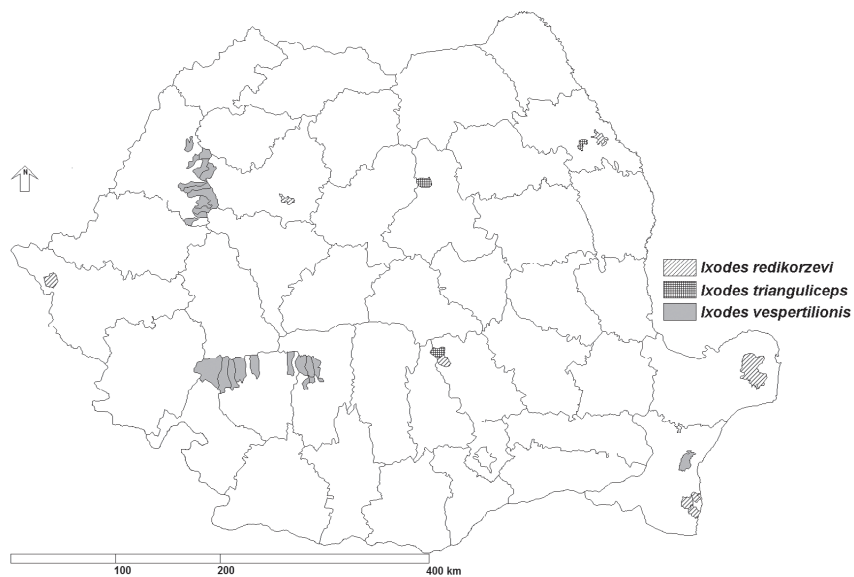


Fig. 11 - Distribution map for *Ixodes redikorzevi*, *I. trianguliceps*, and *I. vespertilionis*.

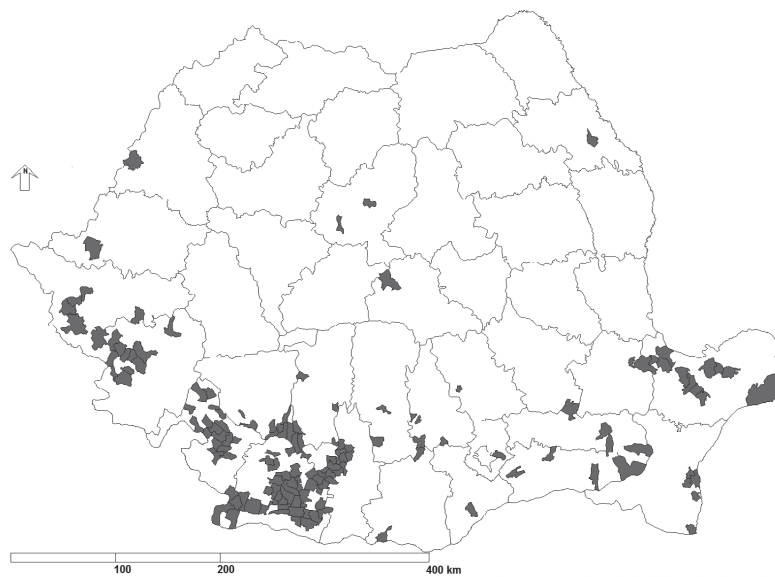


Fig. 12 - Distribution map for *Rhipicephalus bursa*.



Fig. 13 - Distribution map for *Rhipicephalus annulatus*, *Rh. rossicus* and *Rh. sanguineus*.

*Seasonality data* from literature and personal field investigations is presented as monthly presence (+) and maximum activity (++), and refers to all tick stages indiscriminantly. Most of the tick species begin their questing activity in March-April and remain active throughout the warm season, until late October or November (Tab. 1). The species that are active during the cold season months are *Argas persicus*, which overwinters in bird nests or poultry shelters, *Hyalomma detritum scupense* and *Hyalomma marginatum marginatum*, for which it was documented that immature stages feed during winter (Kolonin, 2009; Horak & MacIvor, 1987).

Information on *host associations* of Romanian ticks was available for most of the historical records and was supplemented with personal results (Tab. 2 presents information on host associations for all three tick stages). Most of collections were from livestock hosts, rodents, insectivores and birds. *Ovis aries* was the most common livestock host, followed by *Bos primigenius taurus* and *Capra aegagrus hircus*. Three tick species (*Argas persicus*, *Haemaphysalis inermis* and *Rhipicephalus annulatus*) were collected exclusively from livestock, but no *Ixodes* species (except for *I. ricinus*), *Hyalomma aegyptium* and *Rhipicephalus rossicus* were ever encountered on livestock. All the hard ticks genera were found on various rodent species, of which *Spermophilus citellus*, *Apodemus sylvaticus* and *Microtus arvalis* were the preferred ones, hosting ticks belonging to four genera (*Ixodes*, *Haemaphysalis*, *Rhipicephalus* and *Hyalomma*). From the insectivorous hosts

Table 1

## Seasonality of tick species in Romania.

Species	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
<i>Argas persicus</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Argas reflexus</i>								+	+	+	+	
<i>Dermacentor marginatus</i>		+	+	++	+	+	+	+	+	++	+	
<i>Dermacentor reticulatus</i>		+	+	+								
<i>Haemaphysalis concinna</i>				+	+	+	++	+	+	+		
<i>Haemaphysalis inermis</i>				++	+	+	+	+	+	+	++	
<i>Haemaphysalis parva</i>				++	+	+	+	+	+	++		
<i>Haemaphysalis punctata</i>			+	++	+	+	+	+	+	++	+	
<i>Haemaphysalis sulcata</i>			+	++	+	+	+	+	+	+		
<i>Hyalomma aegyptium</i>				++	+	+	++	++	+			
<i>Hyalomma detritum scupense</i>	+						+	+	+	+	+	+
<i>Hyalomma marginatum marginatum</i>	+	+	+	+	+	++	+	+	++	+	+	
<i>Ixodes apronophorus</i>			+	+	++	+	+	+	+	+		
<i>Ixodes arboricola</i>					+	+						
<i>Ixodes crenulatus</i>						++	++	+	+	+		
<i>Ixodes hexagonus</i>						+						
<i>Ixodes laguri</i>				++	+	+	+	++	+			
<i>Ixodes redikorzevi</i>				++	+	+	+	+	+	++		
<i>Ixodes ricinus</i>			+	+	++	+	+	+	+	++	+	
<i>Ixodes rugicollis</i>						+						
<i>Ixodes simplex</i>				+	+	+	+	+	+	++		
<i>Ixodes trianguliceps</i>				+	+				+	+	+	
<i>Ixodes vespertilionis</i>			+	+	++	+	+	+	+	++	+	
<i>Rhipicephalus annulatus</i>				+	++	+	+	+	+	++		
<i>Rhipicephalus bursa</i>			+	+	++	+	+	+	+	+		
<i>Rhipicephalus rossicus</i>					+	+	+					
<i>Rhipicephalus sanguineus</i>				+	+	++	+	+	+	+	+	

*Erinaceus roumanicus*, *Sorex araneus*, *Sorex alpinus* and *Talpa europaea* were parasitized by ticks and *I. ricinus* and *Rhipicephalus bursa* were the most frequent parasites.

Birds belonging to the order Passeriformes were most frequently mentioned as hosts, with 15 bird species bearing 5 tick species (four of them having quite a wide area of distribution and a large number of collections: *Dermacentor marginatus*, *Hyalomma marginatum marginatum*, *I. ricinus* and *Rhipicephalus bursa*). *I. ricinus*, which leads the field for collections, is also the most versatile tick species in terms of host range, with 36 host species covering all the groups (2 species of companion animals, 4 of livestock, 8 of rodents, one insectivore, one lagomorph, one mustelid, one carnivore, one cervid, 13 of birds and 4 of reptiles), except for bats.

Table 2

## Hosts of tick species in Romania.

Species	Hosts											
	H.	C.a.	Ls.	Ro.	I.	Ch.	Lg.	M.	C.	Cv.	A.	Re.
<i>Argas persicus</i>												+
<i>Argas reflexus</i>												+
<i>Dermacentor marginatus</i>	+	+	+	+								+
<i>Dermacentor reticulatus</i>			+						+			
<i>Haemaphysalis concinna</i>		+	+	+				+				
<i>Haemaphysalis inermis</i>			+	+					+	+		+
<i>Haemaphysalis parva</i>			+				+				+	+
<i>Haemaphysalis punctata</i>		+	+	+								
<i>Haemaphysalis sulcata</i>			+									+
<i>Hyalomma aegyptium</i>					+							+
<i>Hyalomma detritum scupense</i>			+							+		
<i>Hyalomma marginatum marginatum</i>	+		+	+			+				+	
<i>Ixodes apronophorus</i>				+								
<i>Ixodes arboricola</i>											+	
<i>Ixodes crenulatus</i>								+				
<i>Ixodes hexagonus</i>								+	+			
<i>Ixodes laguri</i>				+								
<i>Ixodes redikorzevi</i>				+	+				+		+	+
<i>Ixodes ricinus</i>	+	+	+	+	+		+	+	+	+	+	+
<i>Ixodes rugicollis</i>								+				
<i>Ixodes simplex</i>						+						
<i>Ixodes trianguliceps</i>				+	+							
<i>Ixodes vespertilionis</i>						+						
<i>Rhipicephalus annulatus</i>			+									
<i>Rhipicephalus bursa</i>		+	+		+			+				
<i>Rhipicephalus rossicus</i>				+	+							
<i>Rhipicephalus sanguineus</i>	+	+	+	+								

H.-Human; C.a.-Companion animals; Ls.-Livestocks; Ro.-Rodents; I.-Insectivores; Ch.-Chiropterans; Lg.-Lagomorphs; M.-Mustelids; C.-Carnivorous; Cv.-Cervids; A.-Avian; Re.-Reptiles

## DISCUSSIONS

Our updated distribution maps of ticks are necessary, because many of the ticks in the Romanian fauna are important vectors for different pathogens and parasites of medical and veterinary importance.

In Romania, ticks and tick-borne diseases have been documented ever since the end of the 19<sup>th</sup> century. Cases of human infection with tick-borne encephalitis virus (Molnar et al., 2001; Ungureanu et al., 2001), Crimean-Congo virus (Heyman et al., 2008), *Francisella tularensis* (Pencea et al., 1974 b), *Rickettsia conorii* (Rugină, 2008), *Coxiella burnetti* (Bacalbaşa et al., 1967; Crăcea et al., 1988), *Borrelia burgdorferi* (Căruntu et al., 1988; Pop et al., 1995), have already been reported in România. Some of these pathogens have also been detected in ticks: *Borrelia burgdorferi* s.l. (Coipan & Vladimirescu, 2010) and *Francisella tularensis* (Pencea et al., 1974 a).

As the population ecology of ticks is fundamental to the spatial and temporal variation in the risk of infection by tick-borne pathogens (Randolph, 2004), knowing the distribution and seasonality of ticks is a step forward in the study of ticks and tick-borne diseases. Currently, a large number of new, emerging and re-emerging diseases are zoonotic and many of them are transmitted by arthropod vectors, including ticks. Under these conditions acknowledging host associations of ticks is useful in identifying the different bridging hosts (Kahl et al., 2001), which may form a link between distinct enzootic cycles of infection in particular regions, as well as those hosts that pose a threat to human health by their mere vicinity to human habitations. The distribution maps may be biased due to pre-selection of sampling sites by collectors, or be representative of locations at which collectors reside or work. Also, regarding host associations, the results may be biased by the ease of tick sampling from domestic animals as well as by the immediate economic interest regarding livestock. Nevertheless they could represent a departure point for studies on ecology, phenology, parasitology etc. and are open to continuous improvement as the awareness of researchers, physicians and general public on ticks as vectors is increasing.

### *Conclusions*

To our knowledge this is the first attempt since 1965 to integrate data on the Romanian tick fauna distribution, seasonality and hosts in one paper and represents the updated tick distribution data onto GIS (geographical information system) compatible maps. These maps could serve as a first step to further development of an understanding of the distribution and behaviour of our resident ticks and may aid predicting the risk of tick-borne infectious diseases in Romania, using GIS techniques.

Still, our comprehension, at national level, on tick distribution, seasonality, host association and the pathogens they carry is scarce and further combined investigations on tick distribution and prevalence of infection with tick-borne pathogens in the vectors and in their hosts (human and animals as well) will allow us to improve our knowledge on the real status and dimension of ticks and tick-borne diseases in Romania.

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## DISTRIBUȚIA, SEZONALITATEA ȘI ASOCIEREA CU GAZDELE LA SPECIILE DE CĂPUȘE (ACARI: IXODOIDEA) DIN ROMÂNIA

### REZUMAT

Prin integrarea datelor din literatură cu cele rezultate din investigațiile personale, autorii prezintă distribuția pe teritoriul României a celor 27 specii de căpușe (25 Ixodidae și 2 Argasidae) identificate până în prezent, precum și unele date referitoare la abundență, sezonabilitate și asocierea cu gazdele. Toate cele 1439 de semnalări de pe întreg teritoriul României (dintre care 256, din 25 de județe aparțin autorilor) au fost cartate într-un sistem de georeferință utilizând EpiMap (un sistem GIS compatibil cu ArcView®) din pachetul software CDC EpiInfo™ (v. 3.5.1), pe un fișier vectorial LAU2 (Unități Administrative Locale). Hărțile rezultate ca și datele de sezonabilitate și asocierea cu gazdele pot fi ulterior utile ca sisteme de referință pentru studii referitoare la distribuția, ecologia și biologia diferitelor specii precum și un instrument de prognoză pentru medicina umană și veterinară, având în vedere rolul ixodidelor în transmiterea unor boli periculoase la om și animale de interes economic.

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## DESCRIPTION OF PREADULT STAGES (PROTONYMPHS AND DEUTONYMPHS) OF *DISCOURELLA RADNAENSIS* (WILLMAN, 1941) SPECIES (ACARINA: ANACTINOTRICHIDA: UROPODINA)

IOANA CRISTINA CONSTANTINESCU

**Abstract.** *Discourella radnaensis* species was described by Willmann from Slovenia, Radna city in 1941, the holotype being female. Since then, the species has not been collected, probably because Uropodina faunal studies in the Balkans were very few. Acarologic material was collected in Serbia, Djerdap National Park, Mount Veliki Strbac (768 m altitude), from litter of mixed deciduous forest and the bark of the decomposing trunk of deciduous trees. In addition to a female, individual protonymphs and deutonymphs were collected. *Discourella radnaensis* species is thus recorded for the first time in the fauna of Serbia, and pre-adult stages (protonymphs and deutonymphs) are described for the first time in literature.

**Résumé.** L'espèce *Discourella radnaensis* a été décrite par Willmann de Slovénie, localité Radna, en 1941, le holotype étant une femelle. L'espèce n'avait plus été collectée depuis, probablement parce que les études faunistiques concernant les Uropodines des Balkans ont été très peu nombreuses. Le matériel acarologique est collecté en Serbie, Parc National Djerdap, du mont Veliki Strbac (768 m d'altitude), de la litière d'une forêt de feuillus ainsi que de l'écorce de troncs d'arbres feuillus en train de décomposition. En plus d'un exemplaire femelle on a collecté des protonymphes et des deutonymphes de cette espèce. *Discourella radnaensis* est pour la première fois enregistrée dans la faune de Serbie, et les stades préadultes (protonymphes et deutonymphes) sont pour la première fois décrits dans la littérature.

**Key words:** Uropodina, *Discourella radnaensis*, protonymph and deutonymph description, first record, Serbia.

### INTRODUCTION

Uropodina fauna of Serbia is very little studied, a total of six species (*Polyaspis patavinus*, *Trichouropoda ovalis*, *Urodiaspis stammeri*, *Uropoda splendida*, *U. erlangensis* and *U. cassidea*) being collected by Kontschan, from Fruska-Gora region, in the N-V of the country (Kontschan, 2005), and two species (*Uropoda copridis* and *Uroseius willmanni*) being cited by Hirschmann and Wisniewski from the former Yugoslavia, in the synthesis paper “Uropodiden der Erde” (Hirschmann & Wisniewski, 1993).

*Discourella radnaensis* was described by Willmann from Slovenia, Radna city (Willmann, 1941), the holotype being female. In addition to the female, protonymphs and deutonymphs of this species were collected for the first time, and were described further on.

### MATERIAL AND METHODS

Acarologic material was collected by the author in Serbia, Djerdap National Park, on Mount Veliki Strbac (768 m altitude). Samples were collected from litter of mixed deciduous forest with beech (*Fagus orientalis*), dogwood (*Cornus mas*), lote tree (*Celtis australis*), maple (*Acer monospessulanum*) and hornbeam (*Carpinus betulus*), and bark of the decomposing trunk of deciduous trees.

Mites were extracted from samples using Berlese – Tullgren devices, clarified with lactic acid and identified with the help of a microscope. The drawings were done under microscope, with the help of camera lucida. Acarologic material is stored in alcohol (96%) and is deposited in the author's personal collection, at the Argeş County Museum, Piteşti (Romania). All measurements are given in  $\mu\text{m}$ , and nomenclature is after Hirschmann (Hirschmann, 1957).

*Material examined:* 2 DN, 05.06.2010, Veliki Strbac (sample 1), litter of mixed deciduous forest; 3 DN, 05.06.2010, Veliki Strbac (sample 3), litter of mixed deciduous forest; 2 PN, 4 DN, 05.06.2010, Veliki Strbac (sample 4), litter of mixed deciduous forest; 1 DN, 1 ♀, 05.06.2010, Veliki Strbac (sample 6), litter of mixed deciduous forest; 1 DN, 05.06.2010, Veliki Strbac (sample 10), litter of mixed deciduous forest; 1 DN, 05.06.2010, Veliki Strbac (sample 12), litter of mixed deciduous forest; 2 DN, 05.06.2010, Veliki Strbac (sample 16), bark of the decomposing trunk of deciduous tree; 1 DN, 05.06.2010, Veliki Strbac (sample 20), litter of mixed deciduous forest.

### RESULTS

*Discourella radnaensis* (Willman, 1941)

*Pseuduropoda radnaensis* Willman, 1941: 43.

*Discourella radnaensis* (Willman, 1941): Hirschmann, 1980: 56.

(Figs 1-4)

#### *Protonymph description*

Length of idiosoma 525  $\mu\text{m}$ , width 320  $\mu\text{m}$ , body elongate with narrow front, colour yellow–brown.

#### *Dorsal* (Fig. 1 A)

Podosomal shield ( $L = 350 \mu\text{m}$ ,  $l = 135 \mu\text{m}$ ) is much elongated posteriorly to the  $Z_1$  seta, and bears setae much shorter than the other dorsal setae. Pygidial shield shaped like a strip, the ends rounded and concave, with wavy edges. Lateral shields are kidney-shaped, wider than pygidial shield, with wavy edges. Mesopodal shields small, oblong, placed in the middle zone, at the both sides of the podosomal shield.

Dorsal setae (except pairs on the podosomal shield) are arranged on the insertion platelets (of variable size and shape), in the unsclerotized membrane area, and have different lengths. The  $i_1$  seta is the longest and thickest, bent inwards,  $S_5$  and  $I_4$  setae have equal length, the shortest being seta  $I_3$ . Between  $I_1$ ,  $Z_1$  and  $i_1$ ,  $s_1$  setae, pairs of circular pores are present.

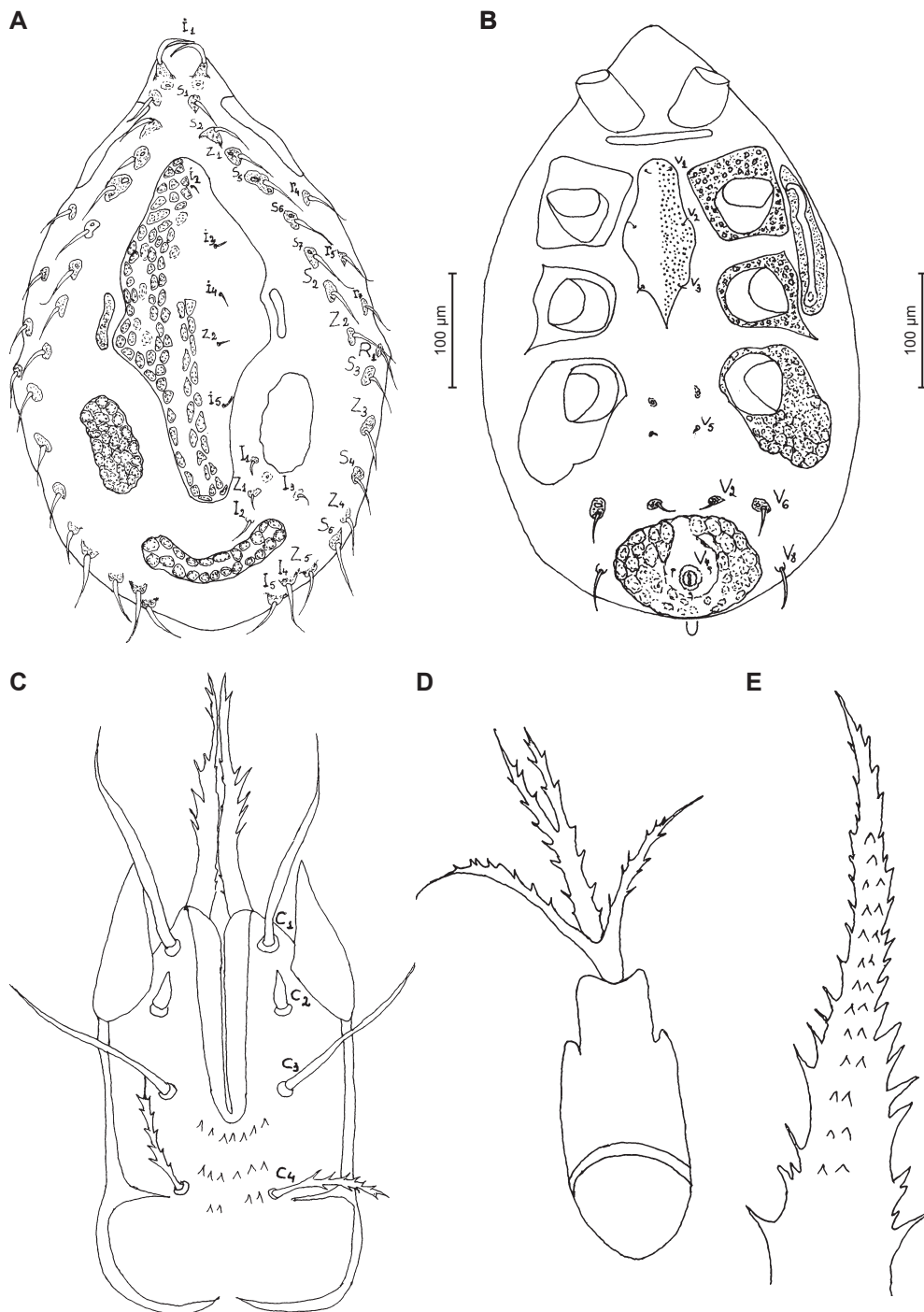


Fig. 1 - *Discourella radnaensis*. Protonymph idiosoma: A, dorsal view; B, ventral view. Deutonymph gnathosoma: C, hypostome; D, tritosternum; E, epistome.

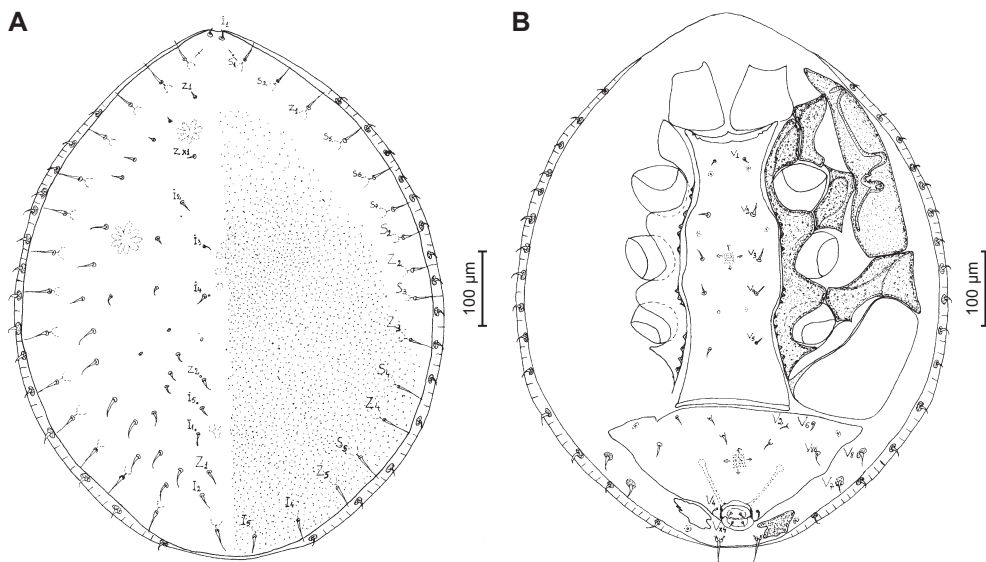


Fig. 2 - *Discourella radnaensis*, deutonymph idiosoma: A, dorsal view; B, ventral view.

Shields ornamentation consists of roughly equal size polygonal impressions, arranged above the whole shield (lateral shields), or a single string on the edge (pygidial shield). Mesopodal shields have a fine granular ornamentation.

#### *Ventral* (Fig. 1 B)

Sternal shield rhomboid-shaped, with a strong sharp posterior elongation, bearing short needle-like setae ( $v_1$ ,  $v_2$ ,  $v_3$ ). Setae  $v_5$ ,  $V_2$ ,  $V_6$  and  $V_8$ , present in the unsclerotized membrane area, are needle-like and arranged on the insertion platelets ( $V_2$  and  $V_6$ ) or on small pedestals ( $V_8$ ). Adanal pair of setae  $V_4$  and postanal seta  $U$  are short. Above  $v_5$  pair of setae, a pair of large circular pores are disposed.

Sternal shield ornamentation is composed of small circles, and peritremal shield is fine granulated. Podal shields of leg II and III have an ornamentation made of small polygons, anal shield and podoinguinal shields of leg IV have larger polygonal impressions.

#### *Legs* (Fig. 3)

Tarsi on all legs with a pair of claws at tip of ambulacral prolongation; simple thorn-like setae on all legs, excepting two setae on the trochanter and femur of legs I, that are denticulate.

#### *Deutonymph description*

Body oval, with narrow front, idiosoma 685 µm length, 525 µm width, colour yellow-brown.



*Dorsal* (Fig. 2 A)

Dorsal shield, oval, oblong anterior. The number of pairs of setae on the dorsal shield is 50, needle-like shaped, of various sizes, the longest being the setae from the lateral row ( $s_1$ - $I_5$ ), which are inserted on small platelets. Marginal row of setae (15 pairs) are needle-like, short, thick at their base and curved like a sickle, and are inserted on small oval platelets.

Dorsal shield ornamentation is finely dotted, and is absent in the first half of the body, in the marginal zone. In the depth of the shield there are two flower-like impressions, and other circular impressions, arranged in the middle and the back of the shield.

*Ventral* (Fig. 2 B)

Between sternal shield, endopodal area and ventroanal shield there is a very narrow band of unsclerotized membrane. Sternal shield is long and exceeds the level of  $v_5$  seta. Sternal setae ( $v_1$ - $v_5$ ) are needle-like, and between them there are three pairs of circular pores. Ventroanal shield is valve-shaped, with slightly irregular

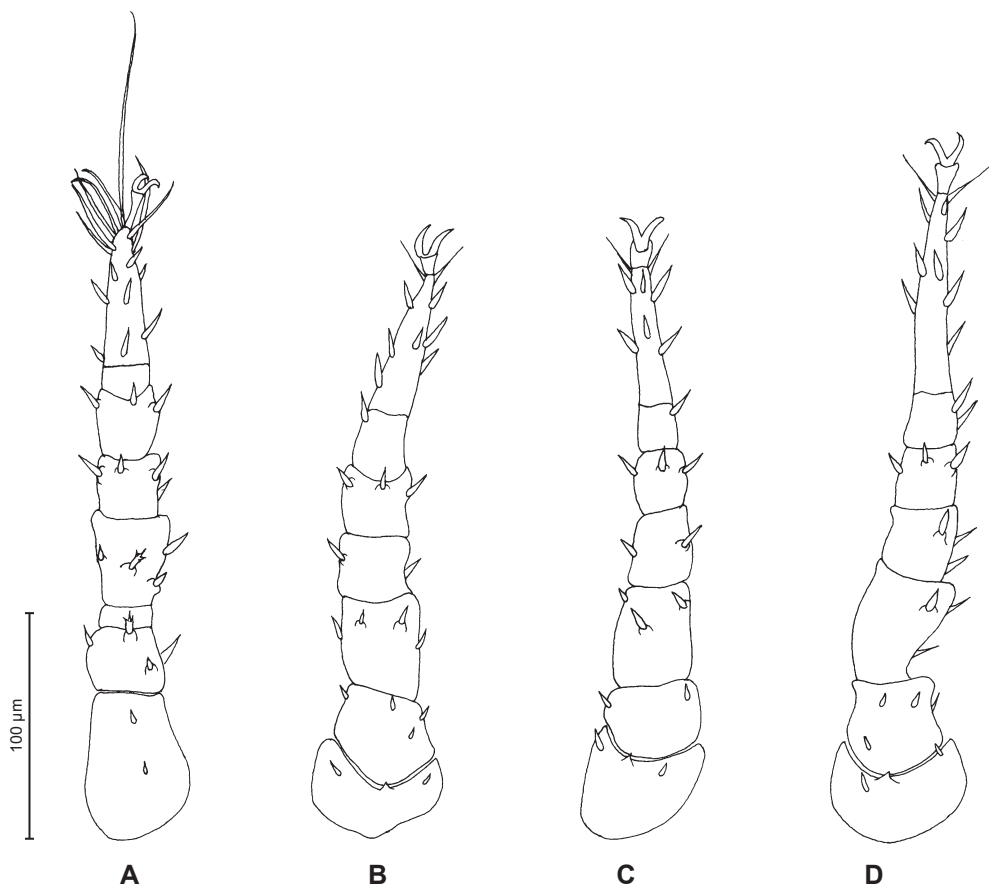


Fig. 3 - *Discourella radnaensis*, protonymph: A, leg I; B, leg II; C, leg III; D, leg IV.

border in certain areas, and bears five pairs of simple needle-like setae ( $V_2$ ,  $V_3$ ,  $V_4$ ,  $V_6$  and  $V_{x6}$ ), two pairs of smaller adanal setae ( $V_{x4}$ ), and a pair of circular pores. The setae  $V_7$  and  $V_8$  are located outside the ventroanal shield, on small circular platelets.

Leg grooves are well developed. The anus is circular, the anal opening is transverse.

Peritremal shield is not emerged with shields from exopodal area. The peritreme has a long anterior branch, which ups to the half of the coxae of legs I, and has two curved portions, and a short posterior branch. The stigmatal opening is at the level of coxae of legs II. The endopodal lines have portions with ornamentation, in the form of small ridges.

All ventral shields have a similar ornamentation, consisting of a fine granulation.

#### *Gnatosoma*

Hypostome (Fig. 1 C) with horn-like corniculi, hypostomal setae  $c_1$  and  $c_3$  needle-like and long,  $c_2$  seta very short and wedge-shaped,  $c_4$  seta denticulate, having a length of 2/3 of  $c_1$  and  $c_3$ . Deutosternum with three rows of hypostomal denticles, lacinae long with large fringe on external border and smaller denticles on internal border.

Tritosternum (Fig. 1 D) has narrow base in apical area, the limb consisting of two denticulate lateral branches and a median branch (bifurcated in his anterior half).

Epistome (Fig. 1 E) has denticulate prolongation (with two rows of smaller denticles on his surface and bigger denticles on the border).

#### *Legs* (Fig. 4)

Coxa I large, tarsi on all legs with a pair of claws at tip of ambulacral prolongation; setae on all legs simple and thorn-like. Coxae, trochanters and femurs of legs I, trochanters and femurs of legs II and III and femurs of legs IV bearing a membranous flange.

#### *Remarks*

Protonymph of *Discourella radnaensis* species is distinct from other protonymphs which have been described for other species of the genera (*D. lindquisti*, *D. cordieri*, *D. dubiosa*, and *D. modesta*). Dorsally there is an additional pair of mesopodal shields, and podosomal shield is much elongated, exceeding the level of  $Z_1$  seta. Ventrally, the inguinal shields are merged with podal shields of legs IV. Body ornamentation is also different from that of the species mentioned above.

From *Discourella* genera deutonymphs described in literature, *Discourella radnaensis* deutonymph is most similar to some extent with *Discourella miyakawai* Hiramatsu, 1979 and *Discourella komoroensis* Hiramatsu, 1979 (all belonging to the *cosmogyna* group of species). The similarity of these species is in the shape of the sternal shield, and in the existence of unsclerotized membrane area between sternal shield, endopodal area and ventroanal shield. Other common morphological characters would be similar shape of endopodal and exopodal area. *Discourella radnaensis* deutonymph distinguishes by characteristic ornamentation on dorsal and ventral shields, the shape of the setae from the dorsal shield, the shape of peritreme, and the shape of ventroanal shield.

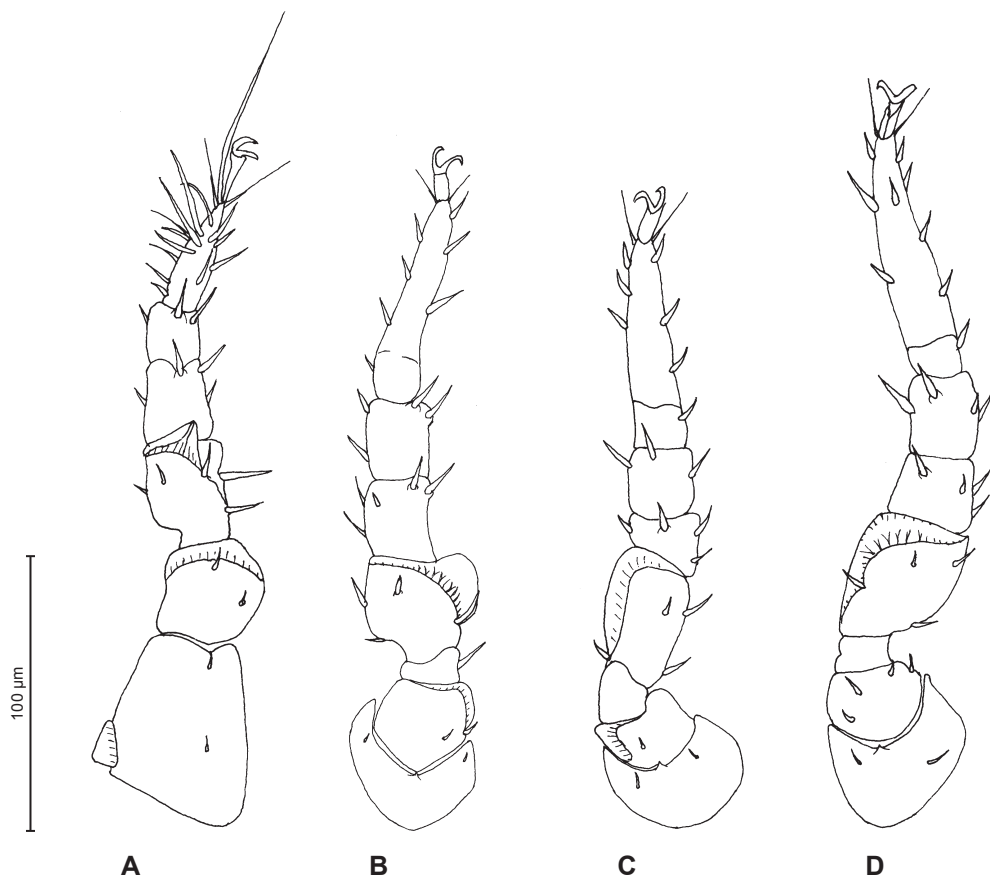


Fig. 4 - *Discourella radnaensis*, deutonymph: A, leg I; B, leg II; C, leg III; D, leg IV.

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#### DESCRIEREA STADIILOR PREADULTE (PROTONIMFE ŞI DEUTONIMFE) ALE SPECIEI *DISCOURELLA RADNAENSIS* (WILLMAN, 1941) (ACARINA: ANACTINOTRICHIDA: UROPODINA)

#### REZUMAT

Specia *Discourella radnaensis* a fost descrisă de Willmann din Slovenia, localitatea Radna, în 1941, holotipul fiind o femelă. De atunci specia nu a mai fost colectată, probabil deoarece studiile faunistice asupra Uropodinelor în Balcani au fost foarte puține.

Materialul acarologic este colectat din Serbia, Parcul Național Djerdap, de pe muntele Veliki Strbac (768 m altitudine). Probele au provenit din litiera unei păduri de amestec de foioase și din scoarța unor trunchiuri în descompunere de foioase. Pe lângă un exemplar de femelă au fost colectate protonimfe și deutonimfe ale acestei specii.

Specia *Discourella radnaensis* este la prima înregistrare în fauna Serbiei, iar stadiile preadulte (protonimfele și deutonimfele) sunt descrise pentru prima dată în literatură.

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## MITE FAUNA OF ANT NESTS – COMPARATIVE STUDY OF MITE FAUNA IN THE ARGEŞ RIVER BASIN (SOUTH ROMANIA)

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ADINA CĂLUGĂR, BÁLINT MARKÓ

**Abstract.** This paper presents the results of a comparative study on the major groups of mites associated with ants in two different areas (hilly and mountain) of the Argeş basin. Mites from order Gamasida (Suborders Uropodina and Gamasina) and order Oribatida, and the ant fauna (Order Hymenoptera, family Formicidae) were investigated. Out of 31 mite species identified, *Oplitis hutae* is new to science (Constantinescu, in press), five are recorded for the first time in the Romanian fauna, and two for the second time. Also, one of the host ant species, *Lasius sabularum* is recorded for the second time in the Romanian myrmecofauna. In addition to the faunistic synopsis, a brief ecological and zoogeographical characterization is presented.

**Résumé.** L'article présente les résultats d'une étude comparative sur les principaux groupes d'acariens associés aux fourmis, dans deux zones différents (collines et montagnes) du bassin d'Argeş. Les acariens de l'Ordre Gamasida (Sousordres Uropodina et Gamasina) et de l'Ordre Oribatida, et la faune des fourmis (Ordre Hymenoptera, Famille Formicidae) ont été étudiés. Parmi les 31 espèces d'acariens identifiées, *Oplitis hutae* est nouvelle pour la science (Constantinescu, sous presse), cinq sont enregistrées pour la première fois dans la faune de Roumanie et deux autres espèces pour la deuxième fois. Aussi, l'une des espèces de fourmis hôte, *Lasius sabularum* est enregistrée pour la deuxième fois dans le myrmécophage de Roumanie. En plus de la synthèse faunistique, une brève caractérisation écologique et zoogéographique a été réalisée.

**Key words:** Southern Romania, Gamasina, Uropodina, Oribatida, Formicidae, mites, myrmecophyllia, faunistics, ecological characterization, zoogeographical spectrum.

### INTRODUCTION

Mites are invertebrates with an extraordinary capacity for adaptation; they live in almost all habitat types on Earth, both in aquatic and terrestrial habitats, in favourable or extreme environmental conditions. They can use almost any food resources, and trophic adaptability of mite species varies largely, from omnivorous (mainly soil inhabitants) to the parasitic species, narrowly specialized, which live and feed on a specific host.

Ant nests can also offer proper habitat conditions for mites. In this type of microhabitat there is a concentration of organic matter, gathered by the ants from surrounding areas, complementing the milder microclimatic conditions of temperature, moisture and soil aeration. Some species of mites enter ant nests just to find here more favourable microclimate, but there are some stenotopic, strictly myrmecophilic species, that have a much closer connection with their hosts.

Recently Uppstrom (2010) summarized the data on mites living in ant nests starting with early studies (e.g. carried out by Berlese, who published in 1904 a list of 80 species of myrmecophilic mites and their ant hosts), and continuing with recent results published by different authors from all continents. Masán (2001) gave information about the host ant species and the ant nest dwelling Uropodina, and mentioned these mites attach to the body of their hosts, specifically close to the mandibles, picking up the pieces of host food, or around the anus where they suck on the excrements, thus contributing to the hygiene of the host.

In Romania studies dedicated to mites associated with ants had been carried out only in the case of Suborder Uropodina. Huțu (1978) published an ecological and faunistic survey concerning this suborder in North Moldavia, including a list of some Uropodina species identified in ant nests. Kontschán (2007) studying the distribution of species of the family Trachyuropodidae in the Carpathian Basin reports from Romania (Transylvania) three species (*Trachyuropoda riccardiana*, *T. hirschmanni* and *Oplitis wasmanni*).

Constantinescu (2007) also studied the Uropodina fauna of Argeș River basin, but none of the three studies provides any references to the host ant species.

In the frame of the present study the authors extend the research on mite fauna from ant nests in Argeș basin, by identifying mite species from several groups (Uropodina, Gamasina and Oribatida) and their ant host species. The species richness and relative abundance of mite fauna is analyzed, by comparing material collected from ant nests in two different habitat types: a hilly area and mountain area. A brief ecological and zoogeographical characterization of mites was also done.

#### MATERIAL AND METHODS

The material (24 samples, containing 402 individuals) was collected from two meadows (used as pasture), located in the hilly area of Argeș near Lacul lui Bârcă in Davidești village (44°59'20.05" N, 24°59'17.11" E; 420 m a.s.l.), and a mountain area near Poienile Vâlsanului (45°22'20.82" N, 24°43'35.87" E; 870 m a.s.l.), on 21.07.2009 and 30.08.2009 respectively.

An equal number of samples (12) were collected from each sampling sites, each sample corresponding to a distinct ant nest. Soil samples containing ants and especially their brood (eggs, larvae and pupae) were collected using a shovel.

Samples were not equal in volume, thus relative abundances of species were used to characterize mite communities.

Mites were removed from ants' nests by extraction from ant nesting material using Tullgren funnels, and ant fauna were extracted by washing soil samples. Mite specimens have been clarified in lactic acid, and then they were separated in systematic groups and identified, and finally stored in alcohol (96%).

In addition to the faunistic synopsis, the world distribution of each mite species (a) and their ecological characterization (b) were included. Species recorded for the first time in the fauna of Romania have been marked with one asterisk, and those recorded for the second time with two asterisks. *Oplitis hutae* is a new species (Constantinescu, in press), and have been marked with three asterisks.

The identification of ant species was carried out on the basis of currently available keys (Czechowski et al., 2002; Seifert, 2007). *Tetramorium* specimens belonging to the *caespitum* species group could not be identified due to the very limited number of specimens (1-2 inds.) available, thus all these individuals were handled as *Tetramorium* cf. *caespitum*. *Lasius balcanicus* Seifert, 1988 and *L. distinguendus* Emery, 1916 could not be distinguished due to the lack of gynes in the samples Seifert (2007).

### RESULTS

All 31 species of mites were identified from the collected material; they belonged to 20 genera, 17 families and two orders, Gamasida (Suborders Uropodina and Gamasina) and Oribatida, while the ant hosts belonged to 4 genera (*Formica*, *Tetramorium*, *Lasius* and *Solenopsis*) (Tab. 1).

#### Faunistic synopsis:

Order Gamasida Leach, 1815

Suborder Uropodina Kramer, 1881

Family Trachyuropodidae Berlese, 1917

#### 1. *Trachyuropoda coccinea* (Michael, 1891)

- a. Palaearctic European and Siberian species;
- b. Stenotopic, myrmecophilic species, with accidental occurrence in grassland areas.

#### 2. *Trachyuropoda cristiceps* (Canestrini, 1884)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species.

#### 3. *Trachyuropoda riccardiana* (Leonardi, 1895)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species, with accidental occurrence in grassland areas.

#### 4. *Trachyuropoda excavata* (Wasmann, 1899)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species, with accidental occurrence in other biotopes.

Table 1

Mite species (Uropodina, Gamasina, Oribatida) and associated ant host species, identified in ant nests at Lacul lui Bărcă (hilly area) and Poienile Vălsanului (mountain area).

Acari			Oribatida	Insecta
Gamasida				
Uropodina	Gamasina			
Lacul lui Bărcă (hilly area)				
<i>Trachyuropoda coccinea</i> <i>Trachyuropoda cristiceps</i>	<i>Gymnolaelaps</i> sp.	-	<i>Formica cunicularia</i> Latreille, 1798	
<i>Oplitis hutae</i> <i>Tracytes irenae</i> <i>Trachyuropoda riccardiana</i>	<i>Laelaspis variopilis</i> <i>Laelaspis equitans</i> <i>Pachylaelaps tessellatus</i>	<i>Tectocephus velatus</i> <i>Peloptulus phaenotus</i> <i>Ceratozetes (C.) conjunctus</i>	<i>Tetramorium</i> cf. <i>caespitum</i>	
<i>Oplitis hutae</i>	-	-	<i>Tetramorium</i> cf. <i>caespitum</i>	
-	<i>Laelaspis equitans</i> <i>Amblyseius</i> sp.	<i>Scheloribates (S.) labyrinthicus</i>	<i>Formica clara</i> Forel, 1886 <i>Solenopsis fugax</i> Latreille, 1798	
<i>Trachyuropoda cristiceps</i> <i>Oplitis hutae</i>	<i>Gymnolaelaps</i> sp.	-	<i>Tetramorium</i> cf. <i>caespitum</i>	
<i>Trachyuropoda coccinea</i> <i>Trachyuropoda cristiceps</i>	<i>Gymnolaelaps</i> sp.	-	<i>Formica rufibarbis</i> Fabricius, 1793	
<i>Trachyuropoda coccinea</i> <i>Trachyuropoda cristiceps</i>	<i>Gymnolaelaps</i> sp. <i>Laelaspis equitans</i>	<i>Epilohmannia cylindrica</i>	<i>Solenopsis fugax</i> Latreille, 1798 <i>Formica clara</i> Forel, 1886 <i>Tetramorium</i> cf. <i>caespitum</i>	
-	<i>Pachylaelaps tessellatus</i>	<i>Oribatula (Z.) glabra</i>	<i>Tetramorium</i> cf. <i>caespitum</i>	



Table 1 (continued)

<i>Trachyuropoda excavata</i> <i>Oplitis schmitzi</i>	<i>Gymnolaelaps</i> sp. <i>Pachylaelaps tessellatus</i>	<i>Scheloribates</i> (S.) <i>labyrinthicus</i> <i>Pergalumna nervosa</i>	<i>Lasius balcanicus</i> / <i>distinguendus</i>
-	-	<i>Peloptulus phaenotus</i> <i>Acrotritita ardua</i>	<i>Lasius balcanicus</i> / <i>distinguendus</i>
<i>Oplitis schmitzi</i> <i>Oplitis berleseiphiloctena</i> <i>Thrichocylliba comata</i>	<i>Ameroseius</i> sp.	<i>Epilohmannia cylindrica</i> <i>Acrotritita ardua</i>	<i>Lasius balcanicus</i> / <i>distinguendus</i>
<i>Oplitis schmitzi</i> <i>Trachyuropoda cristiceps</i> <i>Oplitis latisaetigera</i> <i>Trachyuropoda coccinea</i>	<i>Pseudoparasitus</i> sp.	<i>Mycobates</i> (C.) <i>tridactylus</i>	<i>Lasius paraliensis</i> Seifert, 1992 <i>Lasius sabularum</i> (Bondroit, 1918)
Poienile Vâlsanului (mountain area)			
<i>Oplitis ovatula</i> <i>Trachyuropoda excavata</i>	-	-	<i>Tetramorium</i> cf. <i>caespitum</i>
<i>Trachyuropoda excavata</i>	-	-	<i>Tetramorium</i> cf. <i>caespitum</i>
<i>Oplitis wasmanni</i>	<i>Laelaspis myrmicae</i>	<i>Scheloribates</i> (S.) <i>labyrinthicus</i>	<i>Tetramorium</i> cf. <i>caespitum</i> <i>Lasius flavus</i> (Fabricius, 1782)
<i>Trachyuropoda excavata</i> <i>Oplitis ovatula</i>	-	<i>Liebstadia pannonica</i> <i>Scheloribates</i> (S.) <i>labyrinthicus</i> <i>Galumna</i> (G.) <i>tarsipennata</i>	<i>Tetramorium</i> cf. <i>caespitum</i>
<i>Trachyuropoda excavata</i>	-	-	<i>Tetramorium</i> cf. <i>caespitum</i>
<i>Oplitis minutissima</i>	-	<i>Liebstadia pannonica</i> <i>Scheloribates</i> (S.) <i>labyrinthicus</i> <i>Galumna</i> (G.) <i>tarsipennata</i>	<i>Lasius niger</i> (Linnaeus, 1758)
<i>Trachyuropoda excavata</i>	-	-	<i>Tetramorium</i> cf. <i>caespitum</i>

5. *Oplitis hutae* Constantinescu, in press\*\*\*

- a. Palaearctic European species, described in Romania.
- b. Stenotopic, myrmecophilic species.

6. *Oplitis schmitzi* (Kneissl, 1908)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species, with accidental occurrence in other biotopes.

7. *Oplitis wasmanni* (Kneissl, 1907)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species.

8. *Oplitis latisaetigera* Mašán, 1999\*

- a. Palaearctic European species;
- b. Stenotopic, myrmecophilic species.

9. *Oplitis berlesephiloctena* Hirschmann, 1991\*

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species.

10. *Oplitis minutissima* (Berlese, 1903)

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species, with accidental occurrence in grassland areas.

11. *Oplitis ovatula* (Berlese, 1903)\*\*

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic species.

Family Urodinychidae Berlese, 1917

12. *Thrichocylliba comata* (Leonardi, 1895)\*\*

- a. Palaearctic European and Mediterranean species;
- b. Stenotopic, myrmecophilic and saprophilic species, with accidental occurrence in other biotopes.

Family Trachytidae Trägårdh, 1938

13. *Trachytes irenae* Pecina, 1970

- a. Palaearctic European species;
- b. Stenotopic sylvicolous species (litter and saprophilic), with accidental occurrence in other biotopes (ant nests, excrements, grassland areas).

Suborder Gamasina Leach, 1815

Family Laelapidae Berlese, 1892

14. *Gymnolaelaps* sp.

15. *Laelaspis variopilis* (Hirschmann, 1969)\*

a. Central European species;

b. Myrmecophilic species recorded in *Tetramorium caespitum* nests (Karg, 1993).

16. *Laelaspis equitans* (Michael, 1891)\*

a. Holarctic species;

b. Myrmecophilic species recorded in *Tetramorium caespitum* nests (Bregetova, 1977)

17. *Laelaspis myrmicae* (Hirschmann, 1969)\*

a. Central European species;

b. Myrmecophilic species, recorded in *Myrmica rubra* nests (Karg, 1993).

Family Pachylaelapidae Vitzthum, 1931

18. *Pachylaelaps tessellatus* Berlese, 1920

a. European species;

b. Species cited in bryophytes, in decomposing organic material.

Family Phytoseiidae Berlese, 1916

19. *Amblyseius* sp.

Family Ameroseiidae Evans, 1963

20. *Ameroseius* sp.

Order Oribatida Dugès, 1834

Family Epilohmanniidae Oudemans, 1923

21. *Epilohmannia cylindrica* (Berlese, 1904)

a. Cosmopolitan species;

b. Frequently reported from meadows, cultivated soils, less often from forest soils (humus layer).

Family Euphthiracaridae Jacot, 1930

22. *Acrotritia ardua* (C. L. Koch, 1841)

a. Cosmopolitan species;

b. Mainly sylvicolous species, eurytopic, mesophilic.

## Family Tectocephidae Grandjean, 1954

23. *Tectocephus velatus* (Michael, 1880)

- a. Cosmopolitan species;
- b. Eurybiontic species.

## Family Phenopelopidae Petrunkevich, 1955

24. *Peloptulus phaenotus* (C. L. Koch, 1841)

- a. Palearctic species;
- b. Lawn species.

## Family Ceratozetidae Jacot, 1925

25. *Ceratozetes (Ceratozetes) conjunctus* Mihelčič, 1956

- a. Mediterranean species;
- b. Meso-xerophilous species.

## Family Punctoribatidae Thor, 1937

26. *Mycobates (Calypozetes) tridactylus* Willmann, 1929

- a. Palearctic species;
- b. Mainly sylvicolous species.

## Family Oribatulidae Thor, 1929

27. *Oribatula (Zygoribatula) glabra* (Michael, 1890)

- a. Palearctic species;
- b. Xerophilous species.

## Family Liebstadiidae J. et P. Balogh, 1984

28. *Liebstadia pannonica* (Willmann, 1951)

- a. Holarctic species;
- b. Mainly lawn species.

## Family Scheloribatidae Grandjean, 1933

29. *Scheloribates (Scheloribates) labyrinthicus* Jeleva, 1962

- a. South and South-Eastern European species;
- b. Lawn, eurytopic species.

## Family Galumnidae Jacot, 1925

30. *Galumna (Galumna) tarsipennata* Oudemans, 1913

- a. South Palearctic and Brasil;
- b. Thermo-xerophilous species.

31. *Pergalumna nervosa* (Berlese, 1914)

- a. Holarctic and South Africa species.
- b. Eurytopic, mesophilic species.

Generally, mites from the suborder Uropodina Kramer, 1881 were the most abundant (over 75%) in both sampling sites (Figs 1, 3). Out of the 13 species 12 are myrmecophilic, with accidental occurrence in other biotopes (soil samples from lawns, decaying trunks); *Trachytes irenae* is the only sylvicolous species, most likely present in the ant nests due to favourable microclimatic conditions.

The analysis of the zoogeographical distribution of Uropodina (Wisniewski, 1993) indicates that all species are spread in the Palaearctic region, the majority of species are Euro-Mediterranean (9 species), one species is Euro-Siberian (*Trachyuropoda coccinea*) and 2 species are European (*Trachytes irenae*, *Oplitis latisaetigera*).

Mites of the suborder Gamasina Leach, 1815 represented 11.15% of the total of Gamasida in the hilly stand, and only 0.97 % in mountain area; they are in both cases surpassed by Uropodina. In terms of number of species, a balance was found, meaning that representatives of the Gamasina in ant nests from hilly area made up approximately 35% of all species of the order, and in the mountain ecosystem only 1/5 of the total (Tab. 2). In terms of frequency of occurrence in the analysed samples, Gamasina were found in 83.3% of samples from the hilly area, and in only a single sample from ant nests of the mountainous area.

Overall, there were 7 species of mites of Gamasina, belonging to 5 genera and 4 families, of which the most represented family proved to be Laelapidae, with 2 genera and 4 species (Tab. 1). Three of these species are cited in literature as myrmecophilic, being collected only from ant nests. In terms of geographical spread, the majority of the analyzed species have European distribution (Karg, 1993; Bregetova, 1977).

Mites of the order Oribatida Dugès, 1834 were present in 8 of the 12 samples collected from ant nests around Lacul lui Bârcă; the 9 species sum up 37 specimens, representing 13.26% of all the mites (Tab. 1, fig. 1). In the mountain area of Valea Vâlsanului, Oribatida were found only in 3 samples; 3 species were reported with a total of 20 specimens, representing 16.26% of the total mites (Tab. 1, fig. 3).

The Oribatida fauna found in ant nests in the two sampling sites represented 11 species belonging to 11 genera and 10 families (Ghilarov & Krivolutsky, 1975; Perez-Iñigo, 1993; Weigmann, 2006). Zoogeographical analysis (Subias, 2004) showed that the Palaearctic species are more numerous and Cosmopolitan species follow; it is noteworthy that European species are equally present in Europe and South Mediterranean region. Regarding the ecological spectrum (Mahunka & Mahunka-Papp, 2004; Rajski, 1967, 1968; Schatz, 1983; Vasiliu et al., 1993), lawn species are well represented, some of which are the most abundant. Species with high abundance and even higher frequency are *Scheloribates labyrinthicus*, *Liebstadia pannonica*, *Pergalumna nervosa* with the first two being typical species of lawn; only *S. labyrinthicus*, a praticolous eurytopic species, was identified in both sample sites (Tab. 1).

Table 2

Abundance in individuals (A) and relative abundance (R.A. %) for mite species in two research areas; marked by thickening common species to both areas (hilly and mountain).

Species	Locality		Lacul lui Bârcă (hilly area)		Poienile Vâlsanului (mountain area)	
	A	R.A. %	A	R.A. %	A	R.A. %
<i>Trachyuropoda coccinea</i>	27	9.67	-	-	-	-
<i>Trachyuropoda cristiceps</i>	152	54.48	-	-	-	-
<i>Trachyuropoda riccardiana</i>	1	0.35	-	-	-	-
<i>Trachyuropoda excavata</i>	1	0.35	82	66.66	-	-
<i>Oplitis hutae</i>	9	3.22	-	-	-	-
<i>Oplitis wasmanni</i>	-	-	2	1.62	-	-
<i>Oplitis latisaetigera</i>	4	1.43	-	-	-	-
<i>Oplitis schmitzi</i>	11	3.94	-	-	-	-
<i>Oplitis berleseiphiloctena</i>	1	0.35	-	-	-	-
<i>Oplitis minutissima</i>	-	-	15	12.19	-	-
<i>Oplitis ovatula</i>	-	-	3	2.43	-	-
<i>Thrichocylliba comata</i>	8	2.87	-	-	-	-
<i>Trachytes irenae</i>	1	0.35	-	-	-	-
<i>Gymnolaelaps</i> sp.	14	5.02	-	-	-	-
<i>Laelaspis variopilis</i>	3	1.07	-	-	-	-
<i>Laelaspis equitans</i>	5	1.79	-	-	-	-
<i>Pachylaelaps tessellatus</i>	3	1.07	-	-	-	-
<i>Amblyseius</i> sp.	1	0.35	-	-	-	-
<i>Ameroseius</i> sp.	1	0.35	-	-	-	-
<i>Laelaspis myrmicae</i>	-	-	1	0.81	-	-
<i>Epilohmannia cylindrica</i>	2	0.72	-	-	-	-
<i>Acrotrititia ardua</i>	2	0.72	-	-	-	-
<i>Tectocepheus velatus</i>	1	0.35	-	-	-	-
<i>Peloptulus phaenotus</i>	2	0.72	-	-	-	-
<i>Ceratozetes</i> (C.) <i>conjunctus</i>	1	0.35	-	-	-	-
<i>Mycobates</i> (C.) <i>tridactylus</i>	1	0.35	-	-	-	-
<i>Oribatula</i> (Z.) <i>glabra</i>	1	0.35	-	-	-	-
<i>Liebstadia pannonica</i>	-	-	9	7.31	-	-
<i>Scheloribates</i> (S.) <i>labyrinthicus</i>	23	8.24	3	2.43	-	-
<i>Galumna</i> (G.) <i>tarsipennata</i>	-	-	8	6.50	-	-
<i>Pergalumna nervosa</i>	4	1.43	-	-	-	-

The number of host ant species is low. Altogether 9 species were identified and the most common host ant species were *Tetramorium* cf. *caespitum* and members of the *Chthonolasius* subgenus (*Lasius balcanicus/distinguendus* and *L. sabularum*). Excepting *L. sabularum*, which is reported for the second time in Romania (Markó et al., 2006), all species are common.

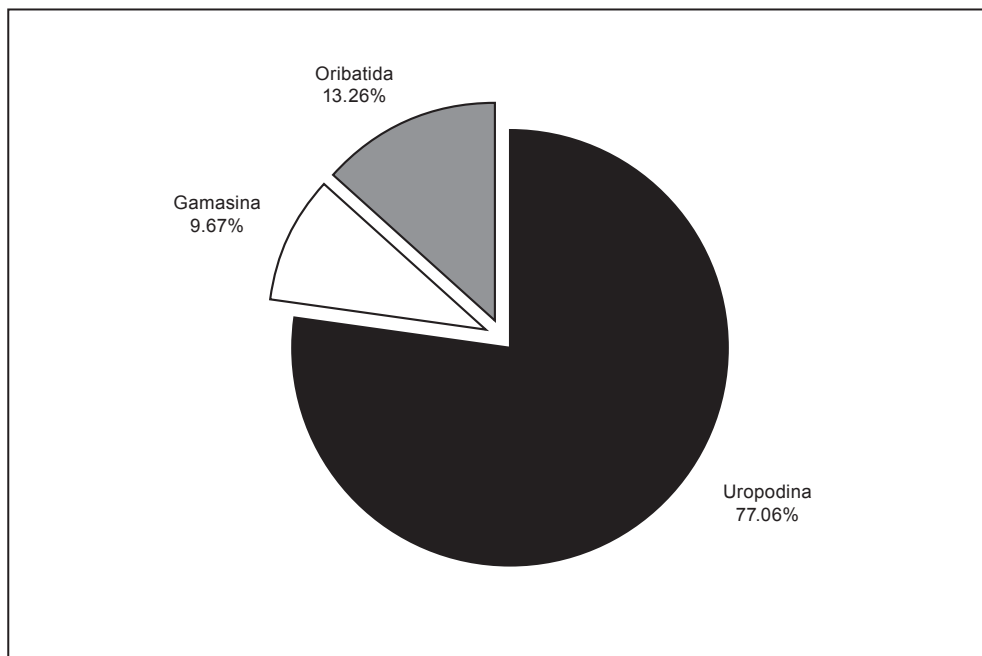


Fig. 1 - Relative abundance (%) of the three systematic groups of mites in Lacul lui Bârcă.

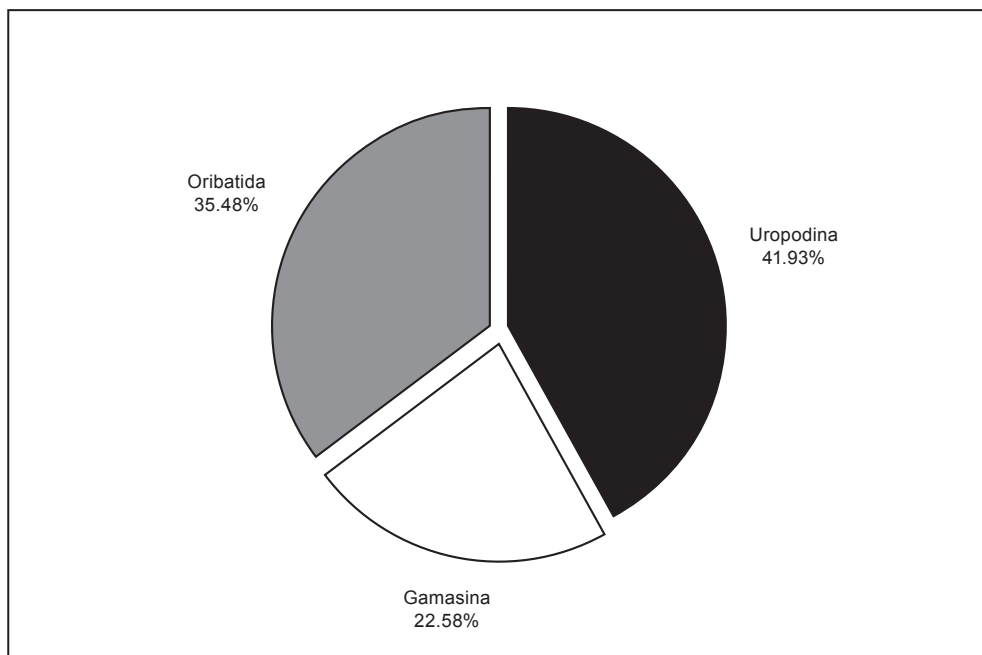


Fig. 2 - The percentage of the three systematic groups of mites according to number of identified species in Lacul lui Bârcă.

## DISCUSSIONS

Analyzing the fauna of mites associated with ants in the two studied areas it was remarked a clear difference in the species composition; a single species, *Scheloribates (S.) labyrinthicus* was found both in the hilly and mountain areas.

In the hilly area, the number of mite species is more than three times higher than in the mountain area. High diversity of mites fauna in the hilly area is likely to be due to more favourable climatic conditions, on one hand, and greater diversity of host ant species, on the other hand (eight ant species have been identified in the hilly area and only three in the mountains area).

The three groups of mites (Uropodina, Gamasina, Oribatida) have different affinity to this microhabitat represented by ant nests. Uropodina species proved to be myrmecophilic (with one exception), only half of the Gamasina can be included in this category, while for the Oribatida species this microhabitat is only a secondary option.

Uropodina are numerically dominant in both study sites, in the hilly area the largest percentage is of *Trachyuropoda cristiceps* (54.48%) and in the mountain one *Trachyuropoda excavata* (66.66%). Of the 13 Uropodina species, one species is new to science (a part of the analyzed material used in species description comes from samples collected from Lacul lui Bârca). Species *Oplitis berleseiphiloctena* and *Oplitis latisaetigera* are for the first time recorded in the Romanian fauna; *Oplitis ovatula* and *Thrichocylliba comata* are recorded for the second time.

Out of the 7 species of suborder Gamasina Leach, 1815 identified, 3 are recorded for the first time in Romania and other 3 require a more detailed taxonomic and morphological study in order to be identified. The mites in Gamasina had the lowest percentage of all groups, both in number of individuals (9.67% in the hilly area and only 0.81% in the mountain area) and in the number of species (22.58% in the hilly area and 12.5% in the mountain area) (Figs 1-4). A single species – *Laelaspis myrmicae* was collected from Poienile Vâlsanului, the other species (*Gymnolaelaps* sp., *Laelaspis variopilis*, *Laelaspis equitans*, *Pachylaelaps tessellatus*, *Amblyseius* sp., *Ameroseius* sp.) were collected from Lacul lui Bârca.

From an autecological point of view, half of all Gamasina species analysed in this paper are strictly myrmecophilic, however all belong to the fam. Laelapidae, which includes numerous representatives with affinity for ants (Tab. 1). A strict connection between certain species of ants and certain species of Gamasina couldn't ultimately be established. In the case of the species *Laelaspis variopilis* and *Laelaspis equitans*, cited in literature (Karg, 1993; Bregetova, 1977) as living in *Tetramorium caespitum* nests, the results of the present study converge towards the same association, but due to impossibility of precise identification of the host ant species this association is still presumptive. *Laelaspis myrmicae* was found in *Tetramorium* cf. *caespitum* and *Lasius flavus* nests, while previously it was reported from nests of *Myrmica rubra* (cited as *M. laevinodis*) (Karg, 1993).



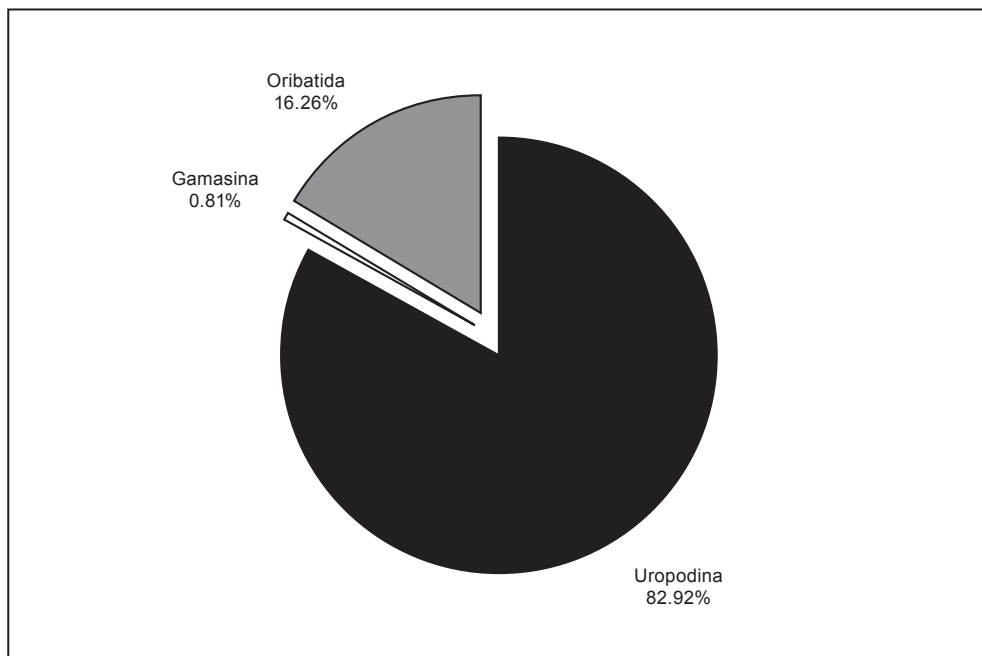


Fig. 3 - Relative abundance (%) of the three systematic groups of mites in Poienile Vâlsanului.

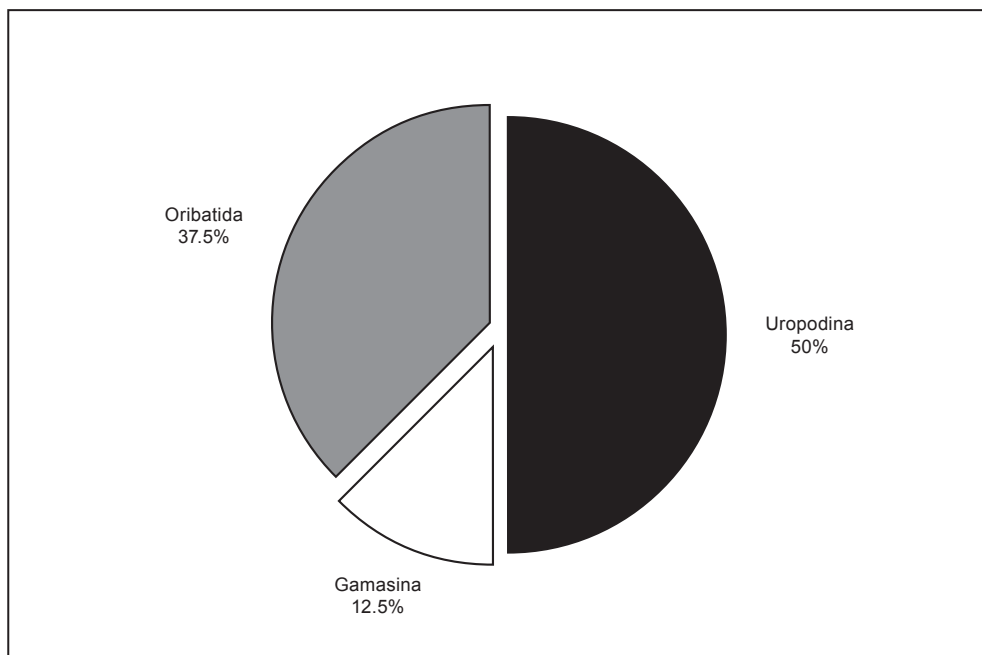


Fig. 4 - The percentage of the three systematic groups of mites according to number of identified species in Poienile Vâlsanului.

In grassland ecosystems, oribatids are well represented among the groups, both in number of species and individuals, within the soil mite fauna (Călugăr, 2006). The fauna collected in this study from ant nests can be appreciated as being reduced, in terms of abundance and number of species, in both sample sites (Tab. 1, figs 1-4). Judging from the proportion of major groups, we can notice the dominance of superior poronotic oribatids, that otherwise characterize grassland communities (Aoki, 1983). These species show greater adaptability and are able to populate other microhabitats outside edaphic environment itself.

Among the identified species some of them (*Acrotritia ardua*, *Tectocephus velatus*, *Peloptulus phaenotus*, *Pergalumna nervosa*) have been already reported in ant nests, and are considered myrmecophilic (Rajski, 1967, 1968; Schatz, 1983; Laakso & Setälä, 1998). Based on an extensive bibliography Uppstrom (2010) presented the list of oribatid species cited in ant nests with the authors' observations, and it can be noted that only a few species of oribatids are truly associated with these insects, while many others are ordinary residents of ant nests or even of their favourite prey, among them most frequent are the representatives of Galumnidae, Scheloribatidae, Tectocephidae families. In the material collected from the Argeş River basin, the first two families are best represented numerically, and family Galumnidae has two species, one in each site (Tab. 2).

As shown in Results, praticalous species prevail in the oribatid fauna of ant nests, so it is very likely that these species are among the members of the community at the basis of the ecosystem. For oribatid mites in particular, it is difficult to assess the possible affinity of some species to the habitat in question and the nature of relations with the ant hosts. This study may provide a starting point for further investigations, in which samples from the ant nests should be analysed, as well as samples of soil from the nest surroundings.

This research is a first approach, a mainly systematic one, to the study of the representative groups of mites associated with ants in Romania. Since most studies conducted worldwide focus smaller systematic group of mites associated with ants we consider these results very important. In other situations, although the whole mite fauna are studied, the identification of the material is at best done to the family level (Uppstrom, 2010). Given the novelty of faunistic information obtained in a relatively small material, the authors suggest further research on the mite fauna of ant nests, mainly by expanding the collection area to other parts of Romania.

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ACAROFAUNA DIN FURNICARE – STUDIUL COMPARATIV AL ACAROFAUNEI ÎN  
BAZINUL RÂULUI ARGEȘ (SUDUL ROMÂNIEI)

## REZUMAT

Lucrarea prezintă rezultatele unui studiu comparativ al principalelor grupe de acarieni asociați cu furnicile, din două zone de relief diferite ale bazinului Argeșului (Lacul lui Bârcă - zona colinară și Poienile Vâlsanului - zona montană). A fost investigată fauna de acarieni din ord. Gamasida (Subord. Gamasina și Uropodina) și ord. Oribatida, precum și fauna de furnici (Ord. Hymenoptera, fam. Formicidae). Dintre cele 31 de specii de acarieni identificate o specie este nouă pentru știință (*Oplitis hutae*), cinci se află la prima citare (*Oplitis berleseiphiloctena*, *O. latisaetigera*, *Laelaspis variopilis*, *L. equitans* și *L. myrmicae*), iar două la a doua citare în fauna României (*Oplitis ovatula* și *Thrichocylliba comata*). De asemenea, o specie de furnică gazdă, *Lasius sabularum*, este identificată pentru a doua oară pe teritoriul României. Pe lângă lista faunistică a speciilor de acarieni s-a realizat o scurtă caracterizare ecologică și zoogeografică a acestora, pe baza datelor personale și a celor existente în literatură.

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## ON THE POSITION OF THE GENUS *THAICUNGELLA* GUȚU & ANGUPANICH IN THE APSEUDOMORPH SYSTEMATICS (CRUSTACEA: TANAIDACEA)

MODEST GUȚU

**Abstract.** The reclassification of the genus *Thaicungella* Guțu & Angsupanich, 2004 of the family Parapseudidae in family Kalliapseudidae, made by Araujo-Silva & Larsen (2010), is commented. Although it is based on phylogenetic methods, the two authors' conclusion is considered unconvincing. In this respect, it is underlined that in their analysis, no other species of the tribe Pakistanapseudini (where the genus *Thaicungella* was classified) are included, nor the common features, characteristic to the mentioned tribe. Under these circumstances the arguments which could establish the relationship “degree” between the genus *Thaicungella* and the other species of the tribe were eliminated. Practically, the main characteristic on which the two authors' conclusion was based was reduced to the presence of dactylar setae on pereopod II (setae which are absent in the other species of the tribe, but present in kalliapseudids), ignoring the numerous differences between the tribe Pakistanapseudini and, implicitly, the genus *Thaicungella*, and the species classified in family Kalliapseudidae.

Also, the mention made by Araujo-Silva & Larsen (op. cit.), by which some affirmations were assigned to the author of present paper (Guțu, 2006) regarding the dactylar setae of the pereopod II in the species *Acutihumerus cavooreni* is refuted.

**Résumé.** On commente le transfèrement du genre *Thaicungella* Guțu & Angsupanich, 2004 de la famille Parapseudidae dans la famille Kalliapseudidae fait par Araujo-Silva & Larsen (2010). Bien que basée sur des méthodes philogénétiques, la conclusion des deux auteurs n'est pas considérée convaincante. En ce sens on met en évidence le fait que dans cette analyse on ne retrouve aucune autre espèce de la tribu Pakistanapseudini (où l'on a classifié le genre *Thaicungella*), mais ni les traits communs, caractéristiques pour les espèces de cette tribu. Dans ces conditions on a éliminé les arguments sur la base desquels on pouvait établir le „degré” de parenté entre le genre *Thaicungella* et les autres espèces de la tribu. Pratiquement, la caractéristique principale sur laquelle s'est basée la conclusion des deux spécialistes a été réduite à la présence des sètes au niveau du dactyle des péréopode II (sètes qui sont absentes chez les autres espèces de la tribu, mais présentes chez les kalliapseudides), en ignorant les nombreuses différences entre la tribu Pakistanapseudini et, d'une manière implicite, entre le genre *Thaicungella* et les espèces classifiées dans la famille Kalliapseudidae.

Dans un autre ordre d'idées, on commente la fausse mention insérée par Araujo-Silva & Larsen (op.cit.), par laquelle on attribue à l'auteur du présent travail des affirmations que celui-ci (Guțu, 2006) n'a pas fait, concernant les sètes dactylaires du péréopode II de l'espèce *Acutihumerus cavooreni*.

**Key words:** *Thaicungella*, Pakistanapseudini, Parapseudidae, Kalliapseudidae.

Guțu & Angsupanich (2004) described the monotypic genus *Thaicungella*, which they included in the family Parapseudidae Guțu, 1981. After a revision of this family, Guțu (2008) classified the genus *Thaicungella* (together with *Biropalostoma* Guțu & Angsupanich, 2004, *Leptolicoa* Guțu, 2006, *Pakistanapseudes* Băcescu, 1978, *Swireapseudes* Bamber, 1997, *Ramosiseta* Guțu, 2008 and *Unguispinosus* Guțu, 2008) in the tribe Pakistanapseudini.

The main characteristic features of the tribe Pakistanapseudini, as it results from Guțu's diagnoses and comments (2008) on the family Parapseudidae, and the mentioned tribe refer to (1) the carpace length, (2) the length of the pereonites, (3) the pleon width (thickness), (4) the length of the pleonites, (5) the configuration of antennule and (6) of antenna, (7) the presence of palp of mandible and (8) of maxillule, (9) the aspect of cheliped, (10) the morphology of pereopod II (pereopod I according to other specialists) and (11) of its dactylus, (12) the length of pereopod V dactylus, (13) the length of uropod exopodite, and (14) of uropod endopodite, (15) the sexual dimorphism of antennules, (16) of antenna and (17) of cheliped.

A feature not mentioned by Guțu (2008) in the above 17 morphological characteristics is the presence of some small setae (four) on the pereopod II dactylus level (also in other pereopods), only in genus *Thaicungella*, which resemble those of some species of the family Kalliapseudidae especially of the subfamilies Hemikalliapseudinae and Tanapseudinae as Guțu & Angsupanich mention (2004: 37). In this respect, Guțu (2008: 62) refers mainly to genera *Acutihumerus* Guțu, 2006 and *Bacescapseudes* Guțu, 1981.

Recently, in a paper on the subfamily Hemikalliapseudidae, Araujo-Silva & Larsen (2010) reached the conclusion that the genus *Thaicungella* is closer to the species of kalliapseudids than to those of parapseudids, based on a phylogenetic revision. In consequence, they transferred genus *Thaicungella* in family Kalliapseudidae, mentioning that „The analysis confirms ... and suggests that the genus *Thaicungella* should probably also be included as it clusters with the Kalliapseudid taxa but not with the other parapseudid genera” (Araujo-Silva & Larsen, op. cit.: 44-45). Regrettably, the two authors don't mention (as it would have been normal) in which of the three kalliapseudid subfamilies the discussed genus had to be included.

The two specialists' conclusion is, in my opinion, unconvincing. As it results from their paper, the comparison is not made between the genus *Thaicungella* and those classified in the tribe Pakistanapseudini (considered by Guțu & Angsupanich, op. cit. and Guțu, 2008 related), on the one hand, and family Kalliapseudidae and other apseudomorph, on the other one, as I think it is normal, but between 15 kalliapseudid species (of 9 genera and 3 subfamilies) and six apseudomorph species (*Apseudella typica* Lang, 1968, *Atlantapseudes brasiliensis* Santos & Hansknecht, 2007, *Kudinopasternakia trispinosa* Santos, 2007, *Longipedis fragilis* Larsen & Shimomura, 2006, *Gigantapseudes maximus* Gamo, 1984 and *Thaicungella lideeiensis*), only two of them belonging to the family Parapseudidae. It is about *Thaicungella lideeiensis* and *Longipedis fragilis*. To my surprise, excepting *T. lideeiensis* no other species of the 16 (belonging to 7 genera), which were classified in the tribe Pakistanapseudini, is not present in the comparative analysis made by the two specialists (the other mentioned parapseudid species, *Longipedis fragilis*, belongs to tribe Parapseudini).

Because the characteristic morphological features of other species of the tribe Pakistanapseudini were not taken into account, the relationship features between *T. lideeiensis* and the other species of the tribe were eliminated from the “equation”. I take into consideration the configuration of the terminal lobe of the labium (with an inner swelling), the great length of the inner flagellum of the antennules, on no account small, as the two authors considered (op. cit.: 48, character mentioned in paragraph no. 20 from „Data Matrix”), dimorphic configuration of the antennules and antenna or the lack of an obvious dimorphism at the cheliped level (Guțu & Angsupanich, op. cit., figs 4 B-E, 5 E, J, K). Basing on a single feature (it is about the presence of the setae on the pereopod II dactylus, but also on other pereopods, cf. Guțu & Angsupanich, op. cit., fig. 6 A-E), Araujo-Silva & Larsen (op. cit.: 45) reached thus the conclusion that: „This result also suggests that *Thaicungella* is located basally in the Kalliapseudidae and probably constitutes a transition form between the Kalliapseudidae and the other Apseudomorpha”.

As it is known very well (and as it results from “Data matrix”, presented by the two authors, op. cit.: 47-48), at the level of the suborder Apseudomorpha there are some resembling morphological features in several unrelated upper taxa. For instance, I take into account the absence of the maxillule palp in families Kalliapseudidae and Apseudellidae (aspect also mentioned by the two specialists), but also in the two known species of the genus *Similipedia* Guțu, 1989 (*S. eminescui* and *S. diarris*, described by Guțu, 1989, and, respectively, by Blazewicz-Paszkowycz & Bamber, 2007) of the family Pagurapseudidae Lang, 1970, subfamily Hodometricinae Guțu, 1981 (genus and family unmentioned by the authors I referred). At the same time, there are also major differences within the same upper taxon, admitted as monophyletic. It is the case of the family Kalliapseudidae in which the mandibular palp can be unarticulated (large, with many long plumose setae, or small, with only one distal seta) or three-articulated (as in other apseudomorphans). Also, in the family Sphyrapodidae the mentioned palp can be absent, or present.

The resemblance of the dactylar setulation of the pereopod II in *Thaicungella lideeiensis* and the species of the family Kalliapseudidae is, in my opinion, the consequence of a convergent adaptation, generated by the relatively similar conditions in which live those species. It is about lagoons or shallow marine waters, with a variable salinity and a mud covering bottom (Guțu, 2008: 45).

Within this context, it is impossible for me not to refer to some aspects regarding the morphological features analysed by Araujo-Silva & Larsen (op. cit.: 32-34). Although it would have been necessary to comment each morphological feature considered irrelevant by me for the two authors’ conclusion, I refer only to some of them. At character (paragraph) no. 1, the mentioned authors refer to „pereonite shape” („wider than long”, „longer than wide” and „square”), without mentioning to which pereonite they referred, as all pereonites of the studied species would be equal. I don’t think it is necessary to demonstrate that it is not so. Regarding the mandibular palp (character 10) it is mentioned that in Shyrapodidae this palp is



three-articulated, overlooking that it is absent completely in the species of all three genera of the subfamily Sphyrapodinae (Guțu, 1980: 395, 399, fig. 1 F; 1991: 346, fig. 1 G; 1996: 143; 2001: 79, fig. 1 F; Guțu & Heard, 2002: 80, 84, fig. 9 E; Guțu & Iliffe, 1998: 216, fig. 2 D; Larsen, 2005: 78).

Regarding the maxillule palp (character 13 from the analyzed features), it is asserted that it is „completely absent in most species of Kalliapseudidae ... it is also seen in Apseudellidae ...”. It is well known that this palp *is absent in all kalliapseudids*, on no account in „most species” (Drumm & Heard, 2010: 38; Guțu, 1996: 140; Larsen, op. cit.: 10), but also in other apseudomorphs, some of them not mentioned by Araujo-Silva & Larsen (op. cit.). It is about the two species of the genus *Similipedia* Guțu, 1989, subfamily Hodometricinae (family Pagurapseudidae), already mentioned by me. As it can be seen, even the junior author mentions that this palp is absent in kalliapseudids in one of his paper (Larsen, op. cit.). A similar observation regarding the pleopods (character 26), on which it is asserted, contrary to reality, „Only the genus *Atlantapseudes* lack pleopods”. The authors can justify, in this example, that they referred only to the species analysed by them (op. cit.: 32), not also to the other apseudomorphs, this being strange because in other circumstances they referred also to the unanalysed taxa. To what I have already mentioned I can add the ambiguity in which some characteristics were expressed. It is about the antenna squama („well developed”, „reduced” and „absent”, as results from paragraph no. 18). Reduced in comparison with what? The squama in *Acutihumerus petronius* and *Kudinopasternakia trispinosa* is considered “reduced” but in *Acutihumerus patagoniensis* (and other species) it is considered “well developed” (Araujo-Silva & Larsen, op. cit.: 48). In reality, at least in *A. petronius* and *A. patagoniensis* squama is similar (Araujo-Silva & Larsen, op. cit., fig. 3 B; Sieg, 1986, fig. 11, A2).

My perplexity is amplified by the two authors’ different interpretation of the identical morphological features for two or more species. In paragraph 13 (Araujo-Silva & Larsen, op. cit.: 33, 47) it results that *Acutihumerus patagoniensis* and *Bacescapseudes adenaicus* have the maxillule with palp, while in the other species belonging to the same genera (*A. cavooreni*, *A. petronius*, *B. brevidigitus* and *B. grossidigitus*) this palp is absent. Or, as it results from literature, Guțu (1981: 85) described the genus *Bacescapseudes* basing on the absence of the maxillule palp, about which Băcescu (1978: 204) wrongly mentioned that it is present. As regards the species *A. patagoniensis*, Sieg (op. cit.: 28) it is clearly written „palp waiting” (and in fig. 12 Mx 1 the palp is not illustrated). Also, the interpretation for other morphological features is disputable, out of which I mention only that from the paragraph 20 (Araujo-Silva & Larsen, op. cit.: 34, 48), from where it results, taking into account the article number of the two flagella of the antennules, that *Thaicungella lideensis* has „outer flagellum much longer than inner”. But, in fact, according to the presentation made by Guțu & Angsupanich (op. cit.: fig. 4 B), in the description, the outer flagellum is not „much longer than inner one”.



Under these circumstances I express again my surprise regarding the elimination of some morphological features characteristic to the tribe Pakistanapseudini in Araujo-Silva & Larsen's analysis (op. cit.), as the deep dimorphism present in the antennule and antenna or the absence of the dimorphism in the chelipeds. By the inclusion of these morphological features (and of others), and also by a more rigorous interpretation of the already analyzed features, it would have been another conclusion. As a matter of fact, even other tanaidologists (Drumm & Heard, in press) do not agree with transferring *Thaicungella* to the family Kalliapseudidae. Also, Drumm & Heard (op. cit.), as Guțu (1998), don't agree that *A. patagoniensis* is a valid species.

If some of the two specialists' errors can be included in the category "pardonable errors", made through an oversight (as that one regarding the author of the family Apeudellidae, mentioned by the two authors in page 1, Lang, 1968 instead of Guțu, 1972), as regards the comment regarding the dactilar aesthetascs of the pereopod II (or pereopod I, cf. Araujo-Silva & Larsen, op. cit.: 33, paragraph 5) I couldn't succeed in finding a reasonable explanation. Although I know, from my own experience, that difficultly understandable mistakes can be done, either in understanding a phenomenon or a morphological feature or in dating a paper, in transcribing a species name or of an author, etc., it is difficult for me now to think that it is about only an oversight problem. The two specialists' false mention (and accuser, at the same time), in which they specify „in this study we observed 6-7 aesthetascs in *A. cavooreni*, and thus consider, 'well developed' unlike Guțu (2006: 206) who claims it is absent", made me to consider this attitude as an immoral one. At page 206 of the paper which they refer (Guțu, 2006) the species *Plectrocopus spicatus* (of the family Metapseudidae) is described. In Guțu's paper (2006), the references and illustrations on *A. cavooreni* (Băcescu & Absalao, 1985) are at pages 178-179 and figures 309-313 (in the diagnosis of the monotypic genus *Acutihumerus*, which has *A. cavooreni* as a type-species). In this diagnosis (Guțu, 2006: 178) it is specified (accentuation is mine): „Pereopod II with a great spiniform coxa; dactylus with some distal simple and long setae and an obvious claw". Additionally, in fig. 311, the pereopod II is presented (or pereopod I in the authors' opinion which I refer), where the seven dactylar setae are clearly presented (the same number mentioned by Araujo-Silva & Larsen, op. cit.), similar to those of the other kalliapseudids, while in fig. 312 a detail of the dactylus and respective setae is presented. I considered necessary to make the above specifications in order to re-establish the scientific truth, not at all for diminishing the value of the two specialists' contribution.

Returning to the systematic position of the genus *Thaicungella* in the suborder Apseudomorpha, I think (partially respecting the two specialists' conclusion, Araujo-Silva & Larsen, op. cit.), it would have been more normal that this genus to be considered "of transition" between Parapseudidae and Kalliapseudidae, keeping its place in the tribe Pakistanapseudini (family Parapseudidae). This last variant would have been more plausible, taking into consideration that the genus *Thaicungella* is related with the species of the tribe Pakistanapseudini by other main morphological features, and on no account with those of the kalliapseudids.

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CU PRIVIRE LA LOCUL GENULUI *THAICUNGELLA*  
GUȚU & ANGUPANICH ÎN SISTEMATICA APSEUDOMORFELOR  
(CRUSTACEA: TANAIDACEA)

## REZUMAT

Este comentată transferarea genului *Thaicungella* Guțu & Angsupanich, 2004 din familia Parapseudidae în familia Kalliapseudidae de către Araujo-Silva & Larsen (2010). Deși s-a bazat pe metode filogenetice, concluzia celor doi autori este considerată neconvingătoare. În acest sens este evidențiat faptul că în analiza făcută nu se regăsește nici o altă specie din tribul Pakistanapseudini (în care a fost clasificat genul *Thaicungella*), dar nici trăsăturile comune, caracteristice speciilor din tribul amintit. În aceste condiții au fost eliminate argumentele în baza cărora se putea stabili „gradul” de rudenie dintre genul *Thaicungella* și celelalte specii ale tribului. Practic, caracteristica principală pe care s-a bazat concluzia celor doi specialiști s-a redus la prezența setelor de la nivelul dactilului pereopodului II (sete absente la celelalte specii ale tribului, dar prezente la kalliapseudide), ignorându-se numeroasele deosebiri dintre tribul Pakistanapseudini și, implicit, dintre genul *Thaicungella* și speciile clasificate în familia Kalliapseudidae.

În altă ordine de idei, este comentată mențiunea falsă inserată de Araujo-Silva & Larsen (op. cit.: 33), prin care i-au fost atribuite autorului prezentei lucrări afirmații pe care acesta nu le-a făcut (Guțu, 2006), cu privire la setele dactilare ale pereopodului II la specia *Acutihumerus cavooreni* (Băcescu & Absalao, 1985).

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## ***LEPTOCHELIA VATULELENSIS* (CRUSTACEA: TANAIDACEA), A NEW SPECIES FROM ANCHIALINE CAVES OF THE SOUTH-WESTERN PACIFIC**

MODEST GUȚU, THOMAS M. ILIFFE

**Abstract.** *Leptochelia vatulelensis* n. sp., discovered on the small islands of Vatulele (Fijian group) and Ouvéa (Loyalty Islands, New Caledonia), is described and illustrated. The new species is distinguished from the others of the “*Leptochelia-dubia* group” (to which it is generally similar) by the following combination of morphological characteristics: (1) the presence of three to four distal setae on the maxilliped basis; (2) merus of pereopods III and IV with only a distosternal seta; (3) endopod of the uropods formed of four (rarely three) articles; (4) males with two (sometimes three) relatively short aesthetascs on the first five articles of the antennular flagellum; (5) male cheliped with a diminished dimorphism; (6) males with a vertical comb-row of setae on the cheliped propodus. Although it inhabits inland, anchialine caves, the new species lacks morphological features that are characteristic of some cave species.

**Résumé.** On décrit l'espèce *Leptochelia vatulelensis* n.sp. provenant des petits Îles Vatulele (groupe des Îles Fidji) et Ouvéa (Îles Loyalty, Nouvelle Calédonie), du sud-ouest de l'Océan Pacifique. La nouvelle espèce se distingue des autres espèces du „groupe *Leptochelia-dubia*” (auxquelles elle ressemble) par la combinaison suivante de traits morphologiques: (1) présence de 3-4 sétas distales sur le basis du maxillipède; (2) le merus des péréopodes III et IV ayant chacun une sète disto-sternale; (3) l'endopode des uropodes formé de quatre (rarement de trois) articles; (4) les mâles ont deux (ou trois) aestetasques (courts) sur chacun des premiers cinq articles du flagellum de l'antenne; (5) le chélipède des mâles avec un dimorphisme réduit; (6) les mâles avec une rangée verticale de setae située sur le propode du chélipède. Bien que provenant de grottes sous-marines, la nouvelle espèce ne présente pas de traits morphologiques caractéristiques aux espèces cavernicoles.

**Key words:** Tanaidacea, Leptocheliidae, Fiji Islands, Loyalty Islands, *Leptochelia vatulelensis* n. sp.

Systematic studies over the last decade by Larsen & Rayment (2002), Bamber (2005, 2006, 2008, 2010), Bamber & Costa (2009), Bamber et al. (2009) and Guțu (2011 a, b), where several species of the genus *Leptochelia* Dana, 1849 are described or re-described, have pointed out both the confusion and the unexpected specific diversity present in this genus.

A new species of the genus *Leptochelia* (“*Leptochelia-dubia* group”, sensu Lang, 1973), collected from anchialine caves in the islands of Vatulele (Fijian group) and Ouvéa (Loyalty Islands, New Caledonia) from the south-western Pacific Ocean, is described and illustrated. Although the described species inhabits inland, anchialine caves, it lacks morphological features characteristic to cave species.

The islands of Vatulele (18°33' S, 177°38' E) in Fiji and Ouvéa (20°36' S, 166°34' E) in New Caledonia are separated by 1,180 km. Vatulele is a 12.5 km long by up to 5 km wide, low lying island situated 31 km south of the main island of Viti Levu. Vatulele consists of uplifted reef limestone with notched cliffs on its western coast marking five periods of stable sea level. Naurambuta Pond is an anchialine limestone pond situated on the west coast of Vatulele, adjacent to Naurambuta Cave (Fig. 17 in Stock & Iliffe, 1991). This strongly tidal pool contains numerous brilliant red prawns, *Parhippolyte uveae* Borradaile, 1899, which are considered by the island's inhabitants as sacred and it is tabu to disturb them (Choy, 1987). The 80 m long, 10 m wide pool has a maximum depth of 6 m, but below 5 m, an opaque layer of H<sub>2</sub>S exists. Surface salinity was 29 ppt at the time of sampling. Amphipods, copepods, tanaidaceans and ostracods were collected from 0-0.5 m depths of the pool with a 93 µm plankton net. A new species of cave adapted amphipod, *Liagoceradocus unciferus* Stock & Iliffe, 1991, was included in these collections.

Ouvéa, an uplifted atoll with a maximum elevation of 46 m, is part of the Loyalty Islands in New Caledonia. Trou Bleu d'Aben is a karstic blue hole located 50 m inland from the lagoon on the west coast of central Ouvéa. This 40 m diameter sinkhole has a 5 m vertical drop to water level and is at least 30 m or more in depth. The water is clear down to 25 m where patchy layers of H<sub>2</sub>S reduce visibility. The bottom consists of thick silt and some vegetal remains. Large algal stalactites are present under overhanging ledges. Surface salinity was 14 ppt increasing to fully marine levels (34.5 ppt) at 30 m. Plankton net collections included copepods, amphipods, and tanaidaceans, as well as shrimp and bivalves collected by hand.

#### Family Leptocheliidae Lang, 1973

##### Genus *Leptochelia* Dana, 1849

Regarding the morphological features characteristic of males of *Leptochelia*, in the generic diagnosis presented by Lang (1973: 224), it is mentioned that the chelipeds of the females have a row of setae (comb-row), vertically oriented, on the propodus, while in the males, it is horizontally directed (*Chelipeden beim Weibchen normal, beim Männchen stark verlängert, Propus beim Weibchen mit vertickaler, beim Männchen mit horizontaler Borstenreihe, ...*). From the literature, it appears that this morphological feature is present in all known males of the "*Leptochelia-minuta* group" (Lang, 1973: figs 6-11; Heard et al., 2004: fig. 144; Guțu, 2011 a: fig. 9 D; 2011 b: fig. 3 D, E), but not in all males of the "*Leptochelia-dubia* group". While males of some species of this "group" have the comb-row horizontally directed (Lang, 1973: fig. 14; Bamber & Bird, 1997: fig. 15; Dojiri & Sieg, 1997: fig. 3.10. Che; Bird & Bamber, 2000: fig. 5 H; Bamber 2008: figs 29 C, 32 C, 35 C; 2010: fig. 8 A; Guțu, 2011 a: fig. 3 C), the males of other species such as *L. vatulelensis* n. sp. (Fig. 3 D, E), *L. itoi*, from the Japanese waters (Ishimaru, 1985, fig. 2 B, D), *L. lusei*, from the South China Sea (Bamber & Bird, 1997, fig. 15 A) and *L. myora*, from the

Australian waters (Bamber, 2008: fig. 26 A) have it vertically oriented, as in the females. In a number of species males are not known, and in some species where males are known this row is not described (e. g. *L. nobbi* Bamber, 2005).

Besides the mentioned vertical comb-row of setae, the male cheliped of *Leptochelia vatulelensis* n. sp. resembles that of the species *L. lusei* Bamber & Bird, 1997, but also that of the species *Pseudoleptochelia antarctica* (cf. Lang, 1953: fig. 1 Y), by the configuration of the fixed finger and of the dactylus (short and thick).

***Leptochelia vatulelensis* n. sp.**

(Figs 1-4)

*Material*: 40 specimens (3 females with eggs or remains of marsupium, 29 females without oostegites or eggs, 4 males and 4 manca) collected from anchialine caves, as follows:

- 25 specimens (3 females with eggs or remains of marsupium, 20 females without eggs and 2 males), Naurambuta Pond, Vatulele Island (a small island in the Fijian group), Station 88-045, 15 May, 1988; leg. Dr. Șerban Sârbu;

- 15 specimens (9 females without oostegites or eggs, 2 males and 4 manca), Trou Bleu d'Aben, Ouvéa Island (Loyalty Islands, New Caledonia), Station 88-068, 23 June, 1988; leg. Drs. Thomas Iliffe and Șerban Sârbu.

*Holotype*, female with remains of marsupium, from the Vatulele Island, preserved in the Collection of the "Grigore Antipa" National Museum of Natural History, Bucharest (Romania), No. 250498;

*Allotype*, male, from the Vatulele Island, in the same collection, No. 250499;

*Paratypes*: 2 adult females with eggs and 18 females without oostegites or eggs, from Vatulele Island, No. 250500 and 250501, respectively, and 2 males, 8 females without oostegites or eggs and 4 manca from Ouvéa Island, No. 250502, 250503 and 250504, respectively.

*Remarks*. Four specimens (2 females without oostegites or eggs and 1 male from Vatulele Island, and 1 female without oostegites or eggs from Ouvéa Island) were destroyed by dissection.

*Etymology*. After the name of one island from which the new species was collected.

*Description of the female*

*Body* (Fig. 1 A) more or less cylindrical, six times as long as the maximum width of carapace; standard length approximately 2.5 mm.

*Carapace*, as long as pereonite three and four (together) and slightly narrower than the first pereonite, with two unequal short setae posterolaterally. Ocular lobes well defined, eyes pigmented (Fig. 1 A, C).



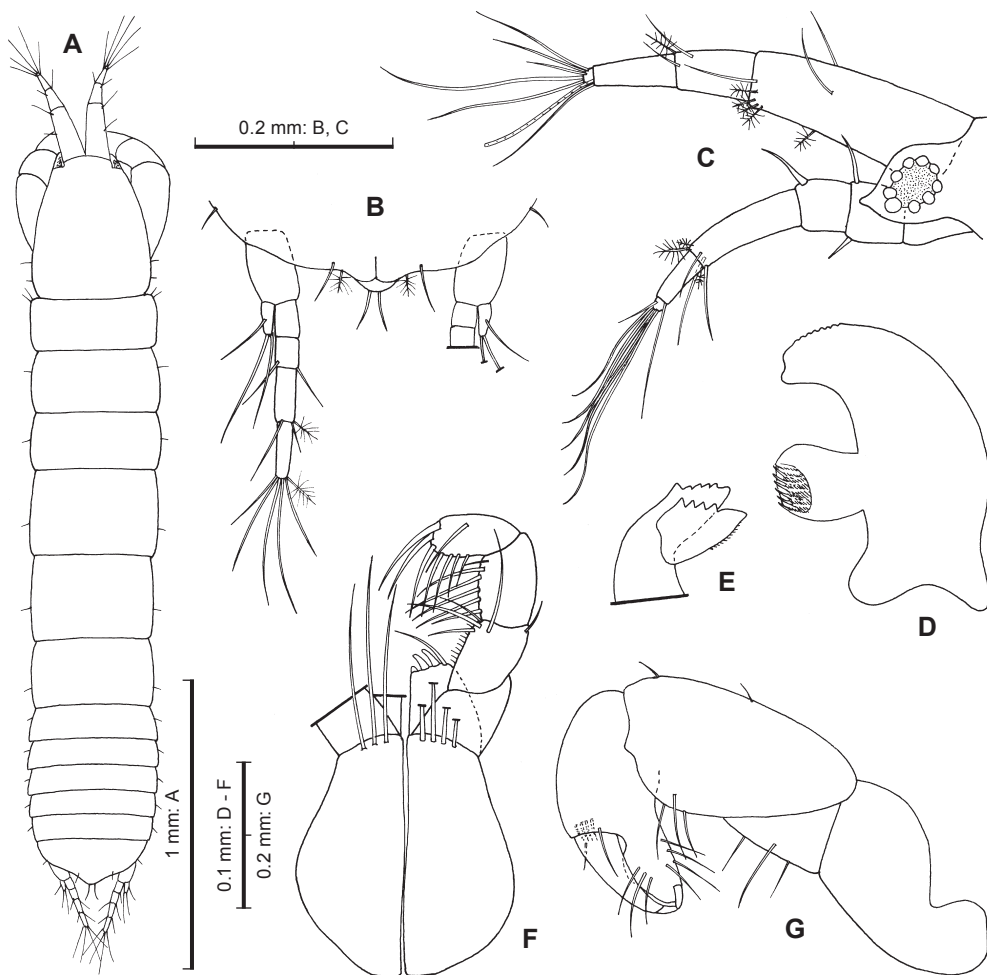


Fig. 1 - *Leptochelia vatulelensis* n. sp., female: A, body (dorsal); B, pleotelson (caudal part) and uropods (endopod of right uropod not shown); C, antennule and antenna (lateral); D, right mandible; E, pars incisiva and lacinia mobilis of left mandible; F, maxilliped (palp of left maxilliped not shown); G, cheliped (left, outer face).

*Pereon* about 2.8 times as long as carapace. First three pereonites together as long as following two, each pereonite wider than long. Pereonite six slightly longer than any of first three, but shorter than either of fourth or fifth pereonites. First pereonite with two short setae on anterolateral corners; pereonites two to six with small seta on each side (Fig. 1 A).

*Pleon* short, about as long as carapace and first pereonite. Each pleonite with one short seta on sides (Fig. 1 A). Pleotelson, longer than any pleonite, with one posterolateral seta on each side and four simple and two broom setae on caudal margin (Fig. 1 B).



*Antennule* (Fig. 1 C), shorter than the carapace, with three-articulated peduncle and one-articulated flagellum. First peduncular article, three times as long as wide and about 2.8 times as long as second article, with three simple and five or six broom setae. Second article with one broom and two simple setae distally. Third article as long as second article, with one simple seta and one aesthetasc. Flagellum (fourth article) very small (tuberculiform), ending in five unequal simple setae.

*Antenna* (Fig. 1 C) six-articulated. First three articles short and thick. Second and third articles with one slender distodorsal spine (as long as third article); second article with one short distoventral spine (half as long as distodorsal spine). Fourth article, as long as but narrower than previous two articles, with six distal setae, three of them simple. Fifth article narrow, as long as third article, ending in two unequal simple setae. Sixth article tuberculiform, with five long simple setae, the longest of them being as long as previous four articles.

*Mandibles* (Fig. 1 D, E) typical of genus. Pars incisiva of right mandible with outer margin slightly crenulated (Fig. 1 D). Pars incisiva of left mandible with six distal denticles; lacinia mobilis with five distal denticles (Fig. 1 E). Pars molaris of both mandibles well developed, having numerous small spinules on distal surface.

*Maxilliped* (Fig. 1 F). Basis, 2.2 times as long as broad, with three or four long simple setae on distal margin. Palp first article as long as wide, naked; second article, slightly longer than first, with one distoexternal and four distoinner simple setae; inner margin with numerous setules; third article, slightly longer than second, with six simple setae on inner margin; last article of palp as long as the second, with eight setae on distal and inner margin. Endite, longer than the first palp article, with one simple seta and three unequal spiniform denticles on the distal margin, innermost smallest.

Other *mouthparts* unstudied.

*Cheliped* (Fig. 1 G) similar to those of other species of the genus. Basis 1.8 times as long as its distal width. Merus small, triangular, with three sternal simple setae. Carpus, longer than basis, with three distosternal and two tergal simple setae. Propodus about as long as carpus, with three short setae on inner surface (near dactylus joint), and one longer seta on outer surface; fixed finger with three inner and four outer long simple setae; claw stout. Dactylus narrower and slightly shorter than fixed finger, with one small proximotergal seta.

*Pereopod II* (Fig. 2 A) slender and long. Basis 3.8 times as long as wide, with proximotergal prominence, and one simple and one broom seta. Ischium with one short sternal seta. Merus about half as long as basis, with one distosternal simple seta. Carpus shorter than merus, with two distosternal and two longer distotergal simple setae. Propodus, longer than merus or carpus, with four distal simple setae. Dactylus together with unguis longer than propodus, with one proximotergal seta; unguis shorter than dactylus.

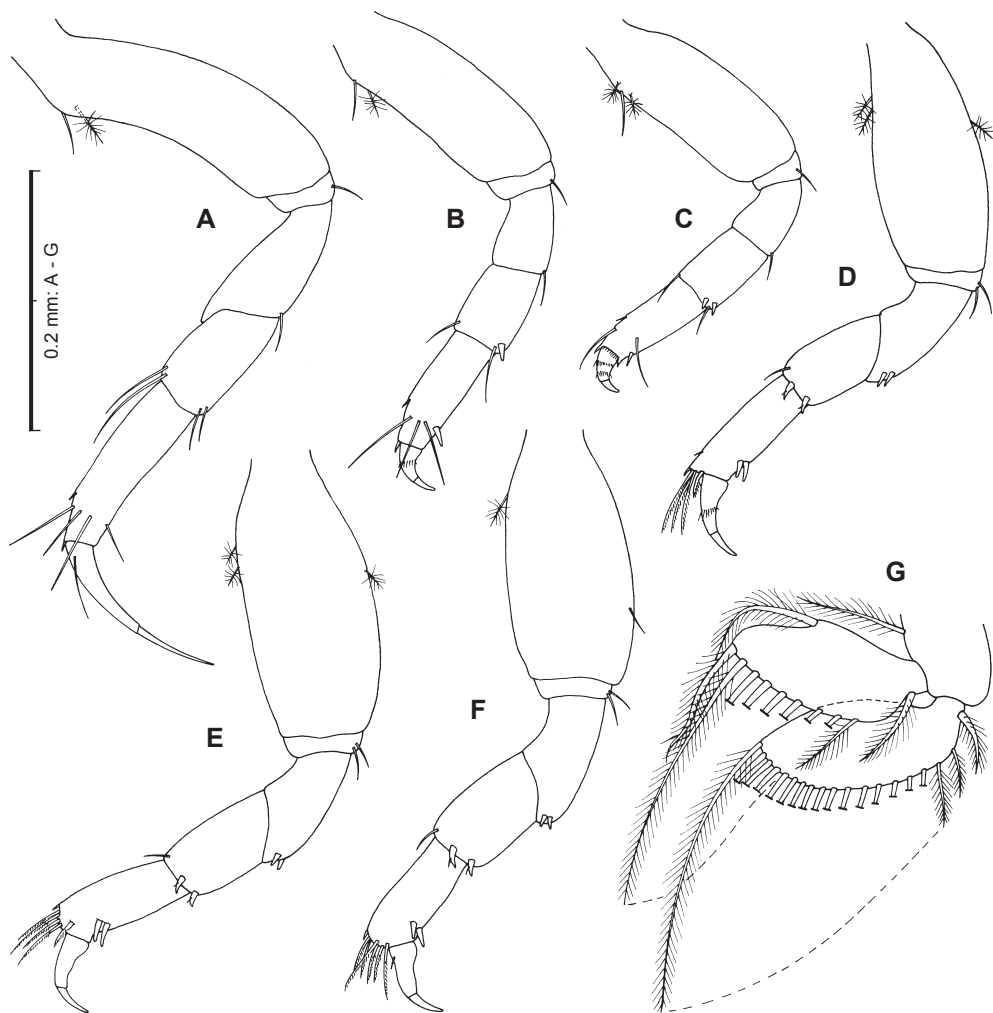


Fig. 2 - *Leptochelia vatulelensis* n. sp., female: A-F, pereopods II-VII, respectively; G, pleopod.

*Pereopod III* (Fig. 2 B) shorter than pereopod II. Basis 2.7 times as long as wide; proximotergally with one simple and one broom seta. Ischium with one sternal simple seta. Merus approximately one-third as long as basis, with one distosternal simple seta. Carpus as long as merus, with one spine and one simple seta in distosternal corner, and one distotergal seta. Propodus 1.5 times as long as carpus, with one distosternal spine and three distal simple setae. Dactylus curved, short and thick, with band of setules; unguis small, curved.

*Pereopod IV* (Fig. 2 C) similar to but shorter than pereopod III. Basis with one simple and two broom setae. Carpus with two small distosternal spines and two distal simple setae. Propodus with one distosternal small spine and two distal simple setae. Ischium, merus and dactylus as in pereopod III, but dactylus with two setule bands.

*Pereopod V* (Fig. 2 D) larger than pereopod IV. Basis swollen, 2.2 times as long as wide, with one sternal and two tergal broom setae. Ischium with two simple setae. Merus a little longer than carpus, with two distosternal spines. Carpus with two spines and one simple seta distally. Propodus, longer but narrower than merus or carpus, with two distosternal spines; distotergally with one short and three long ciliate setae. Dactylus stout, curved; unguis small.

*Pereopod VI* (Fig. 2 E) as pereopod V but with four ciliate setae on propodus.

*Pereopod VII* (Fig. 2 F) similar to pereopods V or VI, with six ciliate setae on propodus.

*Pleopods* (Fig. 2 G). Basal article with an inner plumose seta. Endopod well developed, about 2.3 times as long as maximum width, with one long midinner plumose seta; outer margin with ten unequal plumose setae, having a gap between most proximal seta and rest. Exopod approximately equal to endopod, with 19 unequal plumose setae.

*Uropod* (Fig. 1 A, B). Peduncle thick, as long as first two articles of endopod. Exopod uniarticulated, as long as first article of endopod, with one midlateral and two terminal simple setae. Endopod four-articulated; first two articles shorter than following two; second and third articles with two simple setae and the last article with five simple setae; the third and fourth article with one distoinner broom seta (Fig. 1 B).

#### *Description of the male*

*Body* (Fig. 3 A) similar to that of female; standard length, 2.3 mm.

*Antennule* (Fig. 3 A, C) onethird as long as body length. Peduncle three-articulated as long as carapace; first article, a little shorter than following two; second article shorter than first; third article half as long as second; each article of peduncle with one or two simple and two broom setae, distally. Flagellum six-articulated; each of the first five articles slightly shorter than the last peduncular article and with two aesthetascs; last article very small (tuberculiform), distally with six unequal simple setae and one aesthetasc.

*Antenna* (Fig. 3 C) six-articulated, as long as first two peduncular articles of antennule. First three articles equal, short and thick; second article with one distotergal and one distosternal setiform spine; third article with one distotergal setiform spine; fourth article thin, longer than the first three articles, with three long simple and two short broom setae; fifth article shorter than the preceding article, with one long simple seta; sixth article very short, tuberculiform, distally with one short and three very long simple setae (the longest being longer than last three articles together).

*Mouth parts*, atrophied.

*Cheliped* (Fig. 3 D, E) similar to that of female except propodus with two tuberculiform prominences on inner margin. Propodal comb-row of setae vertical, near dactylus attachment (Fig. 3 E).

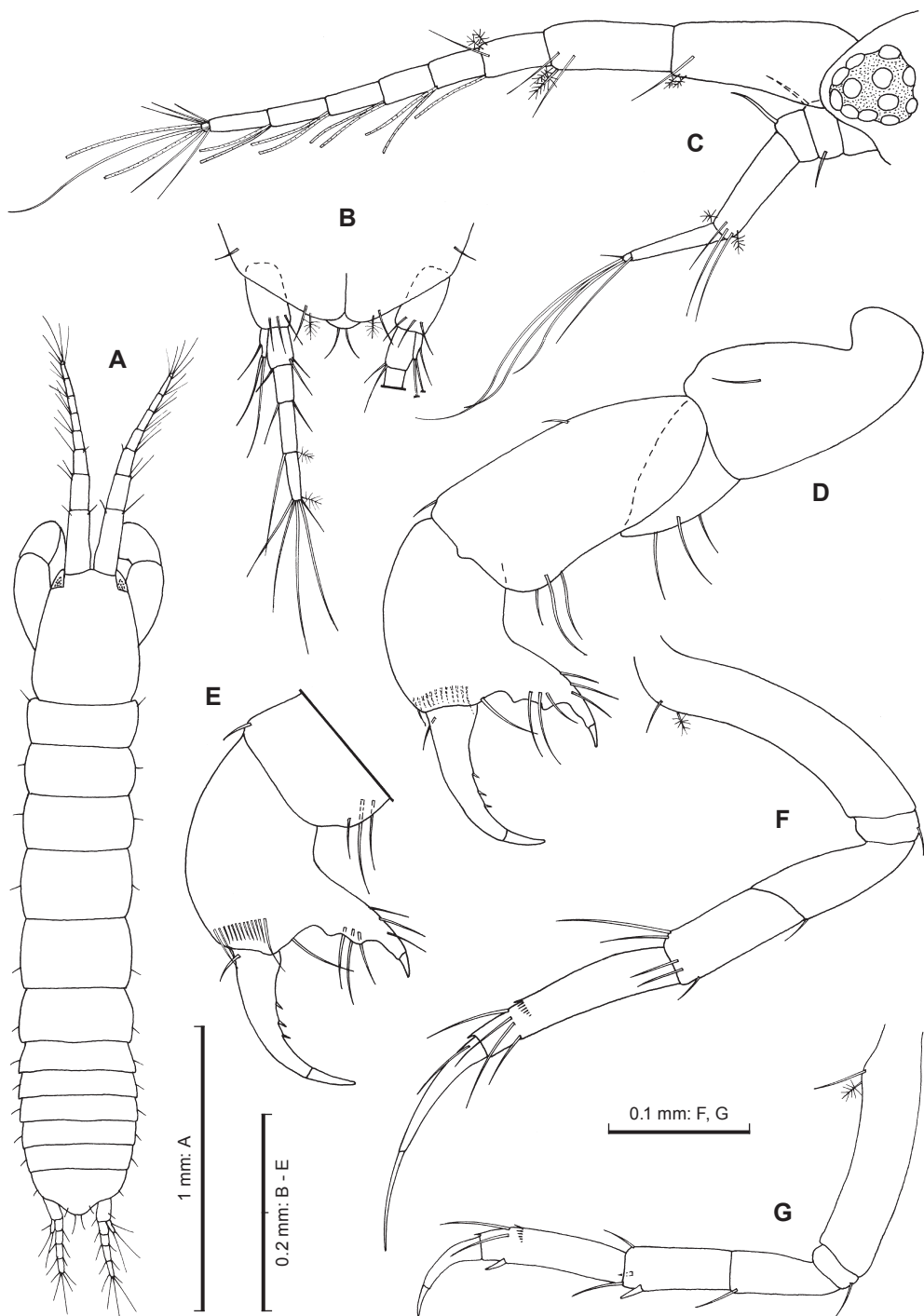


Fig. 3 - *Leptochelia vatulelensis* n. sp., male: A, body (dorsal); B, pleotelson (caudal part) and uropods (excepting the endopod of right uropod); C, antennule and antenna (lateral); D, cheliped (left, outer face); E, chela (right, inner face); F, pereopod II; G, pereopod III.

*Pereopod II* (Fig. 3 F) slender. Basis, 5.4 times as long as wide, with one broom and one proximotergal simple setae. Ischium with one sternal simple seta. Merus about half as long as basis, with one distosternal short seta. Carpus approximately as long as merus, with five distal setae. Propodus 1.6 times as long as carpus, with four distal simple setae. Dactylus together with unguis slightly longer than propodus; proximotergally with one fine seta; unguis shorter than dactylus.

*Pereopod III* (Fig. 3 G) slender but shorter than pereopod II. Basis four times as long as wide, with two setae as in pereopod II. Ischium with one sternal seta. Merus with one distosternal simple seta. Carpus slightly longer than merus, distally with two setae and two spines. Propodus about 1.5 times as long as carpus, with one distosternal spine and two distotergal simple setae. Dactylus strong, curved, with short unguis.

*Pereopod IV* (Fig. 4 A) similar to pereopod III, but slightly smaller.

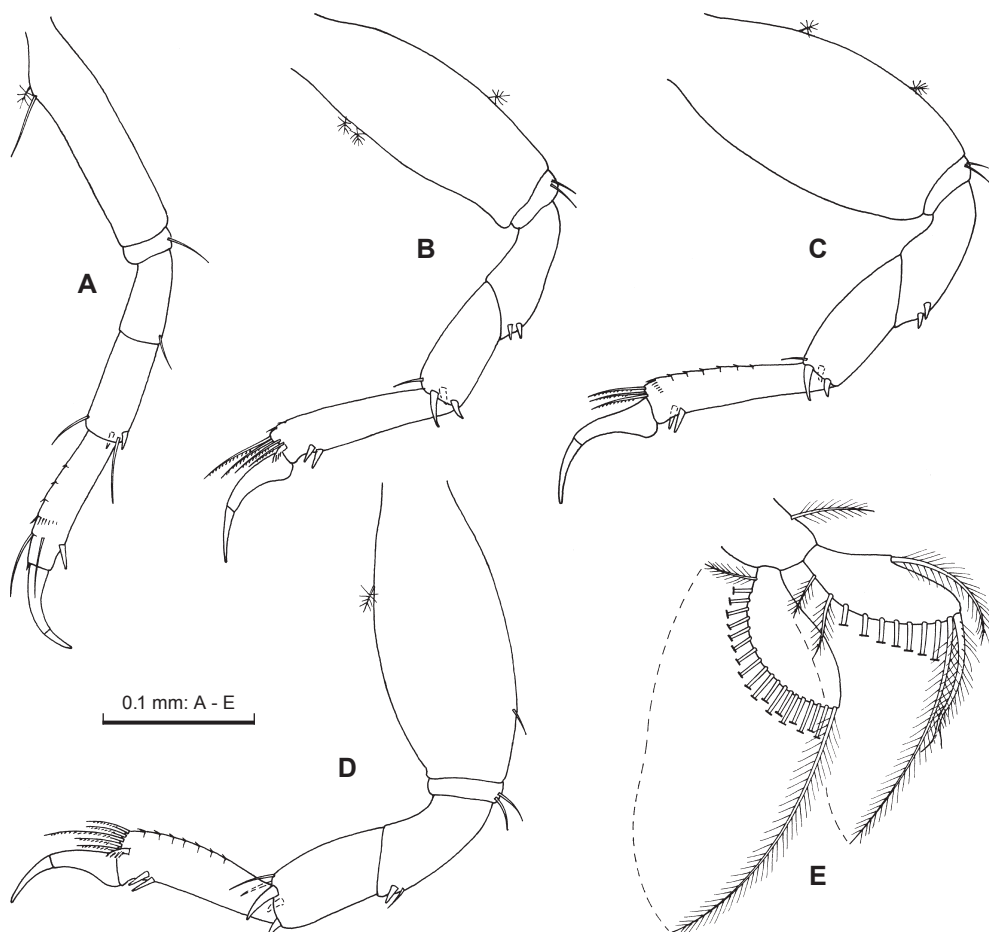


Fig. 4 - *Leptochelia vatulelensis* n. sp., male: A-D, pereopods IV-VII, respectively; E, pleopod.

*Pereopod V* (Fig. 4 B) stronger than pereopod IV. Basis thick, 2.6 times as long as wide, with one sternal and two tergal broom setae. Ischium with two sternal simple setae. Merus narrower than basis, with two distosternal spines. Carpus about as long as merus, with one seta and three spines distally. Propodus four times as long as wide and about 1.5 times as long as carpus, with two distosternal spines, and four ciliate setae and one ciliate spine distotergally. Dactylus with a proximosternal rounded prominence.

*Pereopod VI* (Fig. 4 C) similar to previous pereopod; propodus with three distotergal ciliate setae.

*Pereopod VII* (Fig. 4 D) differing from the previous two pereopods by having two carpal and five propodal distotergal setae.

*Pleopods* (Fig. 4 E). Endopod with one midexternal plumose seta and other eleven (unequal) on the inner margin. Exopod with 20 unequal plumose setae on inner side.

*Uropod* (Fig. 3 A, B) similar to that of female. Peduncle larger than first endopod article, with three distal short setae. Exopod shorter than the first endopod article, with one midlateral and two distal setae. Endopod four-articulated, each of first two articles shorter than either of following two articles. First three articles with one to three simple setae and last article with five simple setae.

*Variability.* In some females and manca stages, the endopod of the uropods is formed of only three articles. Also, the male allotype has the endopod of one of the uropods formed of three articles, and other males have a five-articulated antennular flagellum.

*Remarks.* The main morphological feature which distinguishes *L. vatulelensis* n. sp. from some species of the “group *Leptochelia-dubia*” is the number of the endopod articles of the uropods (4, rarely 3, in comparison with 5 or 6) a feature also found in *L. itoi* Ishimaru, 1985 (from the Japanese waters), *L. lusei* Bamber & Bird, 1997 (from the South China Sea waters), *L. karragarra* Bamber, 2008 and *L. nobbi* Bamber, 2005 (the last two from the Australian waters).

*L. vatulelensis* is distinguished from these four species (both in females and in males) by the absence of the distosternal spine from the merus of pereopods III and IV (the new species having only one seta). In addition, it is distinguished from *L. itoi* by the length of the uropod endopod (shorter in *L. vatulelensis*) and by the size and configuration of the male chelipeds (much larger and showing a very strong dimorphism in *L. itoi*). The antennular flagellum in males is of six articles in *L. vatulelensis* n. sp. (as in *L. karragarra* and *L. nobbi*), but only four in *L. itoi* and *L. lusei*. On the antennular flagellum of the male there are 2 (sometimes 3) aesthetascs (relatively short) on each article in the new species, 3-4 relatively long aesthetascs in *L. lusei*, 5-6 short aesthetascs in *L. itoi*, 6-7 long aesthetascs in *L. karragarra* and 7-9 very long aesthetascs in *L. nobbi*.

These differences, together with other differences in the numbers and lengths of some setae on the pereopods and pleopods, lead to the conclusion that the species from Fiji and New Caledonia is new. As we mentioned in "Abstract", although it inhabits inland, anchialine caves, the new species lacks morphological features that are characteristic of some cave species.

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#### LEPTOCHELIA VATULELENSIS (CRUSTACEA: TANAIDACEA), O NOUĂ SPECIE DIN GROTELE ANCHIALINE ALE PACIFICULUI DE SUD-VEST

#### REZUMAT

Este descrisă specia *Leptochelia vatulelensis* n. sp. provenind din micile insule Vatulele (grupul Insulelor Fiji) și Ouvéa (Insulele Loyalty, Noua Caledonie), din sud-vestul Oceanului Pacific.

Noua specie se deosebește de celelalte ale "grupului *Leptochelia-dubia*" (cu care se aseamănă) prin următoarea combinație de trăsături morfologice: (1) prezența a 3-4 sete distale pe bazisul maxilipedului; (2) merusul pereopodelor III și IV cu câte o singură setă disto-sternală; (3) endopodul uropodelor format din patru (rar trei) articule; (4) masculii cu câte două estetasce (scurte) pe primele cinci articule ale flagelului antenulei; (5) chelipedul masculilor cu dimorfism diminuat; (6) masculii cu un șir vertical de sete situat pe propodul chelipedului, lângă articulația cu dactilul.

Deși provine din grote anchialine, noua specie nu prezintă trăsături morfologice caracteristice unor specii cavernicole.

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## REPRODUCTIVE PARAMETERS OF *PORCELLIUM COLLICOLA* (VERHOEFF, 1907) AND *TRACHELIPUS ARCUATUS* (BUDDE-LUND, 1885) (CRUSTACEA: ISOPODA: ONISCIDEA) IN SOUTH ROMANIA

FINICA MARIANA IVANOV

**Abstract.** *Porcellium collicola* (Verhoeff, 1907) and *Trachelipus arcuatus* (Budde-Lund, 1885) (Crustacea: Isopoda: Oniscidea) are two terrestrial isopod species inhabiting the leaf litter of oak forests in South Romania. This paper presents the size of reproductive females, fecundity (the number of eggs for a female for a brood), fertility (the number of larvae or manca per female) and the relationship between the number of eggs or manca per brood pouch and the total body length of pregnant females. In *Porcellium collicola* populations' reproductive females had a total body length of 3.3 to 7.3 mm, average fecundity was  $18.60 \pm 7.10$  eggs per female and average number of manca per female was  $10.29 \pm 8.05$ . In *Trachelipus arcuatus* the total body length of reproductive females was between 9.80 - 16.60 mm and the average number of eggs per brood per female was  $55.60 \pm 21.71$ . A direct correlation between the size of pregnant females and fecundity and fertility was established for *Porcellium collicola*.

**Résumé.** *Porcellium collicola* (Verhoeff, 1907) et *Trachelipus arcuatus* (Budde-Lund, 1885) sont deux espèces d'isopodes terrestres de la litière des forêts de chênes dans le sud de la Roumanie. Ce travail présente les dimensions du corps des femelles ovigères, fécondité (le nombre d'œufs d'une femelle dans la poche marsupiale), fertilité (le nombre de larves ou manca par une femelle) et la relation entre le nombre d'œufs ou de larves (manca) de leur poche marsupiale et la longueur du corps des femelles ovigères. Chez *Porcellium collicola*, les populations de femelles reproductives ont une longueur totale de 3,3 à 7,3 mm, fécondité moyenne était  $18,60 \pm 7,10$  œufs par femelle et nombre moyen de manca par femelle était  $10,29 \pm 8,05$ . Chez *Trachelipus arcuatus* la longueur totale du corps des femelles reproductives était comprise entre 9,80 à 16,60 mm et le nombre moyen d'œufs par la poche marsupiale était  $55,60 \pm 21,71$ . On a établi l'existence d'une corrélation linéaire entre la longueur du corps des femelles ovigères et la fécondité et la fertilité *Porcellium collicola*.

**Key words:** terrestrial isopods, fecundity, fertility, leaf-litter, oak forests.

### INTRODUCTION

Terrestrial isopods are crustaceans that successfully colonized a variety of terrestrial habitats (e.g. Hornung, 1995/1996, 2011; Quadros et al., 2009; Warburg, 1987). The middle-east European species are mainly iteroparous animals, reproducing more than once during their lifetime (Hornung, 1988). Fecundity and fertility of terrestrial isopods are easy to estimate because females carry their eggs and larvae from the first stage in a brood pouch on the ventral part of the thorax during the breeding period (Hornung, 2011; Kight, 2008; Paris & Pitelka, 1962; Warburg, 1987). Fecundity is defined as the number of eggs for a female for one

brood (Achouri et al., 2008; Hamaied & Charfi-Cheikhrouha, 2004; Quadros et al., 2009). Fertility is the number of juveniles (mancas) leaving the brood pouch per female (Achouri et al., 2008). Fecundity indicates the reproductive potential of a population, while fertility expresses the natural capacity of a population to produce new life forms.

In terrestrial isopods, fecundity is related to the size of the ovigerous females (Achouri et al., 2008; Dangerfield & Hassall, 1992; Hornung, 1988; Lawlor, 1976; Quadros et al., 2009; Radu & Tomescu, 1972; Zimmer, 2002; Warburg, 1994) and the number of broods produced by female per year (Accola et al., 1993; Radu & Tomescu, 1971; Tomescu, 1973, 1976). Fertility of terrestrial isopods is also related to the size of the reproductive females (Warburg, 1994).

This paper presents the size of reproductive females, fecundity, fertility and the relationship between the size of pregnant females and the number of eggs or mancás per brood pouch for the populations of two terrestrial isopod species – *Porcellium collicola* and *Trachelipus arcuatus* that inhabit the leaf-litter of two oak forests from Vlăsia plain (South Romania). We assumed that fecundity and fertility of the studied terrestrial isopod species depend on the total body length of pregnant females.

## MATERIAL AND METHODS

### *Study site and sampling design*

The study was conducted in two oak forests (in the forest steppe of Vlăsia plain), located at 20 km N-E from București (Bucharest) (Fig. 1): a *Quercus frainetto* wood (Moara Vlăsiei forest) and a *Quercus robur* – *Q. pedunculiflora* wood (Brânzeasca forest) (Doniță et al., 1990). The studied area is located in a medium flat plain at an elevation of 90 meters above sea level. The climate is continental, with warm summers (average temperature in July is 23°C) and cold winters (average temperature in January is 2.9°C). The mean annual precipitation is 550 mm and the distribution of average monthly precipitation has a minimum in February-March and October-November and a maximum in June. The type of soil is clay chernozem in Brânzeasca forest and cambic chernozem in Moara Vlăsiei forest.

Four stands (units of forest mapping) were selected in studied forests; within each of them, five areas of 10 square meters, named stations, were randomly chosen: two in Brânzeasca forest (stations 1 and 2) and three in Moara Vlăsiei forest (stations 3, 4 and 5) (Fig. 1). Station 1 (44°39'09.1" N, 26°15'35.7" E) was located in a 63 years native stand with the tree layer composed of *Quercus frainetto*, *Q. pedunculiflora* and *Acer platanoides*. The shrub layer consisted of *Crataegus monogyna* and *Cornus sanguinea*, and the herbaceous layer was composed of *Galium aparine*, *Urtica dioica*, *Lamium album*, *Alliaria officinalis* and *Polygonatum officinale*. Station 2 (44°38'52.7" N, 26°15'18.7" E) was situated in a 30 years plantation of *Quercus pedunculiflora* and *Acer platanoides*. The shrub layer consisted of *Cornus*

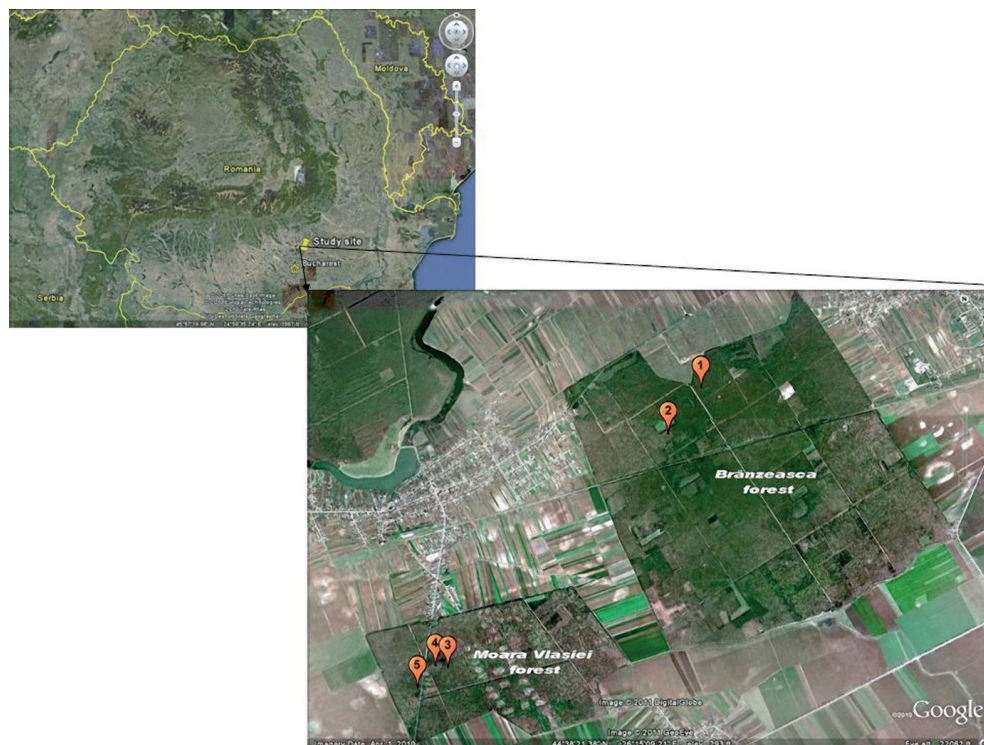


Fig. 1 - Location of the study site in Romania and stations in studied forests (adapted from Google Earth).

*sanguinea*, and the herbaceous layer was composed of *Geum urbanum*, *Bromus sterilis* and *Lysimachia vulgaris*. Station 3 (44°37'28.4" N, 26°13'24.9" E) was located in an 81 years native stand with the tree layer composed of *Quercus pedunculiflora*, *Q. robur* and different species of hard wood (maple, hornbeam, etc.). The shrub layer consisted of *Crataegus monogyna* and *Cornus sanguinea*, and the herbaceous layer was composed of *Galium aparine*, *Lamium album* and *Polygonatum officinale*. Station 4 (44°37'29.2" N, 26°13'18.6" E) was placed in the preceding stand, in an area subjected for almost 10 years to progressive cutting of *Quercus robur*. To ensure statistical independence of the data, station 4 was distanced at more than 50 meters from station 3 (Magura et al., 2000). Station 5 (44°37'21.3" N, 26°13'09.3" E) was located in a 65 years native stand with the tree layer composed of *Quercus pedunculiflora*, *Q. robur* and *Q. frainetto*. The shrub layer consisted of *Crataegus monogyna* and *Cornus sanguinea*, and the herbaceous layer was composed of *Galium aparine*, *Geum urbanum* and *Erodium cicutarium*. The distance between the sampling areas from the two studied forests was approximately 4 km (Fig. 1).

Terrestrial isopod species were collected using pitfall traps containing a mixture of  $\frac{3}{4}$  40% ethylene glycol and  $\frac{1}{4}$  4% formalin. In each station ten pitfall traps were placed in a grid, with a 1.5 meters distance between the lined traps. Traps were emptied monthly from the 20th of April 2008 to the 7th of May 2009 (except for December 2008 and January 2009).

#### *Laboratory procedures*

Isopods from samples were counted and identified using the keys of Radu (1985) and Schmidt (1997). Specimens were sexed and separated into males and females. Males were recognized by the presence of genital apophyses and copulative stylets. Females were divided into three groups: (1) non-reproductive females, recognized by the absence of genital apophyses and brood pouch, (2) ovigerous females, that were carrying eggs or larvae (mancas) in the brood pouch and (3) post-ovigerous females that had empty brood pouch (Achouri et al., 2003; Araujo & Bond-Buckup, 2005; Hamaied & Charfi-Cheikhrouha, 2004).

The eggs or mancas found in the brood pouches of ovigerous females were gently removed and counted. These data allowed quantifying fecundity and fertility.

Using a stereo microscope, the total length of ovigerous females were measured to the nearest 0.05 mm. The length was determined as the distance between median lobe of the head and the tip of the pleotelson (Achouri et al., 2003; Paris & Pitelka, 1962).

#### *Data analysis*

The relationship between the number of eggs or mancas per brood pouch and the total body length of ovigerous females were described using simple linear regression (Achouri et al., 2003, 2008; AlJetlawi & Achuthan Nair, 1994; Paris & Pitelka, 1962). Results were considered statistically significant if the calculated value of the probability to reject the null hypothesis was less than 0.05. The analyses were implemented using Microsoft Excel program.

### *RESULTS AND DISCUSSIONS*

In the five stations of the study sites only two species of terrestrial isopods were collected by pitfall trapping: *Porcellium collicola* (Verhoeff, 1907) and *Trachelipus arcuatus* (Budde-Lund, 1885). *Porcellium collicola* was present in captures from all stations (Tab. 1). It is a sylvan species that is present in forests with a dense shrub layer (Tomescu et al., 1992) and high soil humidity (Tomescu et al., 1995, 2008). In the studied zone *P. collicola* had the highest abundance in station 3 (Tab. 1) that was placed in the native forest stand with the most dense shrub layer and the highest canopy closure. *Trachelipus arcuatus* was collected mainly from station 2 (Tab. 1) located in a plantation from the same forest as station 1. It is also a sylvan species (Tomescu et al., 2000, 2005, 2008) but is less frequent in leaf-litter (Radu, 1985; Tomescu et al., 2008) and prefers areas with moderate light and humidity, as glades (Radu, 1985). The presence of *T. arcuatus* mostly in station 2 may be related

to microclimate conditions on the forest floor in forest plantations that are similar to those from glades, as a consequence of a simplified structure of the phytocenosis and a reduced closure of the canopy.

Table 1

The total number of *Porcellium collicola* and *Trachelipus arcuatus* specimens collected in studied plots.

Species	Station 1	Station 2	Station 3	Station 4	Station 5
<i>Porcellium collicola</i>	1693	26	2052	793	494
<i>Trachelipus arcuatus</i>	2	51	0	2	0
Total	1695	77	2052	795	494

### *The size of reproductive females*

We determined the minimum, maximum and median body length of reproductive (ovigerous and post-ovigerous) *Porcellium collicola* females in stations 1, 3, 4, and 5, from which a large number of specimens were collected, by examining 1145 specimens (612 in station 1, 397 in station 3, 136 in station 4 and 139 in station 5). Size of females at sexual maturity was estimated as the minimum body length of ovigerous females.

Reproductive females of *P. collicola* had a body length of 3.3 to 7.3 mm, with a median of 5.05 mm. The minimum body length of sexually mature *P. collicola* females varied in studied populations between 3.30 and 4.35 mm. Dangerfield and Hassall (1992) also found a variation in the minimum size of gravid female (mean live mass) between different populations of *Armadillidium vulgare*. The variation of the reproductive female' minimum body length may be explained by the existence of different growth rates in terrestrial isopod populations from habitats with different ecological conditions. Kight (2008) argued that two genetically identical females reared in different growth conditions could have different adult body size. The ovigerous females of *P. collicola* had the highest minimum body length (4.35 mm) in station 3 located in the natural forest stand with the most dense shrub layer and the highest canopy closure. This suggests the existence of more favorable microclimate conditions on the forest floor of this stand for *P. collicola* and is supported by the highest abundance of the species in station 3 (Tab. 1). In terrestrial isopods, females have to reach a minimum reproductive size (Caubet, 1998) that depends on tactics of individual development and growth conditions experienced by the individuals (Dangerfield & Hassall, 1992; Zimmer, 2004).

In *Trachelipus arcuatus* we determined the minimum, maximum and median body length of reproductive females by examining 20 specimens collected in station 2. Breeding females of *T. arcuatus* had a body length between 9.80 and 16.60 mm, with a median of 11.10 mm. There are no data regarding the size of the reproductive females of *Porcellium collicola* and *Trachelipus arcuatus* in the literature.



### *Fecundity and fertility*

In *Porcellium collicola* we quantified fecundity and fertility by counting the eggs or manca in the brood pouch of ovigerous females captured in stations 1, 3, 4, and 5 during the entire study. In *Trachelipus arcuatus* we quantified only fecundity because no females with manca in their brood pouch were captured in the studied area.

The number of eggs for a brood was different for all four analyzed *P. collicola* populations (stations 1, 3, 4, and 5). In terrestrial isopods, the number of eggs produced per brood generally varies with the size of females (Paris & Pitelka, 1962), but there are also exceptions (Radu & Tomescu, 1972). The number of *P. collicola* pregnant females collected in each station, their minimum and maximum body length, and minimum, average ( $\pm$ SE) and maximum number of eggs per brood are presented in tab. 2.

Table 2

Reproductive parameters of *Porcellium collicola* populations in stations 1, 3, 4, and 5.

Station	Number of pregnant females	Minimum body length (mm)	Maximum body length (mm)	Minimum eggs number per brood	Maximum eggs number per brood	Average number of eggs ( $\pm$ SE) per brood
1	325	4.00 - 4.95	6.10	5	31	15.22 $\pm$ 5.05
3	215	4.60	7.05	5	54	23.27 $\pm$ 7.30
4	72	4.40	6.05	5	35	18.63 $\pm$ 6.63
5	60	4.95 - 5.60	6.35	9	36	20.15 $\pm$ 6.48

In terrestrial isopods, the average number of eggs per brood pouch may depend upon the species and locality (Hamaied & Charfi-Cheikhrouha, 2004; Kight, 2008) and also on habitat and within-habitat level (Oberfrank et al., 2011). In the case of a species, brood size is connected to life-history strategies, but is influenced by climatic conditions: light intensity, day length, temperature, etc. and habitat parameters: microclimate, vegetation, shelter sites, etc. (Hornung, 1988; Kight, 2008; Oberfrank et al., 2011). In *P. collicola* populations from studied forests, fecundity varied between 5 and 54 eggs per brood per female. A variation in brood size between populations was also found in *Armadillidium vulgare* (Kight, 2008). The variation of terrestrial isopods' fecundity might be explained by a combination of factors influencing individual growth and ecophysiology: the genetic determinant of the growth rate, the ability of individuals to utilize resources, the given environmental conditions, the birth date in seasonal environments, the timing of allocation of resources to reproduction, the timing within the temporal sequence of reproductive events in the case of iteroparous species (Achouri et al., 2003; Hamaied & Charfi-Cheikhrouha, 2004).

The average number of *P. collicola* eggs' ( $\pm$  SE) for a brood of a female in the analyzed stations is presented in tab. 2. In the study zone (combined samples from all stations) the average number of eggs ( $\pm$  SE) per brood per female was 18.60 $\pm$ 7.10, and the body length of ovigerous females carrying eggs in their brood pouch varied



between 3.85 and 6.80 mm. There are no data regarding fecundity of *P. collicola* in the literature. A similar mean number of eggs per brood pouch ( $18.00 \pm 3.4$ ) was found in *Porcellionides pruinosus* (Hamaied & Charfi-Cheikhrouha, 2004). Smaller values of the mean number of eggs per brood pouch were reported:  $11 \pm 4$  eggs per female for *Atlantoscia floridana* (Araujo & Bond-Buckup, 2005), 15 eggs per female for *Hyloniscus transsylvanicus* (Tomescu, 1976), 17 eggs (Radu & Tomescu, 1972) or 17 – 32 eggs per female depending on time for *Protracheoniscus politus* (Hornung, personal communication; Oberfrank et al., 2011). Higher values were reported for *Trachelipus nodulosus* (23 eggs per female) (Hornung, 1988), *Armadillo officinalis* (25 eggs per female) (AlJetlawi & Achuthan Nair, 1994), *Armadillidium pelagicum* ( $50.91 \pm 14.30$  eggs per females) (Hamaied & Charfi-Cheikhrouha, 2004).

In *Trachelipus arcuatus* fecundity was quantified by counting eggs in the brood pouches of 10 ovigerous females collected in the study plots. The number of eggs per brood pouch varied between 33 eggs in a female with body length of 11.90 mm and 110 eggs in a female with body length of 15.00 mm. The average number of eggs ( $\pm$  SE) for a brood in a female was  $55.60 \pm 21.71$ . There are no data regarding fecundity of *T. arcuatus* in the literature.

In terrestrial isopods, the number of eggs per brood per female is in close linear correlation with the size of pregnant females (Hornung, 1988). Using simple linear regression, we described the relation between the number of eggs per brood pouch and the female's body length for both isopod species. In *Porcellium collicola* we described this relation for stations 1, 3, 4, and 5 and for the study zone (combined samples from all stations).

The simple linear regression indicated a significant linear correlation between the number of eggs in the brood pouch and the body length of *P. collicola* females in station 1 ( $r = 0.741$ ,  $p < 0.0001$ ), station 3 ( $r = 0.783$ ,  $p < 0.0001$ ), station 4 ( $r = 0.728$ ,  $p < 0.0001$ ), station 5 ( $r = 0.660$ ,  $p < 0.0001$ ) and for the study zone ( $r = 0.816$ ,  $p < 0.0001$ ). The relation between the number of eggs and the female's body length, along with the coefficient of determination ( $r^2$ ) are presented in figures 2 and 3. Thus, we established the existence of a linear correlation between fecundity and the body length of *P. collicola* females in studied forests. This phenomenon is common in terrestrial isopod species (AlJetlawi & Achuthan Nair, 1994).

We also established a significant correlation ( $r = 0.851$ ,  $p = 0.0009$ ) between the number of eggs in the brood pouch and the body length of *Trachelipus arcuatus* females, although the linear regression model was based only on 10 specimens. The relation between the number of eggs and the females' body length, along with the coefficient of determination ( $r^2$ ) are presented in fig. 4. These results confirm the underlying study hypothesis according to which fecundity of the studied terrestrial isopod species depends on the total body length of pregnant females.

A direct correlation between the number of eggs in the brood pouch and the female's body length was also identified in *Armadillidium vulgare* (Miller & Cameron, 1983; Paris & Pitelka, 1962; Tomescu et al., 1992), *Trachelipus nodulosus*

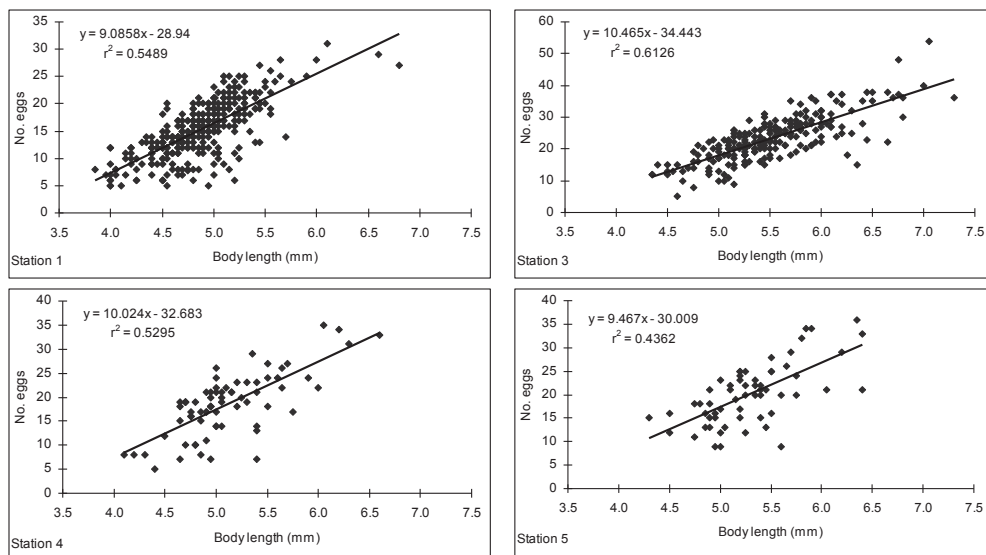


Fig. 2 - The relationship between the number of eggs per brood and the body length of *Porcellium collicola* females in stations 1, 3, 4, and 5.

(Hornung, 1989; Tomescu et al., 1992), *Armadillidium versicolor*, *Ligidium hypnorum*, *Protracheoniscus politus* (Tomescu et al., 1992), *Trachelipus difficilis rotundatus* (Accola et al., 1993; Tomescu et al., 1992), *Cylisticus convexus* (Hatchett, 1947 in Paris & Pitelka, 1962), *Porcellio scaber* (Brereton, 1956 in Paris & Pitelka, 1962; Tomescu & Crăciun, 1987), *Porcellionides pruinosus* (Achouri et al., 2003, 2008), *Armadillo officinalis* (AlJetlawi & Achuthan Nair, 1994), *Agabiformius lentus*, *Porcellio laevis*, *P. dalensis*, *Armadillidium granulatum*, *Soteriscus gaditanus*, *Porcellionides sexfasciatus* (Achouri et al., 2008). In some isopod species direct correlations were identified between fecundity and other parameters

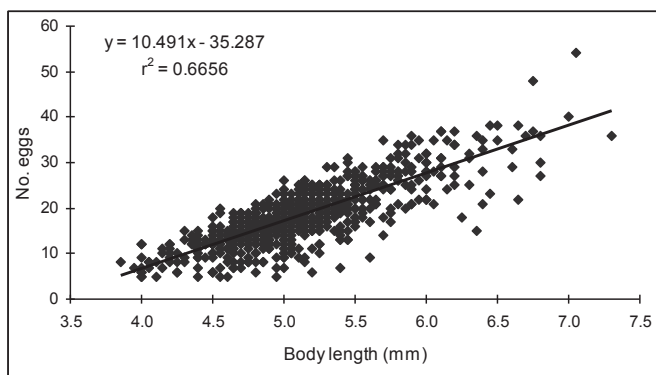


Fig. 3 - The relationship between the number of eggs per brood and the body length of *Porcellium collicola* females in the study zone.

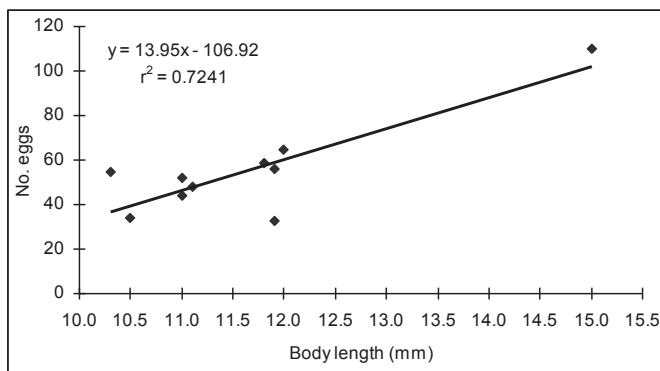


Fig. 4 - The relationship between the number of eggs per brood and the body length of *Trachelipus arcuatus* females in the study zone.

of ovigerous females, as the body weight in *Armadillidium pelagicum* (Hamaied & Charfi-Cheikhrouha, 2004) and *Porcellio laevis* (Lardies et al., 2004) or the cephalothorax width in *Atlantoscia floridana* (Araujo & Bond-Buckup, 2005). In terrestrial isopods, large females produce larger number of eggs per brood than the small ones. Therefore the birth rate in populations is related not only to the number of reproductive females, but also to their size at reproduction (Hamaied & Charfi-Cheikhrouha, 2004).

The number of manca found in marsupial pouch of *Porcellium collicola* pregnant females varied between 2 and 28, and the average number of manca ( $\pm$  SE) per female was  $10.29 \pm 8.05$ . Pregnant females carrying manca in their brood pouch had a body length of 4.35 to 7.00 mm. A wide range of the number of young released from the marsupial pouch (from 7 to 36) was also found in a tropical population of *Porcellionides pruinosus* (Dangerfield & Telford, 1990). From the 21 analyzed *P. collicola* females 12 were carrying less than 10 manca per marsupial pouch. The low number of manca per female may be the result of their expulsion from the brood pouch when females impacted the liquid from the trap. This is supported by the presence of free manca and females with open marsupial pouch and few manca in trapped material. Araujo and Bond-Buckup (2005) found that females of *Atlantoscia floridana* move heavily and expel the marsupial content when they contact the ethanol during Berlese funnel extraction.

Linear regression indicated a significant correlation ( $r = 0.507$ ,  $p = 0.016$ ) between fertility and size of *Porcellium collicola* females. The relation between the number of manca per brood pouch and the female's body length, along with the coefficient of determination ( $r^2$ ) are presented in fig. 5. Thus, we established the existence of a linear correlation between fertility and body length of *P. collicola* females in studied forests. These also confirm the underlying study hypothesis according to which fertility of the studied terrestrial isopod species depends on the size of pregnant females.

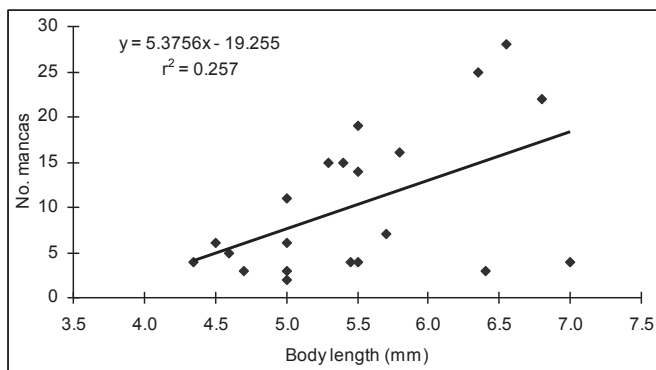


Fig. 5 - The relationship between the number of manca per brood pouch and the body length of *Porcellium collicola* females in the study zone.

A similar relation between fertility and female's size was observed in other terrestrial isopod species. Achouri et al. (2003) showed a significant correlation between the number of hatched embryos found in marsupial pouch and the female's body length in *Porcellionides pruinosus*. AlJetlawi and Nair (1994) found a positive correlation between the number of young liberated by females and females' body length in *Armadillo officinalis*. Dangerfield and Telford (1990) found a positive relationship between the body mass of female and the number of young released from the brood pouch. Miller and Cameron (1983) showed the existence of a significant relation between isopods' size and the number of larvae in the marsupial pouch in *Armadillidium vulgare*.

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#### PARAMETRII REPRODUCERII LA SPECIILE *PORCELLIUM COLLICOLA* (VERHOEFF, 1907) ȘI *TRACHELIPUS ARCUATUS* (BUDDE-LUND, 1885) (CRUSTACEA: ISOPODA: ONISCIDEA) DIN SUDUL ROMÂNIEI

#### REZUMAT

*Porcellum collicola* (Verhoeff, 1907) și *Trachelipus arcuatus* (Budde-Lund, 1885) sunt două specii de izopode terestre care trăiesc în litiera pădurilor de stejar din câmpia Vlăsiei (sudul României). Acest articol prezintă mărimea corpului femelelor reproducătoare, fecunditatea (numărul de ouă per pontă per femelă), fertilitatea (numărul de larve sau manca per femelă) și relația dintre numărul de ouă sau manca per pungă incubatoare și lungimea totală a corpului femelelor purtătoare de ouă sau larve. În populațiile de *Porcellium collicola* femelele reproducătoare au avut o lungime totală a corpului de 3,3 – 7,3 mm, fecunditatea medie a fost de  $18,60 \pm 7,10$  ouă per femelă, iar fertilitatea medie a fost de  $10,29 \pm 8,05$  manca per femelă. În cazul speciei *Trachelipus arcuatus*

lungimea totală a corpului femelelor reproducătoare a fost cuprinsă între 9,8 și 16,6 mm, iar numărul mediu de ouă per pontă per femelă a fost de  $55,60 \pm 21,71$ . S-a stabilit existența unei corelații directe între mărimea corpului femelelor purtătoare de ouă sau manca și fecunditate, respectiv fertilitate la specia *Porcellium collicola*.

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## THE DRAGONFLY (INSECTA: ODONATA) COLLECTION OF IAȘI MUSEUM OF NATURAL HISTORY (ROMANIA)

COSMIN-OVIDIU MANCI

**Abstract.** The dragonfly specimens deposited in the Iași Museum of Natural History were inventoried and analyzed, resulting a total of 3162 adult specimens from 45 species. The majority of these specimens were collected by Constantin Visarion Mândru in 51 localities of Romania. The material includes important new distribution records of three Natura 2000 species (*Coenagrion ornatum*, *Cordulegaster heros* and *Gomphus flavipes*). *Coenagrion scitulum*, *Somatochlora meridionalis* and *Sympetrum danae* are species rarely reported from Romania.

**Résumé.** Les exemplaires de libellules déposés dans le Muséum d'Histoire Naturelle de Iași ont été inventoriés et analysés, résultant un nombre total de 3162 spécimens adultes de 45 espèces. La plupart de ces exemplaires ont été collectés de 51 zones de la Roumanie par Constantin Visarion Mândru. *Coenagrion ornatum*, *Cordulegaster heros* et *Gomphus flavipes* sont des espèces importantes Natura 2000, offrant de nouvelles données pour leur distribution. *Coenagrion scitulum*, *Somatochlora meridionalis* et *Sympetrum danae* sont des espèces rarement mentionnées en Roumanie.

**Key words:** Odonata, dragonflies, catalogue, collection, Iași Museum of Natural History.

### INTRODUCTION

The present paper is the second of a series that deals with dragonfly collections from Romanian museums. The first in this series gave an overview of the dragonfly collection of the Iron Gate Museum from Drobeta Turnu-Severin town (Manci, 2007).

The present paper gives information on material of dragonflies deposited in the Iași Museum of Natural History, most of which are from Moldova and the Danube Delta. The dragonflies of Moldova, north-east part of Romania (the counties: Iași, Vaslui, Galați, Botoșani, Neamț, Bacău, Vrancea and Suceava) and especially the surroundings of Iași have been relatively well studied and the records are included in numerous publications (Bulimar, 1969, 1971; Bulimar & Boișteanu, 1968; Cîrdei, 1956; Cîrdei & Bulimar, 1961, 1965; Manci, 2005). The dragonfly fauna of the Danube Delta was also relatively well studied (Bulimar, 1973, 1984 a, b, 1993, 1994, 1996; Isvoreanu & Boghian, 1980; Griebler, 1994; Kühlmann, 1965).

Of the 69 Odonata species that occur in Romania, 45 species were found in the collection of the Iași Museum of Natural History. This represents 65% from the total of dragonfly fauna known in Romania.

*MATERIAL AND METHODS*

This paper presents a list of specimens of dragonflies present in Iași Natural History Museum. Most of them were collected between 1954 and 1990 by Constantin Visarion Mândru. Many specimens were collected by other museum employees, between 1991 and 1993, but most of these specimens lack information on the collector. The collection was studied by Dr. Felicia Bulimar but the results were never published. The specimens are mounted on entomological pins and are in a very good state of preservation.

All identifications were checked by the author and information on location, date and collector were inserted in a database. All the data found in this paper are available in a digital database (Manci, 2009-2011). For localities and/or toponyms, the Romanian names were used. The list of localities together with their coordinates can be found in the list below. For two of the toponyms found in the collection, we were not able to find any correlation on the maps ("Betreag" and "TO"). The taxonomy used in this paper is the same with the one used in the latest monographic work for Europe (Dijkstra, 2006). Maps shown in this paper were created with the free software Quantum GIS.

List of collecting localities and/or toponyms with geographical coordinates:

- Agigea - village in Constanța county (44°05'37"N / 28°36'40"E)
- Babadag - small town in Tulcea county (44°53'41"N / 28°43'10"E)
- Băile Felix - spa station near Oradea town, administrative center of Bihor county (46°59'21"N / 21°58'49"E)
- Bârnova - village in Iași county (47°04'31"N / 27°37'22"E)
- Bicaz - small town in Neamț county (46°54'41"N / 26°05'39"E)
- Breazu - village near Iași town (47°12'44"N / 27°31'01"E)
- Caraorman - village in the Danube Delta (45°04'37"N / 29°23'31"E)
- Călărași - village in Botoșani county (47°36'23"N / 27°15'26"E)
- Ciucurova - village in Tulcea county (44°54'55"N / 28°28'44"E)
- Cozia - village in Iași county (47°00'08"N / 27°53'42"E)
- Delta Dunării - the Danube Delta without details, in Tulcea county (45°13'25"N / 29°17'16"E)
- Epureni - village in Vaslui county (46°14'42"N / 27°54'41"E)
- Gârbești - village in Iași county (46°58'43"N / 27°17'38"E)
- Gorban - village in Iași county (46°52'41"N / 28°04'54"E)
- Iași - the administrative center of Iași county (47°09'26"N / 27°34'31"E)
- Iași - Ciric - in the neighborhood of Iași town (47°10'58"N / 27°36'15"E)
- Iași - Grădina Botanică - botanical garden in Iași town, the administrative center of Iași county (47°11'09"N / 27°32'59"E)
- Iași - Nicolina - neighborhood of Iași town (47°07'32"N / 27°34'02"E)

- Iași - Pd. Ciric - forest in the north-east part of Iași town (47°10'20"N / 27°36'56"E)
- Iași - Socola - neighborhood of Iași town (47°07'54"N / 27°35'44"E)
- Iași - Valea Vămășoaiei - small stream in the south of Iași town (47°08'16"N / 27°37'51"E)
- Lacul Roșu - a natural dam lake, in Hașmaș-Bicaz Gorges National Park, in Harghita county (46°47'29"N / 25°47'15"E)
- Leorda - village in Botoșani county (47°49'03"N / 26°27'43"E)
- Mamaia - town (sea resort) in Constanța county (44°15'12"N / 28°37'04"E)
- Mănăstirea Neamț - monastery in Neamț county (47°15'48"N / 26°12'29"E)
- Mârzești - small farm north of Rediu Village (47°14'01"N / 27°30'18"E)
- Năvodari - town in Constanța county (44°19'28"N / 28°36'45"E)
- Niculițel - village in Tulcea county (45°10'56"N / 28°28'45"E)
- Odobești - village in Bacău county (46°40'32"N / 27°08'52"E)
- Osoi - village in Iași county (47°05'33"N / 27°11'30"E)
- Pașcani - town in Iași county (47°15'02"N / 26°43'20"E)
- Păun - village in Iași county (47°05'48"N / 27°39'46"E)
- Pd. Babadag - forest south of Babadag town (44°52'21"N / 28°41'00"E)
- Pd. Bârnova - forest in Iași county (47°02'42"N / 27°36'31"E)
- Pd. Bârnova - Pr. Nastea - small stream in the south of Bârnova forest, near Dobrovăț Village in Iași county (46°59'25"N / 27°39'25"E)
- Pd. Breazu - forest near Breazu Village in Iași county (47°12'45"N / 27°31'51"E)
- Pd. Epurenii - forest in Vaslui county (46°15'24"N / 27°51'52"E)
- Pd. Repedea - forest near Repedea reserve (47°04'56"N / 27°38'56"E)
- Podu Iloaiei - small town in Iași county (47°12'45"N / 27°16'06"E)
- Potoci - village in Neamț county (46°59'03"N / 26°06'37"E)
- Prisăceni - village in Iași county (47°04'24"N / 27°53'4"E)
- Repedea - small reserve close to Bârnova Village (47°05'12"N / 27°38'44"E)
- Sarinasuf - village south of the Danube Delta (45°00'22"N / 29°03'24"E)
- Sângeorzi-Băi - town and spa in Bistrița-Năsăud county (47°22'02"N / 24°40'42"E)
- Tulcea - the administrative center of Tulcea county (45°10'48"N / 28°47'58"E)
- Țibana - village in Iași county (46°59'06"N / 27°20'07"E)
- Urluia - village in Constanța county (44°06'13"N / 27°54'53"E)
- Valea lui David - reserve near Iași town (47°11'49"N / 27°28'04"E)
- Vlădiceni - village in Iași county (47°07'52"N / 27°39'36"E)

Abbreviations used in this catalogue:

County names: Bc – Bacău; Bh – Bihor; Bn – Bistrița-Năsăud; Bt – Botoșani; Ct – Constanța; Hr – Harghita; Is – Iași; Nt – Neamț; Tl – Tulcea; Vs – Vaslui.

## RESULTS

The collection comprises 3162 specimens from 45 species which were collected in 53 locations of Romania. The majority of the specimens were collected in Moldova historical province (Iași, Neamț, Bacău, Vaslui and Botoșani counties), but also from Dobrogea (Constanța and Tulcea counties), Transylvania (Harghita and Bistrița-Năsăud counties) and Crișana (Bihor county). Figure 1 and figure 2 show the distribution of these records in Romania and in Iași County. Figure 1 is showing all the records of distribution from collection, these records are mainly from the region Moldova (Iași, Botoșani, Neamț, Bacău and Vaslui counties), Dobrogea (Tulcea and Constanța counties) and only 7 specimens were collected outside of these regions: 1 specimen from Crișana (Bihor county) and 6 specimens (4 species) from Transylvania (Harghita and Bistrița-Năsăud counties). In figure 2, only the distribution data for the records from Iași County (1810 specimens) are shown, the records from this county being best represented in this collection.

## Order Odonata

## Suborder Zygoptera

## Family Calopterygidae

*Calopteryx* Leach, 1815

*Calopteryx splendens* (Harris, 1782) (6 specimens: 4 ♂♂, 2 ♀♀)

Material: 1 ♀, Bârnova (Is), 17.VII.1985; 1 ♀ (specimen that looks like *balcanica* subspecies, wing of the female being extremely dark in colour), Bârnova (Is), 17.VII.1985; 4 ♂♂, Caraorman (Tl), 9.VI.1985.

*Calopteryx virgo* (Linnaeus, 1758) (194 specimens: 147 ♂♂, 47 ♀♀)

Material: Pd. Bârnova (Is) 20.VI.1974 (9 ♀♀), 20.VI.1974 (31 ♂♂, 12 ♀♀), 17.VII.1985 (6 ♂♂); Pd. Bârnova, Pr. Nastea (Is) 12.VII.1985 (21 ♂♂), 19.VII.1985 (10 ♂♂, 13 ♀♀), 9.VII.1990 (53 ♂♂, 11 ♀♀); Caraorman (Tl) 9.VI.1985 (1 ♂).

## Family Lestidae

*Lestes* Leach, 1815

*Lestes sponsa* (Hansemann, 1823) (54 specimens: 21 ♂♂, 33 ♀♀)

Material: Iași, Socola (Is) 17.VII.1974 (4 ♂♂, 5 ♀♀); Iași, Cîrc (Is) 24.VI.1970 (2 ♂♂, 3 ♀♀), 25.VI.1970 (2 ♀♀), 10.VII.1970 (3 ♀♀), 17.VII.1970 (4 ♂♂, 3 ♀♀), 24.VII.1970 (2 ♀♀); Iași, Repede (Is) 19.VII.1973 (1 ♀); Gorban (Is) 25.VI.1981 (2 ♀♀); Potoci (Nt) 7.VII.1977 (10 ♂♂, 11 ♀♀); Tulcea (Tl) 4.VI.1958 (1 ♂, 1 ♀).

*Lestes dryas* Kirby, 1890 (8 specimens: 6 ♂♂, 2 ♀♀)

Material: Iași, Cîrc (Is) 24.VI.1970 (1 ♂), 17.VII.1970 (1 ♀); Iași, Grădina Botanică (Is) 1.VII.1990 (4 ♂♂); Păun (Is) 24.VI.1981 (1 ♂); Agigea (Ct) 10.VIII.1964 (1 ♀).

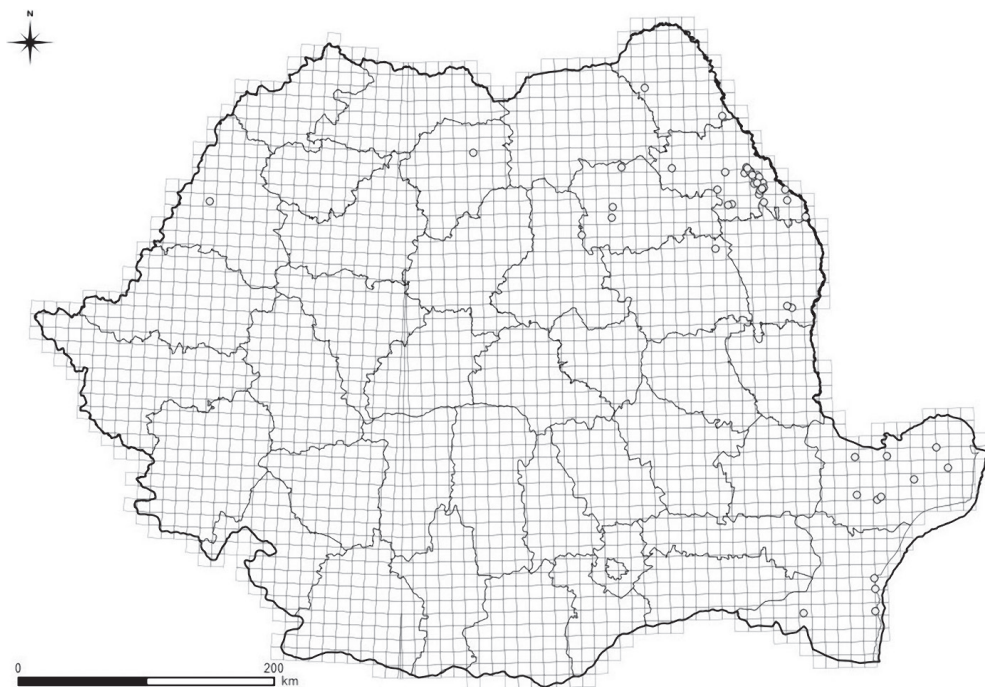


Fig. 1 - Distribution of all dragonfly records that are present in the collection of Iași Natural History Museum (county border and UTM grid of 10x10 km are shown, collecting points marked with dots).

*Lestes barbarus* (Fabricius, 1798) (82 specimens: 43 ♂♂, 39 ♀♀)

Material: Iași, Grădina Botanică (Is) 30.VI.1981 (1 ♀), 1.VII.1990 (2 ♂♂); Iași, Socola (Is) 17.VII.1974 (1 ♀), 16.VIII.1985 (2 ♂♂); Pașcani (Is) 1.VIII.1958 (1 ♀), 10.VIII.1970 (11 ♂♂, 3 ♀♀); Vlădiceni (Is) 14.VI.1966 (4 ♂♂, 10 ♀♀); Pd. Babadag (Tl) 21.VIII.1978 (1 ♂); Tulcea (Tl) 4.VI.1958 (1 ♂, 1 ♀); Năvodari (Ct) 9.IX.1987 (2 ♂♂, 3 ♀♀); Agiea (Ct) 10.VIII.1964 (17 ♂♂, 19 ♀♀).

*Lestes virens* (Charpentier, 1825) (13 specimens: 10 ♂♂, 3 ♀♀)

Material: Iași, Socola (Is) 17.VII.1974 (2 ♂♂), 25.VIII.1974 (1 ♀), 26.VIII.1974 (5 ♂♂, 1 ♀); Iași, Grădina Botanică (Is) 1.VII.1990 (1 ♂); Gârbești (Is) 10.VIII.1970 (2 ♂♂); Agiea (Ct) 10.VIII.1964 (1 ♀).

*Lestes viridis* (Vander Linden, 1825) (9 specimens: 9 ♀♀)

Material: Tulcea (Tl) 29.VII.1987 (7 ♀♀), 2.VIII.1987 (1 ♀, abdomen was broken and the specimen was identified after the color of pterostigma); Caraorman (Tl) 19.X.1981 (1 ♀).

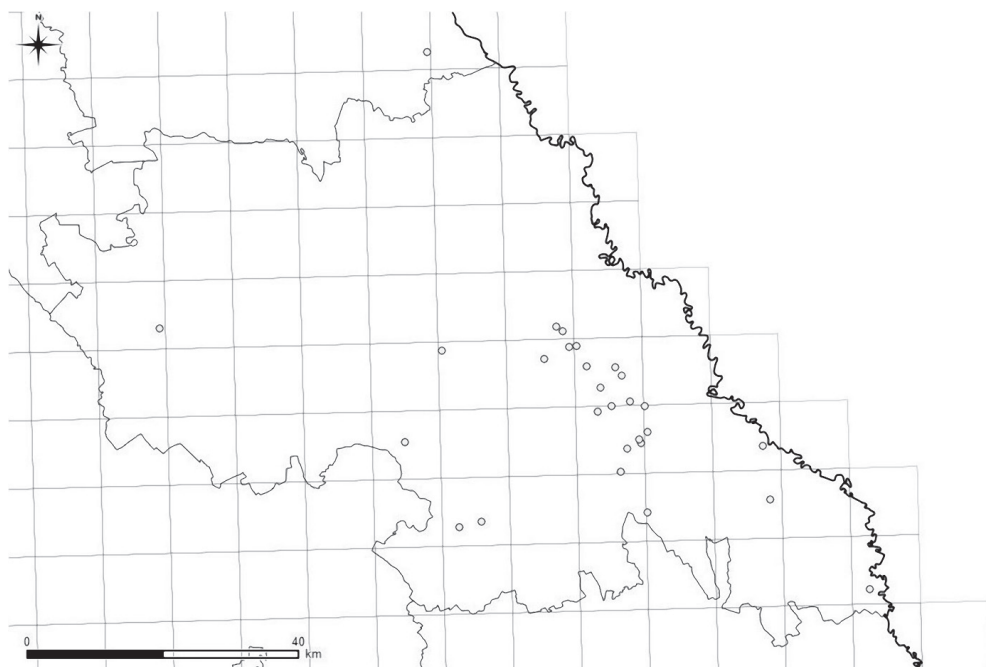


Fig. 2 - Distribution for the dragonfly records from Iași County (1810 specimens) present in the collection of Iași Natural History Museum (county border and UTM grid of 10x10 km are shown, collecting points marked with dots).

### *Sympecma* Burmeister, 1839

*Sympecma fusca* (Vander Linden, 1820) (41 specimens: 20 ♂♂, 21 ♀♀)

Material: Iași, Grădina Botanică (Is) 1.VII.1990 (1 ♀); Iași, Socola (Is) 25.VIII.1974 (1 ♂), 26.VIII.1974 (1 ♀); Bârnova (Is) 7.IX.1958 (2 ♂♂), 2.IX.1973 (1 ♂, 2 ♀♀), 15.IX.1973 (3 ♂♂, 1 ♀); Potoci (Nt) 20.VII.1993 (1 ♂); Tulcea (Tl) 15.VIII.1974 (11 ♂♂, 16 ♀♀); Pd. Babadag (Tl) 21.VIII.1978 (1 ♂).

### Family Coenagrionidae

#### *Ischnura* Charpentier, 1840

*Ischnura elegans* (Vander Linden, 1820) (104 specimens: 57 ♂♂, 47 ♀♀)

Material: Păun (Is) 24.VI.1981 (1 ♀); Podu Iloaiei (Is) 6.VIII.1991 (6 ♂♂, 4 ♀♀); Iași, Grădina Botanică (Is) 15.VII.1981 (2 ♂♂, 1 ♀), 2.VII.1986 (1 ♂), 1.VII.1990 (3 ♀♀); Iași, Socola (Is) 26.VIII.1974 (1 ♂, 1 ♀), 27.VIII.1974 (4 ♂♂, 4 ♀♀), 29.VIII.1974 (1 ♀), 24.IX.1974 (2 ♂♂, 1 ♀), 30.VI.1975 (3 ♂♂, 1 ♀); Vlădiceni (Is) 17.V.1964 (1 ♀); Iași, Cîrc (Is) 24.VI.1970 (1 ♀), 10.VII.1970 (1 ♀), 24.VII.1970 (1 ♀), 15.VI.1971 (1 ♀), 18.VII.1972 (1 ♂, 1 ♀); Iași, Pd. Cîrc (Is) 14.VII.1980 (3 ♂♂); Iași, Repedea (Is) 19.VII.1973 (3 ♂♂); Bârnova (Is) 15.IX.1973 (1 ♀); Leorda (Bt) 9.IX.1958 (1 ♀); Lacul Roșu (Hr) 18.VII.1972 (1 ♂, 1 ♀); Agiea (Ct) 7.VIII.1973 (16 ♂♂, 6 ♀♀), 10.VIII.1973 (4 ♂♂, 2 ♀♀), 13.IX.1973 (1 ♂, 1 ♀), 9.VII.1974 (6 ♂♂, 1 ♀), 11.VII.1974 (5 ♀♀); Mamaia (Ct) 11.VIII.1974 (2 ♀♀); Tulcea (Tl) 4.VI.1958 (3 ♂♂, 3 ♀♀).



*Ischnura pumilio* (Charpentier, 1825) (40 specimens: 17 ♂♂, 23 ♀♀)

Material: Iași, Ciric (Is) 17.VII.1970 (1 ♀), 15.VI.1971 (1 ♂, 2 ♀♀); Iași, Nicolina (Is) 27.VI.1975 (3 ♂♂, 10 ♀♀); Iași, Grădina Botanică (Is) 15.VII.1981 (3 ♂♂, 1 ♀); Iași, Repedea (Is) 19.VII.1973 (1 ♂); Iași, Socola (Is) 17.VII.1974 (1 ♂, 1 ♀), 25.VIII.1974 (6 ♂♂, 8 ♀♀), 26.VIII.1974 (1 ♀); Pașcani (Is) 7.VII.1958 (1 ♂).

*Enallagma* Charpentier, 1840

*Enallagma cyathigerum* (Charpentier, 1840) (18 specimens: 12 ♂♂, 6 ♀♀)

Material: Iași, Repedea (Is) 19.VII.1973 (1 ♂); Iași, Socola (Is) 29.VI.1974 (1 ♂), 17.VII.1974 (4 ♂♂, 1 ♀), 25.VIII.1974 (1 ♀), 26.VIII.1974 (1 ♂), 1.VII.1977 (1 ♂), 16.VIII.1985 (2 ♂♂); Vlădiceni (Is) 17.V.1964 (1 ♀); Bedreag (??) 3.VI.1958 (1 ♀); Păun (Is) 24.VI.1981 (1 ♂, 1 ♀); Bârnova (Is) 7.IX.1958 (1 ♀); Agigea (Ct) 10.VIII.1964 (1 ♂).

*Coenagrion* Kirby, 1890

*Coenagrion pulchellum* (Vander Linden, 1825) (30 specimens: 26 ♂♂, 4 ♀♀)

Material: Iași, Grădina Botanică (Is) 15.VII.1981 (1 ♂), 1.VII.1990 (14 ♂♂, 2 ♀♀); Iași, Ciric (Is) 18.VII.1972 (2 ♂♂); Iași, Socola (Is) 4.VI.1974 (2 ♂♂), 29.VI.1974 (1 ♂, 1 ♀), 29.VI.1974 (2 ♂♂); Breazu (Is) 1.VI.1974 (1 ♀); Agigea (Ct) 7.VIII.1973 (3 ♂♂, 1 ♀).

*Coenagrion puella* (Linnaeus, 1758) (141 specimens: 116 ♂♂, 25 ♀♀)

Material: Ciric (Is) 14.VII.1980 (8 ♂♂, 1 ♀); Iași, Grădina Botanică (Is) 15.VII.1981 (7 ♂♂), 1.VII.1990 (16 ♂♂, 3 ♀♀); Iași, Socola (Is) 4.VI.1974 (4 ♂♂, 7 ♀♀), 29.VI.1974 (9 ♂♂), 17.VII.1974 (1 ♂), 24.IX.1974 (1 ♂), 30.VI.1975 (8 ♂♂), 1.VII.1977 (3 ♂♂); Vlădiceni (Is) 10.VI.1970 (36 ♂♂); Breazu (Is) 15.V.1971 (1 ♂, 1 ♀); Bârnova (Is) 7.IX.1958 (1 ♀); Păun (Is) 24.VI.1981 (3 ♂♂, 1 ♀); Potoci (Nt) 20.VII.1993 (10 ♂♂, 3 ♀♀); Lacul Roșu (Hr) 18.VII.1972 (1 ♂).

*Coenagrion ornatum* (Selys, 1850) (29 specimens: 21 ♂♂, 8 ♀♀)

Material: Iași, Socola (Is) 20.VI.1974 (1 ♂), 24.IX.1974 (1 ♂); Iași, Pd. Ciric (Is) 14.VII.1980 (1 ♂); Pd. Bârnova (Is) 29.V.1985 (18 ♂♂, 8 ♀♀).

*Coenagrion scitulum* (Rambur, 1842) (5 specimens: 3 ♂♂, 2 ♀♀)

Material: Iași, Socola (Is) 17.VII.1974 (3 ♂♂, 2 ♀♀).

*Coenagrion hastulatum* (Charpentier, 1825) (2 specimens: 1 ♂, 1 ♀)

Material: Lacul Roșu (Hr) 18.VII.1972 (1 ♂, 1 ♀).

*Erythromma* Charpentier, 1840

*Erythromma viridulum* (Charpentier, 1840) (5 specimens: 4 ♂♂, 1 ♀)

Material: Agigea (Ct) 10.VII.1974 (3 ♂♂, 1 ♀), 11.VII.1974 (1 ♂).

## Family Platynemididae

*Platynemis* Burmeister, 1839

*Platynemis pennipes* (Pallas, 1771) (12 specimens: 5 ♂♂, 7 ♀♀)

Material: Iași, Socola (Is) 24.IX.1974 (1 ♂, 1 ♀); Iași, Pd. Cîric (Is) 25.VI.1970 (1 ♀); Iași, Grădina Botanică (Is) 2.VII.1986 (3 ♂♂, 2 ♀♀); Pd. Bârnova (Is) 29.V.1985 (1 ♂, 2 ♀♀); Vlădiceni (Is) 10.VI.1970 (1 ♀).

## Suborder Anisoptera

## Family Aeshnidae

*Aeshna* Fabricius, 1775

*Aeshna mixta* Latreille, 1805 (259 specimens: 126 ♂♂, 133 ♀♀)

Material: Iași (Is) 17.VIII.1974 (1 ♀); Iași, Socola (Is) 16.VIII.1985 (2 ♂♂), 29.VIII.1985 (1 ♂, 2 ♀♀); Iași, Repedea (Is) 26.VIII.1980 (2 ♀♀), 2.VIII.1981 (21 ♂♂, 20 ♀♀), 2.VIII.1989 (1 ♂, 3 ♀♀); Iași, Pd. Repedea (Is) 11.VIII.1980 (3 ♂♂, 4 ♀♀), 26.VIII.1980 (1 ♂), 7.IX.1980 (1 ♂, 1 ♀), 2.VIII.1981 (4 ♂♂, 5 ♀♀); Pașcani (Is) 10.VIII.1958 (1 ♀); Bârnova (Is) 7.IX.1958 (1 ♂), 11.VIII.1966 (2 ♂♂), 18.VII.1974 (2 ♀♀), 15.IX.1974 (3 ♂♂); Pd. Bârnova (Is) 31.VIII.1975 (5 ♂♂, 4 ♀♀), 17.VII.1985 (1 ♂); Gârbești (Is) 10.VIII.1970 (1 ♂), 15.VIII.1970 (1 ♂, 1 ♀), 5.VIII.1974 (3 ♂♂, 3 ♀♀); Mănăstirea-Neamț (Nt) 27.VIII.1985 (1 ♂), 19.VIII.1986 (2 ♂♂, 4 ♀♀); Bicaz (Nt) 7.IX.1974 (5 ♂♂, 4 ♀♀); Odobești (Bc) 29.VII.1954 (4 ♂♂, 7 ♀♀); Babadag (Tl) 16.VIII.1974 (18 ♂♂, 18 ♀♀); Pd. Babadag (Tl) 18.VIII.1977 (6 ♂♂, 7 ♀♀); Niculițel (Tl) 23.VIII.1975 (18 ♂♂, 24 ♀♀); Ciucurova (Tl) 16.VIII.1973 (18 ♂♂, 19 ♀♀); Delta Dunării (Tl) 15.VI.1968 (3 ♂♂); Urluia (Ct) 8.VII.1973 (1 ♀).

*Aeshna affinis* Vander Linden, 1820 (312 specimens: 156 ♂♂, 156 ♀♀)

Material: Iași, Repedea (Is) 2.VIII.1989 (1 ♀); Iași, Socola (Is) 10.VIII.1985 (5 ♂♂), 16.VIII.1985 (1 ♂), 29.VIII.1985 (11 ♂♂, 3 ♀♀); Caraorman (Tl) 8.VI.1985 (2 ♂♂, 7 ♀♀), 9.VI.1985 (43 ♂♂, 39 ♀♀), 10.VI.1985 (30 ♂♂, 28 ♀♀), 11.VI.1985 (15 ♂♂, 12 ♀♀), 12.VI.1985 (34 ♂♂, 36 ♀♀); Tulcea (Tl) 8.VI.1985 (3 ♂♂, 12 ♀♀), 10.VI.1985 (10 ♂♂, 14 ♀♀), 13.VI.1985 (1 ♂, 3 ♀♀); Sarinasuf (Tl) 11.VI.1981 (1 ♂, 1 ♀).

*Aeshna isoceles* (Müller, 1767) (87 specimens: 46 ♂♂, 41 ♀♀)

Material: Iași, Grădina Botanică (Is) 30.VI.1981 (1 ♂); Breazu (Is) 27.VI.1975 (1 ♂); Mârzești (Is) 13.V.1973 (2 ♂♂, 3 ♀♀); Tulcea (Tl) 12.VI.1981 (19 ♂♂, 23 ♀♀); Sarinasuf (Tl) 9.VI.1981 (2 ♂♂), 10.VI.1981 (15 ♂♂, 1 ♀), 16.VI.1981 (13 ♀); Caraorman (Tl) 8.VI.1985 (3 ♂♂), 9.VI.1985 (3 ♂♂, 1 ♀).

*Aeshna cyanea* (Müller, 1764) (5 specimens: 5 ♂♂)

Material: Bârnova (Is) 15.IX.1974 (3 ♂♂), 19.VII.1985 (1 ♂); Băile Felix (Bh) 12.IX.1976 (1 ♂).



*Anax* Leach, 1815

*Anax imperator* Leach, 1815 (18 specimens: 15 ♂♂, 3 ♀♀)

Material: Iași, Grădina Botanică (Is) 27.VI.1981 (1 ♀), 30.VI.1981 (2 ♂♂), 25.VII.1981 (1 ♂, 1 ♀); Iași, Socola (Is) 24.VI.1979 (4 ♂♂, 1 ♀), 16.VIII.1985 (4 ♂♂); Osoi (Is) 27.VI.1981 (4 ♂♂).

*Anax parthenope* (Selys, 1839) (7 specimens: 6 ♂♂, 1 ♀)

Material: Iași, Grădina Botanică (Is) 30.VI.1981 (1 ♂), 25.VI.1982 (1 ♂, 1 ♀); Osoi (Is) 27.VI.1981 (3 ♂♂); Delta Dunării (Tl) 17.VIII.1968 (1 ♂).

*Brachytron* Evans, 1845

*Brachytron pratense* (Müller, 1764) (6 specimens: 4 ♂♂, 2 ♀♀)

Material: Mârzești (Is) 13.V.1973 (2 ♂♂), 3.VI.1974 (1 ♂, 1 ♀); Pd. Epureni (VS) 20.V.1973 (1 ♂, 1 ♀).

## Family Gomphidae

*Gomphus* Leach, 1815

*Gomphus flavipes* (Charpentier, 1825) (2 specimens: 1 ♂, 1 ♀)

Material: Tulcea (Tl) 5.VI.1958 (1 ♂); Babadag (Tl) 16.VIII.1974 (1 ♀).

## Family Cordulegastridae

*Cordulegaster* Leach, 1815

*Cordulegaster heros* Theischinger, 1979 (7 specimens: 6 ♂♂, 1 ♀)

Material: Pd. Bârnova (Is) 19.VI.1974 (1 ♂), 20.VI.1974 (1 ♂), 17.VI.1985 (1 ♂), 1.VII.1985 (1 ♀); Pd. Bârnova, Pr. Nastea (Is) 10.VII.1990 (3 ♂♂).

## Family Corduliidae

*Somatochlora* Selys, 1871

*Somatochlora meridionalis* Nielsen, 1935 (4 specimens: 4 ♂♂)

Material: Gârbești (Is) 10.VIII.1970 (1 ♂), 17.VII.1974 (1 ♂); Pd. Bârnova (Is) 17.VII.1985 (1 ♂); Pd. Bârnova, Pr. Nastea (Is) 9.VII.1990 (1 ♂).

## Family Libellulidae

*Libellula* Linnaeus, 1758

*Libellula quadrimaculata* Linnaeus, 1758 (16 specimens: 1 ♂, 15 ♀♀)

Material: Iași, Cîrc (Is) 24.VI.1970 (2 ♀♀), 25.VI.1970 (1 ♀); Caraorman (Tl) 10.VI.1985 (1 ♂), 11.VI.1985 (1 ♀), 12.VI.1985 (1 ♀); Tulcea (Tl) 11.VI.1981 (9 ♀♀), 8.VI.1985 (1 ♀).

*Libellula depressa* Linnaeus, 1758 (38 specimens: 29 ♂♂, 9 ♀♀)

Material: Iași, Grădina Botanică (Is) 30.VI.1981 (7 ♂♂, 1 ♀), 30.VI.1990 (4 ♂♂, 1 ♀); Osoi (Is) 27.V.1975 (1 ♀), 27.VI.1981 (7 ♂♂, 1 ♀); Mârzești (Is) 3.VI.1974 (1 ♂, 1 ♀); Breazu (Is) 15.V.1971 (2 ♀♀), 1.VI.1974 (2 ♂♂, 1 ♀), 27.V.1975 (1 ♀); Pd. Breazu (Is) 1.VI.1974 (1 ♂); Pd. Bârnova (Is) 19.VII.1985 (1 ♂); Cozia (Is) 25.VI.1981 (6 ♂♂).

*Libellula fulva* Müller, 1764 (27 specimens: 8 ♂♂, 19 ♀♀)

Material: Mârzești (Is) 3.VI.1973 (1 ♂, 3 ♀♀); Pd. Mârzești (Is) 20.V.1973 (1 ♀); Epureni (Vs) 20.V.1973 (7 ♂♂, 15 ♀♀).

#### *Orthetrum* Newman, 1833

*Orthetrum cancellatum* (Linnaeus, 1758) (11 specimens: 2 ♂♂, 9 ♀♀)

Material: Iași (Is) 1.VII.1973 (1 ♂); Iași, Grădina Botanică (Is) 15.VII.1981 (4 ♀♀); Iași, Socola (Is) 20.VII.1976 (1 ♂, 1 ♀); Delta Dunării (Tl) 15.VI.1968 (2 ♀♀), 16.VI.1968 (1 ♀), 17.VI.1968 (1 ♀).

*Orthetrum albistylum* (Selys, 1848) (66 specimens: 30 ♂♂, 36 ♀♀)

Material: Iași (Is) 1.VII.1973 (2 ♂♂, 2 ♀♀); Iași, Grădina Botanică (Is) 15.VII.1981 (7 ♂♂, 11 ♀♀); Iași, Socola (Is) 18.VII.1974 (1 ♂), 20.VII.1976 (2 ♂♂, 4 ♀♀); Osoi (Is) 27.VI.1981 (1 ♀); Podu Iloaiei (Is) 6.VIII.1991 (1 ♂); Cozia (Is) 25.VI.1981 (8 ♂♂, 5 ♀♀); Prisăcani (Is) 30.VIII.1980 (2 ♂♂, 4 ♀♀), 18.VII.1982 (4 ♂♂); Pd. Babadag (Tl) 18.VIII.1977 (3 ♂♂, 4 ♀♀); Delta Dunării (Tl) 15.VI.1968 (2 ♀♀), 16.VI.1968 (1 ♀), 17.VI.1968 (2 ♀♀).

*Orthetrum coerulescens* (Fabricius, 1798) (1 specimen: 1 ♂)

Material: Valea lui David (Is) 17.VII.1975 (1 ♂).

*Orthetrum brunneum* (Fonscolombe, 1837) (23 specimens: 12 ♂♂, 11 ♀♀)

Material: Iași (Is) 28.VII.1973 (1 ♂); Iași, Grădina Botanică (Is) 15.VII.1981 (1 ♂, 1 ♀); Iași, Socola (Is) 25.VIII.1974 (1 ♀), 20.VII.1976 (1 ♀); Osoi (Is) 27.VI.1981 (3 ♂♂); Valea lui David (Is) 17.VII.1974 (1 ♂, 2 ♀♀), 17.VII.1975 (1 ♀), 8.VII.1980 (1 ♀), 19.VII.1987 (1 ♀); Gârbești (Is) 10.VIII.1970 (1 ♀); Breazu (Is) 30.VI.1959 (1 ♂); Bedreag (??) 3.V.1958 (2 ♀♀), 30.V.1958 (3 ♂♂, 1 ♀); Agigea (Ct) 19.VIII.1976 (1 ♂).

#### *Sympetrum* Newman, 1833

*Sympetrum danae* (Sulzer, 1776) (32 specimens: 26 ♂♂, 6 ♀♀)

Material: Iași, Socola (Is) 17.VIII.1974 (2 ♂♂), 25.VIII.1974 (1 ♂, 2 ♀♀), 26.VIII.1974 (15 ♂♂, 1 ♀), 27.VIII.1974 (6 ♂♂), 29.VIII.1974 (1 ♂, 2 ♀♀), 12.IX.1974 (1 ♂); Gârbești (Is) 10.VIII.1970 (1 ♀).

*Sympetrum pedemontanum* (Müller in Allioni, 1766) (21 specimens: 18 ♂♂, 3 ♀♀)  
Material: Iași, Socola (Is) 17.VIII.1974 (2 ♂♂), 25.VIII.1974 (7 ♂♂, 2 ♀♀), 26.VIII.1974 (1 ♀), 29.VIII.1974 (8 ♂♂), 12.IX.1974 (1 ♂).

*Sympetrum sanguineum* (Müller, 1764) (419 specimens: 193 ♂♂, 226 ♀♀)  
Material: Iași (Is) 1.VII.1973 (1 ♀); Iași, Grădina Botanică (Is) 11.VII.1980 (1 ♀), 4.VII.1988 (2 ♀♀); Iași, Ciric (Is) 10.VI.1970 (5 ♂♂), 10.VII.1970 (4 ♂♂), 17.VII.1970 (1 ♂), 10.IX.1970 (1 ♀); Iași, Socola (Is) 17.VII.1974 (1 ♀), 25.VIII.1974 (14 ♂♂, 1 ♀), 26.VIII.1974 (7 ♂♂, 1 ♀), 27.VIII.1974 (5 ♂♂, 3 ♀♀), 29.VIII.1974 (20 ♂♂, 1 ♀), 31.VIII.1974 (9 ♂♂, 2 ♀♀), 12.IX.1974 (3 ♂♂, 5 ♀♀), 30.VIII.1975 (1 ♂), 1.VII.1977 (1 ♂), 9.VIII.1977 (2 ♂♂), 27.VIII.1978 (2 ♂♂), 24.VI.1979 (4 ♂♂, 1 ♀), 16.VIII.1985 (5 ♂♂, 2 ♀♀), 29.VIII.1985 (13 ♂♂, 9 ♀♀); Iași, Pd. Repedea (Is) 16.VII.1980 (2 ♂♂, 3 ♀♀); Gorban (Is) 25.VI.1981 (5 ♂♂, 8 ♀♀), 29.VI.1981 (11 ♂♂, 6 ♀♀), 30.VI.1981 (8 ♂♂, 3 ♀♀); Prisăcani (Is) 30.VIII.1980 (1 ♂); Pașcani (Is) 7.VIII.1958 (1 ♂, 3 ♀♀); Breazu (Is) 25.VIII.1964 (2 ♂♂); Pd. Bârnova (Is) 2.IX.1986 (2 ♂♂); Țibana (Is) 15.VIII.1971 (4 ♂♂, 27 ♀♀); Gârbești (Is) 10.VIII.1970 (21 ♂♂, 53 ♀♀); Tulcea (Tl) 12.VIII.1984 (2 ♂♂, 1 ♀), 28.VII.1987 (12 ♂♂, 39 ♀♀), 29.VII.1987 (4 ♂♂, 11 ♀♀), 2.VIII.1987 (12 ♂♂, 33 ♀♀); Babadag (Tl) 6.VIII.1974 (4 ♂♂); Pd. Babadag (Tl) 21.VIII.1978 (1 ♂), 1.VIII.1987 (1 ♀); Caraorman (Tl) 9.VI.1985 (5 ♂♂, 7 ♀♀).

*Sympetrum depressiusculum* (Selys, 1841) (23 specimens: 19 ♂♂, 4 ♀♀)  
Material: Iași, Socola (Is) 17.VII.1974 (1 ♂), 25.VIII.1974 (2 ♂♂, 2 ♀♀), 26.VIII.1974 (1 ♂), 27.VIII.1974 (3 ♂♂), 16.VIII.1985 (5 ♂♂, 1 ♀), 27.VIII.1985 (4 ♂♂), 29.VIII.1985 (2 ♂♂); Iași, Grădina Botanică (Is) 11.VII.1980 (1 ♂); Tulcea (Tl) 28.VII.1987 (1 ♀).

*Sympetrum flaveolum* (Linnaeus, 1758) (70 specimens: 34 ♂♂, 36 ♀♀)  
Material: Iași, Repedea (Is) 19.VII.1973 (1 ♂); Iași, Ciric (Is) 17.VII.1970 (1 ♀); Iași, Socola (Is) 17.VIII.1974 (2 ♂♂, 1 ♀), 25.VIII.1974 (2 ♂♂, 1 ♀), 26.VIII.1974 (1 ♂, 5 ♀♀), 29.VIII.1974 (3 ♂♂, 2 ♀♀), 12.IX.1974 (2 ♂♂, 2 ♀♀), 30.VIII.1975 (5 ♂♂, 4 ♀♀), 16.VIII.1985 (2 ♀♀), 27.VIII.1985 (7 ♂♂, 1 ♀); Păun (Is) 24.VI.1981 (2 ♂♂, 2 ♀♀); Țibana (Is) 15.VIII.1971 (2 ♀♀); Gârbești (Is) 10.VIII.1970 (2 ♂♂, 6 ♀♀); Prisăcani (Is) 30.VIII.1980 (2 ♀♀); Bicaz (Nt) 7.IX.1974 (1 ♂); Potoci (Nt) 7.VII.1977 (1 ♂, 1 ♀), 8.VIII.1980 (3 ♂♂, 3 ♀♀); Leorda (Bt) 9.IX.1958 (1 ♀); Babadag (Tl) 6.VIII.1974 (2 ♂♂).

*Sympetrum fonscolombii* (Selys, 1840) (4 specimens: 2 ♂♂, 2 ♀♀)  
Material: Iași, Socola (Is) 16.VIII.1985 (1 ♂); Agigea (Ct) 10.VIII.1964 (1 ♂); TO ??? 7.X.1990 (2 ♀♀).

*Sympetrum striolatum* (Charpentier, 1840) (175 specimens: 46 ♂♂, 129 ♀♀)

Material: Iași, Grădina Botanică (Is) 4.VII.1988 (2 ♂♂, 1 ♀); Iași, Repedea (Is) 2.VIII.1981 (1 ♂); Iași, Pd. Repedea (Is) 7.IX.1980 (8 ♂♂, 23 ♀♀); Iași, Ciric (Is) 24.VI.1970 (2 ♂♂), 10.IX.1970 (3 ♂♂, 9 ♀♀); Iași, V. Vămășoaiei (1 ♀); Iași, Socola (Is) 9.IX.1958 (1 ♂), 17.VII.1974 (3 ♀♀), 12.IX.1974 (1 ♂), 24.IX.1974 (2 ♀♀), 30.VIII.1975 (1 ♀), 1.VII.1977 (2 ♂♂), 24.VI.1979 (1 ♂); Prisăcani (Is) 30.VIII.1980 (1 ♂, 1 ♀); Țibana (Is) 15.VIII.1971 (5 ♂♂, 6 ♀♀); Gârbești (Is) 10.VIII.1980 (4 ♂♂); Pașcani (Is) 7.VIII.1958 (2 ♂♂); Breazu (Is) 30.VI.1959 (1 ♂, 1 ♀), 21.IX.1973 (3 ♂♂, 31 ♀♀); Pd. Bârnova (Is) 21.IX.1973 (2 ♀♀); Păun (Is) 9.IX.1973 (1 ♂, 3 ♀♀); Valea lui David (Is) 17.VII.1975 (1 ♀); Călărași (Bt) 12.IX.1973 (5 ♀♀); Tulcea (Tl) 12.VIII.1984 (2 ♂♂, 25 ♀♀), 2.VII.1987 (1 ♂); Babadag (Tl) 6.VIII.1974 (4 ♂♂, 7 ♀♀), 16.VIII.1974 (1 ♂, 7 ♀♀).

*Sympetrum vulgatum* (Linnaeus, 1758) (408 specimens: 191 ♂♂, 217 ♀♀)

Material: Iași, Pd. Repedea (Is) 16.VII.1980 (1 ♀), 7.IX.1980 (2 ♂♂, 2 ♀♀), 26.VIII.1987 (2 ♀♀); Iași, Grădina Botanică (Is) 11.VIII.1980 (1 ♂, 1 ♀); Iași, Socola (Is) 17.VII.1974 (2 ♂♂), 25.VIII.1974 (11 ♂♂, 6 ♀♀), 26.VIII.1974 (14 ♂♂, 11 ♀♀), 27.VIII.1974 (5 ♂♂, 4 ♀♀), 29.VIII.1974 (23 ♂♂, 5 ♀♀), 31.VIII.1974 (7 ♂♂, 8 ♀♀), 12.IX.1974 (1 ♀), 21.IX.1974 (8 ♂♂, 6 ♀♀), 24.IX.1974 (13 ♂♂, 12 ♀♀), 30.VIII.1975 (9 ♂♂, 2 ♀♀), 1.VII.1977 (3 ♂♂, 2 ♀♀), 9.VIII.1977 (2 ♂♂), 16.VIII.1985 (4 ♂♂, 4 ♀♀), 27.VIII.1985 (2 ♂♂, 7 ♀♀), 29.VIII.1985 (16 ♂♂, 9 ♀♀), 2.IX.1985 (14 ♂♂, 10 ♀♀); Iași, Ciric (Is) 24.VI.1970 (6 ♂♂, 16 ♀♀), 25.VI.1970 (10 ♂♂, 28 ♀♀), 10.IX.1970 (1 ♂, 3 ♀♀); Pd. Bârnova (Is) 2.IX.1986 (1 ♀); Bârnova (Is) 2.IX.1973 (2 ♂♂, 1 ♀); Țibana (Is) 15.VIII.1971 (4 ♂♂, 23 ♀♀); Păun (Is) 9.IX.1973 (3 ♀♀); Gârbești (Is) 10.VIII.1970 (8 ♂♂, 15 ♀♀); Sângeorz-Băi (Bn) 23.VII.1958 (1 ♂); Călărași (Bt) 12.IX.1973 (4 ♀♀); Tulcea (Tl) 12.VIII.1984 (1 ♀), 29.VII.1987 (1 ♂), 25.VIII.1987 (1 ♀); Caraorman (Tl) 9.VI.1985 (2 ♂♂); Delta Dunării (Tl) 18.VII.1972 (1 ♂); Ciucurova (Tl) 16.VIII.1973 (1 ♂, 3 ♀♀); Babadag (Tl) 17.VIII.1973 (1 ♂, 2 ♀♀), 6.VIII.1974 (12 ♂♂, 10 ♀♀), 16.VIII.1974 (5 ♂♂, 12 ♀♀); Pd. Babadag (Tl) 21.VIII.1978 (1 ♀).

*Sympetrum meridionale* (Selys, 1841) (218 specimens: 91 ♂♂, 127 ♀♀)

Material: Iași, Socola (Is) 12.IX.1974 (1 ♀), 1.VII.1977 (1 ♂, 1 ♀), 9.VIII.1977 (3 ♂♂), 25.VIII.1979 (3 ♂♂, 1 ♀), 16.VIII.1985 (1 ♀), 27.VIII.1985 (1 ♂), 29.VIII.1985 (1 ♂, 2 ♀♀); Iași, Pd. Repedea (Is) 16.VII.1980 (1 ♂, 2 ♀♀); Țibana (Is) 15.VIII.1971 (3 ♀♀); Prisăcani (Is) 30.VIII.1980 (1 ♂); Tulcea (Tl) 21.VIII.1977 (11 ♂♂, 2 ♀♀), 12.VIII.1984 (9 ♂♂, 16 ♀♀), 2.VII.1987 (1 ♂, 1 ♀), 28.VII.1987 (6 ♂♂, 14 ♀♀), 29.VII.1987 (3 ♂♂, 1 ♀), 2.VIII.1987 (2 ♂♂, 3 ♀♀); Ciucurova (Tl) 16.VIII.1973 (1 ♀); Delta Dunării (Tl) 18.VII.1972 (17 ♂♂, 14 ♀♀); Pd. Babadag (Tl) 21.VIII.1978 (5 ♀♀), 1.VIII.1987 (13 ♂♂, 23 ♀♀), Babadag (Tl) 6.VIII.1974 (3 ♂♂, 5 ♀♀), 16.VIII.1974 (2 ♂♂, 12 ♀♀); Urluia (Ct) 8.VII.1973 (1 ♀); Năvodari (Ct) 8.IX.1987 (2 ♂♂, 3 ♀♀), 10.IX.1987 (9 ♂♂, 21 ♀♀), 27.VIII.1989 (2 ♂♂, 3 ♀♀).

*Crocothemis* Brauer, 1868*Crocothemis erythraea* (Brullé, 1832) (110 specimens: 49 ♂♂, 61 ♀♀)

Material: Iași, Socola (Is) 17.VII.1974 (1 ♂); Delta Dunării (TI) 15.VI.1968 (12 ♂♂, 21 ♀♀), 16.VI.1968 (25 ♂♂, 17 ♀♀), 17.VI.1968 (10 ♂♂, 23 ♀♀), 18.VI.1968 (1 ♂).

## DISCUSSIONS

The best represented family is Libellulidae, with 1662 specimens - meaning 53% from the collection. Two species of this family, *Sympetrum sanguineum* (419 specimens) and *Sympetrum vulgatum* (408 specimens), represent more than 25% from the total number of the collection specimens. At the opposite, Gomphidae family is represented only by 2 specimens from 1 species, this being only 0.06% from the total.

*Important species*

The presence of *Lestes viridis* (Vander Linden, 1825) in Dobrogea and in the Danube Delta is interesting. Further field work is needed to see if *Lestes parvidens* Artobolevskii, 1929 occurs in the area and if these two species interbreed in this region. The distribution of these two species in Romania is not clear and material from a larger part of the country is needed to study their occurrence (Olias, 2005).

The presence of *Coenagrion ornatum* (Selys, 1850) near Iași is important, because this is a protected species under Natura 2000 directive. Another protected Natura 2000 species is *Gomphus flavipes* (Charpentier, 1825), from Dobrogea.

*Coenagrion scitulum* (Rambur, 1842), a rare species in Romania, is found for the first time in the northern part of Moldova. Previously it was found only in the southern part of Moldova, near Galați (Patriche & Mancu, 2008).

One of the biggest surprises revealed when studying this collection was the finding of several specimens of *Cordulegaster heros* Theischinger, 1979. Seven specimens were collected between 1974 and 1990, about 20 km south of Iași. With these new data, the distribution of this species in Romania is extended with about 400 km to the north-east. Previously, it was known only from Banat and the south-west of Transylvania (Beutler, 1988; Kipping, 1998; Boudot, 2001; Mancu, unpublished data). This is also the easternmost known locality for this species.

*Somatochlora meridionalis* Nielsen, 1935 – This record strongly expands the known range of this species in Romania (Mancu, unpublished data). This is the first finding of the species in Moldova.

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## COLECȚIA DE LIBELULE (INSECTA: ODONATA) DIN MUZEUL DE ISTORIE NATURALĂ DIN IAȘI (ROMÂNIA)

### REZUMAT

Colecția de libelule depozitată în Muzeul de Istorie Naturală din Iași a fost inventariată și studiată. Rezultatul inventarului este de 3162 specimene de libelule adulte aparținând la 45 de specii, aceasta fiind cea mai mare colecție din țară. Acest material a fost colectat cu precădere de către Constantin Visarion Mândru (între 1954 și 1990) din 51 de puncte de pe teritoriul României. Colectarea fiind făcută în special în Moldova și Dobrogea, doar puține exemplare (7 specimene) au fost colectate din Transilvania și Crișana. Speciile *Coenagrion ornatum*, *Cordulegaster heros* și *Gomphus flavipes* sunt specii importante din perspectiva Natura 2000 iar prin această lucrare sunt cunoscute noi date de distribuție. Pentru specia *Cordulegaster heros* arealul cunoscut se extinde cu peste 400 de km spre nord-vest. Speciile *Coenagrion scitulum*, *Somatochlora meridionalis* și *Sympetrum danae* sunt menționate rar din România.

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## CHEWING LICE (PHTHIRAPTERA: AMBLYCERA, ISCHNOCERA) FROM SOME WILD BIRDS IN THE KIZILIRMAK DELTA (TURKEY)

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**Abstract.** We present the results of the studies on the chewing lice collected during the period 2009-2010 from 32 wild birds belonging to 11 species, in the Kızılırmak Delta of Turkey. From the 13 chewing louse species identified in the studied material, six of them are new records for the parasitological fauna of Turkey, namely: *Ricinus fringillae* De Geer, 1778 ex *Fringilla coelebs*; *Cuculicola latirostris* (Burmeister, 1838) ex *Cuculus canorus*; *Brueelia domestica* (Kellogg & Chapman, 1899) ex *Hirundo rustica*; *Brueelia merulensis* (Denny, 1842) ex *Turdus merula*; *Brueelia turdinulae* Ansari, 1956 ex *Turdus philomelos*; and *Penenirmus affectator* (Złotorzycka, 1976) ex *Sylvia borin*. Also, the following two new chewing louse – bird species associations are reported for the first time all over the world: *Quadriceps anagrapsus* (Nitzsch [in Giebel], 1866) ex *Sterna albifrons*; and *Penenirmus* sp. ex *Sylvia melanocephala*. The presence of a chewing louse species is reported on *S. melanocephala* for the first time in the world. And not the least, it is reported, for the first time, the presence of three chewing louse species – bird species associations in the Turkish parasitological fauna: *Menacanthus curuccae* (Schränk, 1776) ex *Acrocephalus scirpaceus* and *Sylvia borin*; and *Menacanthus eurysternus* (Burmeister, 1838) ex *Turdus merula*.

**Résumé.** On présente les résultats de l'étude contre les mallophages collectées au cours de la période 2009-2010 sur 32 oiseaux sauvages appartenir à 11 espèces, dans le delta Kızılırmak de la Turquie. Entre les 13 espèces de mallophages identifiées dans le matériel analysé, six sont des nouveaux, signalés pour la faune parasitologique de la Turquie, à savoir: *Ricinus fringillae* De Geer, 1778 sur *Fringilla coelebs*; *Cuculicola latirostris* (Burmeister, 1838) sur *Cuculus canorus*; *Brueelia domestica* (Kellogg & Chapman, 1899) sur *Hirundo rustica*; *Brueelia merulensis* (Denny, 1842) sur *Turdus merula*; *Brueelia turdinulae* Ansari, 1956 sur *Turdus philomelos*; et *Penenirmus affectator* (Złotorzycka, 1976) sur *Sylvia borin*. Aussi sont signalées pour la première fois dans le monde les suivants deux nouvelles associations espèces mallophage - espèces oiseaux: *Quadriceps anagrapsus* (Nitzsch [in Giebel], 1866) sur *Sterna albifrons*; et *Penenirmus* sp. sur *Sylvia melanocephala*. On a signalée pour la première fois dans le monde la présence d'une espèce de mallophage sur *S. melanocephala*. Et non des moindres, on a signalée pour la première fois dans la faune parasitologique de la Turquie, l'existence de trois associations espèces mallophages - espèces oiseaux: *Menacanthus curuccae* (Schränk, 1776) sur *Acrocephalus scirpaceus* et *Sylvia borin*; et *Menacanthus eurysternus* (Burmeister, 1838) sur *Turdus merula*.

**Key words:** Phthiraptera, chewing lice, wild birds, the Kızılırmak Delta, the Black Sea, Turkey.

## INTRODUCTION

Chewing lice are relatively benign parasites. When present in large numbers, they can cause severe irritation and reduced host survival and reproductive success (Clayton et al., 2008). Therefore, the knowledge of this group of ectoparasites has also an important practical applicative importance besides the theoretical one. In spite of this, up to now, the chewing lice were relatively less studied in Turkey. An analyse of the knowledge of the chewing louse fauna on the birds of Turkey was recently published by İnci et al. (2010). Taking into account the data given by this paper of synthesis (İnci et al., op. cit.), and also by the subsequent ones (Dik et al., 2011; Dik, Şekercioğlu & Kirpik, 2011; Dik, Yamaç & Uslu, 2011), we can assert that, for the time being, in Turkey only 95 chewing louse species belonging to 44 genera (46 species belonging to 17 amblyceran genera, and the other 49 species belonging to 27 ischnoceran genera) were reported from birds. In this estimation, we haven't included those reports based on an identification till the genus level.

Taking into consideration that the Turkish avifauna is estimated at 491 birds species at present, according to the data given by Lepage (2011) (including the wild species occurred accidentally, from wildlife), as well as the parasite chewing louse species from them, then the parasite chewing louse fauna from birds of Turkey could be estimated to over 900 species. Analysing these data, it can be established that, at present, in the Turkish territory, less than 10% of the total number of chewing louse species possibly present in the fauna of this country were reported, thus the necessity of continuing and deepening the studies in this direction distinguishing. Starting from this necessity, we proposed to study the chewing louse fauna from the occurred birds in one of the most important areas from the avifaunal point of view of Turkey that is the delta of the Kızılırmak River. Within this area, such kind of studies was not made till now.

The Kızılırmak Delta is one of the largest deltas on the Turkish territory, formed at the mouth of the Kızılırmak River (the longest river of Turkey) at the Black Sea, in the central-northern part (coordinates of the river mouth: 41°44' N, 35°57' E) (Fig. 1). This delta lays to the north of Bafra locality (Fig. 2), by both sides of the river, on a surface of over 56000 ha, including a very large range of habitat types (lakes; reed areas; freshwater marshes and swamps; watery meadows; pastures; forests; dunes; coastal lakes; lagoons; and agricultural areas). At present, in this area, the presence of 331 bird species was reported, out of which 124 are passerine species (Bariş et al., 2010).

By the results of our studies, included in this paper, which are, as a matter of fact, preliminary, and by their reporting to those already published in the specialized literature, we succeeded in completing both the world list of the bird species-chewing louse species associations (host-parasite) and the faunal list of the parasite chewing lice from the wild birds of Turkey.

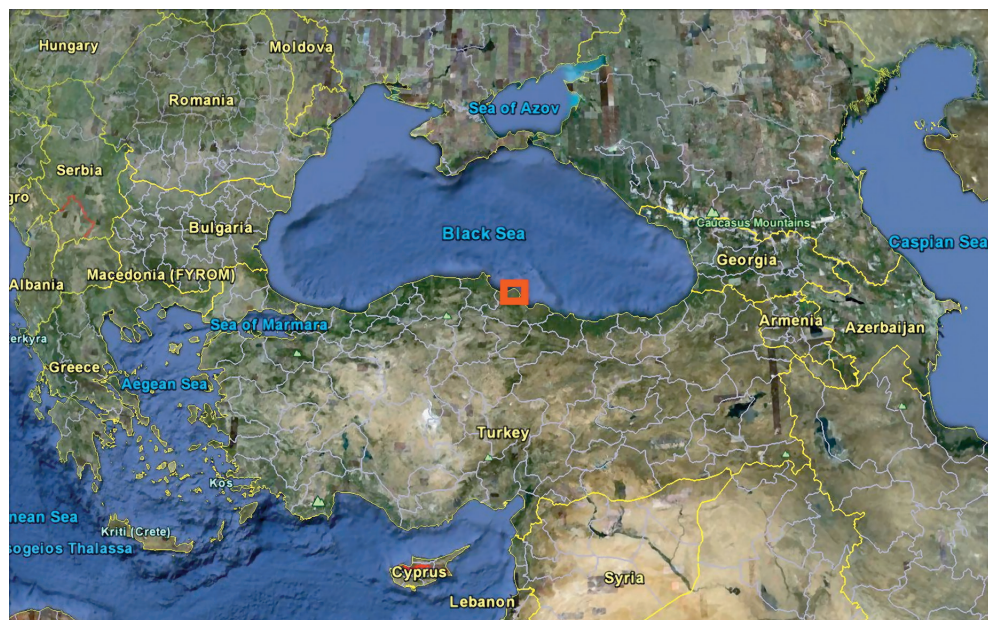


Fig. 1 - Geographical position of the Kızılırmak Delta (adapted from Google Earth).



Fig. 2 - Geographical position of collecting place in the Kızılırmak Delta (adapted from Google Earth).

### MATERIAL AND METHOD

Studied material was collected within the period 2009–2010. Studied birds were captured in an area between Cernek Lake and the Black Sea coast, close to Cernek Birdring & Birdwatch Station, GPS coordinates of the collecting place being 41°38.843' N, 36°04.841' E (Fig. 2). Birds were captured with mist nets, and the ectoparasitological material collected from them was labelled and preserved in 70% alcohol.

Totally, a number of 189 birds, which belong to 37 species of 18 families and 6 orders, were examined. From all these examined birds, we found chewing lice only on 32 individuals (belonging to 11 species of 8 families and 3 orders). On the other 157 birds (belonging to 34 species of 16 families and 5 orders) (Tab. 1) we did not find chewing lice. Total prevalence of the chewing louse infestation in the studied birds was of 16.9 (n=189). In the case of Podicipediformes, Strigiformes and Coraciiformes orders, the prevalence of the chewing louse infestation was zero. From the other bird orders, the lowest value of the prevalence (P) occurred in Passeriformes (P=16.1; n=180), and the highest value, in Cuculiformes (P=100; n=1) and Charadriiformes (P=66.6; n=3) (Tab. 1). From passeriforms, the most numerous not infested birds were those of the family Sylviidae, and the most numerous infested birds belonged to family Laniidae.

The captured birds were identified using the field guides by Porter et al. (1996) and Porter & Aspinall (2010), and the taxonomy of the birds followed Clements (2007).

For the chewing lice identification, a part of the collected material was mounted in Canada balsam, following the technique of Palma (1978). The rest of the material is preserved in 70% alcohol.

Identifications of the chewing lice based on Marshall (2002), Nelson (1972), Palma et al. (1998), Price (1977), Rheinwald (1968; 2007) and Złotorzycka (1976). The scientific names of the chewing lice used in this paper are according to the chewing louse list published by Price et al. (2003).

### RESULTS

From all collected material, 88 chewing louse specimens were identified. Later, these chewing louse specimens were identified as belonging to eight genera and 13 species (Tab. 1). From the 88 collected specimens, 54 are females (61.36%), 17 males (19.32%) and 17 nymphs (19.32%).

From the chewing lice collected by us, 51 specimens (32 females, 10 males and 9 nymphs) (57.95%) belong to the suborder Amblycera, the best represented being genus *Menacanthus* (38 specimens: 21 females, 8 males and 9 nymphs), and the rest of 37 specimens (22 females, 7 males and 8 nymphs) (42.05%) belong to the suborder Ischnocera, within it the best represented being genus *Brueelia* (23 specimens: 12 females, 5 males and 6 nymphs).



Table 1

List of examined wild bird hosts and chewing louse species from the Kizilirmak Delta.

Examined host birds				Chewing lice			
Order/Family/Species	NEB <sup>1</sup>	NIB <sup>2</sup>	Prev. <sup>3</sup> (%)	Species	♂	♀	Total
Order Podicipediformes							
1. Family Podicipedidae							
<i>Tachybaptus ruficollis</i> (Pallas, 1764)	1	0	0	-	-	-	-
Order Charadriiformes							
2. Family Scolopaciidae							
<i>Calidris alpina</i> (Linnaeus, 1758)	1	1	100	<i>Linnaeops actophilus</i> (Kellogg & Chapman, 1899)	-	1	1
<i>Tringa totanus</i> (Linnaeus, 1758)	1	0	0	-	-	-	-
3. Family Laridae							
<i>Sterna albifrons</i> Pallas, 1764	1	1	100	<i>Quadraceps anagrapsus</i> (Nitzsch [in Giebel], 1866)	1	3	5
Order Cuculiformes							
4. Family Cuculidae							
<i>Cuculus canorus</i> Linnaeus, 1758	1	1	100	<i>Cuculicola latirostris</i> (Burmeister, 1838)	-	2	3
Order Strigiformes							
5. Family Strigidae							
<i>Athene noctua</i> (Scopoli, 1769)	1	0	0	-	-	-	-
Order Coraciiformes							
6. Family Alcedinidae							
<i>Alcedo atthis</i> (Linnaeus, 1758)	3	0	0	-	-	-	-
Order Passeriformes							
7. Family Hirundinidae							
<i>Hirundo rustica</i> Linnaeus, 1758	7	3	28.5	<i>Myrsidea rustica</i> (Giebel, 1874)	-	2	2
			42.8	<i>Brueelia domestica</i> (Kellogg & Chapman, 1899)	1	3	6
8. Family Motacillidae							
<i>Motacilla alba</i> Linnaeus, 1758	2	0	0	-	-	-	-
<i>Motacilla flava</i> Linnaeus, 1758	1	0	0	-	-	-	-
9. Family Prunellidae							
<i>Prunella modularis</i> (Linnaeus, 1758)	1	0	0	-	-	-	-
10. Family Turdidae							
<i>Luscinia luscinia</i> (Linnaeus, 1758)	4	0	0	-	-	-	-
<i>Phoenicurus phoenicurus</i> (Linnaeus, 1758)	8	0	0	-	-	-	-
<i>Turdus merula</i> Linnaeus, 1758	11	6	54.5	<i>Menacanthus eurysternus</i> (Burmeister, 1838)	2	5	10
			45.4	<i>Brueelia merulensis</i> (Denny, 1842)	4	8	16
<i>Turdus philomelos</i> Brehm, C. L., 1831	3	1	33.3	<i>Brueelia turdinulae</i> Ansari, 1956	-	1	1

Table 1 (continued)

Examined host birds			Chewing lice		
Order/Family/Species	NEB <sup>1</sup>	NIB <sup>2</sup>	Prev. <sup>3</sup> (%)	Species	♂ ♀ N <sup>4</sup> Total
11. Family Muscicapidae					
<i>Eriothacus rubecula</i> (Linnaeus, 1758)	23	0	0	-	- - - -
<i>Ficedula albicollis</i> (Temminck, 1815)	3	0	0	-	- - - -
<i>Ficedula hypoleuca</i> (Pallas, 1764)	3	0	0	-	- - - -
<i>Ficedula parva</i> (Bechstein, 1792)	3	0	0	-	- - - -
12. Family Regulidae					
<i>Regulus regulus</i> (Linnaeus, 1758)	1	0	0	-	- - - -
13. Family Sylviidae					
<i>Acrocephalus scirpaceus</i> (Hermann, 1804)	5	1	20	<i>Menacanthus currucae</i> (Schrank, 1776)	- 1 - - 1
<i>Cettia cetti</i> (Temminck, 1820)	14	0	0	-	- - - -
<i>Locustella luscinioides</i> (Savi, 1824)	2	0	0	-	- - - -
<i>Phylloscopus collybita</i> (Vieillot, 1817)	6	0	0	-	- - - -
<i>Phylloscopus trochilus</i> (Linnaeus, 1758)	9	0	0	-	- - - -
<i>Sylvia atricapilla</i> (Linnaeus, 1758)	29	0	0	-	- - - -
<i>Sylvia borin</i> (Boddaert, 1783)	8	2	12.5	<i>Menacanthus currucae</i> (Schrank, 1776)	- 2 - - 2
			25	<i>Penenirmus affectator</i> (Zlotorzyska, 1976)	1 2 - - 3
<i>Sylvia communis</i> Latham, 1787	3	0	0	-	- - - -
<i>Sylvia curruca</i> (Linnaeus, 1758)	2	0	0	-	- - - -
<i>Sylvia melanocephala</i> (Gmelin, J. F., 1789)	6	1	16.6	<i>Penenirmus</i> sp.	- 2 - - 2
<i>Sylvia nisoria</i> (Bechstein, 1792)	1	0	0	-	- - - -
14. Family Aegithalidae					
<i>Aegithalos caudatus</i> (Linnaeus, 1758)	1	0	0	-	- - - -
15. Family Laniidae					
<i>Lanius collurio</i> Linnaeus, 1758	13	12	92.3	<i>Menacanthus camelinus</i> (Nitzsch [in Giebel], 1874)	6 13 6 25
16. Family Sturnidae					
<i>Sturnus vulgaris</i> Linnaeus, 1758	1	0	0	-	- - - -
17. Family Passeridae					
<i>Passer domesticus</i> (Linnaeus, 1758)	3	0	0	-	- - - -
<i>Passer hispaniolensis</i> (Temminck, 1820)	3	0	0	-	- - - -
18. Family Fringillidae					
<i>Fringilla coelebs</i> Linnaeus, 1758	4	3	75	<i>Ricinus fringillae</i> De Geer, 1778	2 9 - - 11
TOTAL	189	32	16.9		17 54 17 88

<sup>1</sup>NEB = number of examined birds; <sup>2</sup>NIB = number of infested birds; <sup>3</sup>Prev. = prevalence; <sup>4</sup>N = nymphs.

Taking into account the number of species, from the 13 chewing louse species identified by us, 5 (of the three genera and two families) belong to the suborder Amblycera, and 8 (of five genera and a family) belong to the suborder Ischnocera. Also, from the number of species point of view, *Menacanthus* was the best represented genus of the suborder Amblycera, in our material, with three species, and from the suborder Ischnocera, *Brueelia* was the best represented genus, also with three species. Therefore, it can be observed that, in our material, amblycerans are prevalent in the specimen number, and ischnocerans, in the species one.

Table 1 includes the systematic list of the host species and chewing louse species, collected and identified. Also in this table, the total number of controlled individuals are mentioned for each bird species, the number of individuals infested with chewing lice and their prevalence, and for the species of collected chewing lice, the number of collected specimens are mentioned (males, females and nymphs).

### DISCUSSIONS

Analysing the data from the specialized literature regarding the chewing louse fauna of Turkey (İnci et al., 2010; Dik et al., 2011; Dik, Şekercioğlu & Kirpik, 2011; Dik, Yamaç & Uslu, 2011), published up to now and we were aware, we can assert that from all studied species the next six species, collected from the wild birds, are reported for the first time in the ectoparasitological fauna of this country: *Ricinus fringillae* De Geer, 1778 ex *Fringilla coelebs* (Fig. 3 B, C); *Cuculicola latirostris* (Burmeister, 1838) ex *Cuculus canorus* (Fig. 3 D); *Brueelia domestica* (Kellogg & Chapman, 1899) ex *Hirundo rustica* (Figs 4 D; 5 A); *Brueelia merulensis* (Denny, 1842) ex *Turdus merula* (Fig. 5 B, C); *Brueelia turdinulae* Ansari, 1956 ex *Turdus philomelos* (Fig. 5 D); and *Penenirmus affectator* (Złotorzycka, 1976) ex *Sylvia borin* (Fig. 6 A).

For the first time throughout the world, we report two new parasite species-host species associations (unmentioned in the world catalogue published by Price et al. in 2003), which can be considered normal, because it is not about deserting cases, considering that the new hosts which we found are closely related to the hosts they were reported before. It is about the following chewing louse species – bird species associations, namely: *Quadriceps anagrapsus* (Nitzsch [in Giebel], 1866) ex *Sterna albifrons* (Fig. 4 A, B, C); and *Penenirmus* sp. ex *Sylvia melanocephala* (Fig. 6 B).

We report, for the first time in the world, the presence of the chewing louse genus *Penenirmus* on the bird species *Sylvia melanocephala*, this chewing louse genus being reported on other species of *Sylvia* up to now. As a matter of fact, we report for the first time in the world the presence of a chewing louse species on the bird species *S. melanocephala*. *Penenirmus* sp. distinguishes from the other species of *Penenirmus* from the birds of the genus *Sylvia* especially by some features as: chaetotaxy and morphology of the preantennal part of the head; abdominal tergal, sternal and pleural chaetotaxy; thoracic sternal chaetotaxy; number of the vulval posterior marginal setae.

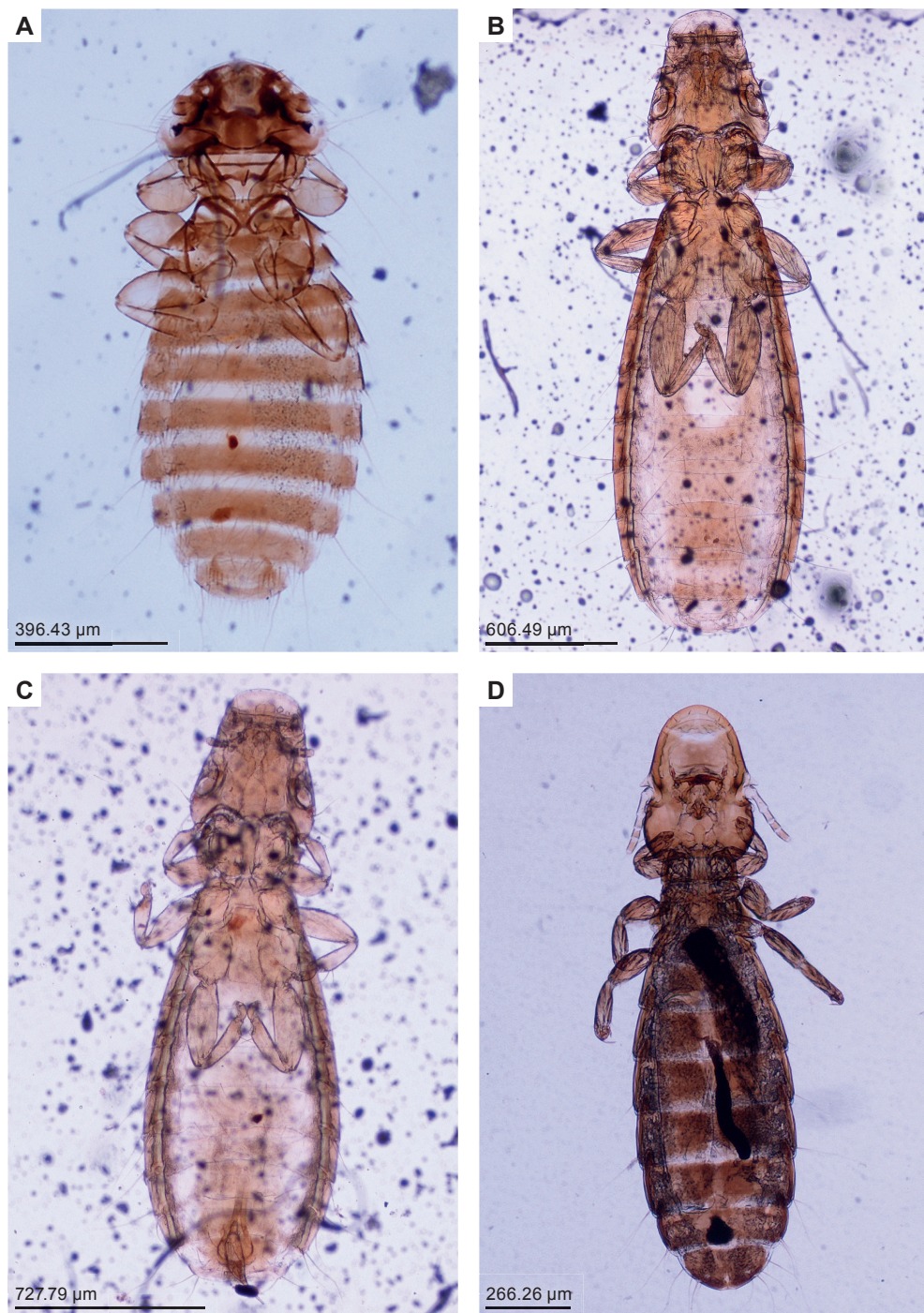


Fig. 3 - *Menacanthus curuccae* (from *Sylvia borin*): A, female; *Ricinus fringillae* (from *Fringilla coelebs*): B, female; C, male; *Cuculicola latirostris* (from *Cuculus canorus*): D, female.



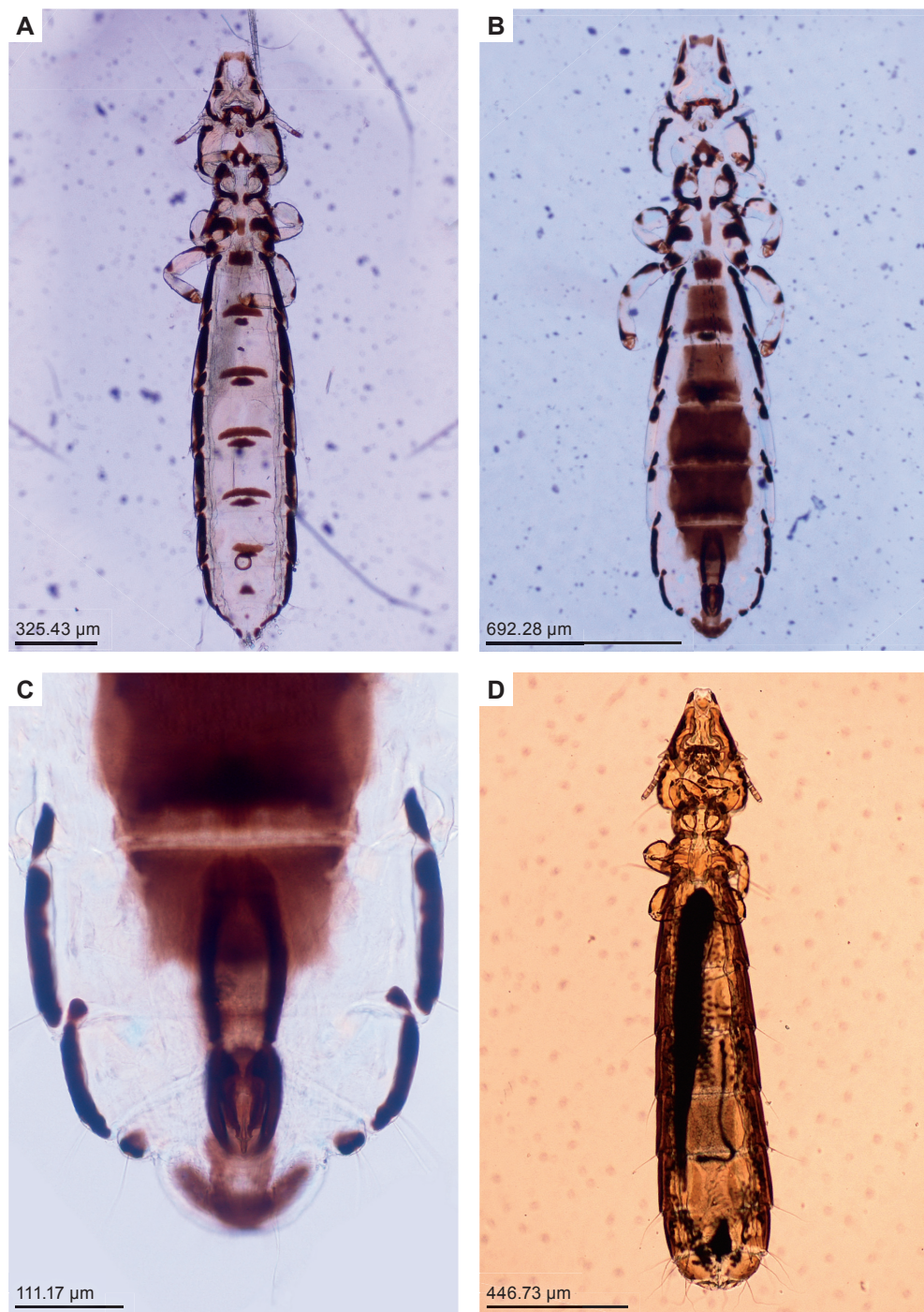


Fig. 4 - *Quadriceps anagrapsus* (from *Sterna albifrons*): A, female; B, male; C, male genitalia; *Brueelia domestica* (from *Hirundo rustica*): D, female.

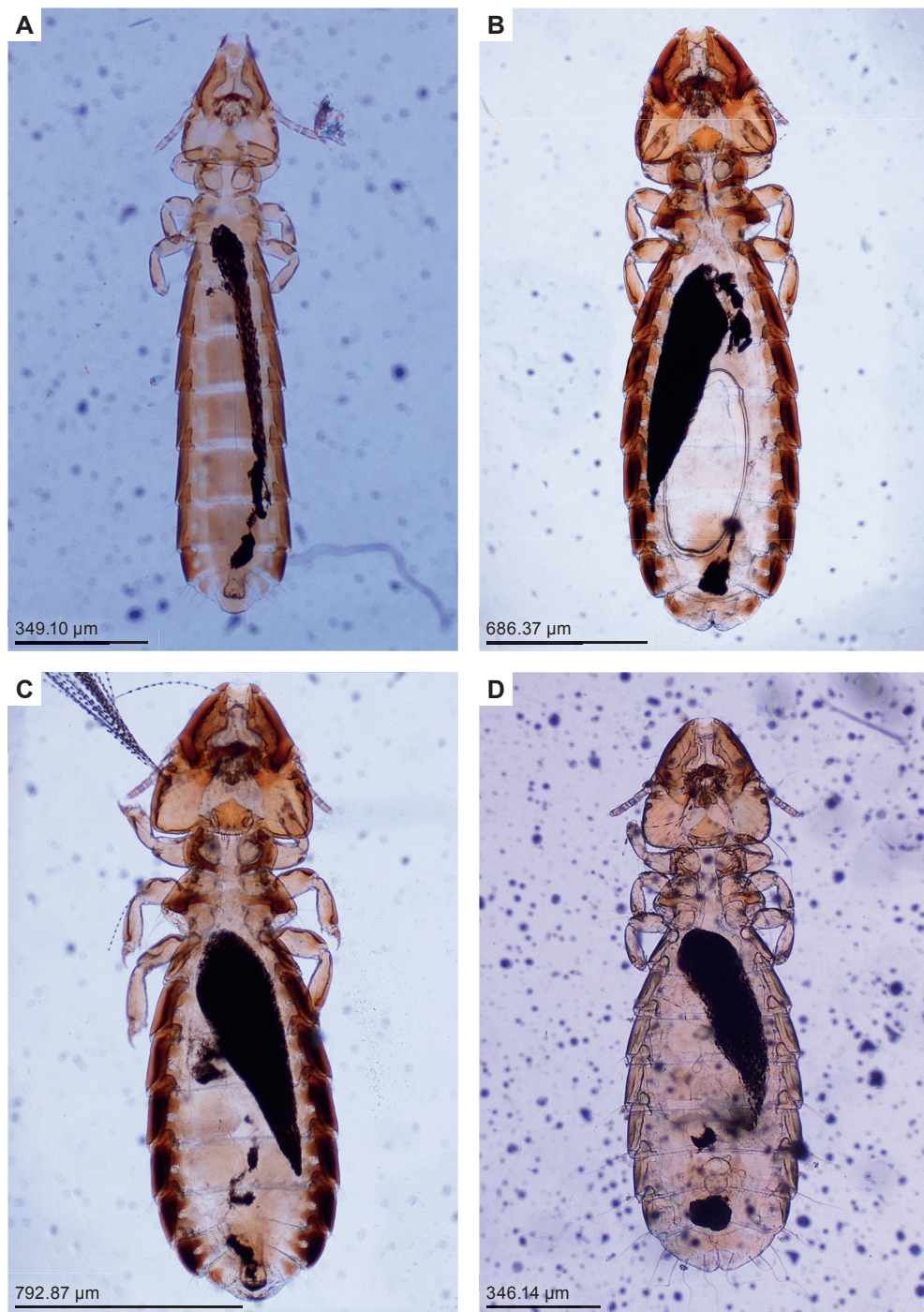


Fig. 5 - *Brueelia domestica* (from *Hirundo rustica*): A, male; *Brueelia merulensis* (from *Turdus merula*): B, female; C, male; *Brueelia turdinulae* (from *Turdus philomelos*): D, female.



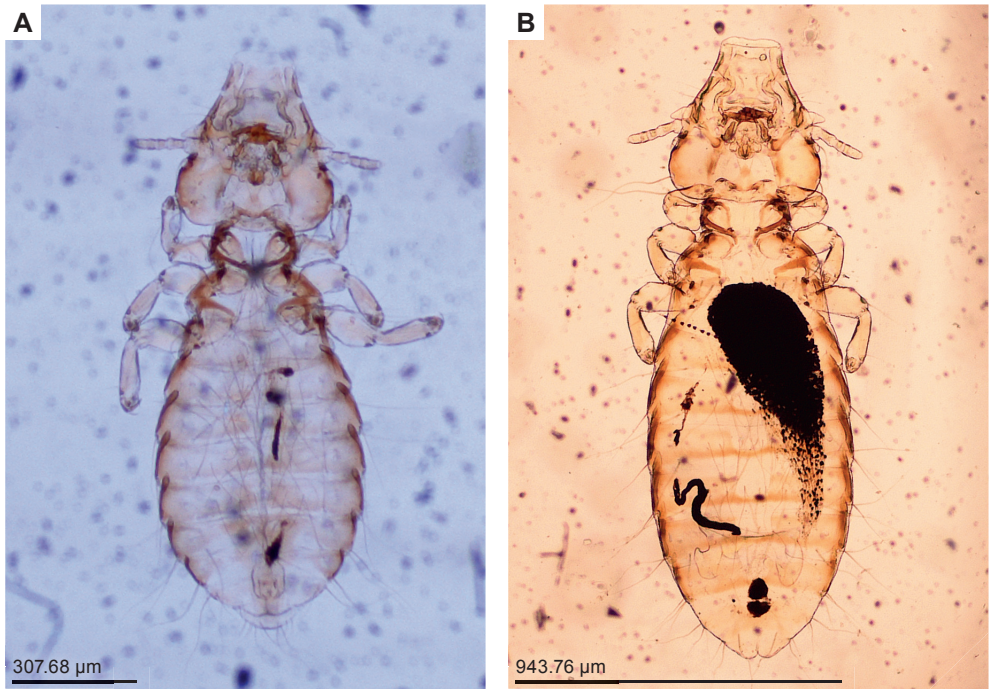


Fig. 6 - *Penenirmus affectator* (from *Sylvia borin*): A, male; *Penenirmus* sp. (from *Sylvia melanocephala*): B, female.

*Q. anagrapsus* was reported only on *Chlidonias hybridus* and *Ch. leucopterus* (Price et al., 2003) till now, species of the same family with *Sterna albifrons*, on which we report it now. Normally, *S. albifrons* is parasitized by the species *Quadriceps nyctemerus* (Burmeister, 1838). The two species differs one another by the following features: body length (longer in *Q. anagrapsus* than in *Q. nyctemerus*); form of the abdominal tergal and sternal plates of the females (Fig. 4 A); form of the abdominal pleural plates V and VI in males (in *Q. anagrapsus* only the anterior part is chitinized, so distinguishing from the rest of the abdominal pleural plates) (Fig. 4 B); and by the conformation of male genitalia (Fig. 4 C).

And not the least, we report for the first time in the parasitological fauna of Turkey, the presence of the following three host-parasite associations: *Menacanthus curuccae* (Schrank, 1776) ex *Acrocephalus scirpaceus* and *Sylvia borin* (Fig. 3 A); and *Menacanthus eurysternus* (Burmeister, 1838) ex *Turdus merula*.

The results of the present survey add data to the limited epidemiological information regarding chewing louse faunal composition in wild birds from the Black Sea region of Turkey.

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# MALOFAGE (PHTHIRAPTERA: AMBLYCERA, ISCHNOCERA) DE PE UNELE PĂSĂRI SĂLBATICE DIN DELTA KIZILIRMAK (TURCIA)

## REZUMAT

Sunt prezentate rezultatele cercetării asupra malofagelor colectate în perioada 2009-2010 de pe 32 de păsări aparținând la 11 specii, în Delta Kızılırmak din Turcia. Dintre cele 13 specii de malofage identificate în materialul cercetat, șase reprezintă semnalări noi pentru fauna parazitologică a Turciei, și anume: *Ricinus fringillae* De Geer, 1778 de pe *Fringilla coelebs*; *Cuculicola latirostris* (Burmeister, 1838) de pe *Cuculus canorus*; *Brueelia domestica* (Kellogg & Chapman, 1899) de pe *Hirundo rustica*; *Brueelia merulensis* (Denny, 1842) de pe *Turdus merula*; *Brueelia turdinulae* Ansari, 1956 de pe *Turdus philomelos*; și *Penenirmus affectator* (Złotorzycka, 1976) de pe *Sylvia borin*. De asemenea, sunt semnalate pentru prima dată în lume următoarele două asocieri noi specie malofag – specie pasăre: *Quadriceps anagrapsus* (Nitzsch [in Giebel], 1866) de pe *Sterna albifrons*; și *Penenirmus* sp. de pe *Sylvia melanocephala*. Pe *S. melanocephala* se semnalează pentru prima dată în lume prezența unei specii de malofag. Și nu în ultimul rând, este semnalată pentru prima dată existența în fauna parazitologică a Turciei a trei asocieri specie malofag – specie pasăre: *Menacanthus currucae* (Schränk, 1776) de pe *Acrocephalus scirpaceus* și *Sylvia borin*; și *Menacanthus eurysternus* (Burmeister, 1838) de pe *Turdus merula*.

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## CONTRIBUTIONS TO THE KNOWLEDGE ON STAPHYLINIDS (COLEOPTERA: STAPHYLINIDAE) IN SOME RIPARIAN ECOSYSTEMS OF SOUTH-EASTERN ROMANIA

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**Abstract.** The diversity of the staphylinid fauna is investigated in some riparian ecosystems along rivers of south-east Romania: the Danube, Prut, Siret, Buzău. 94 staphylinid species and subspecies were identified from 23 investigated sites. *Thecturota marchii* (Dodero) is a new record for the Romanian fauna. *Leptobium dimidiatum* (Grideli), a rare species, is recorded from a new site, the second record from Romania.

**Résumé.** On présente la diversité de la faune de staphylinides dans quelques écosystèmes ripariens qui se trouvent le long des rivières du sud-est de la Roumanie: Danube, Prut, Siret, Buzău. 94 espèces et sous-espèces de staphylinides y ont été trouvées, en 23 sites. *Thecturota marchii* (Dodero) est signalée pour la première fois en Roumanie. *Leptobium dimidiatum* (Grideli), une espèce rare, est signalée dans un nouveau site, le deuxième sur le territoire roumain. Pour chaque espèce on présente le site où elle a été trouvée, la date, la nombre d'exemplaires (pour la plupart le sexe), legit. Sur la base des observations faites sur le terrain on offre une brève référence sur la caractéristique écologique des espèces.

**Key words:** Staphylinidae, riparian ecosystems, faunistics.

### INTRODUCTION

The hydrobiologic regime represents the most important control element for the existence, characteristics and maintaining of the wetland types and of their characteristic processes. Riparian areas are very important for the delimitation of the ecosystems, but especially in the specific functions which they have within the ecosystem complexes: flooding control, protection against erosion, supplying/discharging of the underground waters, nutrient retention, biomass export, protection against storms, water transportation, stabilization of the microclimate.

Flooding areas which are in a natural regime of flooding are characterized by high biodiversity. Staphylinids live in such kind of habitats - most of the species are hygrophilous, some of them are stenotopic and biological indicators.

Some riparian ecosystems studied in order to find out the diversity of the staphylinids are protected areas, designated at local or national level: The Small Wetland of Brăila Natural Park, the Low Floodplain of the Lower Prut Natural Park. To them, there are superposed Sites of Community Importance (SCI), established according to the presence of some plant and animal species, as well as of certain types of habitats listed in the annex of the Habitats Directive 92/43/EEC+AA2003/ACT:

the Small Wetland of Brăila (ROSCI0006), Low Floodplain of Prut (ROSCI0105). Lower Siret Floodplain, another investigated area, is an Area of Avifaunal Special Protection (SPA). SPA are established based on some bird species listed in the Bird Directive 78/409/EEC+AA2003/ACT of the European Union.

#### MATERIAL AND METHODS

The material was sampled in some riparian ecosystems along some rivers of south-east Romania, during different periods: 1994-1995 (Small Wetland of Brăila Natural Park), 2002-2007, 2010 (Buzău valley), 2004 and 2008 (Danube isles), 2009 (Siret floodplain) and 2010 (Low Floodplain of the Lower Prut Natural Park).

A brief description of the sampling places is presented below:

The Small Wetland of Brăila Natural Park – a wetland of international importance, is situated in the Danube floodplain, upstream of the Danube Delta Biosphere Reservation, and includes terrestrial and aquatic ecosystems whose configuration depends on the current annual dynamics of the Danube flow, particularly on the amplitude and the duration of the seasonal high floods. Terrestrial ecosystems cover over 60% of the surface and are represented by forests, meadows and bushes. Autochthonous elements of the forest resources are represented by the willow and poplar forests, both of which are, unfortunately, in decline. There are natural mixed forests which form the link between the compact willow forests which surround the pools and the depression areas. In the areas where the willow forests were cut there are plantations with American and Italian poplar. Aquatic ecosystems are represented by permanent pools, temporary pools (which gradually evolve into aquatic ecosystems of the marshy type or marshy area and finally dry up), marshes, marshy areas, permanent and temporary channels.

Lower Prut Natural Park – a prolongation of the Danube Delta Biosphere Reserve is a wetland area of avifaunal interest both for Romania as well as for the Southeast Europe.

Within the park area, a multitude of habitats was identified: mixed riparian forests, riverside coppices, low altitude wetland meadows, forest skirts with high bushes, muddy bank rivers, eutrophic natural lakes, oligotrophic to mesotrophic still waters, dystrophic lakes and ponds.

Lower Floodplain of Siret River is characterized by floodplain vegetation: riparian galleries and bushes, salty marshes, riverside coppices with *Salix alba* and *Populus alba*, oligotrophic to mesotrophic still waters.

The staphylinid fauna from some Danube islets (Giurgiu and Călărași sectors) has been addressed in two papers (Stan, 2005, 2009). In the present paper, I report the species which have to be added to those previously published, the specimens being identified by László Ádám (Hungarian Natural History Museum, Budapest).



The floodplain area of the Buzău valley is characterized by an intense activity of exploitation of the river bed for sand and gravel. Sampling was conducted in the few areas without anthropic impact. Most of the data are from oak, elm, hornbeam forests.

Collecting sites are presented in fig. 1:

- Small Wetland of Brăila Natural Park: Small Island of Brăila, Gura Gârлуței; Chirchinețu fish farm (an ex-fish breeding place), south of Small Island of Brăila; Fundu Mare Island; Hogioaia Channel-entry in Stan's Marsh.
- Lower Prut Natural Park: Vădeni, Cavadinesti, Mața-Rădeanu Complex, (N: 46°04.218', E: 028°05.315'), bank of the Prut River, flooded area in summer; Rogojeni, Pochina Lake, wetland area with *Salix* spp. and *Rubus* spp. (N: 45°59.798', E: 028°05.451'); Vlădești, bank of the Prut River (N: 45°50.575', E: 028°06.205'); Giurgiulești, (N: 45°28.261', E: 028°11.139'), area with temporary pools, a result of the summer flooding.

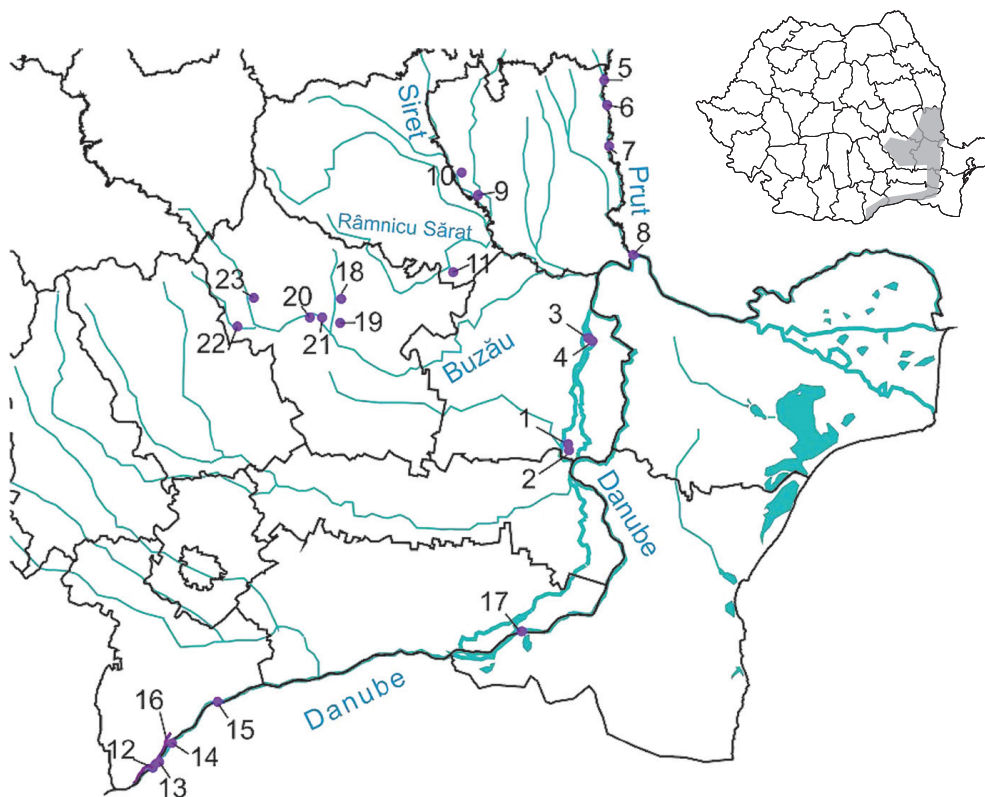


Fig. 1 - The map of collecting sites from south-east of Romania. 1 - Gura Gârлуței; 2 - Chirchinețu fish farm (ex-fish breeding place); 3 - Fundu Mare Island; 4 - Hogioaia Channel-entry in Stan's Marsh; 5 - Vădeni; 6 - Rogojeni; 7 - Vlădești; 8 - Giurgiulești; 9 - Salcia; 10 - Movileni; 11 - Ciorăști; 12 - Cama Islet, 13 - Dinu Islet; 14 - Slobozia Islet; 15 - Lung Islet; 16 - dike area (508 - 521 km); 17 - Turcescu Islet; 18 - Izvorul Dulce; 19 - Cernătești; 20 - Unguriu; 21 - Berca; 22 - Bâscenii de Sus; 23 - Valea Seaca.

- Siret Floodplain: Salcia (N: 45°40.606', E: 027°26.701', Umbrărești commune), sandy bank of Siret River; Movileni (N: 45°43.619'; E: 027°23.423'), pools with reed; Ciorăști (N: 45°26.487', E: 027°18.702'), bank of Râmnicu Sărat River.
- Giurgiu Danube sector: islets Cama (km 510), Dinu (km 507), Slobozia (km 500), Lung (km 468) and the dam area: Malu (km 508), Vedeia (km 517), Cetățuia (km 516), Pietroșani (km 521); Călărași Danube sector – Turcescu Islet (km 344).
- Basin of the Buzău River: valley of the Slănic River - Izvorul Dulce (Beceni commune) and Cernătești; valley of the Buzău River - Unguriu (Măgura commune), Berca, Bâscenii de Sus (Calvini commune) - Chiojdului valley (tributary of Buzău, N: 45°15.094', E: 026°16.964'), Valea Seaca (Pătârlagele commune, N: 45°16.653', E: 026°21.605') – bank of the river.

#### Abbreviations.

In the faunistic list, the collectors' names from "Grigore Antipa" National Museum of Natural History, Bucharest and collaborators of the Museum are abbreviated as follows: C.C. – Ciubuc Constantin; P.C. – Pârnu Corneliu; S.E. – Schneider Eckbert; S.M. – Stan Melania; U.V. – Ungureanu Viorel; ex. (s) – exemplar (s).

The rove beetles were collected using the pitfall traps (for the material from Small Island of Brăila Natural Park, during the period 15.06-30.12.1994, replaced every two weeks. The dates mentioned in the paper represent the day when the traps were taken), aspirators, light traps with a mercury vapour bulb (basin of the Buzău River), by the flotation method, direct collecting from the ground, collecting from mushrooms, cattle, horse and pig dung.

The specimens are preserved in the Coleoptera Collection of "Grigore Antipa" National Museum of Natural History (Bucharest).

### RESULTS AND DISCUSSIONS

The paper presents 94 staphylinid species and subspecies, collected from some riparian ecosystems associated with some rivers in southeastern Romania: the Danube, Prut, Siret, Buzău.

The identified staphylinid species are grouped according to subfamilies, and listed alphabetically within subfamilies. Species of 7 subfamilies were identified: Pselaphinae (1), Aleocharinae (30), Oxytelinae (19), Euaestethinae (1), Steninae (6), Paederinae (11) and Staphylininae (26). For each species, the collecting site, date, number of specimens (sex, for most of them), and the collector are specified. The species marked with an asterisk were identified by László Ádám (Budapest, Hungary).

## Subfamily Pselaphinae Latreille, 1802

*Rybaxis longicornis* (Leach, 1817)

*Examined material:* 2 exs., Fundu Mare Island, temporarily flooded, 30.10.1994, leg. C.C.

## Subfamily Aleocharinae Fleming, 1821

*Acrotona muscorum*\* (Brisout de Barneville, 1860)

*Examined material:* 1 ex., Turcescu Islet, 26.05.2008, leg. S.M.

*Aleochara brevipennis* Gravenhorst, 1806

*Examined material:* 1 ex., Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 3.09.1994, leg. C.C.

*Aleochara curtula* (Goeze, 1777)

*Examined material:* 1 ex., Hogioaia Channel-entry in Stan's Marsh, rarely flooded, 30.07.1994; 1 ex., Gura Gârluței, rarely flooded, 4.10.1994; 1 ♂, 1 ♀, Fundu Mare Island, rarely flooded, 4.10.1994, leg. C.C.; 1 ex., Izvorul Dulce, 2.05.2002, leg. U.V.

*Aleochara haematoptera* Kraatz, 1858

*Examined material:* 2 exs., Chirchinețu fish farm, rarely flooded, 16.08.1994; 2 exs., Gura Gârluței, frequently flooded, 16.09.1994; 42 exs., the same place, rarely flooded area, 4.10.1994; 2 ♂, the same place, frequently flooded 12.10.1994; 11 exs., Fundu Mare Island, rarely flooded and 7 exs. the same place in a frequently flooded area, 4.10.1994, leg. C.C.

*Aleochara intricata* Mannerheim, 1830

*Examined material:* 1 ex., Izvorul Dulce, 30.04.2005 (on carcasses) and 3 exs., the same site, 3.05.2005, on fresh dung, bed of the Slănic River, leg. U.V.

*Aloconota gregaria* (Erichson, 1839)

*Examined material:* 1 ♀, bank of the Râmnicu Sărat River, Ciorăști area, 27.05.2009, leg. S.M.

*Amischa analis* (Gravenhorst, 1802)

*Examined material:* 1 ♀, Hogioaia Channel-entry in Stan's Marsh, rarely flooded, 15.07.1994, leg. C.C.

*Amischa bifoveolata* (Mannerheim, 1830)

*Examined material:* 1 ♂, Hogioaia Channel-entry in Stan's Marsh, 15.11.1994, rarely flooded; 1 ♂, Gura Gârluței, frequently flooded, 29.11.1994, leg. C.C.

*Amischa forcipata* Mulsant & Rey, 1873

*Examined material:* 1 ♂, Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 3.10.1994; 2 ♀, the same sampling place, frequently flooded area, 15.11.1994 and 1 ♂, 1 ♀ the same place, 28.11.1994, leg. C.C.

*Atheta atramentaria* (Gyllenhal, 1810)

*Examined material:* 3 exs., Izvorul Dulce, 3.05.2005, on fresh dung, bed of Slănic River, leg. U.V.

*Atheta fungi* (Gravenhorst, 1806)

*Examined material:* 1 ex., Chirchinețu fish farm, rarely flooded, 16.08.1994; 1 ♂, 1 ♀, Hogioaia Channel-entry in Stan's Marsh (frequently flooded), 15.11.1994; 1 ♂, 1 ♀, Gura Gârluței, frequently flooded, 29.11.1994, leg. C.C.

*Atheta orbata*\* (Erichson, 1837)

*Examined material:* 2 exs., Turcescu Islet, 26.05.2008, leg. S.M.

*Atheta laticollis* (Stephens, 1832)

*Examined material:* 1 ♀, Gura Gârluței, frequently flooded, 16.09.1994; 1 ex., Fundu Mare Island, frequently flooded, 4.10.1994 and 1 ♀, 18.10.1994; 1 ♀, Hogioaia Channel-entry in Stan's Marsh, rarely flooded, 17.10.1994; 1 ♂, Chirchinețu fish farm, rarely flooded, 30.10.1994.

*Atheta melanaria* (Mannerheim, 1830)

*Examined material:* 1 ex., Izvorul Dulce, 3.05.2005, on fresh dung, bed of Slănic River, leg. U.V.

*Atheta xanthopus*\* (Thomson, 1856)

*Examined material:* 1 ex., Cama Islet, 7-16.06.2004, leg. S.M.

*Brachyusa concolor* (Erichson, 1839)

*Examined material:* 7 ♂, 4 ♀, Vădeni, 29.09.2010, bank of Prut River, flooded area in summer, leg. S.M.

*Gyrophæna lucidula* Erichson, 1837

*Examined material:* 16 ♂, 12 ♀, Giurgiuilești, 30.09.2010, area with temporary pools, a result of the summer floodings, in mushrooms, leg. S.M.

*Liogluta microptera* Thomson, 1867

*Examined material:* 1 ex., Gura Gârluței, rarely flooded, 4.10.1994, leg. C.C.

*Meotica marchica*\* Benick, 1954

*Examined material:* 1 ♂, Hogioaia Channel-entry in Stan's Marsh, frequently flooded area, 15.07.1994; 1 ♀, the same place, 15.11.1994, leg. C.C.

*Myllaena intermedia* Erichson, 1837

*Examined material:* 1 ♂, Giurgiuilești, 30.09.2010, area with temporary pools, a result of the summer floodings, leg. S.M.

*Oligota pumilio* Kiesenwetter, 1858

*Examined material:* 1 ♀, Gura Gârluței, temporarily flooded, 3.10.1994, leg. C.C.

*Oxypoda filiformis*\* Redtenbacher, 1849

*Examined material:* 1 ♀, Gura Gârluței, frequently flooded, 29.11.1994; 1 ex., Turcescu Islet, 26.05.2008, leg. S.M.

*Oxypoda haemorrhoea* (Mannerheim, 1830)

*Examined material:* 1 ♂, Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 28.11.1994, leg. C.C.

*Oxypoda longipes*\* Mulsant & Rey, 1861

*Examined material:* 1 ex., Pietroșani, 28.04.2004, leg. P.C.

*Oxypoda opaca* (Gravenhorst, 1802)

*Examined material:* 1 ♂, Gura Gârluței, rarely flooded, 15.11.1994; 1 ♂, Hogioaia Channel-entry in Stan's Marsh, 15.11.1994, leg. C.C.

*Oxypoda vicina*\* Kraatz, 1858

*Examined material:* 1 ex., Cetățuia, 26.04.2004, leg. S.M.

*Tachyusa coarctata* Erichson, 1837

*Examined material:* 1 ex., Salcia, sandy bank of the Siret River, 27.05.2009; 1 ex., Ciorăști, the bank of the Râmnicu Sărat River, 27.05.2009, leg. S.M.

*Tachyusa concinna*\* Heer, 1839

*Examined material:* 1 ex., Slobozia Islet, 21.06.2004, leg. S.M.

*Tachyusa objecta* Mulsant & Rey, 1870

*Examined material:* 2 exs., Hogioaia Channel-entry in Stan's Marsh, rarely flooded, 15.07.1994; 1 ♂, Gura Gârluței, frequently flooded, 16.09.1994; 3 exs., the same place, frequently flooded, 29.11.1994, leg. C.C.; 5 exs., Ciorăști, the bank of the Râmnicu Sărat River, 27.05.2009, leg. S.M.; 3 exs., Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 1 ♀, 1 ♂, Rogojeni, Pochina Lake, wetland with *Salix* spp. and *Rubus* spp., 29.09.2010, leg. S.M.; 6 exs., Vlădești, bank of Prut River, 29.09.2010, leg. S.M.

*Thecturota marchii* (Doderö, 1922) (Fig. 2 A-D)

*Examined material:* 1 ♀, Fundu Mare Island, frequently flooded, 4.10.1994, leg. C.C. First record from Romania.

*Remarks:* *Thecturota* is represented by two species in Europe, *Thecturota williamsi* (Bernhauer), known only from the United Kingdom, and *T. marchii* (Doderö) recorded from Austria, Czech Republic, Denmark, Estonia, Finland, France, United Kingdom, Germany, Italy, Norway, Sweden, Switzerland (Smetana, 2004). According to Horion (1967) the species is distributed in North Europe (southern part), Central and South Europe, its range expanding, and occurs in rotting plant material (compost) and debris.

## Subfamily Oxytelinae Fleming, 1821

*Anotylus affinis* (Czwalina, 1871)

*Examined material:* 4 ♂, Hogioaia Channel-entry in Stan's Marsh, temporarily flooded, 1.08.1994, leg. C.C.; 1 ♂, Gura Gârluței, frequently flooded, 16.09.1994; 5 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Anotylus insecatus* (Gravenhorst, 1806)

*Examined material:* 1 ex., Izvorul Dulce, 10.04.2002, leg. U.V.

*Anotylus intricatus* (Erichson, 1840)

*Examined material:* 23 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Anotylus nitidulus* (Gravenhorst, 1802)

*Examined material:* 1 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, cattle dung, leg. S.M.



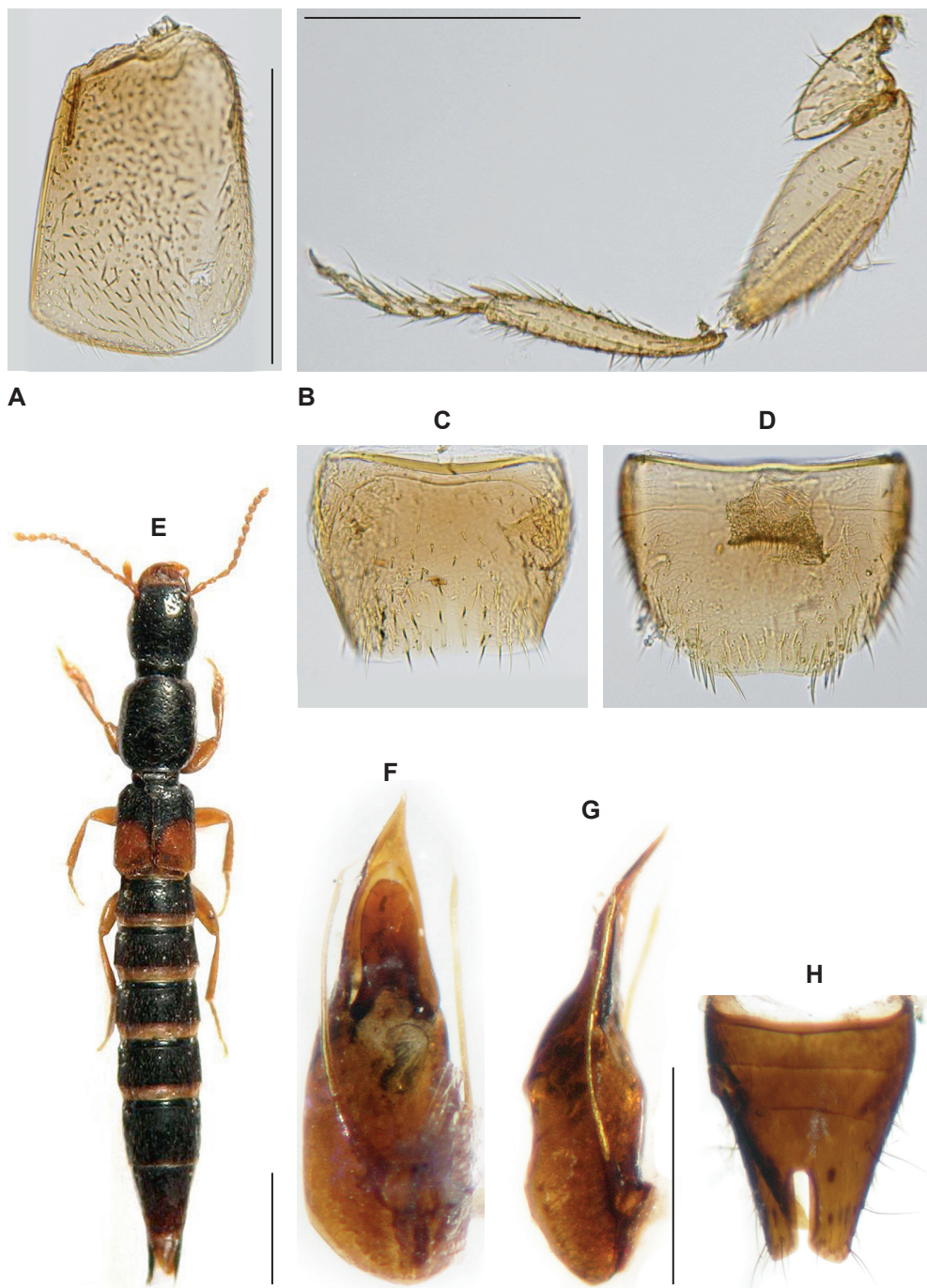


Fig. 2 - *Thecturota marchii* (Doderö): A - left elytron; B - hind leg; C - tergite VIII (internal view); D - sternite VIII (internal view). *Leptobium dimidiatum* (Gridelli): E - habitus; F - aedeagus (ventral view); G - aedeagus (lateral view); H - male sternite VIII. Scale bars: 1 mm (E), 0.25 mm (A-D, F-H).

*Anotylus pumilus* (Erichson, 1839)

*Examined material:* 6 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Anotylus tetracarinatus* (Block, 1799)

*Examined material:* 5 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Carpelimus corticinus* (Gravenhorst, 1806)

*Examined material:* 1 ex., Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 15.11.1994, leg. C.C.; 1 ex., Izvorul Dulce, 4.08.2005, leg. U.V.

*Carpelimus exiguus* (Erichson, 1839)

*Examined material:* 1 ex., Fundu Mare Island, frequently flooded, 4.10.1994; 1 ex., Gura Gârluței, temporarily flooded, 3.10.1994; 1 ex., Chirchinețu fish farm, temporarily flooded, 30.10.1994; 2 exs., Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 15.11.1994, leg. C.C.; 2 exs., Salcia, sandy bank of Siret River, 27.05.2009, leg. S.M.; 2 exs., Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 2 exs., Rogojeni, Pochina Lake, wetland with *Salix* sp. and *Rubus* sp., 29.09.2010, leg. S.M.; 1 ex., Vlădești, bank of Prut River, 29.09.2010, leg. S.M.; 1 ex., Giurgiulești, 30.09.2010, area with temporary pools, a result of the summer flooding, leg. S.M.

*Carpelimus gracilis* (Mannerheim, 1830)

*Examined material:* 1 ex., Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 3.10.1994; 1 ex., Fundu Mare Island, frequently flooded, 4.10.1994; 1 ex., Gura Gârluței, frequently flooded, 29.11.1994, leg. C.C.

*Carpelimus impressus* (Lacordaire, 1835)

*Examined material:* 1 ♂, Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 1 ♂, Lung Islet, 22.06.2004, leg. P.C.

*Carpelimus obesus* (Kiesenwetter, 1844)

*Examined material:* 6 exs., Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 3 exs., Vlădești, bank of Prut River, 29.09.2010, leg. S.M.; 2 exs., Giurgiulești, 30.09.2010, area with temporary pools, a result of the summer flooding, leg. S.M.; 1 ♀, Movileni, pools with reed, 27.05.2009, leg. S.M.; 1 ex., Izvorul Dulce, 4.08.2005, leg. U.V.

*Carpelimus rivularis* (Motschulsky, 1860)

*Examined material:* 2 exs., Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 5 exs., Izvorul Dulce, 4.08.2005, leg. U.V.

*Deleaster dichrous* (Gravenhorst, 1802)

*Examined material:* 2 exs., Izvorul Dulce, 12.05.2007, at light trap, leg. U.V.

*Oxytelus piceus* (Linnaeus, 1767)

*Examined material:* 1 ♀, Fundu Mare Island, frequently flooded, 28.11.1994, leg. C.C.; 24 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Oxytelus sculptus* Gravenhorst, 1806

*Examined material:* 1 ex., Izvorul Dulce, 13.09.2005, at light trap, leg. U.V.

*Platystethus arenarius* (Geoffroy, 1785)

*Examined material:* 1 ex., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Platystethus cornutus* (Gravenhorst, 1802)

*Examined material:* 1 ♂, Vădeni, 29.09.2010, area flooded in summer, leg. S.M.; 1 ♀, Movileni, pools with reed, 27.05.2009, leg. S.M.

*Platystethus nitens* (Sahlberg, 1832)

*Examined material:* 1 ♂, Gura Gârluței, frequently flooded, 16.09.1994; 1 ex., Hogioaia Channel-entry in Stan's Marsh, frequently flooded, 3.10.1994; 1 ex., Fundu Mare Island, frequently flooded, 18.10.1994, leg. C.C.

*Thinodromus dilatatus* (Erichson, 1839)

*Examined material:* 2 exs., Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.

## Subfamily Euaesthetinae Thomson, 1859

*Euaesthetus bipunctatus* (Ljungh, 1804)

*Examined material:* 1 ♀, Hogioaia Channel-entry in Stan's Marsh, area rarely flooded, 15.07.1994; 1 ♂, the same sampling place, in a frequently flooded area, 15.11.1994, leg. C.C.

## Subfamily Steninae MacLeay, 1825

*Stenus argus* Gravenhorst, 1806

*Examined material:* 1 ♂, Rogojeni, Pochina Lake, wetland with *Salix* sp. and *Rubus* sp., 29.09.2010, leg. S.M.

*Stenus biguttatus* (Linnaeus, 1758)

*Examined material:* 2 ♂, 1 ♀, Giurgiulești, 30.09.2010, area with temporary pools, leg. S.M.; 1 ♀, Salcia, sandy bank of Siret River, 27.05.2009; 3 ♂, 3 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, leg. S.M.; 1 ♂, Bâscenii de Sus, Chiojd valley, 27.04.2010, leg. S.M.; 2 ♂, 6 ♀, Valea Seaca, bank of Buzău River, 7.07.2010, leg. S.M.; 4 ♂, 3 ♀, the same sampling place, 13.07.2010, leg. S.M.

*Stenus boops boops* Ljungh, 1810

*Examined material:* 1 ♀, Vlădești, bank of Prut River, 29.09.2010, leg. S.M.

*Stenus comma comma* LeConte, 1863

*Examined material:* 4 ♂, 2 ♀, Hogioaia Channel-entry in Stan's Marsh, area frequently flooded, 30.06.1994 and 1 ♂, 29.11.1994; 4 ♂, Gura Gârluței, frequently flooded, 29.11.1994; 1 ♀, 1 ♂, Chirchinețu fish farm, frequently flooded, 29.11.1994, leg. C.C.

*Stenus humilis* Erichson, 1839

*Examined material:* 1 ♀, Hogioaia Channel-entry in Stan's Marsh, area rarely flooded, 30.07.1994; 2 ♀, the same sampling place, rarely and frequently flooded areas, 1.08.1994; 1 ♂, the same sampling place, 28.11.1994, leg. C.C.



*Stenus morio* Gravenhorst, 1806

*Examined material:* 1 ex., Turcescu Islet, 28.08.2007, sandy bank of the Danube River, leg. S.M.; 2 ♂, 1 ♀, Movileni, pools with reed, 27.05.2009, leg. S.M.

## Subfamily Paederinae Fleming, 1821

*Ochtheophilum fracticorne* (Paykull, 1800)

*Examined material:* 1 ex., Izvorul Dulce, 4.08.2005, leg. U.V.

*Lathrobium pallidum* Nordmann, 1837

*Examined material:* 2 ♀, Hogioaia Channel-entry in Stan's Marsh, area frequently flooded, 15.09.1994, leg. C.C.

*Lathrobium taxi* Bernhauer, 1902

*Examined material:* 1 ex., Izvorul Dulce, 4.05.2003, at light trap, leg. U.V.

*Leptobium dimidiatum* (Gridelli, 1926) (Fig. 2 E-H)

*Examined material:* Cama Islet: 2 ♂, 5 ♀, 29.05-3.06.2004 (collected from the Danube river bank on the base of a cliff-like high bank; river bank with wet, fine sized sand, without vegetation, temporarily flooded; river bank with muddy wet side, poor vegetation, poor in detritus); 3 ♂, 1 ♀, 7-16.06.2004, leg. S.E. (the Danube river bank, forest with white willow, elm and tall herbaceous vegetation); 2 ♂, 1 ♀, 16.06.2004, leg. S.M. (the Danube river bank, in open area, from the mud from the edge of the temporary pools left behind the flooding); 1 ♂, Vedeia, 29.05-3.06.2004, leg. S.E. (in low hardwood forest with black poplar, oak, herbaceous layer and leaf litter); 3 ♂, 3 ♀, Dinu Islet, 29.05-3.06.2004, leg. S.E. (hardwood forest with tall herbaceous vegetation; wet sandy river bank with some detritus); 1 ♂, Malu, 27.04.2004, leg. S.M. (grassland, pig dung).

*Remarks:* The specimens which were previously recorded under the name *Leptobium gracile* (Grav.) (Stan, 2005) were misidentified and belong to *Leptobium dimidiatum*. This species is highly similar to *Leptobium gracile*, but readily distinguished based on the morphology of the aedeagus. It had been recorded only from three scattered localities: Romania (Comana), Georgia (Tbilisi, Kumisi), Turkmenistan (Ashkhabad) (Assing, 2005).

*Paederus fuscipes fuscipes* Curtis, 1826

*Examined material:* 1 ♂, Gura Gârluței, rarely flooded, 4.10.1994; 1 ♂, 1 ♀, the same place, 28.11.1994; 2 ♂, 1 ♀, Chirchinețu fish farm, temporarily flooded, 30.10.1994; 7 exs., Movileni, pools with reed, 27.05.2009, leg. S.M.

*Paederus littoralis littoralis* Gravenhorst, 1802

*Examined material:* 1 ex., Izvorul Dulce, 9.06.2002; 1 ex., Cernătești, 31.08.2005, leg. U.V.

*Rugilus orbiculatus* (Paykull, 1789)

*Examined material:* 1 ex., Izvorul Dulce, 10.04.2002, leg. U.V.

*Rugilus subtilis* (Erichson, 1840)

*Examined material:* 1 ex., Izvorul Dulce, 10.04.2002; 1 ex., the same sampling place, 12.04.2002, leg. U.V.

*Scopaeus debilis* Hochhuth, 1851

*Examined material:* 5 exs., Izvorul Dulce, 4.08.2005, at light trap, leg. U.V.

*Scopaeus laevigatus* (Gyllenhal, 1827)

*Examined material:* 2 exs., Izvorul Dulce, 4.08.2005, leg. U.V.

*Sunius fallax* (Lokay, 1919)

*Examined material:* 1 ♀, Hogioaia Channel-entry in Stan's Marsh, area rarely flooded, 15.07.1994, leg. C.C.; 1 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, leg. S.M.

## Subfamily Staphylininae Latreille, 1802

*Creophilus maxillosus maxillosus* (Linnaeus, 1758)

*Examined material:* 1 ex., Izvorul Dulce, 30.04.2005, on carcasses, bed of Slănic River, leg. U.V.

*Gabrius osseticus* (Kolenati, 1846)

*Examined material:* 1 ♀, Gura Gârluței, temporarily flooded, 28.11.1994, leg. C.C.

*Gauropterus fulgidus* (Fabricius, 1787)

*Examined material:* 1 ex., Izvorul Dulce, 12.04.2002, leg. U.V.

*Gyrohypnus fracticornis* (Müller, 1776)

*Examined material:* 1 ex., Izvorul Dulce, 12.04.2002, leg. U.V.

*Neobisnius procerulus procerulus* (Gravenhorst, 1806)

*Examined material:* 1 ♀, Hogioaia Channel-entry in Stan's Marsh, area rarely flooded, 15.07.1994, leg. C.C.; 3 ♀, Rogojeni, Pochina Lake, wetland with *Salix* sp. and *Rubus* sp., 29.09.2010, leg. S.M.; 1 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, leg. S.M.

*Ocypus nitens nitens* (Schrank, 1781)

*Examined material:* 1 ex., Izvorul Dulce, 12.04.2002; 1 ex., the same sampling place, 18.04.2002; 1 ex., Unguriu, 28.04.2007 (in clearing, under stone), leg. U.V.

*Ocypus ophthalmicus ophthalmicus* (Scopoli, 1763)

*Examined material:* 1 ex., Izvorul Dulce, 3.05.2005, bed of Slănic River, leg. U.V.

*Ontholestes murinus* (Linnaeus, 1758)

*Examined material:* 3 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River; 1 ex., the same sampling place, 16.04.2005, cattle dung, leg. U.V.

*Philonthus cochleatus* Scheerpeltz, 1937

*Examined material:* 4 exs., Izvorul Dulce, 3.05.2005, leg. U.V.

*Philonthus coprophilus* Jarrige, 1949

*Examined material:* 2 ♂, 1 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, cattle dung, leg. S.M.

*Philonthus cruentatus* (Gmelin, 1790)

*Examined material:* 4 exs., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Philonthus diversiceps* Bernhauer, 1901

*Examined material:* 1 ex., Movileni, pools with reed, 27.05.2009, leg. S.M.; 2 ♀, 2 ♂, Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.

*Philonthus ebeninus* (Gravenhorst, 1802)

*Examined material:* 1 ex., Izvorul Dulce, 3.05.2005, on cattle fresh dung, bed of Slănic River leg. U.V.

*Philonthus intermedius* (Lacordaire, 1835)

*Examined material:* 2 ♀, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, cattle dung, leg. S.M.

*Philonthus laminatus* (Creutzer, 1799)

*Examined material:* 1 ex., Izvorul Dulce, 16.06.2002, leg. U.V.

*Philonthus longicornis* Stephens, 1832

*Examined material:* 1 ♂, bank of Râmnicu Sărat River, Ciorăști area, 27.05.2009, cattle dung, leg. S.M.

*Philonthus micans* (Gravenhorst, 1802)

*Examined material:* 2 ♀, 2 ♂, Rogojeni, Pochina Lake, wetland with *Salix* sp. and *Rubus* sp., 29.09.2010, leg. S.M.

*Philonthus parvicornis* (Gravenhorst, 1802)

*Examined material:* 3 exs., Izvorul Dulce, 16.04.2005, cow dung; 10 exs., the same sampling place, 3.05.2005, on cattle fresh dung, bed of Slănic River, leg. U.V.

*Philonthus pseudovarians* Strand, 1941

*Examined material:* 1 ex., Izvorul Dulce, 3.05.2005, on fresh dung, bed of Slănic River, leg. U.V.

*Philonthus punctus punctus* (Gravenhorst, 1802)

*Examined material:* 1 ♀, 1 ♂, Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M.; 2 ♀, Giurgiulești, 30.09.2010, area with temporary pools, leg. S.M.

*Philonthus quisquiliarius quisquiliarius* (Gyllenhal, 1810)

*Examined material:* 2 ♂, 1 ♀, Giurgiulești, 30.09.2010, area with temporary pools, leg. S.M.; 1 ♀, 1 ♂, Vădeni, 29.09.2010, bank of Prut River, area flooded in summer, leg. S.M., 7 exs., Izvorul Dulce, 4.08.2005, leg. U.V.

*Philonthus salinus* Kiesenwetter, 1844

*Examined material:* 1 ♂, Gura Gârluței, temporarily flooded, 28.11.1994, leg. C.C.

*Philonthus spinipes spinipes* Sharp, 1874

*Examined material:* 1 ex., Izvorul Dulce, 25.07.2002, cattle fresh dung; 2 exs., the same sampling place, 9.05.2004, under stones on the bank of Slănic River; 1 ex., Berca, 1.09.2005, horse dung, leg. U.V.

*Platydracus stercorarius stercorarius* (Olivier, 1795)

*Examined material:* 1 ex., Unguriu, 28.04.2007, leg. U.V.

*Stenistoderus nothus* (Erichson, 1839)

*Examined material:* 1 ex., Chirchinețu fish farm, area temporarily flooded, 29.11.1994, leg. C.C.

*Xantholinus dvoraki* Coiffait, 1956

*Examined material:* Hogioaia Channel-entry in Stan's Marsh: 4 ♀, temporarily flooded, 30.06.1994, 1 ♀, rarely flooded area, 17.07.1994; 2 ♀, temporarily flooded, 2.09.1994; 3 ♂, 1 ♀, frequently flooded, 16.11.1994; 12 exs., temporarily flooded, 28.11.1994; 16 ♂, 4 ♀, frequently flooded, 28.11.1994; 2 ♂, 3 ♀, rarely flooded, 28.11.1994; 2 ♂, Gura Gârluței, temporarily flooded, 28.11.1994; 1 ♂, 1 ♀, Chirchinețu fish farm, 28.11.1994; 1 ♂, 1 ♀, Fundu Mare Island, temporarily flooded area, 28.11.1994, 1 ♂, 1 ♀, the same site, frequently flooded, 28.11.1994, leg. C.C.

The results represent a part of the Bilateral Collaboration Project within the Agreement between the Romanian Academy and the National Academy of Sciences of Belarus: "Distribution patterns of staphylinid species (Coleoptera: Staphylinidae) from the riparian ecosystems of East Europe (south-north direction) – case study Romania and Belarus".

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CONTRIBUȚII LA CUNOAȘTEREA STAFILINIDELOR (COLEOPTERA:  
STAPHYLINIDAE) DIN CÂTEVA ECOSISTEME RIPARIENE DIN ZONA DE  
SUD-EST A ROMÂNIEI

## REZUMAT

Diversitatea faunei de stafilinide este investigată în câteva ecosisteme ripariene prezente de-a lungul unor râuri din zona de sud - est a României: Dunăre, Prut, Siret, Buzău. 94 specii și subspecii de stafilinide au fost identificate în 23 de situri investigate. *Thecturota marchii* (Dodero) este o semnalare nouă în fauna României. *Leptobium dimidiatum* (Grideli), o specie rară, este semnalată dintr-un nou sit, al doilea pe teritoriul României. Pentru fiecare specie se prezintă situl de colectare, data, numărul de exemplare (sexul pentru cele mai multe), colectorul.

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**CATALOGUE OF CERAMBYCIDAE, MEGALOPODIDAE AND  
CHRYSOMELIDAE (COLEOPTERA: CHRYSOMELOIDEA)  
RECENTLY ENTERED IN THE PATRIMONY OF  
“GRIGORE ANTIPA” NATIONAL MUSEUM OF  
NATURAL HISTORY (BUCHAREST).  
“IGOR CEIANU” COLLECTION.**

*To Dr. Eng. Igor Ceianu's memory*

RODICA SERAFIM, SANDA MAICAN

**Abstract.** The paper presents data on 268 species belonging to the Cerambycidae, Megalopodidae and Chrysomelidae families, preserved in the “Igor Ceianu” Collection, recently entered in the patrimony of “Grigore Antipa” National Museum of Natural History (Bucharest). Some Carpathians endemic species are highlighted: *Pseudogaurotina excellens* Brancsik, 1874, *Cryptocephalus carpathicus* Weise, 1875, *Sclerophaedon carpathicus* Weise, 1875, *Neocrepidodera transsilvanica* Fuss, 1864 and *Chrysolina weisei* Frivaldszky, 1883. Among the rare species preserved in the “Igor Ceianu” collection, we mention: *Nivellia sanguinosa* Gyllenhal, 1827, *Semanotus ruscicus ruscicus* Fabricius, 1776, *Pronocera angusta* Kriechbaum, 1844, *Callimoxys gracilis* Brullé, 1832, *Callimus angulatus angulatus* Schrank, 1789, *Cornumutilla lineata* Letzer, 1844, *Pedostrangalia revestita* Linnaeus, 1767, *Pedostrangalia verticalis* Germar, 1822, *Etorofus pubescens* Fabricius, 1787, *Cryptocephalus bohemicus* Drapiez, 1819 and *Cheilotoma musciformis* Goeze, 1777. In terms of conservation, the following species of community interest are noted: *Rosalia alpina* Linnaeus, 1758, *Morimus asper funereus* Mulsant, 1863 and *Pseudogaurotina excellens* Brancsik, 1874.

**Résumé.** Le travail présente des données sur 268 espèces appartenant aux familles des Cerambycidae, Megalopodidae et Chrysomelidae, préservés dans la collection “Igor Ceianu”, récemment entrée dans le patrimoine de Muséum National d'Histoire Naturelle “Grigore Antipa” (Bucarest). Certaines espèces endémiques des Carpates sont mises en évidence: *Pseudogaurotina excellens* Brancsik, 1874, *Cryptocephalus carpathicus* Weise, 1875, *Sclerophaedon carpathicus* Weise, 1875, *Neocrepidodera transsilvanica* Fuss, 1864 and *Chrysolina weisei* Frivaldszky, 1883. Parmi les espèces rares de la collection “Igor Ceianu”, on mentionne: *Nivellia sanguinosa* Gyllenhal, 1827, *Semanotus ruscicus ruscicus* Fabricius, 1776, *Pronocera angusta* Kriechbaum, 1844, *Callimoxys gracilis* Brullé, 1832, *Callimus angulatus angulatus* Schrank, 1789, *Cornumutilla lineata* Letzer, 1844, *Pedostrangalia revestita* Linnaeus, 1767, *Pedostrangalia verticalis* Germar, 1822, *Etorofus pubescens* Fabricius, 1787, *Cryptocephalus bohemicus* Drapiez, 1819 et *Cheilotoma musciformis* Goeze, 1777. En termes de conservation, les suivantes espèces d'intérêt communautaire sont notées: *Rosalia alpina* Linnaeus, 1758, *Morimus asper funereus* Mulsant, 1863 et *Pseudogaurotina excellens* Brancsik, 1874.

**Key words:** Coleoptera, Chrysomeloidea, Cerambycidae, Megalopodidae, Chrysomelidae, “Igor Ceianu” collection, “Grigore Antipa” National Museum of Natural History, București (Bucharest).

### INTRODUCTION

The entomological collections of natural science museums and academic institutions make valuable contributions to biological science in many areas, such as taxonomy, systematics, biogeography, monitoring of environmental change, biological invasions, plant protection and human health.



In 2010 the heritage of “Grigore Antipa” National Museum of Natural History was enriched with “Igor Ceianu” insects collection, donated by his daughter, Cornelia Ceianu PhD, from “Cantacuzino” National Institute for Research and Development in Microbiology and Immunology (Bucharest).

Dr. Eng. Igor Ceianu (1925 - 2000) was one of the greatest Romanian specialists in the field of plant protection. As Olenici noted (2000): “*He was one of the stars of our forestry, a star that we hope that even the younger generations will see him in the true light*”.

### MATERIAL AND METHOD

The material comprises about 18,000 coleopteran specimens, of which about 960 are cerambycids and 2,300 chrysomelids, most of them being collected by Igor Ceianu. Some of the specimens presented in the catalogue belonged to the “Friedrich Deubel” collection.

Friedrich Deubel (1845-1933), an amateur entomologist from Braşov, worked with Ludwig Ganglbauer (1856-1912), director of the Museum of Natural History in Vienna, and Karl Holdhaus (1883-1975), curator of the same museum. The results of this collaboration were published in 1910 in the book *Research on Carpathians Zoogeography (Untersuchungen über die Zoogeographie der Karpathen)*, here being listed the beetles species from Ciucaş, Postăvaru, Bucegi, Piatra Craiului, Făgăraş (Bâlea Lake, Negoiu Mt.), Parâng, Retezat and Rodna Mountains (Holdhaus & Deubel, 1910). Deubel (1925) has collaborated with the naturalist Dr. Karl Petri (1852-1932) from Sighişoara, the author of a synthesis of beetle fauna from Transylvania (Petri, 1912) which he filled in later.

Nomenclature and systematical order from Cerambycidae family are in accordance with those used by Sama (2005) in *Fauna Europaea*, Hoskovec & Rejzek (2009) in *Longhorn beetles (Cerambycidae) of the West Palaearctic region* and Danilevsky & Smetana (2010) in *Catalogue of Palaearctic Coleoptera* edited by Löbl & Smetana (2010).

The arrangement of the taxa within the Megalopodidae and Chrysomelidae families and the nomenclature follows the *Catalogue of Palaearctic Coleoptera*, namely: Silfverberg (2010), for subfamily Zeugophorinae; Schmitt (2010) - subfamily Criocerinae; Borowiec & Sekerka (2010) - subfamily Cassidinae; Kippenberg (2010)



- subfamily Chrysomelinae; Beenen (2010) - subfamily Galerucinae; Döberl (2010) - subfamily Alticinae; Regalin & Medvedev (2010) - tribe Clytrini; Lopatin, Smetana, Schöller & Löbl (2010) – tribe Cryptocephalini (including genus *Cryptocephalus* and remaining Cryptocephalini); Moseyko & Sprecher-Uebersax (2010) - subfamily Eumolpinae.

The information on the general distribution are given from Warchałowski (2003) and Löbl & Smetana (op. cit.).

Abbreviations:

f.h. - Forest house; Mt./Mts - Mountain/s; spec. (s) - specimen/s; coll. - collection; GANMNH - "Grigore Antipa" National Museum of Natural History.

Collectors' name:

Fr.D. - Fridrich Deubel; E.R. - Edmund Reitter.

Abbreviations of the county names:

AB - Alba; AR - Arad; BR - Brăila; BH - Bihor; BT - Botoşani; BV - Braşov; BZ - Buzău; CS - Caraş Severin; CL - Călăraşi; CJ - Cluj; CT - Constanţa; CV - Covasna; DJ - Dolj; GL - Galaţi; HD - Hunedoara; HR - Harghita; IF - Ilfov; IL - Ialomiţa; IS - Iaşi; MM - Maramureş; MS - Mureş; NT - Neamţ; PH - Prahova; SB - Sibiu; SM - Satu Mare; SV - Suceava; TL - Tulcea; TM - Timiş; TR - Teleorman; VS - Vaslui.

## RESULTS

Based on the material examined until now, the "Igor Ceianu" collection includes 268 species, belonging to 131 genera and 14 subfamilies. Most of the material originates in Romania. Also, in the collection there is material from France, Spain, Italy, Austria, Germany, Hungary, Poland, Czech Republic, Republic of Moldova, Ukraine, Russia and Kazakhstan.

There are listed 268 species (174 Cerambycidae species, two Megalopodidae species and 92 Chrysomelidae species belonging to 131 genera of 14 subfamilies.

### Superfamily Chrysomeloidea Latreille, 1802

#### Family Cerambycidae Latreille, 1802

##### Subfamily Prioninae Latreille, 1802

##### Tribe Aegosomatini J. Thomson, 1861

##### Genus *Aegosoma* Audinet-Serville, 1832

##### *Aegosoma scabricorne* (Scopoli, 1763)

1 spec., Vrancea Mts (Carpathians Curvature), 19.VI.1951.

##### Tribe Prionini Latreille, 1802

##### Genus *Prionus* Geoffroy, 1762

##### *Prionus coriarius* (Linnaeus, 1758)

2 specs, Câmpulung Moldovenesc (Eastern Carpathians) (SV), altitude: 700 m, 17.VII.1980, 8.VIII.1987.

## Subfamily Lepturinae Latreille, 1802

## Tribe Lepturini Latreille, 1802

Genus *Alosterna* Mulsant, 1863*Alosterna tabacicolor tabacicolor* (De Geer, 1775)(syn. *bicoloripes* Pic, 1914)

1 spec., Borsec (HR), altitude: 1000 m, VII.1910; 1 spec., Bicaz (NT), 1949; 2 specs, Broșteni (Eastern Carpathians), altitude: 800 m, 20.V.1949; 2 specs, Tarcău Mts (Eastern Carpathians) (NT), 16.VI.1949; 1 spec., Lacul Roșu, Ghilcoș (HR), 31.VII.1949; 4 specs, Câmpulung Moldovenesc (SV), 18.VI.1950, 30.V.1953, 14.VIII.1963, 30.V.1983; 1 spec., Hitiș (TM), 5.V.1960; 2 specs, Huși, Voloșeni (VS), 16-17.V.1968; 1 spec., Anina Mts (CS), 5.VI.1968; 3 specs, Demăcușa (SV), 20.VII.1979, 15.VII.1983, 23.VI.1989; 1 spec., Dorna Căndrenilor (SV), 24.V.1982; 2 specs, Câmpulung Moldovenesc, Valea Caselor (SV), 6.VI.1984, 1.VI.1988.

Genus *Anastrangalia* Casey, 1924*Anastrangalia dubia dubia* (Scopoli, 1763)

1 spec., Hațeg (HD) without other data; 1 spec., Broșteni, Paltinu (SV), 3.VI.1958; 1 spec., Beliș, Ponor, 28.VII.1961; 1 spec., Rarău Mt., altitude: 1500 m, 23.VII.1967; 4 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900 m, 14.VI.1972, 1.VIII.1980; 1 spec., Moldovița (SV), altitude: 800 m, 20.VII.1979.

*Anastrangalia reyi* (Heyden, 1889)

1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 24.VIII.1967; 3 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900-1000 m, 23.VII.1965, 1.VIII.1980, 20.VI.1996.

*Anastrangalia sanguinolenta* (Linnaeus, 1760)

1 spec., Tarcău Mts, Fundul Aței (NT), 14.VI.1949; 1 spec., Ghilcoș (HR), 31.VII.1949; 1 spec., Drăgoiasa (SV), 26.VI.1958; 10 specs, Valea Putnei (Eastern Carpathians) (SV), 3.VIII.1970, 8.VI.1972, 22-23.VI.1972, 9.VII.1973, 1.VIII.1980, 12.VII.1981, 10.VIII.1982, 29.V.1986; 5 specs, Dornișoara (SV), 24.VII.1982.

Genus *Anoplodera* Mulsant, 1839*Anoplodera rufipes rufipes* (Schaller, 1783)

1 spec., without data.

*Anoplodera sexguttata* (Fabricius, 1775)

4 specs, Huși, Voloșeni (VS), 16-18.V.1968; 3 specs, without data.

Genus *Cornumutula* Latzner, 1844*Cornumutula lineata* (Gebler, 1830)

1 spec., Rarău Mt., altitude: 1500 m, 23.VII.1967; 2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 15.VI.1970, 20.VII.1987.

Genus *Etorofus* Matsushita, 1933*Etorofus pubescens* (Fabricius, 1787)

1 spec., Austria, Vienna, without other data; 1 spec., Băile Herculane (CS), without other data.

Genus *Grammoptera* Audinet-Serville, 1835*Grammoptera ruficornis ruficornis* (Fabricius, 1781)(syn. *atra* Fabricius, 1775)

1 spec., Domogled Mt., Mehedinți Mts (CS), 10.VII.1978; 4 specs, Marginea (Voievodeasa, SV), 27.VI.1984.

Genus *Judolia* Mulsant, 1863*Judolia sexmaculata* (Linnaeus, 1758)

1 spec., Covasna (CV), without other data, Fr.D.; 1 spec., Cibin Mts (Cindrel Mts) (SB), without other data, Fr.D.; 1 spec., Borsec (HR), altitude: 1000 m, 18.VI.1960; 2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900-1000 m, 19.VI.1971, 2.VII.1983.

Genus *Leptura* Linnaeus, 1758*Leptura aethiops* Poda von Neuhaus, 1761

1 spec., Brașov (Southern Carpathians) (BV), 20.VII.1979.

*Leptura annularis annularis* Fabricius, 1801

1 spec., Câmpulung Moldovenesc (SV), 18.VII.1982.

*Leptura aurulenta* Fabricius, 1792

2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 16.VI.1950, 5.VII.1955.

*Leptura quadrifasciata quadrifasciata* Linnaeus, 1758

1 spec., Republic of Moldova, Tighina, VI.1938; 1 spec., Râșnov (BV), VII.1939; 1 spec., Ghilcoș (HR), 31.VII.1949; 1 spec., Câmpulung Moldovenesc (SV), 15.VII.1982.

Genus *Lepturobosca* Reitter, 1913*Lepturobosca virens* (Linnaeus, 1758)

1 spec., Tarcău Mts, Fundul Aței (NT), 14.VI.1949; 1 spec., Broșteni (Eastern Carpathians), altitude: 800 m (SV), 26.VII.1963; 1 spec., Pojorâta (Fieru) (SV), 23.VII.1965.

Genus *Nivellia* Mulsant, 1863*Nivellia sanguinosa* (Gyllenhal, 1827)

1 spec., Rodna Mts (Rodnaer Gebirge) (MM), without other data, Fr.D.; 1 spec., Valea Putnei (Eastern Carpathians) (SV), altitude: 900 m, 23.V.1953 (Fig. 1 B).

Genus *Pachytodes* Pic, 1891*Pachytodes cerambyciformis* (Schrank, 1781)

1 spec., Cibin Mts (Cindrel Mts) (SB), VII.1910; 1 spec., Tarcău Mts (NT), 2.VIII.1949; 3 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 23.V.1965, 10.VIII.1982, 6.IX.1984.

*Pachytodes erraticus erraticus* (Dalman, 1817)

1 spec., Hungary, Pecs, without other data; 1 spec., București, 19.VI.1959, 1 spec., Oravița (CS), 28.VI.1962.

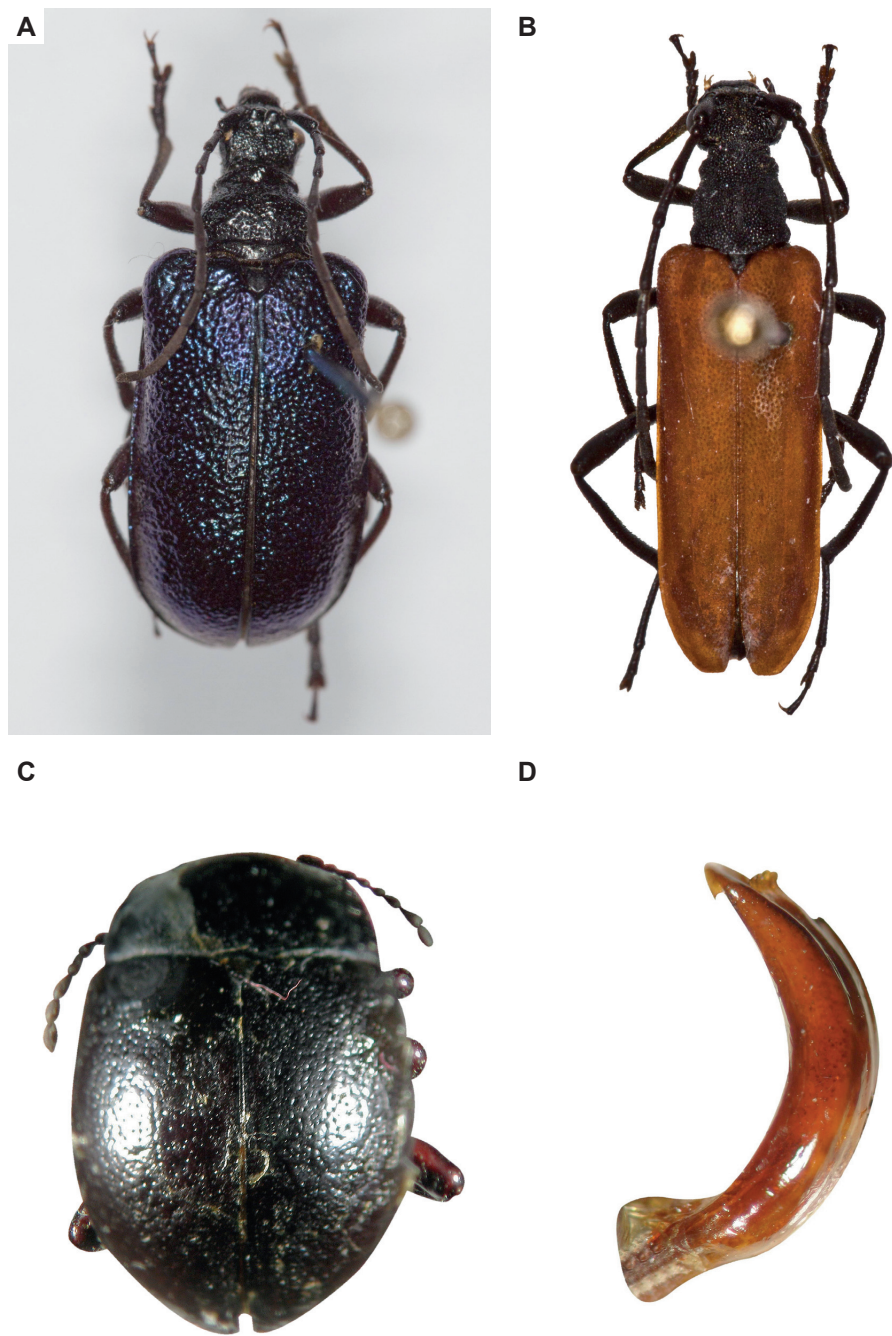


Fig. 1 - A, *Pseudogaurotina excellens*; B, *Nivellia sanguinosa*; C, *Chrysolina weisei*; D, *Chrysolina weisei*, penis lateral view.

Genus *Pedostrangalia* Sokolov, 1897

Subgenus *Pedostrangalia* Sokolov, 1897

*Pedostrangalia (Pedostrangalia) revestita* (Linnaeus, 1767)

1 spec., Codreni forest (VS), 19.V.1966.

Subgenus *Neosphenalia* Löbl, 2010

*Pedostrangalia (Neosphenalia) verticalis* (Germar, 1822)

1 spec., Babadag (TL), 10.VI.1962; 2 specs, Lunca (BT), 2.VI.1972; 1 spec., Domogled Mt., Mehedinți Mts (CS), 12.VIII.1978.

Genus *Pseudovadonia* Lobanov, Danilevsky & Murzin, 1981

*Pseudovadonia livida livida* (Fabricius, 1776)

1 spec., Retezat Mts (Western Carpathians) (HD), without other data; 1 spec., Brașov, Tâmpa Mt., without other data; 1 spec., Eastern Carpathians (SV), 25.VII.1949; 1 spec., Borsec (HR), altitude: 1000 m, 18.VI.1960; 2 specs, Jegălia (CL), 5.VI.1963, 3.VI.1992; 1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 24.VII.1967; 3 specs, Valea Putnei (Eastern Carpathians) (SV), 17.VI.1972, 7.VII.1973; 2 specs, Domogled Mt., Mehedinți Mts (CS), 7.VIII.1976; 1 spec., Gura Gârлуței (BR), VI.1994.

Genus *Rutpela* Nakane & K. Ohbayashi, 1957

*Rutpela maculata maculata* (Poda von Neuhaus, 1761)

1 spec., Buhalnița (NT), 25.VII.1949; 1 spec., Postăvarul Mts (Southern Carpathians) (BV), 7.VII.1955; 1 spec., Brașov (Southern Carpathians) (BV), altitude: 700 m, 15.VII.1956; 1 spec., Anina Mts (Southern Carpathians) (CS), 5.VI.1968.

Genus *Stenurella* Villiers, 1974

*Stenurella bifasciata bifasciata* (O. F. Müller, 1776)

1 spec., Bucu (IL), 22.VII.1957; 1 spec., Gyarmat Forest (SM), 1 spec., Mangalia (CT), 23.VI.1972; 6 specs, Jegălia (CL), 23.VI.1976, 30.VII.1992; 4 specs, Bărgan experimental forest resort, Jegălia (CL), 25.VI.1976; 3 specs, Cornetu (IF), 14.VII.1988.

*Stenurella melanura* (Linnaeus, 1758)

1 spec., Bucegi Mts, without other data; 1 spec., Secu (NT), 25.VII.1979; 3 specs, Ghilcoș (HR), 31.VII.1949; 3 specs, Miciurin Forest, Voluntari (IF), 23.VI.1959; 6 specs, Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 26.VII.1958, 5.VIII.1959; 6 specs, Borsec (HR), altitude: 1000 m, 7-9.VIII.1959, 27.VII.1967; 2 specs, Beliș (CJ), 28.VII.1960; 1 spec., Babadag (TL), 12.VI.1962; 12 specs, Frasin (SV), altitude: 500 m, 23.VII.1962; 15 specs, Câmpulung Moldovenesc (SV), 17.VI.1962, 15-17.VII.1962, 6.VIII.1962, 14.VIII.1963, 19.VI.1965, 4.VIII.1973, 11.VIII.1974, 24.VIII.1976, 18.VII.1982, 19.VII.1983; 1 spec., Baci Forest (CJ), 7.VI.1965; 2 specs, Pojorâta (SV), altitude: 800 m, 23-24.VII.1965; 21 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900 m, 8-23.VII.1965, 15.VII.1978, 1.VIII.1980, 2.VII.1981, 10.VIII.1982; 1 spec., Vatra Dornei (SV), 21.VII.1967; 2 specs, Coșna (Eastern Carpathians) (SV), altitude: 1000 m, 22.VII.1967; 9 specs, Domogled Mt., Mehedinți Mts (CS), 7.VIII.1976; 1 spec., Bicaz (NT), altitude: 600 m, 30.V.1979; 2 specs, Vama (Eastern Carpathians) (SV), altitude: 1100 m, 13-23.VIII.1979; 3 specs, Moldovița (SV), altitude: 800 m, 9.VIII.1982, 15.VII.1983; 3 specs, Cornetu (IF), 10.VI.1985, 14-18.VII.1988.



*Stenurella nigra* (Linnaeus, 1758)

1 spec., Măgura Codlei Mts (Zeidner Berg) (BV) VI., without other data; 1 spec., Bicaz (NT), altitude: 600 m, 10.VI.1949; 1 spec., Braşov (BV), altitude: 700 m, 26.V.1954; 3 specs, Huşi, Voloşeni (VS), 16-20.V.1968.

*Stenurella septempunctata septempunctata* (Fabricius, 1792)

1 spec., Târgu Mureş (MS), 7.VI.1965; 1 spec., Pustnicu Forest, Brăneşti (IF), 19.VI.1966; 1 spec., Huşi, Voloşeni (VS), 16.VI.1968; 4 specs, Domogled Mt., Băile Herculane (CS), altitude: 900 m, 31.VII.1949, 7.VIII.1976; 1 spec., Cornetu (IF), 10.VI.1985.

Genus *Stictoleptura* Casey, 1924Subgenus *Aredolpona* Nakane & K. Ohbayashi, 1957*Stictoleptura (Aredolpona) rubra rubra* (Linnaeus, 1758)

1 spec., Secu (NT), 25.VII.1979; 1 spec., Frasin (SV), altitude: 500 m, 27.VII.1962; 2 specs, Câmpulung Moldovenesc (SV), 3.IX.1974, 26.VIII.1976; 1 spec., Deia (SV), 4.VII.1989.

Subgenus *Stictoleptura* Casey, 1924*Stictoleptura (Stictoleptura) erythroptera* (Hagenbach, 1822)

1 spec., Râşnov (BV), 2.VIII.

*Stictoleptura (Stictoleptura) maculicornis maculicornis* (De Geer, 1775)

1 spec., Bicaz (NT), 1949; 1 spec., Tarcău Mts (Eastern Carpathians) (NT), 16.VI.1949; 4 specs, Câmpulung Moldovenesc (SV), 20.VI.1951, 19.VI.1965; 6 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900-1000 m, 23.VII.1965, 13.VII.1970, 17.VI.1972, 9.VII.1973, 10.VIII.1982.

*Stictoleptura (Stictoleptura) scutellata scutellata* (Fabricius, 1781)

2 specs, Tarcău Mts (Eastern Carpathians) (NT), 14.VII.1949; 1 spec., Buhalniţa (NT), 25.VII.1949; 2 specs, Băile Herculane (CS), 1.VIII.-10.IX.1976.

*Stictoleptura (Stictoleptura) tesseraula* (Charpentier, 1825)

3 specs, Băile Herculane (CS), 1.VIII.1976, 30.VII.1978; 3 specs, Domogled Mt., Mehedinţi Mts (CS), 2.VIII.1978.

Genus *Strangalia* Audinet-Serville, 1835

(syn. *Strangalina* Aurivillius 1912, *Typocerus* auct.)

*Strangalia attenuata* (Linnaeus, 1758)

1 spec., Bucureşti, 23.VI.1959.

Genus *Vadonia* Mulsant, 1863*Vadonia unipunctata unipunctata* (Fabricius, 1787)

1 spec., Hungary, without other data; 1 spec., Baci Forest, Târgu Mureş, 7.VI.1965.

## Tribe Oxymirini Danilevsky, 1997

Genus *Oxymirus* Mulsant, 1862*Oxymirus cursor* (Linnaeus, 1758)

2 specs, Pojorâta (Eastern Carpathians) (SV), 20.V.1952; 1 spec., Veşău f.h., Putna (SV), 23.V.1965; 1 spec., Grinţieş (Eastern Carpathians) (NT), 20.V.1979.

## Tribe Rhagiini Kirby, 1837

Genus *Acmaeops* Le Conte, 1850*Acmaeops pratensis* (Laicharting, 1784)

1 spec., without data.

*Acmaeops septentrionis* (C. G. Thomson, 1866)

1 spec., without data.

Genus *Anisorus* Mulsant, 1862*Anisorus quercus quercus* (Götz, 1783)

2 specs, București, 8.VI.1947; 1 spec., Babadag (TL), 12.IV.1961.

Genus *Cortodera* Mulsant, 1863*Cortodera femorata* (Fabricius, 1787)

2 specs, Broșteni (Eastern Carpathians), altitude: 800 m (SV), 26.V.1952; 1 spec., Câmpulung Moldovenesc (SV), altitude: 700 m, 25.VI.1967.

*Cortodera humeralis humeralis* (Schaller, 1783)

2 specs, Băneasa Forest, București, V.1947; 1 spec., Huși (VS), 14.V.1967.

*Cortodera* sp.

4 specs, Visterna (TL), 14.V.1963; 1 spec., Valea Putnei (Eastern Carpathians) (SV), 19.VI.1975.

Genus *Dinoptera* Mulsant, 1863*Dinoptera collaris* (Linnaeus, 1758)

2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 23.VII.1965; 1 spec., Jegălia (CL), 3.VI.1992.

Genus *Evodinus* Le Conte, 1850*Evodinus clathratus* (Fabricius, 1792)

3 specs, Broșteni (Eastern Carpathians), altitude: 800 m (SV), 26.V.1959; 1 spec., Farcău, Socolău (MM), 28.V.1970; 18 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900-1000 m, 18.V.1972, 4.VI.1973, 20.V.1978, 28.V.-2.VI.1980, 18.V.-10.VIII.1982, 16-19.V.1983; 1 spec., Rarău Mt., altitude: 1400 m, 20.VIII.1977; 2 specs, Vatra Dornei (SV), 18.V.1978; 4 specs, Călimani Mts (Eastern Carpathians), altitude: 1700 m, 16.VII.1979, 21.VII.1983; 1 spec., Săcele (BV), V.1989.

Genus *Gaurotes* Le Conte, 1850Subgenus *Carilia* Mulsant, 1863*Gaurotes (Carilia) virginea virginea* (Linnaeus, 1758)

1 spec., Austria, Koralpe, without other data, E.R.; 1 spec., Lacul Roșu, Ghilcoș (HR), 31.VII.1949; 1 spec., Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 23.VII.1965.

Genus *Pachyta* Dejean, 1821*Pachyta lamed lamed* (Linnaeus, 1758)

1 spec., Călimani Mts (Eastern Carpathians), altitude: 1500 m, 24.VIII.1978.

*Pachyta quadrimaculata* (Linnaeus, 1758)

1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 22.VII.1968; 1 spec., Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 14.VII.1981; 1 spec., Deia (SV), 4.VII.1989.



Genus *Pidonia* Mulsant, 1863*Pidonia lurida* (Fabricius, 1792)

1 spec., Tarcău Mts (Eastern Carpathians) (NT), 16.VI.1949; 1 spec., Bicăz (NT), 17.VI.1949; 1 spec., Timișu de Sus (Southern Carpathians) (BV), altitude: 1000 m, 21.VI.1957; 1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 18.VII.1958; 1 spec., Beliș (CJ), 28.VII.1960; 2 specs, Câmpulung Moldovenesc, Valea Caselor (SV), 1.VI.1988.

Genus *Pseudogaurotina* Plavilstshikov, 1958*Pseudogaurotina excellens* (Brancsik, 1874)

1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 10.VI.1958 (Fig. 1 A).

Genus *Rhagium* Fabricius, 1775Subgenus *Hagrium* Villiers, 1978*Rhagium (Hagrium) bifasciatum* Fabricius, 1775

1 spec., Câmpulung Moldovenesc (Eastern Carpathians) (SV), 18.VII.1953.

Subgenus *Megarhagium* Reitter, 1913*Rhagium (Megarhagium) mordax* (De Geer, 1775)

1 spec., Piatra Neamț (NT), 30.IV.1949.

*Rhagium (Megarhagium) sycophanta* (Schrank, 1781)

1 spec., Târgu Neamț (NT), 25.IV.1971.

Subgenus *Rhagium* Fabricius, 1775*Rhagium (Rhagium) inquisitor inquisitor* (Linnaeus, 1758)

1 spec., Piatra Neamț (NT), 10.V.1949; 1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 26.V.1958.

Genus *Stenocorus* Geoffroy, 1762*Stenocorus meridianus* (Linnaeus, 1758)

1 spec., Timișu de Sus (Southern Carpathians) (BV), altitude: 1000 m, 6.VI.1954; 2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 900 m, 26.VI.1980, 23.V.1986; 1 spec., Cornetu (IF), 10.VI.1985.

## Tribe Rhamnusiini Sama, 2009

Genus *Rhamnusium* Latreille, 1829*Rhamnusium bicolor bicolor* (Schrank, 1781)

1 spec., without data.

## Tribe Xylosteini Reitter, 1913

Genus *Xylosteus* Frivaldszky von Frivald, 1837*Xylosteus spinolae* Frivaldszky von Frivald, 1837

1 spec., Retezat Mts, 6.VI.1962; 1 spec., Băile Herculane (CS), 20.VI.1976.

## Subfamily Spondylidinae Audinet-Serville, 1832

## Tribe Anisarthrini Mamaev &amp; Danilevsky, 1973

Genus *Anisarthron* Dejean, 1835*Anisarthron barbipes* (Schränk, 1781)

1 spec., Braşov (BV), altitude: 700 m, 24.VI.1957.

## Tribe Asemmini J. Thomson, 1861

Genus *Arhopalus* Serville, 1834*Arhopalus rusticus* (Linnaeus, 1758)

2 specs, Buhalniţa (NT), VII.1949.

Genus *Asemum* Eschscholtz, 1830*Asemum striatum* (Linnaeus, 1758)

2 specs, Broşteni (Eastern Carpathians) (SV), altitude: 800 m, 22-26.V.1958.

Genus *Tetropium* Kirby, 1837*Tetropium castaneum* (Linnaeus, 1758)

1 spec., Broşteni (Eastern Carpathians) (SV), altitude: 800 m, 28.VII.1958; 1 spec., Russia, Siberia, VI.1981; 2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 25-31.V.1983.

*Tetropium fuscum* (Fabricius, 1787)

1 spec., Taşca, (NT), V.1949; 1 spec., Câmpulung Moldovenesc (Eastern Carpathians) (SV), 25.III.1951.

## Tribe Saphanini Gistel, 1848

Genus *Saphanus* Audinet-Serville, 1834*Saphanus piceus piceus* (Laicharting, 1784)

2 specs, Băile Herculane (CS), 10-12.VIII.1978; 1 spec., Săcele (BV), 6.VII.1988.

## Tribe Spondylidini Audinet-Serville, 1832

Genus *Spondylis* Fabricius, 1775*Spondylis buprestoides* (Linnaeus, 1758)

1 spec., Tarcău Mts (Eastern Carpathians) (NT), 21.V.1949; 1 spec., Băile Herculane (CS), altitude: 900 m, 12.V.1977.

## Subfamily Necydalinae Latreille, 1825

## Tribe Necydalini Latreille, 1825

Genus *Necydalis* Linnaeus, 1758*Necydalis major major* Linnaeus, 1758

1 spec., without data.

*Necydalis ulmi* Chevrolat, 1838

1 spec., Germany, Steglitz, 25.V.

## Subfamily Cerambycinae Latreille, 1802

## Tribe Anaglyptini Lacordaire, 1868

Genus *Anaglyptus* Mulsant, 1839*Anaglyptus mysticus* (Linnaeus, 1758)

1 spec., Timișoara, Pădurea Verde (TM), 10.V.1960; 1 spec., Târgu Mureș, Pădurea Mare (MS), 14.V.1963; 1 spec., Huși, Voloșeni (VS), 14.V.1967.

## Tribe Callichromatini Swainson &amp; Shuckard, 1840

Genus *Aromia* Audinet-Serville, 1833*Aromia moschata moschata* (Linnaeus, 1758)

1 spec., Câmpulung Moldovenesc (SV), altitude: 600 m, 15.VIII.1974.

## Tribe Callidiini Kirby, 1837

Genus *Callidium* Fabricius, 1775Subgenus *Callidium* Fabricius, 1775*Callidium* (*Callidium*) *violaceum* (Linnaeus, 1758)

1 spec., Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 24.VI.1958; 2 specs, Valea Putnei (Eastern Carpathians) (SV), 6.VI.1979, 3.VI.1982.

Subgenus *Callidostola* Reitter, 1913*Callidium* (*Callidostola*) *aeneum aeneum* (De Geer, 1775)

2 specs, Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 7-10.VI.1982; 1 spec., Brașov, 7 Izvoare (Southern Carpathians) (BV), 18.VI.1987.

Genus *Leioderes* Redtenbacher, 1849*Leioderes kollari* Redtenbacher, 1849

2 specs, without other data.

Genus *Phymatodes* Mulsant, 1839Subgenus *Phymatodellus* Reitter, 1913*Phymatodes* (*Phymatodellus*) *rufipes rufipes* (Fabricius, 1776)

1 spec., without data.

Subgenus *Phymatodes* Mulsant, 1839*Phymatodes* (*Phymatodes*) *testaceus* (Linnaeus, 1758)

2 specs, Tâmpa (Kapellenberg), Brașov, without other data, Fr.D.; 2 specs, Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.; 2 specs, Pojorâta (SV), 15.VI.1950; 2 specs, Jegălia (CL), 3.IV.1957, 20.IV.1960; 1 spec., Cerhat Forest (SM), 23.V.1962; 1 spec., Roșiori de Vede (TR), 6.V.1966; 1 spec., Câmpulung Moldovenesc (SV), 30.VI.1984.

Genus *Poecilium* Fairmaire, 1864*Poecilium alni alni* (Linnaeus, 1767)

2 specs, Huși, Voloșeni (VS), 10.V.1967.

*Poecilium pusillus pusillus* (Fabricius, 1787)

6 specs, Timișoara, Lighed Forest (TM), 29.IV.-5.V.1960; 1 spec., Hitiaș (TM), 6.V.1960; 2 specs, Cerhat Forest (SM), 22.V.1962.

Genus *Pronocera* Motschulsky, 1875*Pronocera angusta* (Kriechbaum, 1844)

1 spec., Ciumârna, Vatra Moldoviței (SV), 24.VI.1980.

Genus *Pyrrhidium* Fairmaire, 1864*Pyrrhidium sanguineum* (Linnaeus, 1758)

1 spec., Republic of Moldova, Tighina (Bender), II.1937; 1 spec., Buzău (BZ), 16.IV.1947; 7 specs, Jegălia (CL), 20-21.IV.1960.

Genus *Ropalopus* Mulsant, 1839*Ropalopus clavipes* (Fabricius, 1775)

1 spec., Pojorâta (SV), altitude: 800 m, 7.VII.1952.

*Ropalopus femoratus* (Linnaeus, 1758)

1 spec., Brașov (BV), altitude: 700 m, Fr.D.; 1 spec., Târgu Mureș, Pădurea Mare (MS), 22.V.1964.

*Ropalopus macropus* (Germar, 1824)

1 spec., Ardeluța (NT), 24.V.1949; 1 spec., Brașov (BV), altitude: 700 m, 28.IV.1957.

Genus *Semanotus* Mulsant, 1839*Semanotus ruscicus ruscicus* (Fabricius, 1776)

1 spec., Câmpulung Moldovenesc (SV), altitude: 800 m, 25.IV.1951; 5 specs, Simeria (HD), 10-11.III.1959.

## Tribe Cerambycini Latreille, 1802

Genus *Cerambyx* Linnaeus, 1758*Cerambyx scopolii* Fuessly, 1775

1 spec., București, Băneasa Forest, 8.V.1947.

## Tribe Clytini Mulsant, 1839

Genus *Chlorophorus* Chevrolat, 1863*Chlorophorus figuratus* (Scopoli, 1763)

1 spec., Deva (HD), 2.VI.; 2 specs, Huși, Voloșeni (VS), 16-20.V.1968.

*Chlorophorus herbstii* (Brahm, 1790)

2 specs, Câmpulung Moldovenesc (SV), 21.VII.1962, 2.VIII.1966; 1 spec., Suceava, Adâncata, 2.VII.1953.

*Chlorophorus sartor* (O. F. Müller, 1766)

1 spec., Bucu (IL), 22.VII.1957; 17 specs, Jegălia (CL), 30.VII.1992.

*Chlorophorus varius varius* (O. F. Müller, 1766)

1 spec., Republic of Moldova, Tighina, VII.1936; 2 specs, Jegălia (CL), 16-23.VII.1955.

Genus *Clytus* Laicharting, 1784*Clytus arietis arietis* (Linnaeus, 1758)

1 spec., Braşov (BV), altitude: 700 m, without other data, Fr.D.; 1 spec., Hărman (Honigberg) (BV), 15.V.1906; 1 spec., Republic of Moldova, Ştefan Vodă district, Ermoclia, VII.1938; 1 spec., Câmpulung Moldovenesc (SV), VII.1950.

*Clytus lama* Mulsant, 1847

2 specs, Câmpulung Moldovenesc (SV), VII.1950, 1.VII.1951.

*Clytus rhamni* Germar, 1817

2 specs, Jegălia (CL), 20.VI.1955, 3.VI.1992; 1 spec., Huşi (SV), 20.V.1968.

*Clytus tropicus* (Panzer, 1795)

1 spec., Germany, Freistaat Thüringen, without other data; 1 spec., Timişoara, Hitiaş (TM), 13.V.1960.

Genus *Cyrtoclytus* Ganglbauer, 1882*Cyrtoclytus capra* (Germar, 1824)

1 spec., Transylvanian Mts = Southern Carpathians (Transsylvania Alpen), without other data; 1 spec., Valea Putnei (Eastern Carpathians) (SV), altitude: 1000 m, 3.VII.1979.

Genus *Isotomus* Mulsant, 1862*Isotomus speciosus* (D. H. Schneider, 1787)

1 spec., Suceava (Burdujeni) (SV), 4.VII.1953.

Genus *Plagionotus* Mulsant, 1842*Plagionotus arcuatus* (Linnaeus, 1758)

1 spec., Czech Republic, Moravia, without other data; 1 spec., Hărman (Honigberg) (BV), 4.VI.1902; 1 spec., Visterna, Babadag (TL), 14.V.1938; 1 spec., Poeni (IS), 17.IV.1953; 13 specs, Cerhat Forest (SM), 23-27.V.1962; 1 spec., Baci Forest (CJ), 7.VI.1963; 14 specs, Huşi, Voloşeni (VS), 15.V.1967.

*Plagionotus detritus* (Linnaeus, 1758)

3 specs, Buriaşu Forest, Periş (IF), 26.VI.1964.

*Plagionotus floralis* (Pallas, 1773)

2 specs, Jegălia (CL), 28.VI.1955.

Genus *Rusticoclytus* Vives, 1977*Rusticoclytus rusticus* (Linnaeus, 1758)

1 spec., Braşov (BV), altitude: 700 m, without other data, Fr.D.; 1 spec., Câmpulung Moldovenesc, (SV), altitude: 600 m, 4.VI. 1953; 1 spec., Buzău (BZ), 24.VI.1963; 1 spec., Văratec (NT), 11.VI.1970.

Genus *Xylotrechus* Chevrolat, 1860*Xylotrechus antilope antilope* (Schönherr, 1817)

1 spec., Cerhat Forest (SM), 23.V.1962; 2 specs, Baci Forest (CJ), 7.VI.1963.

*Xylotrechus arvicola* (Olivier, 1795)

2 specs, without data.

## Tribe Deilini Fairmaire, 1864

Genus *Deilus* Audinet-Serville, 1834*Deilus fugax* (Olivier, 1790)

1 spec., without data.

## Tribe Graciliini Mulsant, 1839

Genus *Gracilia* Audinet-Serville, 1834*Gracilia minuta* (Fabricius, 1781)

1 spec., Czech Republic, Boemia, without other data.

## Tribe Hesperophanini Mulsant, 1839

Subtribe Hesperophanina Mulsant, 1839

Genus *Trichoferus* Wollaston, 1854*Trichoferus pallidus* (Olivier, 1790)

2 specs, Galați (Barboși) (GL), 4.VIII.1960; 1 spec., Retezat Mts, Râul Mare, X.1964.

## Tribe Hylotrupini Zagajkevitch, 1991

Genus *Hylotrupes* Audinet-Serville, 1834*Hylotrupes bajulus* (Linnaeus, 1758)

3 specs, Domogled Mt., Mehedinți Mts (CS), 18.VII.1978.

## Tribe Molorchini Gistel, 1848

Genus *Glaphyra* Newman, 1840*Glaphyra umbellatarum* (Schreber, 1759)

1 spec., without other data; 1 spec., Cerhat Forest (SM), 25.V.1962.

Genus *Molorchus* Fabricius, 1792*Molorchus minor minor* (Linnaeus, 1767)

1 spec., Brașov, 7 Izvoare (Southern Carpathians) (BV), 25.VI.1987; 2 specs, Broșteni (Eastern Carpathians) (SV), altitude: 800 m, 7.VI.1958, 25.V.1959; 1 spec., Câmpulung Moldovenesc (SV), 18.VI.1960.

## Tribe Obriini Mulsant, 1839

Genus *Obrium* Dejean, 1821*Obrium brunneum* (Fabricius, 1792)

8 specs, Valea Putnei (Eastern Carpathians) (SV), 4.VII.1970, 2.VII.1976, 10.VI.1978, 31.V.-5.VI.1979, 1.VIII.1980, 10.06.1982, 23.07.1984; 1 spec., Bodea, Rarău Giumalău Mts, 5.VII.1976; 2 specs, Deia (SV), 26.V.1984, 11.VI.1987; 1 spec., Borsec (HR), 17.VI.1986; 1 spec., Brașov, 7 Izvoare (Southern Carpathians) (BV), 16.VI.1987; 4 specs, Săcele (BV), 7-16.VI.1990.

*Obrium cantharinum cantharinum* (Linnaeus, 1767)

1 spec., Republic of Moldova, without other data; 1 spec., Cotu Ciorii (BZ), 24.V.1963.

Tribe Purpuricerini J. Thomson, 1861

Genus *Purpuricen* Dejean, 1821

*Purpuricen* *budensis* (Götz, 1783)

3 specs, Brănești, Pasărea Forest (IF), 15.VI.1994.

*Purpuricen* *kaehleri kaehleri* (Linnaeus, 1758)

1 spec., Brănești, Pasărea Forest (IF), 15.VI.1994.

Tribe Rosaliini Fairmaire, 1864

Genus *Rosalia* Audinet-Serville, 1834

*Rosalia alpina alpina* (Linnaeus, 1758)

2 specs, Domogled Mt., Mehedinți Mts (CS), 24.VIII.-8.X.1978; 1 spec., Sinaia (PH), 12.VII.1994.

Tribe Stenopterini Gistel, 1848

Genus *Callimoxys* Kraatz, 1863

*Callimoxys gracilis* (Brullé, 1832)

1 spec., Timișoara, Pădurea Verde (TM), 30.IV.1960.

Genus *Callimus* Mulsant, 1846

*Callimus angulatus angulatus* (Schränk, 1789)

1 spec., Băile Herculane (Herkulesbad) (CS), without other data, Fr.D.; 1 spec., Cerhat Forest (SM), 17.V.1962.

Subfamily Lamiinae Latreille, 1825

Tribe Acanthocinini Blanchard, 1845

Genus *Acanthocinus* Dejean, 1821

*Acanthocinus aedilis* (Linnaeus, 1758)

4 specs, Galu (NT), 3.V.1949.

*Acanthocinus griseus* (Fabricius, 1792)

2 specs, Fundata (BV), 14.VII.1949; 2 specs, Pojorâta (SV), 10.VI.1965.

*Acanthocinus reticulatus* (Razoumowsky, 1789)

1 spec., Republic of Moldova, without other data.

Genus *Leiopus* Audinet-Serville, 1835

*Leiopus nebulosus nebulosus* (Linnaeus, 1758)

1 spec., Republic of Moldova, Tighina, without other data; 1 spec., Hitiaș (TM), 10.VI.1960; 2 specs, Târgu Mureș, Pădurea Mare (MS), 11.VI.1963.

Tribe Acanthoderini J. Thomson, 1860

Genus *Aegomorphus* Haldeman, 1847

*Aegomorphus clavipes* (Schränk, 1781)

5 specs, Fetești (IL), 9-22.II.1960 (adults were obtained by breeding in laboratory conditions).



Genus *Oplosia* Mulsant, 1862*Oplosia cinerea* (Mulsant, 1839)

1 spec., Domogled Mt., Mehedinți Mts (CS), 24.VII.1978.

## Tribe Agapanthiini Mulsant, 1839

Genus *Agapanthia* Audinet-Serville, 1835Subgenus *Agapanthia* Audinet-Serville, 1835*Agapanthia (Agapanthia) cardui* (Linnaeus, 1767)

2 specs, Gyarmat Forest (SM), 27.VI.1960; 12 specs, Cerhat Forest (SM), 18-27.V.1962; 1 spec., Târgu Mureș (MS), Pădurea Mare (MS), 11.VI.1963.

*Agapanthia (Agapanthia) violacea* (Fabricius, 1775)

1 spec., Republic of Moldova, Tighina, V.1939; 8 specs, Jegălia (CL), 25.V.-21.VI.1955, 5.VI.1960; 1 spec., Huși, Voloșeni (VS), 12.V.1967; 1 spec., Cornetu (IF), 23.V.1984.

Subgenus *Epopetes* Gistel, 1857*Agapanthia (Epopetes) asphodeli* (Latreille, 1804)

1 spec., Spain, Madrid, without other data.

*Agapanthia (Epopetes) dahli* (C. F. W. Richter, 1820)

1 spec., Republic of Moldova, Hârbovăț monastery, VI.1938; 1 spec., C. A. Rosetti (TL), VI.1948; 1 spec., Jegălia (CL), 21.VI.1955; 1 spec., Bazargic, 25.VI.1956.

*Agapanthia (Epopetes) villosoviridescens* (De Geer, 1775)

1 spec., Southern Carpathians (Transsylvaniche Alpen), Piatra Mare Mts (Hohenstein), without other data, Fr.D.; 1 spec., Prejmer (BV), 23.V.1956; 8 specs, Timișu de Sus (BV), 21.VI.1957; 2 specs, Barnar (SV), 1.VIII.1958; 1 spec., Broșteni (Eastern Carpathians) (SV), 5.VIII.1959; 2 specs, Valea Putnei (Eastern Carpathians) (SV), 27.VI.1983; 1 spec., Câmpulung Moldovenesc, Valea Caselor (SV), 1.VI.1988.

Genus *Agapanthiola* Ganglbauer, 1900*Agapanthiola leucaspis* (Steven, 1817)

5 specs, Vurpăr (Burgberg) (SB), 28.V.; 5 specs, Agigea (CT), 19-23.VI.1964.

Genus *Calamobius* Guérin-Ménéville, 1847*Calamobius filum* (Rossi, 1790)

1 spec., Austria, Wien, in the surroundings, without other data; 2 specs, Agigea (CT), 23.VI.1964.

## Tribe Apodasyini Lacordaire, 1872

Genus *Anaesthetis* Dejean, 1835*Anaesthetis testacea testacea* (Fabricius, 1781)

1 spec., Republic of Moldova, Tighina, 13.VI.1940; 1 spec., Cerhat Forest (SM), 17.V.1962; 1 spec., Voloșeni (VS), 20.V.1968.

## Tribe Dorcadionini Swainson &amp; Shuckard, 1840

Genus *Dorcadion* Dalman, 1817Subgenus *Carinatodorcadion* Breuning, 1943*Dorcadion (Carinatodorcadion) aethiops* (Scopoli, 1763)

3 specs, Sabed (MS), 31.III.1951; 2 specs, Cerhat Forest (SM), 18.V.-23.V.1962.

*Dorcadion (Carinatodorcadion) fulvum erythropteron* (Fischer von Waldheim, 1823)

1 spec., Republic of Moldova, Ștefan Vodă district, Ermoclia, V.1938; 3 specs, Sabed (MS), 31.III.1951.

Subgenus *Cribridorcadion* Pic, 1910*Dorcadion (Cribridorcadion) arenarium arenarium* (Scopoli, 1763)

1 spec., Italy, without other data.

*Dorcadion (Cribridorcadion) equestre transsilvanicum* Ganglbauer, 1884

1 spec., Republic of Moldova, Ștefan Vodă district, Ermoclia, V.1938; 2 specs, Cucuieți, Scioaștea (TR), 6.V.1966.

*Dorcadion (Cribridorcadion) pedestre pedestre* (Poda, 1761)

2 specs, Sabed (MS), 31.III.1951; 4 specs, Cerhat Forest (SM), 24.IV.-13.V.1962; 1 spec., Visterna (TL), 14.V.1963.

*Dorcadion (Cribridorcadion) murrayi* (Küster, 1847)

1 spec., Cernica Forest (IF), V.1945; 1 spec., București, 4.IV.1946; 1 spec., Bufta (IF), 20.V.1947; 2 specs, Cucuieți, Scioaștea (TR), 6.V.1966.

*Dorcadion (Cribridorcadion) scopolii* (Herbst, 1784)

2 specs, Bacova (TM), 8.V.1960; 3 specs, Cerhat Forest (SM), 23.IV.-22.V.1962.

Genus *Neodorcadion* Ganglbauer, 1884*Neodorcadion bilineatum* (Germar, 1824)

1 spec., Republic of Moldova, V.1939; 2 specs, Poeni (IS), 17.IV.1953; 1 spec., Cotu Ciorii (BZ), 24.V.1963.

## Tribe Lamiini Latreille, 1825

Genus *Lamia* Fabricius, 1775*Lamia textor* (Linnaeus, 1758)

1 spec., Adâncata (SV), 3.VII.1953.

Genus *Morimus* Brullé, 1832*Morimus asper asper* (Sulzer, 1776)

1 spec., Alba Iulia (Karlsburg) (AB), without other data, Fr.D.

*Morimus asper funereus* (Mulsant, 1863)

1 spec., Bârnova (IS), VIII.1949; 1 spec., București, IV.1950; 1 spec., Babadag (TL), V.1953.

Tribe Mesosini Mulsant, 1839

Genus *Mesosa* Latreille, 1829

Subgenus *Aplocnemias* Stephens, 1831

= *Aphelecnemias* Stephens, 1831 [emendation, not in usage]

*Mesosa (Aplocnemias) nebulosa nebulosa* (Fabricius, 1781)

2 specs, Lighed Forest (TM), 5.V.1960; 4 specs, Hitiaș (TM), 9-13.V.1960; 2 specs, Cerhat Forest (SM), 22.V.1962.

Subgenus *Mesosa* Latreille, 1829

*Mesosa (Mesosa) curculionoides* (Linnaeus, 1760)

1 spec., Republic of Moldova, Ștefan Vodă district, Ermoclia, VII.1938; 1 spec., Gurghiu (MS), 14.VII.1952; 1 spec., Gyarmat Forest (SM), 25.VII.1960; 1 spec., Baci Forest (CJ), 7.VI.1962; 3 specs, Piscu, Tunari Forest (DJ), 11.IX.1965; 1 spec., Huși, Voloșeni (VS), 13.V.1967.

Tribe Monochamini Gistel, 1848

Genus *Monochamus* Dejean, 1821

Subgenus *Monochamus* Dejean, 1821

*Monochamus (Monochamus) galloprovincialis* (Olivier, 1795)

1 spec., Beliș (CJ), 28.VII.1960; 1 spec., Câmpulung Moldovenesc (SV), 18.VII.1982

*Monochamus (Monochamus) saltuarius* (Gebler, 1830)

1 spec., Greifenstein, without other data.

*Monochamus (Monochamus) sartor* (Fabricius, 1787)

2 specs, Tarcău Mts, Fundul Aței (NT), 14.VII.1949; 1 spec., Tașca (NT), 29.VII.1949; 3 specs, Pojorâta (SV), 19.IX.1949, 10.VI.1965; 1 spec., Timișu de Sus (BV), 21.VI.1957.

*Monochamus (Monochamus) sutor sutor* (Linnaeus, 1758)

7 specs, without data; 1 spec., Borsec (HR), 1.V.1958; 6 specs, ex U.R.S.S., without mentioning the collection place, 28.VI.1982 (adults were obtained by breeding in laboratory conditions).

*Monochamus (Monochamus) urussovii* (Fischer von Waldheim, 1805)

2 specs, ex U.R.S.S., without mentioning the collection place, 24.VI.1982 (adults were obtained by breeding in laboratory conditions).

Tribe Phytoeciini Mulsant, 1839

Genus *Oberea* Dejean, 1835

Subgenus *Amaurostoma* J. Müller, 1906

*Oberea (Amaurostoma) erythrocephala erythrocephala* (Schrank, 1776)

2 specs, Jegălia (CL), 21.VI.1955; 1 spec., Prejmer (BV), 12.VI.1956.

*Oberea (Amaurostoma) euphorbiae* (Germar, 1813)

1 spec., C. A. Rosetti, the Danube Delta (TL), VII.1950; 1 spec., Hanu Conachi (GL), VII.1950.

Subgenus *Oberea* Dejean, 1835*Oberea (Oberea) linearis* (Linnaeus, 1761)

1 spec., C. A. Rosetti, the Danube Delta (TL), VII.1950.

*Oberea (Oberea) oculata* (Linnaeus, 1758)

1 spec., Timiș, 6.VII.1954; 3 specs, Târnăveni (MS), 1.IV.1967.

*Oberea (Oberea) pupillata* (Gyllenhal, 1817)

2 specs, Câmpulung Moldovenesc (SV), 17.VI.1971.

Genus *Opsilia* Mulsant, 1862*Opsilia coerulescens* (Scopoli, 1763)

3 specs, Bicaz (NT), 2.VI.1949; 1 spec., București, Ștefănești Forest, 5.VI.1959.

Genus *Phytoecia* Dejean, 1835Subgenus *Musaria* J. Thomson, 1864*Phytoecia (Musaria) affinis affinis* (Harrer, 1784)(= *Phytoecia nigripes* Voet, 1778)

1 spec., without data.

*Phytoecia (Musaria) argus* (Frölich, 1793)

1 spec., Ocna Sibiului (Salzburg) (SB), without other data.

Subgenus *Phytoecia* Dejean, 1835*Phytoecia (Phytoecia) caerulea caerulea* (Scopoli, 1772)

10 specs, Jegălia (CL), 19-25.VI.1955; 1 spec., Visterna, Babadag (TL), 17.V.1963.

*Phytoecia (Phytoecia) cylindrica* (Linnaeus, 1758)

1 spec., București, Ștefănești Forest, 23.VI.1959; 3 specs, Timișoara, Pădurea Verde (TM), 5-8.VI.1959.

*Phytoecia (Phytoecia) icterica* (Schaller, 1783)

1 spec., Hungary (Hungarn), without other data.

*Phytoecia (Phytoecia) nigricornis* (Fabricius, 1781)

1 spec., Republic of Moldova, VI.1938.

*Phytoecia (Phytoecia) pustulata pustulata* (Schränk, 1776)

1 spec., Roznov (NT), 17.VI.1952; 1 spec., Huși, Voloșeni (VS), 16.V.1967.

*Phytoecia (Phytoecia) virgula* (Charpentier, 1825)

1 spec., Sighișoara (Schässburg) (MS), without other data; 1 spec., București, Ștefănești Forest, 10.VI.1959; 1 spec., Timișoara, Pădurea Verde (TM), 5.V.1960; 1 spec., Cerhat Forest (SM), 12.V.1962; 1 spec., Agigea (CT), 20.VI.1964.

Genus *Pilemia* Fairmaire, 1864*Pilemia hirsutula hirsutula* (Frölich, 1793)

1 spec., Hungary, Peczel, without other data; 3 specs, Huși, Voloșeni (VS), 17-20.V.1968.

## Tribe Pogonocherini Mulsant, 1839

Genus *Exocentrus* Dejean, 1835*Exocentrus adspersus* Mulsant, 1846

1 spec., Retezat Mts (Háztéger Gebirge) (Western Carpathians), without other data, Fr.D.

*Exocentrus lusitanus* (Linnaeus, 1767)

1 spec., Târgu Mureș, Pădurea Mare (MS), 11.VI.1963; 1 spec., Huși, Voloșeni (VS), 16.V.1968.

*Exocentrus punctipennis* Mulsant & Guillebeau, 1856

1 spec., Simeria (HD), 19.VI.1959; 31 specs, Bărağan experimental forest resort, Jegălia (CL), 26.V.1955, 7.VII.1956, 15-28.VI.1957, 4.VII.1966.

Genus *Pogonocherus* Dejean, 1821*Pogonocherus decoratus* Fairmaire, 1855

1 spec., Marginea (Voivodeasa, SV), 27.VI.1984; 1 spec., Câmpulung Moldovenesc, Valea Caselor (SV), 10.V.1985.

*Pogonocherus eugeniae eugeniae* Ganglbauer, 1891

1 spec., Râșnov Mts (Rosenauer Gebirge) (BV), without other data, Fr.D.

*Pogonocherus fasciculatus fasciculatus* (De Geer, 1775)

1 spec., Neagra (AR), 19.V.1958; 1 spec., Borsec (HR), 6.VI.1958; 6 specs, Valea Putnei, (Eastern Carpathians) (SV), 20.IX.1969, 17.V.-26.VI.1972, 15.V.-5.VI.1979; 1 spec., Pojorâta (SV), 8.VIII.1979; 4 specs, Coșna (SV), 8.VII.1988.

*Pogonocherus hispidulus* (Piller & Mitterpacher, 1783)

1 spec., Ilișești (SV), 6.VI.1988; 1 spec., Cerhat Forest (SM), 14.V.1962; 1 spec., Întorsura Buzăului (CV), VI.1981.

*Pogonocherus hispidus* (Linnaeus, 1758)

1 spec., without data.

*Pogonocherus ovatus* (Goeze, 1777)

16 specs, Brețcu (CV), 18.V.1994

## Tribe Saperdini Mulsant, 1839

Genus *Menesia* Mulsant, 1856*Menesia bipunctata* (Zubkov, 1829)

1 spec., Austria, Umgebungen Graz, without other data.

Genus *Saperda* Fabricius, 1775*Saperda carcharias* (Linnaeus, 1758)

1 spec., Pojorâta (SV), 25.VII.1965; 1 spec., Valea Putnei (Eastern Carpathians) (SV), 21.V.1981; 2 specs, without other data.

*Saperda perforata* (Pallas, 1773)

1 spec., Republic of Moldova, VI.1938; Câmpulung Moldovenesc (SV), 31.V.1953.

*Saperda populnea* (Linnaeus, 1758)

13 specs, Jegălia (CL), 22.V.-19.VI.1955, 12-14.V.1956, 3.IV.-7.V.1957, 21.I.1959.

*Saperda punctata* (Linnaeus, 1767)

2 specs, Republic of Moldova, 1937-1939; 1 spec., Broșteni (Eastern Carpathians) (SV), 26.V.1959.

*Saperda scalaris scalaris* (Linnaeus, 1758)

1 spec., Tarcău Mts (Eastern Carpathians) (NT), 16.VI.1949; 1 spec., Izvorul Alb, Câmpulung Moldovenesc (SV), 17.V.1951; 1 spec., Domogled Mt., Feregari Valley (CS), 28.V.1977; 1 spec., Valea Putnei (Eastern Carpathians) (SV), 2.VII.1981.

*Saperda similis* Laicharting, 1784

1 spec., Poland, Silesia (Schlesien), Weistritz, without other data.

Genus *Stenostola* Dejean, 1835*Stenostola ferrea ferrea* (Schrank, 1776)

1 spec., Valea Putnei (Eastern Carpathians) (SV), 11.VII.1984.

## Tribe Tetropini Portevin, 1927

Genus *Tetrops* Stephens, 1829*Tetrops praeustus praeustus* (Linnaeus, 1758)

11 specs, Piatra Neamț (NT), 6.V.1949; 3 specs, Jegălia (CL), 25-27.V.1955, 23.VI.1956; 1 spec., Babadag (TL), 12.IV.1961; 3 specs, Cerhat Forest (SM), 14-25.V.1962; 4 specs, Câmpulung Moldovenesc, Valea Caselor (SV), 24.V.1978, 1.VI.1988, 10.VI.1984, 8.VI.1987.

## Family Megalopodidae Latreille, 1802

## Subfamily Zeugophorinae Böving &amp; Craighead, 1931

Genus *Zeugophora* Kunze, 1818Subgenus *Zeugophora* Kunze, 1818*Zeugophora (Zeugophora) flavicollis* (Marsham, 1802)

3 specs, without data.

*Zeugophora (Zeugophora) subspinosa* (Fabricius, 1781)

1 spec., Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

## Family Chrysomelidae Latreille, 1802

## Subfamily Criocerinae Latreille, 1804

Genus *Crioceris* Geoffroy, 1762*Crioceris duodecimpunctata* (Linnaeus, 1758)

1 spec., Visterna, Babadag (TL), 17.VI.1963.

*Crioceris quatuordecimpunctata* (Scopoli, 1763)

1 spec., Hanu Conachi (GL), 17.VII.1950; 1 spec., without data.

Genus *Lilioceris* Reitter, 1913*Lilioceris lili* (Scopoli, 1763)

1 spec., Austria, Umgebungen Graz, without other data.

*Lilioceris merdigera* (Linnaeus, 1758)

1 spec., Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.; 1 spec., Pădurea Verde (TM), 1.V.1960.

## Subfamily Cassidinae Gyllenhal, 1813

## Tribe Cassidini Gyllenhal, 1813

Genus *Cassida* Linnaeus, 1758*Cassida canaliculata* Laicharting, 1781

1 spec., Zau de Câmpie (Mező Zah), Transylvania (Erdély), without other data.

*Cassida murraea murraea* Linnaeus, 1767

4 specs, Câmpulung Moldovenesc, Valea Caselor (SV), 1.06.1988.

*Cassida rubiginosa rubiginosa* O. F. Müller, 1776

1 spec., Jegălia (CL), 25.VI.1955.

Genus *Hypocassida* Weise, 1893*Hypocassida subferruginea* (Schränk, 1776)

1 spec., Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

Genus *Pilemostoma* Desbrochers des Loges, 1891*Pilemostoma fastuosa* (Schaller, 1783)

1 spec., Valley of the Olt River (Alt, Fluss), without other data, Fr.D.

## Subfamily Chrysomelinae Latreille, 1802

## Tribe Chrysomelini Latreille, 1802

## Subtribe Chrysomelina Latreille, 1802

Genus *Chrysomela* Linnaeus, 1758*Chrysomela vigintipunctata vigintipunctata* Scopoli, 1763

1 spec., Broșteni (Eastern Carpathians) (SV), 4.05.1958; 1 spec., Timișu de Sus (BV), 21.VI.1957.

## Subtribe Prasocurina Reitter, 1913

Genus *Phaedon* Latreille, 1829Subgenus *Phaedon* Latreille, 1829*Phaedon (Phaedon) cochleariae cochleariae* (Fabricius, 1792)

2 specs, Rodna Mts (Rodnaer Gebirge), without other data, Fr.D.

Genus *Prasocuris* Latreille, 1802Subgenus *Hydrothassa* C. G. Thomson, 1859*Prasocuris (Hydrothassa) glabra* (Herbst, 1783)

3 specs, Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

*Prasocuris (Hydrothassa) marginella marginella* (Linnaeus, 1758)

1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

Subgenus *Prasocuris* Latreille, 1802*Prasocuris (Prasocuris) phellandrii* (Linnaeus, 1758)

1 spec., without data; 2 specs, Valley of the Olt River (Alt, Fluss), without other data, Fr.D.



Tribe Doryphorini Motschulsky, 1860

Subtribe Chrysolinina S.-H. Chen, 1936

Genus *Chrysolina* Motschulsky, 1860

Subgenus *Chrysolina* Motschulsky, 1860

*Chrysolina (Chrysolina) staphylaea staphylaea* (Linnaeus, 1758)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

Subgenus *Taeniosticha* Motschulsky, 1860

*Chrysolina (Taeniosticha) fimbrialis hungarica* (Fuss, 1861)

1 spec., Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

*Chrysolina (Taeniosticha) weisei* (Frivaldszky, 1883)

1 spec. ♂, Retezat Mts (Hátzégér Gebirge), without other data, Fr.D (Fig. 1, C-habitus, D-aedeagus, lateral view).

Genus *Oreina* Chevrolat, 1836

Subgenus *Chrysochloa* Hope, 1840

*Oreina (Chrysochloa) cacaliae senecionis* (Schummel, 1844)

1 spec., Rodna Mts (Rodnaer Gebirge), without other data, Fr.D.; 1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

Subgenus *Protorina* Weise, 1894

*Oreina (Protorina) plagiata plagiata* (Suffrian, 1861)

1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

Tribe Entomoscelini Reitter, 1913

Genus *Sclerophaedon* Weise, 1882

Subgenus *Sclerophaedon* Weise, 1882

*Sclerophaedon (Sclerophaedon) carpathicus* (Weise, 1875)

4 specs, Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D (Fig. 2 A).

Genus *Gonioctena* Chevrolat, 1836

Subgenus *Gonioctena* Chevrolat, 1836

*Gonioctena (Gonioctena) linnaeana* ab. *decastigma* (Duftschmid, 1825)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Gonioctena (Gonioctena) linnaeana* ab. *kraatzi* (Westhoff, 1881)

1 spec., Germany, Thuringia, Hildburghausen, without other data.

*Gonioctena (Gonioctena) linnaeana* ab. *nigricollis* (Westhoff, 1882)

1 spec., Râşnov Mts (Rosenauer Gebirge) (BV), without other data, Fr.D.

*Gonioctena (Gonioctena) viminalis viminalis* (Linnaeus, 1758)

1 spec., Câmpulung Moldovenesc, Valea Caselor (SV), 1.VI.1988.

Subgenus *Goniomena* Motschulsky, 1860

*Gonioctena (Goniomena) quinquepunctata quinquepunctata* (Fabricius, 1787)

3 specs, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

A



B



C



D

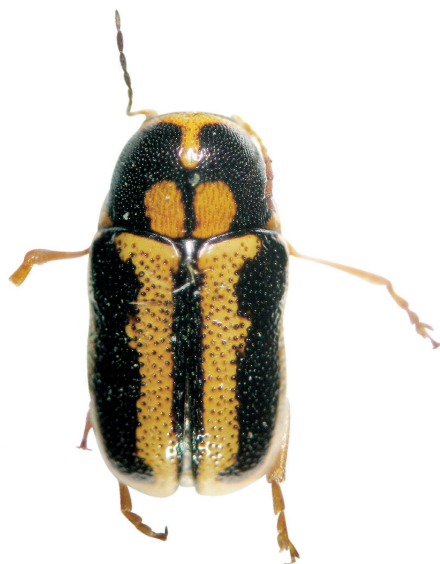


Fig. 2 - A, *Sclerophaedon carpathicus*; B, *Neocrepidodera transsilvanica*; C, *Cheilotoma musciformis*; D, *Cryptocephalus bohemi*.

## Subfamily Galerucinae Latreille, 1802

## Tribe Galerucini Latreille, 1802

Genus *Galeruca* Geoffroy, 1762Subgenus *Galeruca* Geoffroy, 1762*Galeruca (Galeruca) pomonae pomonae* (Scopoli, 1763)

1 spec., Tâmpa (Kapellenberg) (BV), without other data, Fr.D.; 1 spec., Bicaz (NT), VI.1949; 1 spec., Câmpulung Moldovenesc (SV), 22.VII.1952; 2 specs, Băile Herculane (CS), altitude: 900 m, 30.VII.1976, 9.VIII.1978; 1 spec., Domogled Mt., Mehedinți Mts (CS), 12.VIII.1978.

*Galeruca (Galeruca) tanacetii tanacetii* (Linnaeus, 1758)

1 spec., Cotu Ciorii (BZ), 10.XI.1963; 1 spec., Piscu, Tunari Forest (DJ), 11.IX.1965; 1 spec., Câmpulung Moldovenesc, Deia (SV), 1.IX.1974; 3 specs, Băile Herculane (CS), altitude: 900 m, 11-12.IX.1976, 2.VII.1978; 2 specs, Domogled Mt., Mehedinți Mts (CS), 30.IX.1978, 2.X.1978.

Genus *Galerucella* Crotch, 1873Subgenus *Neogalerucella* Chûjô, 1962*Galerucella (Neogalerucella) lineola lineola* (Fabricius, 1781)

1 spec., Jegălia (CL), 17.VII.1955 (on *Populus*).

Genus *Lochmaea* Weise, 1883*Lochmaea caprea* (Linnaeus, 1758)

1 spec., Cerhat forest (SM), 21-24.IX.1962.

Genus *Xanthogaleruca* Laboissière, 1934*Xanthogaleruca luteola* (O. F. Müller, 1766)

1 spec., Mărculești Forest (IL), 1.VIII.1955; 5 specs, Jegălia (CL), 25.-28.V.1955, 30-31.VII.1955; 1 spec., Sabed (MS), 31.III.1959; 1 spec., Bărağan experimental forest resort, Jegălia (CL), 10.IX.1991.

## Tribe Luperini Gistel, 1848

## Subtribe Luperina Gistel, 1848

Genus *Calomicrus* Dillwyn, 1829*Calomicrus circumfusus* (Marsham, 1802)

3 specs, Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

Genus *Phyllobrotica* Chevrolat, 1836*Phyllobrotica adusta adusta* (Creutzer, 1799)

1 spec., without data; 1 spec., Miciurin Forest, Voluntari (IF), 23.VI.1959.

## Subfamily Alticinae Newman, 1835

Genus *Argopus* Fischer von Waldheim, 1824*Argopus ahrensii* (Germar, 1817)

1 spec., Vurpăr (Burgberg) (SB), 23.VII.

Genus *Chaetocnema* Stephens, 1831

Subgenus *Chaetocnema* Stephens, 1831

*Chaetocnema (Chaetocnema) obesa* (Boieldieu, 1859)

4 specs, Valley of the Olt River (Alt, Fluss), without other data, Fr.D.

Genus *Crepidodera* Chevrolat, 1836

*Crepidodera aurata* ab. *pulchella* (Stephens, 1835)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Crepidodera aurata* ab. *subunicolor* (Pic, 1918)

6 specs, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

Genus *Hippuriphila* Foudras, 1861

*Hippuriphila modeeri* (Linnaeus, 1760)

5 specs, Dealul Şprengi (Gespreng), Braşov (BV), without other data.

Genus *Mniophila* Stephens, 1831

*Mniophila muscorum muscorum* (Koch, 1803)

5 specs, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

Genus *Neocrepidodera* Heikertinger, 1911

*Neocrepidodera corpulenta* (Kutschera, 1860)

1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

*Neocrepidodera ferruginea* (Scopoli, 1763)

3 specs, Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Neocrepidodera transsilvanica* (Fuss, 1864)

2 specs, Rodna Mts (Rodnaer Gebirge), without other data, Fr.D (Fig. 2 B).

*Neocrepidodera transversa* (Marsham, 1802)

2 specs, Vurpăr (Burgberg) (SB), 28.07.

Genus *Phyllotreta* Chevrolat, 1836

*Phyllotreta armoraciae* (Koch, 1803)

1 spec., Czech Republic, Moravia, Beskydy Mountains (Besciden), without other data, E.R.

*Phyllotreta atra* (Fabricius, 1775)

1 spec., Turnu Roşu (Rotenturm), Cindrel Mts (Cibin Mts) (SB), without other data, Fr.D.

*Phyllotreta diademata* Foudras, 1860

2 specs, Rodna Mts (Rodnaer Gebirge), without other data, Fr.D.

*Phyllotreta flexuosa* (Illiger, 1794)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Phyllotreta nigripes nigripes* (Fabricius, 1775)

1 spec., Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

*Phyllotreta ochripes* (Curtis, 1837)

1 spec., Valley of the Olt River (Alt, Fluss), without other data, Fr.D.

*Phyllotreta tetrastigma* (Comolli, 1837)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

Genus *Sphaeroderma* Stephens, 1831*Sphaeroderma testaceum* (Fabricius, 1775)

2 specs, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

## Subfamily Cryptocephalinae Gyllenhal, 1813

## Tribe Clytrini Kirby, 1837

## Subtribe Clytrina Kirby, 1837

Genus *Cheilotoma* Chevrolat, 1836*Cheilotoma musciformis musciformis* (Goeze, 1777)

2 specs (1 ♀, 1 ♂), Tâmpa (Kapellenberg) (BV), without other data, Fr.D (Fig. 2 C).

Genus *Clytra* Laicharting, 1781Subgenus *Clytra* Laicharting, 1781*Clytra (Clytra) laeviuscula* Ratzeburg, 1837

1 spec., without data.

*Clytra (Clytra) quadripunctata quadripunctata* (Linnaeus, 1758)

1 spec., Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

Genus *Coptocephala* Chevrolat, 1836*Coptocephala chalybaea chalybaea* (Germar, 1824)

3 specs (2 ♂♂, 1 ♀), without data.

*Coptocephala scopolina scopolina* (Linnaeus, 1767)

2 specs, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

*Coptocephala unifasciata unifasciata* (Scopoli, 1763)

1 spec., Tâmpa (Kapellenberg) (BV), without other data, Fr.D.; 1 spec., Gherla (Szamosújvár) (CJ), 20.VII.1948.

Genus *Labidostomis* Chevrolat, 1836Subgenus *Labidostomis* Chevrolat, 1836*Labidostomis (Labidostomis) cyanicornis* (Germar, 1822)

2 specs, Orşova, Danube Gorges (Cazanele Dunării) (CS), without other data.

*Labidostomis (Labidostomis) pallidipennis* (Gebler, 1830)

1 spec., without data.

Genus *Lachnaia* Chevrolat, 1836Subgenus *Lachnaia* Chevrolat, 1836*Lachnaia (Lachnaia) sexpunctata* (Scopoli, 1763)

1 spec., Măgura Codlei Mts (Zeidner Berg) (BV), without other data, Fr.D.

Genus *Tituboea* Lacordaire, 1848*Tituboea macropus* (Illiger, 1800)

2 specs (1 ♂, 1 ♀), Guşteriţa (Hemmersdorf) (SB), without other data.

Tribe Cryptocephalini Gyllenhal, 1813

Subtribe Cryptocephalina Gyllenhal, 1813

Genus *Cryptocephalus* Geoffroy, 1762

Subgenus *Asionus* Lopatin, 1988

*Cryptocephalus (Asionus) apicalis* Gebler, 1830

1 spec., Băneasa forest, Bucharest, 8.V.1947; 2 specs, Visterna, Babadag (TL), 12.IV.1961; 1 spec., Agigea (CT), 20.VI.1964; 1 spec., Kazakhstan, Uralsk, without other data, E.R.

*Cryptocephalus (Asionus) bohemi* Drapiez, 1819

1 spec., Hanu Conachi (GL), 18.VII.1951 (Fig. 2 D).

*Cryptocephalus (Asionus) gamma* Herrich-Schäffer, 1835

1 spec., Lacul Sărat (BR), 21.VII.1950.

*Cryptocephalus (Asionus) quatuordecimmaculatus* D. H. Schneider, 1792

4 specs, Dealul Talinenberg, Hărman (BV), 13.V.

Subgenus *Burlinius* Lopatin, 1965

*Cryptocephalus (Burlinius) carpathicus* Frivaldszky, 1883

1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Burlinius) connexus* Olivier, 1807

9 specs, Jegălia (CL), 31.VII.1952, 31.VII.1955, 17.VII.1957, 30.VII.1992 (on *Tamarix*).

*Cryptocephalus (Burlinius) frontalis* Marsham, 1802

1 spec., Cotu Ciorii (BZ), 23-26.V.1963.

*Cryptocephalus (Burlinius) fulvus fulvus* (Goeze, 1777)

3 specs, Braşov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Burlinius) rufipes* (Goeze, 1777)

1 spec., without data.

Subgenus *Cryptocephalus* Geoffroy, 1762

*Cryptocephalus (Cryptocephalus) bicolor* Eschscholz, 1818

2 specs, without data; 1 spec., Cotu Ciorii (BZ), 26.05.1963.

*Cryptocephalus (Cryptocephalus) biguttatus* (Scopoli, 1763)

2 specs, Oraviţa, Ceresnaia (CS), 23.VI.1962; 1 spec., Câmpulung Moldovenesc (SV), 13.VI.1987.

*Cryptocephalus (Cryptocephalus) bipunctatus* (Linnaeus, 1758)

2 specs, Secu, Vânători (NT), 30.V.1949; 1 spec., Miciurin Forest, Voluntari (IF), VI.1959; 1 spec., Visterna, Babadag (TL), 12.IV.1961; 6 specs, Cerhat Forest (SM), 17-23.V.1962; 1 spec., Câmpulung Moldovenesc (SV), 15-17.VII.1962; 1 spec., Babadag (TL), 10.V.1962; 3 specs, Cotu Ciorii (BZ), 26.VI.1963; 1 spec., Jegălia (CL), 5.VI.1992.

*Cryptocephalus (Cryptocephalus) bipunctatus* ab. *sanguinolentus* Scopoli, 1763

4 specs, Câmpulung Moldovenesc (SV), 18.VI.1950, 15-17.VII.1962; Câmpulung Moldovenesc, Poiana Bota (SV), 17.VI.1966; 1 spec., Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.



*Cryptocephalus (Cryptocephalus) cordiger* (Linnaeus, 1758)

1 spec., Vurpăr (Burgberg) (SB), without other data; 1 spec., Visterna, Babadag (TL), 14.V.1963; 1 spec., Huși, Voloșeni (VS), 14.V.1967.

*Cryptocephalus (Cryptocephalus) flavipes* Fabricius, 1781

2 specs, Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Cryptocephalus) frenatus* Laicharting, 1781

1 spec., Câmpulung Moldovenesc (SV), 16.VI.1951, on *Salix*; 2 specs, Câmpulung Moldovenesc, Valea Caselor (SV), 14.VIII.1963; 1 spec., Retezat Mts (Hátságér Gebirge), without other data, Fr.D.

*Cryptocephalus (Cryptocephalus) janthinus* Germar, 1824

2 specs, C. A. Rosetti, the Danube Delta (TL), VII.1950.

*Cryptocephalus (Cryptocephalus) marginatus* Fabricius, 1781

4 specs (3 ♀♀, 1 ♂), Cotu Ciorii (BZ), 23-26.VI.1963 (on *Tamarix*).

*Cryptocephalus (Cryptocephalus) moraei* (Linnaeus, 1758)

2 specs, Valea Putnei (Eastern Carpathians) (SV), 7.VI.1950; 2 specs, Visterna, Babadag (TL), 12.IV.1961; 3 specs, Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.; 1 spec., Gura Gârluței (BR), without other data.

*Cryptocephalus (Cryptocephalus) nitidulus* Fabricius, 1787

2 specs, Vurpăr (Burgberg) (SB), without other data.

*Cryptocephalus (Cryptocephalus) octacosmus* Bedel, 1891

1 spec., without data; 1 spec., C. A. Rosetti, the Danube Delta (TL), VII.1950; 1 spec., C. Borcea, Buta, 27.VI.1956.

*Cryptocephalus (Cryptocephalus) octopunctatus octopunctatus* (Scopoli, 1763)

1 spec., Ardeluța, Tarcău Mts (Eastern Carpathians) (NT), 24.V.1949; 2 specs, Câmpulung Moldovenesc (SV), 7.V.1952, 30.V.1953; 1 spec., Câmpulung Moldovenesc, Valea Caselor (SV), 14.VIII.1963, 1 spec., Visterna, Babadag (TL), 14.V.1963; 1 spec., Pojorâta (SV), 27.V.1965; 1 spec., Huși, Voloșeni (VS), 13.V.1967; 1 spec., Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.; 2 specs, Valea Putnei (Eastern Carpathians) (SV), 11.VI.1981, 2.VII.1981.

*Cryptocephalus (Cryptocephalus) parvulus* O. F. Müller, 1776

1 spec., France, Biarritz, without other data.

*Cryptocephalus (Cryptocephalus) quadriguttatus* C. F. W. Richter, 1820

1 spec., Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Cryptocephalus) quadripustulatus* Gyllenhal, 1813

2 specs, Postăvaru Mts (Schuler Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Cryptocephalus) quinquepunctatus* (Scopoli, 1763)

2 specs, Secu, Vânători (NT), 30.V.1949.

*Cryptocephalus (Cryptocephalus) sexpunctatus sexpunctatus* (Linnaeus, 1758)

1 spec., Brașov Mts (Kronstädter Gebirge) (BV), without other data, Fr.D.

*Cryptocephalus (Cryptocephalus) violaceus violaceus* Laicharting, 1781

1 spec., Republic of Moldova, VI.1939.



*Cryptocephalus (Cryptocephalus) vittatus* Fabricius, 1775

2 specs, Broșteni, Drăgăioasa (SV), 26.VII.1958; 1 spec., Pojorâta (SV), 13.VII.1965.

Subgenus *Heterichnus* Warchałowski, 1991

*Cryptocephalus (Heterichnus) coryli* (Linnaeus, 1758)

1 spec. ♀, Dealul Melcilor (Schneckenberg), Brașov (BV), without other data, Fr.D., 28.V.; 1 spec., without data; Pojorâta (SV), 23.VII.1965.

Subgenus *Protophysus* Chevrolat, 1836

*Cryptocephalus (Protophysus) schaefferi schaefferi* Schrank, 1789

1 spec. ♀, Tâmpa (Kapellenberg) (BV), without other data, Fr.D.

Subtribe *Pachybrachina* Chapuis, 1874

Genus *Pachybrachis* Chevrolat, 1836

Subgenus *Pachybrachis* Chevrolat, 1836

*Pachybrachis (Pachybrachis) fimbriolatus* Suffrian, 1848

3 specs, Vurpăr (Burgberg) (SB), without other data.

*Pachybrachis (Pachybrachis) tessellatus tessellatus* (Olivier, 1791)

2 specs, Vurpăr (Burgberg) (SB), without other data.

## Subfamily Eumolpinae Hope, 1840

Tribe Bromiini Chapuis, 1874

Genus *Bromius* Chevrolat, 1836

*Bromius obscurus* (Linnaeus, 1758)

1 spec., Pojorâta (SV), 16.VI.1965; 1 spec., Falcău-Sadău (SV), 9.VI.1970; 1 spec., without data; 1 spec., Moldavița, Demăcușa (SV), 29.VI.1977.

*Bromius obscurus* ab. *villosulus* (Schrank, 1781)

2 specs, without data; 1 spec., Borsec (HR), 9.VIII.1966.

Tribe Eumolpini Hope, 1840

Genus *Chrysochus* Chevrolat, 1836

*Chrysochus asclepiadeus asclepiadeus* (Pallas, 1773)

1 spec., Ukraine, Răstoace, Cernăuți, 13.VII.1949.

Tribe Nodinini S.H.-Chen, 1940

Genus *Eupales* Lefèvre, 1885

*Eupales ulema* (Germar, 1813)

2 specs, Băile Herculane (Herkulesbad) (CS), Fr.D.; 2 specs, Valea Cernei; 1 spec., Lighed Forest (TM), 29.IV.1960; 7 specs, Timișoara, Pădurea Verde (TM), 1-8.V.1960.

## DISCUSSIONS

For many species new data on the distribution in Romanian fauna are given.

Among the valuable species preserved in the “Igor Ceianu” collection, we mention: *Pseudogaurotina excellens*, *Cryptocephalus carpathicus*, *Asiorestia transsilvanica*, *Chrysolina weisei*, *Nivellia sanguinosa*, *Semanotus ruscicus ruscicus*, *Pronocera angusta*, *Callimoxys gracilis*, *Callimus angulatus angulatus*, *Cornumutilla lineata*, *Pedostrangalia revestita*, *Pedostrangalia verticalis*, *Etorofus pubescens*, *Cryptocephalus bohemicus* and *Cheilotoma musciformis*.

*Pseudogaurotina excellens* is a Carpathians endemic species, being distributed in Slovakia, Poland, Hungary, Romania and Ukraine (Pawłowski, 2009; Danilevsky & Smetana, 2010). In Romania it was recorded from Transylvania, without other mentions (Petri, 1912); Retezat Mts and Cindrel Mts (Gura Râului, the Valley of Cibin River) (Petri, 1925 - 1926); Gura Apei (the Valley of Râul Mare River, Retezat Mts) (Panin & Săvulescu, 1961); Săpânța (Maramureș) (Serafim, 1997); Rodna Mts (Maramureș) (Nitzu et al., 2008); Parâng Mts (Tatole et al., 2009). The specimens from Gura Apei (June 15, 1956) and Săpânța (July 5, 1996) belong to the collections of the “Grigore Antipa” Museum (Serafim, 2005). In the “Igor Ceianu” collection there is a specimen collected at Broșteni (Eastern Carpathians, June 10, 1958). *Pseudogaurotina excellens* is strictly protected at European level.

The collection includes some chrysomelid species endemic to the Carpathians, such as: *Neocrepidodera transsilvanica* (a mesoalpine species, endemic in the Eastern Carpathians), *Sclerophaedon carpathicus* (a montane species, endemic in the Eastern Carpathians), *Cryptocephalus carpathicus* (distributed in Carpathians: Hungary, Romania, Polonia, Slovakia, Serbia and Montenegro) (Warchałowski, 2003; Pawłowski, 2009; Löbl & Smetana, 2010).

Also, *Chrysolina weisei* is a rare alpine species, probably endemic to the Romanian Carpathians (Warchałowski, 2003; Löbl & Smetana, op.cit.). It was mentioned only in some areas of Romania: Bălan (Petri Collection), Retezat (Deubel collection) (Petri, 1912); Retezat Mountains (Zănoaga Lake), Cibin Mountains, Făgăraș Mountains, Băile Herculane, Rodna Mountains, Brașov, Bălan, Hațeg (Panin, 1944, with older data).

*Poecilium pusillum pusillum* occurs in Europe. There are only a few mentions of its presence in Romania: Gușterița, Sibiu, Rupea (Petri, 1912). In Ceianu collection there is a single specimen, unfortunately without data.

*Pronocera angusta* is a very rare species in Central and South-East Europe. In Romania it was recorded from Băile Herculane, Baia-de-Criș, Borsec, Tușnad, Târgu Secuiesc, Câmpulung Moldovenesc (1 specimen GANMNH collections) (Panin & Săvulescu, 1961). The “Igor Ceianu” collection includes one specimen collected from Ciomârna, Vatra Moldoviței.

*Semanotus ruscicus ruscicus* is a rare species in Romania. It has been reported by: Panin & Săvulescu (op. cit.) from Câmpulung Moldovenesc and

Lovrin (GANMNH collections); Kovacs et al. (1998-1999) from Băile Herculane, Domogled Mt.; Serafim (2009) from Vaidacuta (GANMNH collections). In the Ceianu collection there are preserved specimens from Câmpulung Moldovenesc and Simeria. The species occurs in South-East and Central Europe, Near East.

*Trichoferus pallidus* is distributed in Europe. In Romania, this species was reported from: Sibiu (Petri, 1925-1926); București, Tecuci, Drobeta-Turnu Severin (Săvulescu, 1972; Serafim, 2009); Cernișoara (Ruicănescu, 1997). In "Igor Ceianu" collection there are some specimens from Galați and Retezat Mts.

*Callimoxys gracilis* was mentioned until now only from Transylvania and Băile Herculane (Petri, 1912). The only specimen from GANMNH collections (Pădurea Verde) belongs to the "Igor Ceianu" collection.

*Callimus angulatus angulatus* is distributed in Europe, North Africa, Near East. In Romanian fauna it was reported from Sibiu, Dumbrava, Bălan, Cibin Mts, Măgura (Petri, 1912); Băile Herculane (Panin & Săvulescu, op.cit.); Drobeta-Turnu Severin, Breznița, Băile Herculane, Pasărea Forest, Brănești (Serafim, 2009). In Ceianu collection there are two specimens collected from Băile Herculane and Cerhat Forest.

*Nivellia sanguinosa* is a rare Palaearctic, boreo-montaineous species. In the "Igor Ceianu" collection there are two specimens collected from Rodna Mts and Putna Valley.

Also, *Cornumutilla lineata* is a boreo-mountainous species, distributed in Central and Eastern Europe and Siberia. A few data have been published on this species: Făgăraș Mountains, Bârcaciu Chalet (Panin & Săvulescu, op. cit.); Făgăraș Mts, Negoiu Peak (GANMNH collections) (Serafim, 2006).

*Pedostrangalia revestita* occurs in Europe and Transcaucasia. In Romania, it was reported from Dumbrava, Hațeg, Baia Mare, Brașov, Băile Slănic, Cindrel Mountains (Panin & Săvulescu, op. cit.); Măzănești (Andriescu, 1972); Craiova (Serafim, 1985); Bodi Ferneziu (Serafim, 2006). In the collections of "Grigore Antipa" Museum there are three specimens collected from Craiova, Maramureș and Codreni Forest ("Igor Ceianu" collection).

The following chrysomelid species are mentioned as being rare in Romania: *Cryptocephalus bohemi* (recorded from Letea Forest and Periprava, Dobrogea region) (Roșca, 1973); *Cryptocephalus gamma* (cited from Turda, Sibiu (Petri, 1912, 1925-1926), Ocna Sibiului, Azuga (Roșca, 1973), Periteașca, Portița, Sf. Gheorghe (Dobrogea region) (Crișan, 1995); *Cheilotoma musciformis* (mentioned from Sighișoara, Deva, Zau de Câmpie and Brașov (Petri, 1912); in the GANMNH collections there is a female specimen of *C. musciformis*, collected by Dr. Nicolae Săvulescu, from Tecuci, 5.VI.1954 (Maican, 2006).

In terms of conservation, *Rosalia alpina*, *Morimus asper funereus* and *Pseudogaurotina excellens* are species of community interest, included in the annexes of the Habitats Directive 92/43/EEC.

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CATALOGUL CERAMBYCIDELOR, MEGALOPODIDELOR ȘI CRISOMELIDELOR  
(COLEOPTERA: CHRYSOMELOIDEA) INTRATE RECENT ÎN PATRIMONIUL  
MUZEULUI NAȚIONAL DE ISTORIE NATURALĂ  
„GRIGORE ANTIPA” (BUCUREȘTI).  
COLECȚIA „IGOR CEIANU”.

## REZUMAT

Lucrarea prezintă date referitoare la materialul de coleoptere (Familii Cerambycidae, Megalopodidae și Chrysomelidae) păstrat în Colecția „Igor Ceianu”, donată în 2010 Muzeului Național de Istorie Naturală „Grigore Antipa” din București. Sunt listate 268 specii (174 specii Cerambycidae, două specii Megalopodidae și 92 specii Chrysomelidae), încadrate în 131 genuri, din 14 subfamilii.

Dintre speciile rare, care conferă valoare patrimoniului științific al Muzeului „Grigore Antipa” menționăm: *Nivellia sanguinosa* Gyllenhal, 1827, *Semanotus ruscicus ruscicus* Fabricius, 1776, *Pronocera angusta* Kriechbaum, 1844, *Callimoxys gracilis* Brullé, 1832, *Callimus angulatus angulatus* Schrank, 1789, *Cornumutilla lineata* Letzer, 1844, *Pedostrangalia revestita* Linnaeus, 1767, *Pedostrangalia verticalis* Germar, 1822, *Etorofus pubescens* Fabricius, 1787, *Cryptocephalus bohemiensis* Drapiez, 1819 și *Cheilotoma musciformis* Goeze, 1777.

*Pseudogaurotina excellens* Brancsik, 1874, *Cryptocephalus carpathicus* Weise, 1875, *Sclerophaedon carpathicus* Weise, 1875 și *Neocrepidodera transsilvanica* Fuss, 1864 sunt specii endemice în Munții Carpați, iar *Chrysolina weisei* Frivaldszky, 1883 este endemică în România.

*Rosalia alpina* Linnaeus, 1758, *Morimus asper funereus* Mulsant, 1863 și *Pseudogaurotina excellens* Brancsik, 1874 sunt specii de interes comunitar, incluse în anexele Directivei 92/43/EEC referitoare la conservarea habitatelor naturale și a speciilor de faună și floră sălbatică.

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## THE LEPIDOPTERA OF BUCHAREST AND ITS SURROUNDINGS (ROMANIA)

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**Abstract.** This study presents a synthesis of the current knowledge regarding the Lepidoptera fauna of Bucharest and the surrounding areas within a distance up to 50 kilometers around the Romanian capital. Data about the fauna composition are presented: the results of the research work beginning with the end of the 19<sup>th</sup> century, as well the results of the research work carried out in the last 15 years. The research initiated and done by the author himself, led to the identification of 180 species which were unknown in the past. Even if the natural habitats from this region have undergone through radical changes in the 20<sup>th</sup> century, the area still preserves a quite rich and interesting Lepidoptera fauna. The forests provide shelter to rich populations of the hawk moth *Dolbina elegans* A. Bang-Haas, 1912, one of the rarest Sphingidae in Europe, and some other species with high faunistical and zoogeographical value as: *Noctua haywardi* (Tams, 1926) (it is new record for the Romanian fauna from this area), *Catocala dilecta* (Hübner, 1808), *Tarachidia candefacta* (Hübner, [1831]), *Chrysodeixis chalcites* (Esper, [1789]), *Aedia leucomelas* (Linnaeus, 1758), and *Hecatera cappa* (Hübner, [1809]). We also present and discuss the current status of the protected Lepidoptera species from the surroundings of the Romanian capital for the first time.

**Résumé.** Ce travail représente une synthèse des connaissances actuelles concernant la faune de lépidoptères de Bucarest et de ses zones limitrophes sur un rayon de 50 km autour de la capitale de la Roumanie. On présente toutes les données sur la composition de la faune de lépidoptères publiées à partir de la fin du XIX-ème siècle, ainsi que les résultats des dernières 15 années. Les recherches faites par l'auteur après 1966 ajoutent 180 nouvelles espèces pour la région. Bien que le cadre naturel de cette région ait été radicalement changé au cours du XX-ème siècle, elle conserve une assez riche et intéressante faune. Les forêts abritent de nombreux exemplaires du sfingide *Dolbina elegans* A. Bang-Haas, 1912, l'une des plus rares espèces de sfingide de l'Europe, ainsi que d'autres espèces de valeur faunistique et zoogéographique comme *Noctua haywardi* (Tams, 1926) (signalée de cette zone comme nouvelle pour la faune de Roumanie), *Catocala dilecta* (Hübner, 1808), *Tarachidia candefacta* (Hübner, [1831]), *Chrysodeixis chalcites* (Esper, [1789]), *Aedia leucomelas* (Linnaeus, 1758) et *Hecatera cappa* (Hübner, [1809]). On présente pour la première fois la situation actuelle des espèces protégées par la législation européenne et nationale de la zone de la capitale roumaine.

**Key words:** Lepidoptera, fauna, old records, new records, Bucharest, Romania.

### INTRODUCTION

The surroundings of the large European cities and especially the surroundings of the capitals have suffered major changes of natural scenery in the 20<sup>th</sup> century, that affected the Lepidoptera fauna (butterflies and moths), too. Romania was not an exception since its capital and the surrounding areas have undergone radical changes in the last 100 years. The study of the Lepidoptera fauna has begun in this region around 1880 and the first published studies about the Lepidoptera fauna of



Romania have partially referred to this area too (Caradja, 1896; Montandon, 1900; Abafi-Aigner, 1901; Salay, 1910). They represented the only reliable knowledge about the fauna of Bucharest ("București" in Romanian). In those times, however, the surroundings of the Romanian capital were very different compared to what can be seen nowadays. There were much wider forested areas, wetlands, moors and large areas of land were farmed by traditional means. Even in the inner city there was a much richer Lepidoptera fauna than nowadays, because in a city made up mainly of gardens and houses, as Bucharest used to be in those times, the butterfly and moth species assemblages were different compared to the nowadays fauna of apartment-building districts.

The scenery of Bucharest and its surroundings has radically changed after the 1950s, as soon as the land areas were brought under intensive farming, the wetlands under drainage work, the herbicides and insecticides were used on a large scale, and transports and urbanization were developed (Székely, 1994). The research work started by A. Ostrogovich upon the Lepidoptera fauna until 1935 and the research started by the eminent entomologist A. Popescu-Gorj in 1938 (Popescu, 1938, 1939; Popescu-Gorj, 1960, 1964) has practically ended the study of Lepidoptera-fauna from Bucharest and its surroundings from that period. Due to the alterations of natural environment, the research work has entered a period of decline after 1970, and many of the species which had been recorded 50-100 years before, were considered as "probably extinct".

The aim of this work is to demonstrate the contrary. The researches from the period 1996-2010 have brought new results and, based on these new data, we can conclude that the surroundings of Bucharest (Fig. 1) still preserve, even at present, a fairly rich and varied entomofauna. A lot of species that were considered "probably extinct" were recorded again. 180 species are completely new to this region and 55 species are new to Wallachia. *Noctua haywardi* (Tams, 1926) was reported as a new record for the entomofauna of Romania based on material collected in this region (Székely & Stanciu, 2002). The forests surrounding the capital city provide shelter to rich populations of *Dolbina elegans* A. Bang-Haas, 1912, one of the rarest hawk moths of the European Lepidoptera fauna and 17 species would be welcome for European and Natural laws.

#### MATERIAL AND METHODS

The material was collected by aiming the still forested areas. The diurnal collecting was done with the insect net, while the nocturnal species were captured by using a 125W mercury vapor bulb placed in front of a white sheet. In addition, three to five portable light traps with 8W white and black light tubes were used during each collecting event.



Fig. 1 - Localities investigated for this study in the period 1996-2010.

Two - three centuries ago, forests covered large territories in the surroundings of Bucharest. The famous “Codrii Vlăsiei – Vlăsiei Forest”, to which the aforementioned forested areas pertained to, were gradually clear cut. Now such forested areas form island-like patches, on restrained territories of forest vegetation. The climate is continental, with very hot summers and frosty winters. The yearly average temperature is 10-11°C. The highest average temperatures occur in July when they exceed 23°C. The yearly rainfall is around 500-600 mm with mostly heavy summer showers. The winter is characterized by cold air intrusions but snowfalls are scarce.

Wallachia (“Muntenia” in Romanian) is a historical region in southern Romania. Its boundaries are the Carpathian Mountains in north (which delimits of Transylvania), in west the Olt River (which separates it from Oltenia), in south and east the Danube River (which delimits Bulgaria and Dobrogea). Dobrogea is a historical province of Romania located east of Wallachia, and Oltenia another historical province situated west of Wallachia.

The Romanian Plain (Câmpia Română) is located in southern Romania. Part of the historical region of Wallachia, it is bordered by the Danube River in the east, south and west, and by the Getic Plateau in the north. Bucharest, the capital of Romania, is located in the central part of the Romanian Plain. It is contiguous to the south with the Danubian Plain, in Bulgaria.

This work comprises the data gathered during the systematic collection work done in different forested areas that surround the capital: Brănești (the Bridge of Brănești, the former small railway station CFR-Cozieni), Pasărea (the forest district

and the vicinity of the railway station), Comana (Comana Forest), Cernica (the vicinity of the monastery) and Pustnicu (Pustnicu Forest). In these areas collecting activities were done during different periods of the year (May – October) between 1996 – 2010 (Fig. 1). Occasional collecting has been carried out at: Călugăreni, Jilava, Pădurea Buda (Buda Forest). The source of the systematic order is „The Lepidoptera of Europe” (Karlsholt & Razowsky, 1996).

List of collecting localities with geographical coordinates (Fig. 1):

Pustnicu - forest in Ilfov county (44°53' N / 26°09' E)

Brănești - village in Ilfov county (44°45' N / 26°33' E)

Cernica – village and forest in Ilfov county (44°40' N / 26°26' E)

Pasărea – village and forest in Ilfov county (44°28' N / 26°19' E)

Comana – village and forest in Giurgiu county (44°17' N / 26°13' E)

Mihai Bravu - village in Giurgiu county (44°13' N / 26°05' E)

Abbreviations:

\*- new species for Bucharest and its surroundings

\*\* - older records, considered doubtful at present

very rare (1–3 specimens/collecting day or night)

rare (4–9 specimens/collecting day or night)

common (10–29 specimens/collecting day or night)

very common (more than 30 specimens/collecting day or night).

Păd. = forest (“pădure” in Romanian)

♂ = male, ♀ = female

## RESULTS

The results of the research work done between 1996-2010 comprise for now about 520 species. Considering the whole amount of literature data, the area of Bucharest and its surroundings can be considered as being intensely entomologically researched, since 822 species of Lepidoptera (590 species of Macrolepidoptera and 232 species of Microlepidoptera) have been recorded up to the present day.

From the impressive amount of 822 species we can find data in literature referring to 632 of them. Therefore, the faunistic list of Lepidoptera of Bucharest and its surroundings has increased by 180 species which hadn't been reported in the past.

Concerning the butterflies (Papilionoidea & Hesperioidea), over 50% of the species that have been recorded in the past were not found again. One should however not forget the fact that 100 years ago researchers investigated mostly the butterfly-fauna. Another aspect to be taken into consideration is the fact that the habitats of these species were altered considerably during the last 100 years since these species favour open areas, forest selvages and clearings, all being habitats which were most severely altered by man.

## FAUNISTIC LIST OF LEPIDOPTERA

## Family Lasiocampidae

*Eriogaster lanestris* (Linnaeus, 1758): București, 28.III.1895, coll. Salay, (Popescu-Gorj, 1964).

*Malacosoma neustria* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, Comana, 12.VII.-9.VIII.1996-2008, common. Further records: București, Comana (Montandon, 1900; Popescu-Gorj, 1964).

*Lasiocampa trifolii* ([Denis & Schiffermüller], 1775): Comana, Țigănești, 1915-1916 (Popescu-Gorj, 1964).

*Lasiocampa quercus* (Linnaeus, 1758)\*: Pasărea, Păd. Buda, 12.VII.-1.VIII.1997-99, rare.

*Macrothylacia rubi* (Linnaeus, 1758): Comana, Chitila, București (Popescu-Gorj, 1964).

*Euthrix potatoria* (Linnaeus, 1758)\*\*: București, 6.VI.1892, coll. Salay (Popescu-Gorj, 1964).

*Phyllodesma tremulifolia* (Hübner, 1810): Comana, Mihai Bravu, 12-13.VII.1996-97, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Gastropacha quercifolia* ([Denis & Schiffermüller], 1775): Pasărea, Pustnicu, 21.VII.-6.VIII.1996-2010, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Gastropacha populifolia* ([Denis & Schiffermüller], 1775): Brănești, 3.VIII.2004, 1 ♂. Further records: București, 17.VIII.1905, coll. Salay (Popescu-Gorj, 1964).

*Odonestis pruni* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 25.VII.-8.VIII.1996-2009, common. Further records: București (Popescu-Gorj, 1964).

## Family Endromidae

*Endromis versicolora* (Linnaeus, 1758): Buftea, 5.IV.1890, coll. Salay (Popescu-Gorj, 1964).

## Family Saturniidae

*Agria tau* (Linnaeus, 1758)\*: Cernica, Comana, Pasărea, 1-7.V.1997-98, rare. *New record for the Romanian Plain.*

*Saturnia pyri* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, Comana, 2-23.V.1999-2001, rare. Further records: București (Popescu-Gorj, 1964).

*Saturnia spini* ([Denis & Schiffermüller], 1775)\*\*: București, Comana, Filaret, 1895-1929 (Popescu-Gorj, 1964). Acceptable historical record, the species being reported from the northern territories of Bulgaria (Ruse, Razgrad, Pleven, Veliko Târnovo) (S. Beshkov, pers. comm.).

*Perisomena caecigena* (Kupido, 1825) (Fig. 2 B): Comana, 4.X.1915 (Popescu-Gorj, 1964), București, 3.X.1934, leg. Niculescu (Nemeș & Voicu, 1973), Cernica, 10-15.IX.1953, 23.IX.1954, ex. larva, leg. Niculescu (König, 1975), Comana, 15.IX.1949 (leg. A. Popescu-Gorj). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (S. Beshkov, pers. comm.).

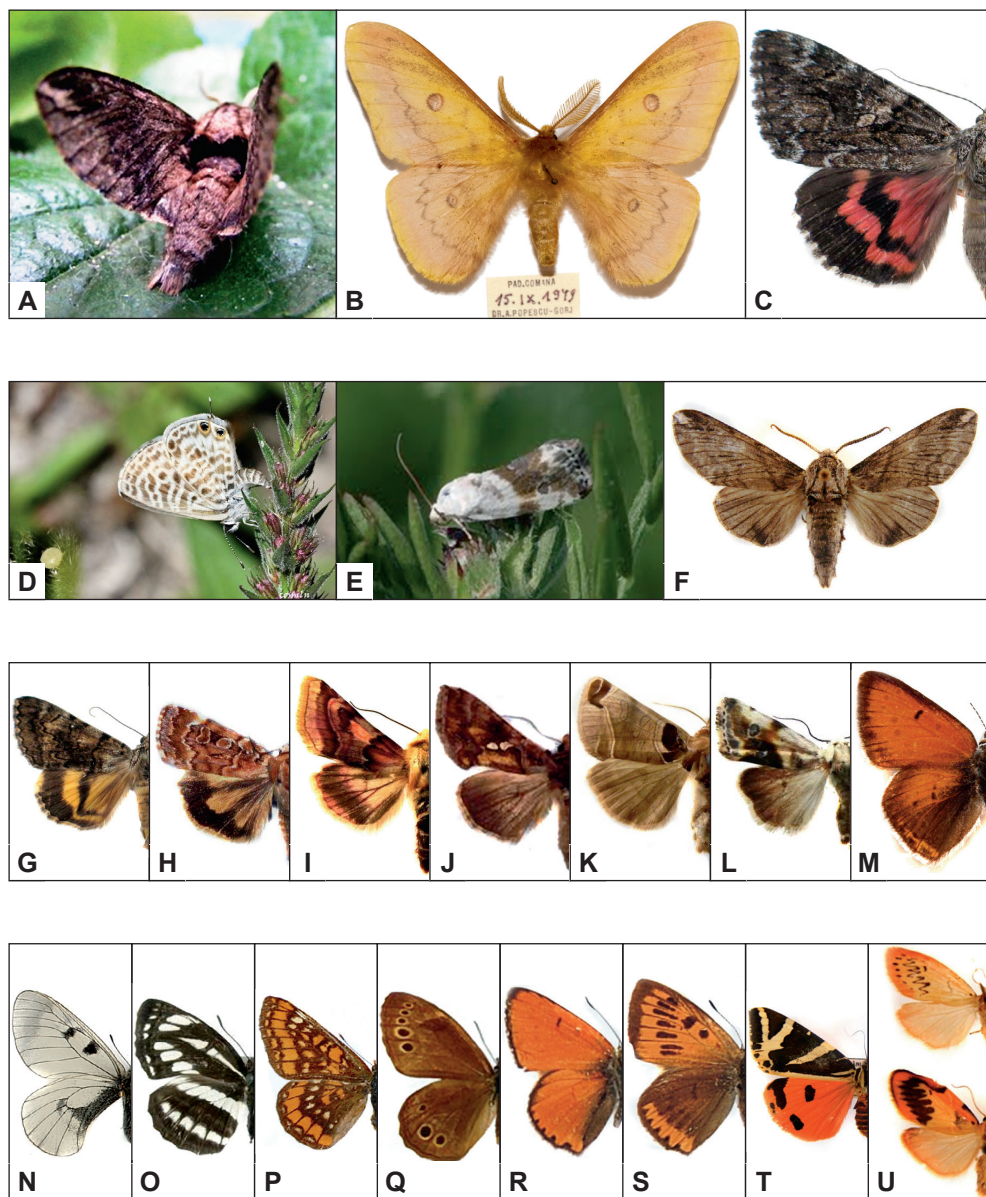


Fig. 2 - *Dolbina elegans* (A, F); *Perisomena caecigena* (B); *Leptotes pirithous* (D); *Tarachidia candefacta* (E, L); *Catocala dilecta* (C); *Catocala nymphagoga* (G); *Noctua haywardi* (H); *Periphanes delphini* (I); *Chrysodeixis chalcites* (J); *Plusidia cheiranthi* (K); *Lycaena hippothoe* (M); *Parnassius mnemosyne* (N); *Neptis sappho* (O); *Euphydryas maturna* (P); *Lopinga achine* (Q); *Lycaena dispar* (R, male; S, female); *Euplagia quadripunctaria* (T); *Mitochondria miniata* (U; bottom side - f. *fasciata*). Taxa protected by law at European or national level: A, F, K, M, N, O, P, Q, R, S, T. Foto: Levente Székely (A, C, F, G, H, I, J, K, L, N, O, P, Q, R, S, T, U); Iorgu Ionuț Ștefan (B, M); Cosmin Ovidiu Mancu (D); Cristian Mihai (E).



## Family Sphingidae

*Marumba quercus* ([Denis & Schiffermüller], 1775): Brănești, Comana, Mihai Bravu, Pasărea, 12.VII.-1.VIII.1996-2004, very common. Further records: București, Comana, Ciocănești (Popescu-Gorj, 1964).

*Mimas tiliae* (Linnaeus, 1758): Pasărea, Comana, Brănești, Pustnicu, 1-24.V. and 25.VII.-17.VIII.1996-2010, very common. Further records: Brănești, Cozieni (Popescu-Gorj, 1964).

*Smerinthus ocellata* (Linnaeus, 1758)\*: Brănești, Pasărea, 21.VII.-2.VIII.1996-2001, rare.

*Laothoe populi* (Linnaeus, 1758): Brănești, Pasărea, Cernica, 30.V.-9.VIII.1996-2010, rare. Further records: București (Popescu-Gorj, 1964).

*Agrius convolvuli* (Linnaeus, 1758): Brănești, Pasărea, Cernica, 23.VII.-2.X.1997-2001, rare. Further records: București, Otopeni (Popescu-Gorj, 1964).

*Sphinx ligustri* (Linnaeus, 1758): București (Popescu-Gorj, 1964).

*Acherontia atropos* (Linnaeus, 1758): București, Jilava, Brănești (Popescu-Gorj, 1964).

*Dolbina elegans* A. Bang-Haas, 1912 (Fig. 2 A, F): Brănești, Cernica, Cozieni, Păd. Buda, Pasărea, Pustnicu, Jilava, 7-23.V. and 24.VII.-7.VIII.1997-2010, in two broods, local common. Further records: Halta Cozieni (Popescu-Gorj, 1971). Distributed from SW-Ukraine and eastern Balkans to western and southern Turkey, northern Syria, western Jordan, northern Iraq and northern Iran. Not a very active species, with adults flying only for a short period after nightfall, usually quite close to the ground. The first specimens from Romania were taken in 1968 from Cozieni railway station near Brănești (Popescu-Gorj, 1971). Based on these specimens the subspecies *steffensi* Popescu-Gorj, 1971 has been described. There are no constant differences between the genitalia and morphology of European, Turkish and Syrian examples. This subspecific status is not justified for the European population, previously referred to as subsp. *steffensi* (Pittaway, 2010).

*Hemaris croatica* (Esper, 1779)\*\*: București-Botanical Garden (Caradja, 1947).

*Macroglossum stellatarum* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, Comana, Jilava, 25.VII.-2.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939), București, Comana (Popescu-Gorj, 1964).

*Daphnis nerii* (Linnaeus, 1758): București, 8.VI.1890, coll. Salay (Popescu-Gorj, 1964).

*Hyles euphorbiae* (Linnaeus, 1758): Pasărea, 1-2.VIII.2002, rare. Further records: Mihai Bravu (Popescu, 1939).

*Hyles livornica* (Esper, 1779): Brănești, Pasărea, 31.VII.-17.VIII.1997-99, common. Further records: București (Popescu-Gorj, 1964).

*Deilephila elpenor* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 23.V.-28.VII.1996-2010, rare. Further records: București (Popescu-Gorj, 1964).

*Deilephila porcellus* (Linnaeus, 1758): Comana, Pasărea, Pustnicu, 7.V.-17.VIII.1996-2010, common. Further records: București, Comana (Popescu-Gorj, 1964).

*Hippotion celerio* (Linnaeus, 1758): București (Salay, 1910).

## Family HesperIIDae

*Erynnis tages* (Linnaeus, 1758): Pasărea, Brănești, 25.VII.-8.VIII.1997-2009, common. Further records: Mihai Bravu (Popescu, 1939), Comana (Popescu-Gorj, 1964).

*Carcharodus alceae* (Esper, 1780): București, Chitila, Comana, Jilava (Popescu-Gorj, 1964).

*Carcharodus floccifera* (Zeller, 1847): Brănești, București, Comana, Filaret (Popescu-Gorj, 1964).

*Spialia orbifer* (Hübner, 1823): Comana, 19.V.1896, coll. Salay (Popescu-Gorj, 1964).

*Pyrgus malvae* (Linnaeus, 1758): București, Chitila, Comana (Popescu-Gorj, 1964).

*Pyrgus serratalae* (Rambur, 1839)\*\*: Bufta, Mogoșoaia (Popescu-Gorj, 1964).

The species being recorded from the northern territories of Bulgaria, reported from Svishtov (Buresch & Tuleschcow, 1930).

*Pyrgus alveus* (Hübner, 1803)\*\*: București, Comana (Popescu-Gorj, 1964).

*Thymelicus lineola* (Ochsenheimer, 1808): Brănești, Pasărea, 3.V.-25.VII.1996-99, rare. Further records: Comana (Popescu-Gorj, 1964).

*Hesperia comma* (Linnaeus, 1758): Brănești, Pasărea, 26-27.V.2001, rare. Further records: Mihai Bravu (Popescu, 1939); București, Brănești, Comana, Filaret (Popescu-Gorj, 1964).

*Ochlodes sylvanus* (Esper, 1777): Brănești, Pasărea, 26-27.V.2001, rare. Further records: București, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

## Family Papilionidae

*Zerynthia polyxena* ([Denis & Schiffermüller], 1775)\*\*: București, 1892, leg. Joannis (Montandon, 1900; Niculescu, 1960); Comana, 15-20.IV.1911-1915, Filaret, 1.V.1905, Mihai Bravu, 1915 (Popescu-Gorj, 1964).

*Parnassius mnemosyne distincta* Bryk & Eisner, 1930 (Fig. 2 N): Brănești, Pasărea, 1-14.V.2001-2008, very common. Further records: București, Chitila, Comana, Țigănești (Montandon, 1900; Popescu-Gorj, 1964); Comana (König, 1975); Cernica (Niculescu, 1960).

*Iphiclides podalirius* (Linnaeus, 1758): Brănești, Cernica, Pasărea, Pustnicu, 1.V.-18.VIII.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); Dudești-Ciopea (Niculescu, 1960); Băneasa, București, Chitila, Păd. Andronache (Niculescu, 1960); București, Brănești, Comana, Chitila, Filaret, Țigănești (Popescu-Gorj, 1964).

*Papilio machaon* (Linnaeus, 1758): Pasărea, București, 25.VII.-8.VIII.1996-2007, rare. Further records: București, Comana, Chitila (Popescu-Gorj, 1964).

## Family Pieridae

*Leptidea sinapis* (Linnaeus, 1758): Brănești, Comana, Pasărea, 1-27.V.; 24.VI.-8.VIII.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); Păd. Andronache (Popescu-Gorj, 1964); București, Cernica (Niculescu, 1963); Brănești, București, Chitila, Comana, Țigănești (Popescu-Gorj, 1964).



*Anthocharis cardamines* (Linnaeus, 1758): Brănești, Pasărea, 1-26.V.2001-2003, rare. Further records: București, Cernica, Comana, Budești (Niculescu, 1963); Brănești, București, Comana, Chitila, Țigănești (Popescu-Gorj, 1964).

*Aporia crataegi* (Linnaeus, 1758): Brănești, Pasărea, 26-27.V.2001, common. Further records: București, Cernica (Niculescu, 1963); Comana, Chitila, Filaret (Popescu-Gorj, 1964).

*Pieris brassicae* (Linnaeus, 1758): Pasărea, 2.V.-17.VIII.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Dudești-Ciolea (Niculescu, 1963); Comana, Chitila (Popescu-Gorj, 1964).

*Pieris mannii* (Meyer, 1851): Giurgiu (Popescu-Gorj, 1960; Niculescu, 1963). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (Lovech and Târnovo) (S. Beshkov, pers. comm.).

*Pieris rapae* (Linnaeus, 1758): Pasărea, Brănești, 2.V-3.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Cernica, Dudești-Ciolea (Niculescu, 1963); Chitila, Jilava (Popescu-Gorj, 1964).

*Pieris balcana* Lorkovic, 1970\*: Pasărea, 2-4.V.2002, rare. It is a poorly known species in Romania with few records scattered across the country's territory. *New record for the Romanian Plain.*

*Pieris napi* (Linnaeus, 1758): Pasărea, Brănești, 2.V-3.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, (Niculescu, 1963); Brănești, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Pontia edusa* (Fabricius, 1777): Pasărea, Cernica, 24.VII.-17.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București (Niculescu, 1963); Brănești, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Colias erate* (Esper, 1805): Pasărea, Pustnicu, 26.V.-20.X.1996-2009, common. Further records: Dudești-Ciolea (Niculescu, 1963); București, Comana, Mogoșoaia, Pasărea, Ștefănești (Popescu-Gorj, 1978).

*Colias croceus* (Fourcroy, 1785): Pasărea, 1.VIII.-3.X.1996-2010, rare. Further records: Mihai Bravu (Popescu, 1939); București (Niculescu, 1963); Brănești, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Colias chrysotheme* (Esper, 1781)\*\*: Păd. Andronache (Popescu-Gorj, 1938); Dudești-Ciolea (Niculescu, 1963).

*Colias hyale* (Linnaeus, 1758): Cernica, Dudești-Ciolea (Niculescu, 1963); București, Chitila, Comana, Filaret, Jilava, Țigănești (Popescu-Gorj, 1964).

*Colias alfacariensis* Ribbe, 1905\*: Pasărea, 27.V.2001, 1 ♂. *New record for the Romanian Plain.*

*Gonepteryx rhamni* (Linnaeus, 1758): București, Cernica (Niculescu, 1963); București, Chitila, Comana (Popescu-Gorj, 1964).

## Family Riodinidae

*Hamearis lucina* (Linnaeus, 1758): Pasărea, 2-4.V.2002, common. Further records: București, Brănești, Chitila, Țigănești (Popescu-Gorj, 1964).

## Family Lycaenidae

*Lycaena phlaeas* (Linnaeus, 1761): Pasărea, 6.X.2001, 1 ♀. Further records: București, Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Lycaena helle* ([Denis & Schiffermüller], 1775)\*\*: București, Chitila, 20.V.1889, coll. Salay (Popescu-Gorj, 1964).

*Lycaena dispar rutila* (Werneburg, 1864) (Fig. 2 R, S): Brănești, Pasărea, 2-4.V.2002, rare. Further records: București, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Lycaena virgaureae* (Linnaeus, 1758): Mihai Bravu (Popescu, 1939); Comana, 15.VII.1916 (Popescu-Gorj, 1964).

*Lycaena tityrus* (Poda, 1761): Comana, 26.VI.2010, rare, leg. C. Mihai. Further records: Mihai Bravu (Popescu, 1939); Buftea, Țigănești (Popescu-Gorj, 1964).

*Lycaena hippothoe* (Linnaeus, 1758)\*\* (Fig. 2 M): București, Chitila, 8.VI.1889, coll. Salay (Popescu-Gorj, 1964). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (Markowitsch, 1904, 1909; Drenowski, 1907, 1930; Buresch & Tuleschkow, 1930).

*Lycaena thersamon* (Esper, 1784): Comana, 27.VI.2010, rare, leg. C. Mihai. Further records: Mihai Bravu (Popescu, 1939); București, Brănești, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Thecla betulae* (Linnaeus, 1758): Buftea, Comana, Țigănești (Popescu-Gorj, 1964).

*Neozephyrus quercus* (Linnaeus, 1758): Comana, Cernica, Pasărea, 12.VII.-8.VIII.1997-99, very common. Further records: Brănești, Țigănești (Popescu-Gorj, 1964).

*Calophrys rubi* (Linnaeus, 1758): Pasărea, 2-4.V.2002, common. Further records: București, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

*Satyrrium pruni* (Linnaeus, 1758)\*: Pasărea, 26-27.V.2001, very common.

*Satyrrium spini* ([Denis & Schiffermüller], 1775): Chitila, Comana, Țigănești (Popescu-Gorj, 1964).

*Satyrrium ilicis* (Esper, 1779): Comana, Țigănești (Popescu-Gorj, 1964).

*Leptotes pirithous* (Linnaeus, 1758)\* (Fig. 2 D): Comana, 27.VIII.2009, 1 ♀, leg. C. O. Mancu. *New record for the Romanian Plain.*

*Everes argiades* (Pallas, 1771): Comana, 10-11.VII.2010, rare, leg. C. Mihai. Further records: București, Brănești, Chitila, Jilava (Popescu-Gorj, 1964).

*Everes alcetas* (Hoffmannsegg, 1804): Comana, 10-11.VII.2010, rare, leg. C. Mihai. Further records: București, Comana, Jilava (Popescu-Gorj, 1964). It is a poorly known species in Romania with few records scattered across the country's territory.

*Cupido minimus* (Fuessly, 1775)\*: Pustnicu, 8.V.2010, 1 ♂.

*Celastrina argiolus* (Linnaeus, 1758): Brănești, Pasărea, 25.VII.-9.VIII.1997-2010, rare. Further records: București, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).

*Glaucopsyche alexis* (Poda, 1761): Comana (Popescu-Gorj, 1964).

*Maculinea arion* (Linnaeus, 1758)\*\*: Brănești (Popescu-Gorj, 1964).

*Plebejus argus* (Linnaeus, 1761): Brănești, Pasărea, 7.V.-6.VIII.1996-2010, rare. Further records: Mihai Bravu (Popescu, 1939); București, Brănești, Filaret, Chitila, Comana, Jilava (Popescu-Gorj, 1964).

*Plebejus argyrognomon* (Bergstässer, 1779): București, Chitila, Țigănești (Popescu-Gorj, 1964).

*Aricia agestis* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, Cernica, 2.V.-25.VII.1996-2009, rare. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).

*Cyaniris semiargus* (Rottemburg, 1775): Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Polyommatus icarus* (Rottemburg, 1775): Pasărea, Brănești, 1.V.-2.X.1996-2010, very common. Further records: Mihai Bravu (Popescu, 1939); București, Brănești, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

*Polyommatus thersites* (Cantener, 1834)\*: Brănești, Cernica, 2.V.-25.VII.1996-99, very rare.

*Meleageria bellargus* (Rottemburg, 1775): Pasărea, 27.V.2001, rare. Further records: București, Brănești, Comana, Filaret, Jilava (Popescu-Gorj, 1964).

*Meleageria coridon* (Poda, 1761): București, Filaret (Popescu-Gorj, 1964).

### Family Nymphalidae

#### Subfamily Nymphalinae

*Libythea celtis* (Laicharting, 1782): Comana, 15.VI.2010. (Obs. S. M. Stanciu). Requiring reconfirmation!

*Argynnis paphia* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 25.VII.-9.VIII.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); Cernica (Niculescu, 1965); București, Chitila, Țigănești (Popescu-Gorj, 1964).

*Argynnis pandora* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, Cernica, 26.V.-23.VIII.1996-2010, rare. Further records: Mihai Bravu (Popescu, 1939); Cernica (Niculescu, 1965); București, Comana (Popescu-Gorj, 1964).

*Argynnis aglaja* (Linnaeus, 1758): Mihai Bravu (Popescu, 1939); Cernica, Ștefănești (Niculescu, 1965); Comana, Chitila (Popescu-Gorj, 1964).

*Argynnis adippe* ([Denis & Schiffermüller], 1775): Mihai Bravu (Popescu, 1939); Băneasa, Cernica, Ștefănești (Niculescu, 1965); Comana, Chitila (Popescu-Gorj, 1964).

*Argynnis niobe* (Linnaeus, 1758): Cernica, Comana (Niculescu, 1965).

*Issoria lathonia* (Linnaeus, 1758): Pasărea, Pustnicu, 25.VII.-3.X.1996-2010, very common. Further records: Mihai Bravu (Popescu, 1939); Cernica (Niculescu, 1965); București, Chitila, Comana, Mihai Bravu (Popescu, 1939); Cernica, Ștefănești (Niculescu, 1965); Comana, Chitila (Popescu-Gorj, 1964).

*Brenthis daphne* ([Denis & Schiffermüller], 1775): Comana, 27.VI.2010, rare, leg. C. Mihai. Further records: Comana (Caradja, 1896; București, 5.VII.1915, Comana, 4.VI.1911 (Popescu-Gorj, 1964); Cernica (Niculescu, 1965).

*Brenthis hecate* ([Denis & Schiffermüller], 1775)\*\*: Țigănești, 4.VI.1916 (Popescu-Gorj, 1964). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (Lovech, Razgrad, Samuil) (S. Beshkov, pers. comm.).

*Clossiana euphrosyne* (Linnaeus, 1758): București, Chitila, Comana, Țigănești (Popescu-Gorj, 1964); Băneasa, Cernica (Niculescu, 1965).

*Clossiana selene* ([Denis & Schiffermüller], 1775): Comana, Țigănești (Popescu-Gorj, 1964); Comana (Niculescu, 1965).

*Clossiana dia* (Linnaeus, 1767): Pasărea, 2-4.V.2002, common. Further records: București, Comana, Jilava (Popescu-Gorj, 1964); Buftea, Chitila, Cernica, Păd. Andronache (Niculescu, 1965).

*Vanessa atalanta* (Linnaeus, 1758): Pasărea, 25.VII.-9.VIII.1996-2009, rare. Further records: Mihai Bravu (Popescu, 1939); București, Comana (Popescu-Gorj, 1964); Cernica (Niculescu, 1965).

*Vanessa cardui* (Linnaeus, 1758): Brănești, Pasărea, 24.VII.-3.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Chitila, Comana, Jilava (Popescu-Gorj, 1964); Comana, Dudești-Cioplea (Niculescu, 1965).

*Inachis io* (Linnaeus, 1758): Pasărea, 25.VII.-9.VIII.1996-2010, rare. Further records: Comana (Popescu-Gorj, 1964); București (Niculescu, 1965).

*Aglais urticae* (Linnaeus, 1758): Pasărea, 25.VII.1997, rare. Further records: Comana (Popescu-Gorj, 1964).

*Polygonia c-album* (Linnaeus, 1758): Pasărea, Pustnicu, 4.V.-3.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București (Niculescu, 1965).

*Polygonia egea* (Cramer, 1775)\*\*: București, leg. A. L. Montadon (De Joannis, 1892; Niculescu, 1965). Acceptable historical record, the species being recorded from the northern territories of Bulgaria: Resseletz near Tcherven Bryag, the most northern locality in Bulgaria (S. Beshkov, pers. comm.).

*Araschnia levana* (Linnaeus, 1758): Brănești, 2-4.V.2002, common. Further records: Comana, Țigănești (Popescu-Gorj, 1964; Niculescu, 1965).

*Nymphalis antiopa* (Linnaeus, 1758): București, Comana, Cernica, Buftea, Țigănești (Popescu-Gorj, 1960, 1964).

*Nymphalis polychloros* (Linnaeus, 1758): Pasărea, 22.VII.1997, 1 ♀. Further records: Mihai Bravu (Popescu, 1939); București, Comana (Popescu-Gorj, 1964).

*Nymphalis xanthomelas* ([Denis & Schiffermüller], 1775): Păd. Andronache, 1936, leg. Popescu-Gorj (Niculescu, 1965).

*Nymphalis vaualbum* ([Denis & Schiffermüller], 1775)\*\*: Comana, 7.VIII.1915 (Popescu-Gorj, 1964).

*Euphydryas maturna* (Linnaeus, 1758) (Fig. 2 P): Brănești, Pasărea, 26-27.V.2001; 26.V.2008 (leg. Stanciu & Görbe), very common. Further records: București, Brănești, Chitila, Țigănești (Popescu-Gorj, 1964); Afumați, Băneasa, Cernica, Ștefănești (Niculescu, 1965).

*Melitaea cinxia* (Linnaeus, 1758): București, Comana, Filaret, Țigănești (Popescu-Gorj, 1964); Cernica (Niculescu, 1965).

*Melitaea phoebe* ([Denis & Schiffermüller], 1775): Pasărea, 26.V.-25.VII.1997-2009, rare. Further records: București, Brănești, Comana, Țigănești (Popescu-Gorj, 1964); Cernica (Niculescu, 1965).

*Melitaea ornata ogygia* Frusthorfer, 1908\*: Comana, 11.VII.2010, very rare, leg. C. Mihai. Requiring reconfirmation!

*Melitaea aurelia* Nickerl, 1850: București, coll. Salay (Popescu-Gorj, 1964).

*Melitaea trivia* ([Denis & Schiffermüller], 1775) : Comana, Brănești, 26.V.-10.VII.1997-99, very rare. Further records: Băneasa, Cernica, Ștefănești, Păd. Andronache, Pasărea (Niculescu, 1965).

*Melitaea didyma* ([Denis & Schiffermüller], 1775): Comana, 10-11.VII.2010, rare, leg. C. Mihai. Further records: Brănești, Comana, 7.VII.-2.VIII.1916 (Popescu-Gorj, 1964); București, Cernica (Niculescu, 1965).

*Melitaea arduinna* (Esper, 1784)\*\*: București (Caradja, 1895; Fleck, 1900; Niculescu, 1965). Acceptable historical record, the species being recorded from the northern territories of Bulgaria: Sboryanovo (Buresch & Tuleschkow, 1929, 1930; Abadjiev, 1995).

*Melitaea athalia* (Rottemburg, 1775): Mihai Bravu (Popescu, 1939); Brănești, Comana, Țigănești (Popescu-Gorj, 1964); Cernica, Ștefănești (Niculescu, 1965).

*Limenitis populi* (Linnaeus, 1758)\*\*: Comana, 1916 (Niculescu, 1965).

*Neptis sappho* (Pallas, 1771) (Fig. 2 O): Brănești, Pasărea, 2-4.V.2002, common. Further records: Băneasa, București, Chitila, Comana, Țigănești (Popescu-Gorj, 1964); București (Niculescu, 1965).

*Neptis rivularis* (Scopoli, 1763): București, Chitila, Comana (Popescu-Gorj, 1964; Niculescu, 1965).

*Apatura metis* Freyer, 1829: Brănești, 3-4.V.2002, rare, Comana, 29.V.2009, rare. Further records: Giurgiu (Popescu-Gorj, 1960; Niculescu, 1965); Budești-București (Niculescu, 1965).

*Apatura ilia* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).

*Apatura iris* (Linnaeus, 1758)\*\*: București, 27.VII.1919 (Popescu-Gorj, 1964).

#### Family Nymphalidae

##### Subfamily Satyrinae

*Kirinia roxelana* (Cramer, 1777)\*\*: Comana, 20.VI.1916 (Popescu-Gorj, 1964).

*Pararge aegeria tircis* Butler, 1867: Mihai Bravu (Popescu, 1939); București, Brănești, Chitila, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

*Lasiommata megera* (Linnaeus, 1758): București, Chitila, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).



*Lasiommata maera* (Linnaeus, 1758): Pasărea, 3-4.V.2002, rare. Further records: București, Brănești, Chitila, Comana, Țigănești (Popescu-Gorj, 1964).

*Lopinga achine* (Scopoli, 1763) (Fig. 2 Q): Comana, Românești, 6.VI.-12.VII.1997-2004, rare. Further records: București, Chitila, Comana, Dudești-Cioplea, Țigănești (Popescu-Gorj, 1964).

*Coenonympha arcania* (Linnaeus, 1761): Brănești, Țigănești (Popescu-Gorj, 1964).

*Coenonympha glycerion* (Borkhausen, 1788): București, Brănești, Chitila, Comana (Popescu-Gorj, 1964).

*Coenonympha pamphilus* (Linnaeus, 1758): Pasărea, Cernica, Pustnicu, 24.VII.-2.X.1996-2010, common. Further records: București, Brănești, Chitila, Comana, Filaret, Jilava, Țigănești (Popescu-Gorj, 1964).

*Aphantopus hyperanthus* (Linnaeus, 1758): Comana, Brănești, Chitila, 1892-1916 (Popescu-Gorj, 1964).

*Maniola jurtina* (Linnaeus, 1758): Pasărea, 24.VII.-9.VIII.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Brănești, Comana, Chitila, Țigănești (Popescu-Gorj, 1964).

*Hyponephele lycaon* (Rottemburg, 1775)\*\*: București, Chitila, 1890-1916, coll. Salay (Popescu-Gorj, 1964).

*Hyponephele lupina* (O. G. Costa, 1836)\*\*: Brănești, 20.VIII.1915, coll. Salay (Popescu-Gorj, 1977).

*Erebia ligea* (Linnaeus, 1758)\*\*: Chitila, 26.VI.1889, coll. Salay (Popescu-Gorj, 1964).

*Melanargia galathea* (Linnaeus, 1758): Comana, 12-13.VII.1996, common. Further records: București, Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Minois dryas* (Scopoli, 1763): Pasărea, Comana, 10.VII.-17.VIII.1999-2010, common. Further records: Mihai Bravu (Popescu, 1939); Băneasa, București, Brănești, Chitila, Comana (Popescu-Gorj, 1964).

*Hipparchia fagi* (Scopoli, 1763): Comana, 5.VIII.1890, coll. Salay (Popescu-Gorj, 1964).

*Hipparchia semele* (Linnaeus, 1758): Comana, 1915-1916 (Popescu-Gorj, 1964)

*Arethusana arethusa* ([Denis & Schiffermüller], 1775): Brănești, Comana, Țigănești, 1886-1927 (Popescu-Gorj, 1964).

*Brinthesia circe* (Fabricius, 1775): Comana, 1893-1927 (Popescu-Gorj, 1964).

#### Family Drepanidae

*Thyatira batis* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 21.VII.-9.VIII.1996-2010, very common. Further records: București (Popescu-Gorj, 1964).

*Habrosyne pyritoides* (Hufnagel, 1766)\*: Brănești, Comana, Pasărea, 22.V.-9.VIII.1996-2010, very common.

*Tethea ocularis* (Linnaeus, 1758): Brănești, Pasărea, 30-31.V.2001-2002, rare. Further records: București (Popescu-Gorj, 1964).

*Watsonalla binaria* (Hufnagel, 1767): Brănești, Pasărea, Pustnicu, 7.V.-8.VIII.1996-2010, common. Further records: București, Filaret (Popescu-Gorj, 1964).

*Drepana falcataria* (Linnaeus, 1758): București, Comana (Montandon, 1900; Popescu-Gorj, 1964).

*Cilix glaucatus* (Scopoli, 1763): Brănești, Pasărea, 1-9.VIII.1997-2001, rare. Further records: București, Chitila (Popescu-Gorj, 1964).

#### Family Geometridae

*Abraxas grossulariata* (Linnaeus, 1758): Pasărea, 30.V.1998, 1 ♂. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).

*Lomaspilis marginata* (Linnaeus, 1758): Comana, Pasărea, Pustnicu, 21.V.-28.VII.1996-2010, common. Further records: București, Comana, Filaret (Popescu-Gorj, 1964).

*Ligdia adustata* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, rare. Further records: București, Chitila, Țigănești (Popescu-Gorj, 1964).

*Stegania dilectaria* (Hübner, 1790): Brănești, Pasărea, 3-4.V.2002, rare. Further records: București, 22.V.1904, coll. Salay (Popescu-Gorj, 1964).

*Helioimmata glarearia* ([Denis & Schiffermüller], 1775): Pasărea, Pustnicu, 28.VII.-8.VIII.1996-2010, common. Further records: București, Comana, Chitila (Popescu-Gorj, 1964).

*Macaria notata* (Linnaeus, 1758)\*: Pasărea, Pustnicu, 21.V.-21.VII.1996-2009, common.

*Macaria alternata* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).

*Chiasmia clathrata* (Linnaeus, 1758): Brănești, Pasărea, Cernica, Pustnicu, 30.V.-9.VIII.1996-2010, common. Further records: București, Brănești, Chitila, Jilava (Popescu-Gorj, 1964).

*Godonella aestimaria sareptanaria* (Staudinger, 1891): București (Popescu-Gorj, 1964).

*Tephрина murinaria* ([Denis & Schiffermüller], 1775): Pasărea, Cernica, 30.V.-21.VII.1996-2009, rare. Further records: București, Comana, Filaret (Popescu-Gorj, 1964).

*Tephрина arenacearia* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 15-31.V.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Comana, Jilava (Popescu-Gorj, 1964).

*Neognopharmia stevenaria* (Boisduval, 1840)\*: Pustnicu, 6.VIII.2009, 1 ♂. Known only from the South and the East of Romania (the Extra-Carpathian areas), from Banat (Orșova, Băile Herculane), Moldova (Iași, Tecuci, Hanul Conachi), Muntenia (Amara, Slobozia). It is a common species in Dobrogea and in the Danube Delta.

*Petrophora chlorosata* (Scopoli, 1763)\*: Pasărea, 26.V.2001, rare.



*Plagodis pulveraria* (Linnaeus, 1758)\*: Comana, Cernica, Pasărea, Pustnicu, 21.VII.-1.VIII.1996-2010, very common.

*Plagodis dolabraria* (Linnaeus, 1758): Comana, 12.V.1919 (Popescu-Gorj, 1964).

*Opistographis luteolata* (Linnaeus, 1758): Comana (Popescu-Gorj, 1964).

*Therapis flavicaria* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 30.V.-25.VII.1996-2009, rare. Further records: București, Chitila, Comana, Filaret (Popescu-Gorj, 1964).

*Pseudopanthera macularia* (Linnaeus, 1758): Comana, Pasărea, Cernica, 16.V.-8.VIII.1996-2010, common. Further records: București, Chitila, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

*Eilicrinia cordiaria* (Hübner, 1790): Pasărea, 7-8.VIII.1997, rare. Further records: București (Popescu-Gorj, 1964).

*Eilicrinia trinotata* (Metzner, 1845): București (Popescu-Gorj, 1964); Păd. Andronache, 28.V.1936 (König, 1975).

*Apeira syringaria* (Linnaeus, 1758)\*: Brănești, Pasărea, Cernica, 30.V.-15.IX.1996-2009, rare. *New record for the Romanian Plain.*

*Ennomos autumnaria* (Werneburg, 1859): Comana (Popescu-Gorj, 1964).

*Ennomos quercinaria* (Hufnagel, 1767): Buftea, Comana, 1890, coll. Salay (Popescu-Gorj, 1964).

*Ennomos fuscantaria* (Haworth, 1809): Buftea, București (Popescu-Gorj, 1964).

*Ennomos erosaria* ([Denis & Schiffermüller], 1775): Comana, 18.VII.1915 (Popescu-Gorj, 1964).

*Selenia dentaria* (Fabricius, 1775)\*: Comana, Pasărea, 12-31.VII.1996-2010, common.

*Selenia lunularia* (Hübner, 1788): Pasărea, Pustnicu, 28.VII.-8.VIII.1996-97, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Selenia tetralunaria* (Hufnagel, 1767)\*: Pasărea, 25.VII.1997, 1 ♀. *New record for the Romanian Plain.*

*Artiora evonymaria* ([Denis & Schiffermüller], 1775): Pasărea, 6.X.2001, 1 ♀. Further records: București, Chitila (Popescu-Gorj, 1964).

*Crocallis tusciaria* ([Denis & Schiffermüller], 1775): Pasărea, 6-20.X.2001, rare. Further records: București, 11.X.1910, coll. Salay (Popescu-Gorj, 1964).

*Crocallis elinguaris* (Linnaeus, 1758)\*: Cernica, Pasărea, Pustnicu, 24-31.VII.1996-2009, common. *New record for the Romanian Plain.*

*Colotois pennaria* (Linnaeus, 1758)\*: București, 27.XI.2001, 1 ♂.

*Lycia hirtaria* (Clerck, 1759): București (Popescu-Gorj, 1964).

*Briston betularia* (Linnaeus, 1758)\*: Brănești, Comana, Pasărea, Pustnicu, 12.VII.-8.VIII.1996-2009, common.

*Agriopsis marginaria* (Fabricius, 1766): București, Comana, Țigănești (Popescu-Gorj, 1964).

*Erannis defoliaria* (Clerck, 1759): București, 30.XI.2001, 1 ♂. Further records: București, Comana (Popescu-Gorj, 1964).

- Menophra abruptaria* (Thunberg, 1792)\*\*: Muntenia ? (Abafi-Aigner, 1901).
- Synopsia sociaria* (Hübner, 1799)\*: Pasărea, 25.VII.1997, very rare.
- Peribatodes rhomboidaria* ([Denis & Schiffermüller], 1775): Pasărea, 30.V.-31.VII.1996-2009, rare. Further records: București, Comana, Țigănești (Popescu-Gorj, 1964).
- Alcis repandata* (Linnaeus, 1758)\*: Pustnicu, 21.V.2009, common. *New record for the Romanian Plain.*
- Hypomecis roboraria* ([Denis & Schiffermüller], 1775): Brănești, Comana, Cernica, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, very common. Further records: București, Comana (Popescu-Gorj, 1964).
- Hypomecis punctinalis* (Scopoli, 1763): București, Comana, Filaret, Otopeni (Popescu-Gorj, 1964).
- Ascotis selenaria* ([Denis & Schiffermüller], 1775): București, Comana, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, very common. Further records: București, Comana (Popescu-Gorj, 1964).
- Ematurga atomaria* (Linnaeus, 1758): Pasărea, Cernica, 21.VII.-8.VIII.1996-2010, very common. Further records: București, Brănești, Chitila, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).
- Cabera pusaria* (Linnaeus, 1758): Pasărea, Pustnicu, 24.VII.-1.VIII.1996-2009, rare. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).
- Cabera exanthemata* (Scopoli, 1763): Pasărea, 25.VII.1997, very rare. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).
- Siona lineata* (Scopoli, 1763): București, Comana, Filaret (Popescu-Gorj, 1964).
- Brephos puella* (Esper, 1787): Păd. Andronache (Popescu-Gorj, 1960).
- Alsophila aceraria* ([Denis & Schiffermüller], 1775): Comana, 20.X.1915 (Popescu-Gorj, 1964).
- Orthostixis cribraria* (Hübner, 1759): Comana, 11-24.VI.1916 (Popescu-Gorj, 1964).
- Pseudoterpna pruinata* (Hufnagel, 1767): Comana, 24.VI.1916 (Popescu-Gorj, 1964).
- Comibaena bajularia* ([Denis & Schiffermüller], 1775)\*: Comana, Cernica, Pasărea, 30.V.-12.VII.1996-2008, very common. *New record for the Romanian Plain.*
- Antonechloris smaragdaria* (Fabricius, 1787): Pasărea, 8.VIII.1997, rare. Further records: București, Chitila, Jilava (Popescu-Gorj, 1964).
- Hemithaea aestivaria* (Hübner, 1789): Comana, Țigănești (Popescu-Gorj, 1964).
- Chlorissa viridata* (Linnaeus, 1758): București, Jilava (Popescu-Gorj, 1964).
- Chlorissa cloraria* (Hübner, 1813)\*: Brănești, Pasărea, 25.VII.-2.VIII.1996-97, rare.
- Thalera fimbrialis* (Scopoli, 1763): Pasărea, 21.VII.-1.VIII.1996-97, rare. Further records: București, Chitila (Popescu-Gorj, 1964).
- Cyclophora albicellaria* (Hübner, 1789): Pasărea, 21.VII.1997, rare. Further records: Brănești, Comana (Popescu-Gorj, 1964).
- Cyclophora annularia* (Fabricius, 1775): Comana, Pasărea, Pustnicu, 21.V.-1.VIII.1996-2008, common. Further records: Comana (Popescu-Gorj, 1964).

*Cyclophora pupillaria* (Hübner, 1799)\*: Pasărea, 21.VII.1997, very rare. *New record for the Romanian Plain.*

*Cyclophora porata* (Linnaeus, 1767): Pasărea, 1.VIII.-15.IX.1996-2001, rare. Further records: București, Brănești (Popescu-Gorj, 1964).

*Cyclophora punctaria* (Linnaeus, 1758): Pustnicu, 21.V.2009, common. Further records: Comana (Popescu-Gorj, 1964).

*Cyclophora suppunctaria* (Zeller, 1847): Pasărea, 21.VII.1997, 1 ♀, Pustnicu, 28.VII.2008, rare. Further records: Comana, 16.VII.1916 (Popescu-Gorj, 1964).

*Timandra comae* A. Schmidt, 1931: Brănești, Pasărea, Pustnicu, 21.VII.-9.VIII.1996-2010, very common. Further records: București, Chitila, Jilava (Montandon, 1900; Popescu-Gorj, 1964).

*Scopula tessellaria* (Boisduval, 1840): Brănești, Comana (Popescu-Gorj, 1964).

*Scopula nigropunctata* (Hufnagel, 1767)\*: Pasărea, 30.V.1998, rare. *New record for the Romanian Plain.*

*Scopula virgulata* ([Denis & Schiffermüller], 1775): Comana (Popescu-Gorj, 1964).

*Scopula ornata* (Scopoli, 1763): București, Comana, Jilava (Popescu-Gorj, 1964).

*Scopula rubiginata* (Hufnagel, 1767): București (Montandon, 1900), Comana, Pasărea, 12.VII.-16.IX., rare.

*Scopula marginepunctata* (Goeze, 1781): Mihai Bravu (Popescu, 1939); București (Popescu-Gorj, 1964).

*Scopula incanata* (Linnaeus, 1758)\*: Pasărea, 8.VIII.1997, 1 ♀, Pustnicu, 28.VII.2008, common.

*Scopula immutata* (Linnaeus, 1758): Comana, Păd. Călugăreni (Popescu-Gorj, 1964).

*Scopula flaccidaria* (Zeller, 1852): Giurgiu (Popescu-Gorj, 1960).

*Scopula floslactata* (Haworth, 1809)\*: Comana, 12-13.VII.1997, very rare.

*Idaea ochrata* (Scopoli, 1763): Brănești, Comana (Popescu-Gorj, 1964).

*Idaea muricata* (Hufnagel, 1767): Brănești, Pasărea, Cernica, 30.V.-25.VII.1996-99, rare. Further records: București, Otopeni (Popescu-Gorj, 1964).

*Idaea rusticata* ([Denis & Schiffermüller], 1775)\*: Pasărea, 1-8.VIII.1996-2008, rare.

*Idaea biselata* (Hufnagel, 1767): Comana (Popescu-Gorj, 1964).

*Idaea inquinata* (Scopoli, 1763): București, Filaret (Popescu-Gorj, 1964); Comana (König, 1975).

*Idaea politaria* (Hübner, 1799)\*: Pasărea, 21-25.VII.1996-98, very rare.

*Idaea seriata* (Schrank, 1802)\*: Pasărea, 7-8.VIII.1997, very rare.

*Idaea dimidiata* (Hufnagel, 1767): Pasărea, 25.VIII.1997, very rare. Further records: București (Popescu-Gorj, 1964).

*Idaea camparia* (Herrich-Schäffer, 1852): București, 12.VIII.1941 (Popescu-Gorj, 1964).

*Idaea pallidata* ([Denis & Schiffermüller], 1775): Comana, Țigănești (Popescu-Gorj, 1964).

- Idaea aversata* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 30.V.-1.VIII.1996-2010, common. Further records: București, Comana, (Popescu-Gorj, 1964).
- Idaea deversaria* (Herrich-Schäffer, 1848): Giurgiu (Popescu-Gorj, 1964).
- Idaea degeneraria* (Hübner, 1788)\*: Brănești, Pasărea, Pustnicu, 21.V.-8.VIII.1996-2010, very common.
- Rhodostrophia vibicaria* (Clerck, 1759): Pasărea, 21.VII.-8.VIII.1996-2009, common. Further records: București, Chitila, Comana, Țigănești (Popescu-Gorj, 1964).
- Rhodometra sacraria* (Linnaeus, 1758): Giurgiu (Popescu-Gorj, 1960).
- Lythria purpuraria* (Linnaeus, 1758): Brănești, Pasărea, 19.VII.-8.VIII.1996-2009, very common. Further records: Mihai Bravu (Popescu, 1939); București, Comana, Chitila, Filaret, Jilava (Popescu-Gorj, 1964).
- Cataclysmis rigata* (Hübner, 1813): Pasărea, 30.V.1998, very rare. Further records: Comana, 1888-1891, coll. Salay (Popescu-Gorj, 1964).
- Scotopteryx bipunctaria* ([Denis & Schiffermüller], 1775): Comana, 1915-1916 (Popescu-Gorj, 1964).
- Scotopteryx mucronata* (Scopoli, 1767): Comana, 1915-1916 (Popescu-Gorj, 1964).
- Cidaria fulvata* (Forster, 1771)\*: Pustnicu, 21.V.2009, common.
- Xanthorhoe disignata* (Hufnagel, 1767): București, Comana, 1913-1916 (Popescu-Gorj, 1964).
- Xanthorhoe fluctuata* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 1-31.V.1996-2001, common. Further records: București, Brănești, Comana (Popescu-Gorj, 1964).
- Epirrhoe alternata* (Müller, 1764): Brănești, Pasărea, Pustnicu, 21.V.-6.X.1998-2009, common. Further records: București, Chitila, Comana, Jilava, Țigănești (Popescu-Gorj, 1964).
- Epirrhoe tristata* (Linnaeus, 1758)\*: Pustnicu, 21.V.2009, rare.
- Epirrhoe rivata* (Hübner, 1813): București, Chitila (Popescu-Gorj, 1964).
- Camptogramma bilineata* (Linnaeus, 1758): Pasărea, 30.V.-15.IX.1997-2009, rare. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).
- Mesoleuca albicillata* (Linnaeus, 1758)\*: Pasărea, Cernica, Pustnicu, 21-28.VII.1996-2009, rare.
- Pelurga comitata* (Linnaeus, 1758): București, Comana (Popescu-Gorj, 1964).
- Cosmorhoe ocellata* (Linnaeus, 1758): Pasărea, 30.V.1998, rare. Further records: Comana, 1915-1916 (Popescu-Gorj, 1964).
- Horisme vitalbata* ([Denis & Schiffermüller], 1775)\*: Pasărea, 21.VII.1997, very rare.
- Horisme tersata* ([Denis & Schiffermüller], 1775)\*: Brănești, Pasărea, 30-31.V.1998, rare.
- Melanthia procellata* ([Denis & Schiffermüller], 1775): Pasărea, 25.VII.1997, very rare.
- Epirrita dilutata* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).
- Operopthera brumata* (Linnaeus, 1758): București, 30.XI.2001, 2 ♂♂. Further records: București, Comana (Popescu-Gorj, 1964).

*Perizoma lugdunaria* (Herrich-Schäffer, 1855)\*: Pasărea, 21-25.VII.1997, very rare.  
*Perizoma flavofasciata* (Thunberg, 1792): București, 20.VI.1919 (Popescu-Gorj, 1964).

*Eupithecia haworthiata* Doubleday, 1856\*: Pasărea, Pustnicu 21-30.V.1996-98, common.

*Eupithecia linariata* ([Denis & Schiffermüller], 1775): Pasărea, 30.V.-16.IX.1996-2001, common. Further records: București, 6.VI.1888 (Popescu-Gorj, 1964).

*Eupithecia laqueraria* Herrich-Schäffer, 1848\*: Pasărea, 8.VIII.1997, 2 ♂♂.

*Eupithecia centaureata* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 25.VII.-9.VIII.1996-2010, common. Further records: București (Popescu-Gorj, 1964).

*Eupithecia absinthiata* (Clerck, 1759)\*: Pasărea, 1.VIII.1997, 1 ♀.

*Eupithecia assimilata* Doubleday, 1856: București, 5.IX.1936 (Popescu-Gorj, 1964).

*Eupithecia subnotata* (Hübner, 1803): București (Popescu-Gorj, 1964).

*Eupithecia millefoliata* Rössler, 1866\*: Pasărea, Pustnicu, 28.VII.-8.VIII.1996-99, rare.

*Eupithecia innotata* (Hufnagel, 1767)\*: Pustnicu, 21.V.2009, rare.

*Chloroclystis chloerata* (Mabille, 1870)\*: Brănești, Pasărea, 1-8.VIII.1996-97, rare.

*Chloroclystis v-ata* (Haworth, 1809)\*: Pasărea, 31.VII.-8.VIII.1996-2009, rare.

*Aplocera plagiata* (Linnaeus, 1758): Pasărea, 15.IX.2001, rare. Further records: București, Chitila (Montandon, 1900; Popescu-Gorj, 1964).

*Aplocera praeformata* (Hübner, 1826): Mihai Bravu (Popescu, 1939).

*Schistostege decussata* ([Denis & Schiffermüller], 1775): Cernica (Popescu-Gorj, 1960); Comana, leg. Montandon (Popescu-Gorj, 1964).

*Lithostege griseata* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 21.VII.-8.VIII.1996-2009, common. Further records: București (Popescu-Gorj, 1964).

*Lithostege farinata* (Hufnagel, 1767)\*: Pasărea, 30-31.V.1998, rare.

*Asthenes albulata* (Hufnagel, 1767)\*: Pasărea, 30.V.-25.VII.1997-2009, rare.

*Minoa murinata* (Scopoli, 1763): Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Lobophora halterata* (Hufnagel, 1767)\*: Pasărea, 3-4.V.2002, rare.

#### Family Thaumetopoeidae

*Thaumetopoea processionea* (Linnaeus, 1758): București, 1906-1916, coll. Salay (Popescu-Gorj, 1964).

#### Family Notodontidae

*Clostera curtula* (Linnaeus, 1758)\*: Pasărea, Cernica, 21.VII.-1.VIII.1996-2001, rare.  
*Clostera pygra* (Hufnagel, 1766)\*: Pustnicu, 28.VII.2008, 1 ♂. *New record for the Romanian Plain.*

*Cerura vinula* (Linnaeus, 1758): București, 1892-1819, coll. Salay (Popescu-Gorj, 1964).

*Furcula furcula* (Clerck, 1759): București, Jilava (Popescu-Gorj, 1964).

*Dicranura ulmi* ([Denis & Schiffermüller], 1775): București, 9.V.1904, coll. Salay (Popescu-Gorj, 1964).



*Ochrostigma velitaris* (Hufnagel, 1767): Băneasa, 9.VII.1936 (Nemeş & Voicu, 1973).

*Tritophia tritophus* ([Denis & Schiffermüller], 1775)\*: Pasărea, 21.VII.1997, 1 ♀, Pustnicu, 28.VII.2008, rare.

*Notodonta ziczac* (Linnaeus, 1758): Pasărea, 3-4.VIII.2002, rare. Further records: Bucureşti (Popescu-Gorj, 1964).

*Drymonia dodonaea* ([Denis & Schiffermüller], 1775): Pasărea, Pustnicu, 21-30.V.1997-2003, rare. Further records: Bucureşti (Popescu-Gorj, 1964).

*Pterostoma palpina* (Clerck, 1759): Pustnicu, 28.VII.2008, common. Further records: Bucureşti (Popescu-Gorj, 1964).

*Ptilophora plumigera* ([Denis & Schiffermüller], 1775): Bucureşti, 30.XI.2002, 1 ♂. Further records: Bucureşti (Popescu-Gorj, 1964).

*Phalera bucephala* (Linnaeus, 1758)\*: Pasărea, Pustnicu, 21.V.-8.VIII.1996-2009, common. *New record for the Romanian Plain.*

*Phalera bucephaloides* (Ochsenheimer, 1810)\*: Comana, Pasărea, Pustnicu, 12-28.VII.1996-2008, common. *New record for the Romanian Plain.*

*Peridea anceps* (Goeze, 1781): Bucureşti, 1896-1906, coll. Salay (Popescu-Gorj, 1964).

*Stauropus fagi* (Linnaeus, 1758)\*: Pasărea, Pustnicu, 21.V.-8.VIII.1996-2010, common.

*Harpyia milhauseri* (Fabricius, 1775): Brăneşti, Pasărea, 21-28.VII.1996-98, rare. Further records: Bucureşti, 9.V.1904, coll. Salay (Popescu-Gorj, 1964).

*Spatalia argentina* ([Denis & Schiffermüller], 1775): Brăneşti, Comana, Pasărea, Pustnicu, 7.V.-28.VII.1996-2009, common. Further records: Bucureşti (Popescu-Gorj, 1964).

#### Family Noctuidae

*Moma alpium* (Osbeck, 1778): Pasărea, Pustnicu, 21.V.-28.VII.1996-2009, rare. Further records: Afumaţi, Bucureşti, 1885-1888 (Popescu-Gorj, 1964; Rákossy, 1996).

*Acrionicta alni* (Linnaeus, 1767): Bucureşti, 1910, coll. Salay (Popescu-Gorj, 1964).

*Acrionicta tridens* ([Denis & Schiffermüller], 1775): Mihai Bravu (Popescu, 1939); Bucureşti, 1892-1912 (Popescu-Gorj, 1964).

*Acrionicta psi* (Linnaeus, 1758): Bucureşti, 1903-1919 (Popescu-Gorj, 1964; Rákossy, 1996).

*Acrionicta aceris* (Linnaeus, 1758): Bucureşti (Popescu-Gorj, 1964; Rákossy, 1996).

*Acrionicta megacephala* ([Denis & Schiffermüller], 1775): Bucureşti, 1916-1928 (Popescu-Gorj, 1964; Rákossy, 1996).

*Acrionicta auricoma* ([Denis & Schiffermüller], 1775): Bucureşti, 23.VII.1888, leg. F. Salay, (Popescu-Gorj, 1964; Rákossy, 1996).

*Acrionicta rumicis* (Linnaeus, 1758): Pustnicu, 21.V.2009, common. Further records: Bucureşti, Chitila, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Craniophora ligustri* ([Denis & Schiffermüller], 1775): Brănești, Comana, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, very common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Symira nervosa* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964; Rákosy, 1996).

*Symira albovenosa* (Goeze, 1781): Pasărea, 25.VII.-7.VIII.1996-2001, rare. Further records: București, 9.V.1903, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Cryphia fraudatricula* (Hübner, 1803): Pasărea, 25-31.VII.1997-2009, rare, Pustnicu, 28.VII.2008, common. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Cryphia algae* (Fabricius, 1775): Pasărea, 19.VII.-2.VIII., 1996-2009 common. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Cryphia raptricula* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964; Rákosy, 1996).

*Idia calvaria* ([Denis & Schiffermüller], 1775): București, Comana, Filaret (Popescu-Gorj, 1964; Rákosy, 1996).

*Simplicia rectalis* (Eversmann, 1842): București, Brănești (Popescu-Gorj, 1964; Rákosy, 1996).

*Paracolax tristalis* (Fabricius, 1794): Brănești, Comana, Cernica, Pasărea, 12.VII.-9.VIII. 1996-2009, very common. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Herminia grisealis* ([Denis & Schiffermüller], 1775): București, Buftea, Comana (Popescu-Gorj, 1964).

*Herminia tarsicrinalis* (Knoch, 1782): București (Rákosy, 1996).

*Polypogon tentacularia* (Linnaeus, 1758): București (Rákosy, 1996).

*Zanclognatha lunalis* (Scopoli, 1763)\*: Pasărea, 21.VII.1997, rare.

*Zanclognatha zelleralis* (Wocke, 1850)\*: Comana, 12.VII.1997, 2 ♀♀. *New record for the Romanian Plain.*

*Zanclognatha tarsipennalis* Treitschke, 1835\*: Brănești, Pasărea, 1-8.VIII.1996-98, common.

*Pechipogo strigilata* (Linnaeus, 1758): București, (Rákosy, 1996).

*Catocala sponsa* (Linnaeus, 1758): Comana, Pasărea, 12-27.VII.1996-2001, rare. Further records: București, Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Catocala dilecta* (Hübner, 1808) (Fig. 2 C): Comana, 12.VII.1997, 1 ♂ (Székely & al., 1998). Further records: București (Rákosy, 1996).

*Catocala fraxini* (Linnaeus, 1758): Afumați, 5.VIII.1890, coll. Salay (Popescu-Gorj, 1964).

*Catocala nupta* (Linnaeus, 1758): Pasărea, Pustnicu, 24.VII.-8.VIII.1996-2010, common. Further records: București, Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Catocala elocata* (Esper, 1787): Brănești, Pasărea, Cernica, 19.VII.-8.VIII.1996-2009, rare. Further records: Mihai Bravu (Popescu, 1939); București, Comana (Popescu-Gorj, 1964; Rákosy, 1996).



- Catocala puerpera* (Giorna, 1791): Giurgiu (Popescu-Gorj, 1964).
- Catocala promissa* ([Denis & Schiffermüller], 1775): Comana, Pustnicu, 12-28.VII.1997-2008, common. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).
- Catocala electa* (Vieweg, 1783): București, Comana, 1893-1899, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).
- Catocala conversa* (Esper, 1783): Comana (Popescu-Gorj, 1964; Rákosy, 1996). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (Razgrad) (S. Beshkov, pers. comm.).
- Catocala nymphagoga* (Esper, 1787)\* (Fig. 2 G): Comana, Mihai Bravu, Cernica, Pasărea, 12-31.VII.1996-99, very common. *New record for the Romanian Plain.*
- Catocala hymenaea* ([Denis & Schiffermüller], 1775): Pasărea, Cernica, Pustnicu, 19-28.VII.1996-2001, rare. Further records: Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996).
- Catocala fulminea* (Scopoli, 1763): București, Comana, Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996).
- Minucia lunaris* ([Denis & Schiffermüller], 1775): Pasărea, Pustnicu, 7-31.V.1997-2009, rare. Further records: București, Comana, Otopeni, Pantelimon (Montandon, 1900; Popescu-Gorj, 1964; Rákosy, 1996).
- Dysgonia algira* (Linnaeus, 1758): Pasărea, Pustnicu, 25.VII.-9.VIII.1997-2010, rare. Further records: București, Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996).
- Prodotis stolidia* (Fabricius, 1775): Brănești, Pasărea, Pustnicu, 25.VII.-17.VIII.1996-2009, rare. Further records: Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996); Mihai Bravu (Popescu, 1939).
- Lygephila pastinum* (Treitschke, 1820): București, Pantelimon, 1901-1904, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).
- Lygephila cracca* ([Denis & Schiffermüller], 1775): Pasărea, 3-4.VIII.2002, rare. Further records: București, Pantelimon, (Popescu-Gorj, 1964; Rákosy, 1996).
- Lygephila viciae* (Hübner, 1822): București (Rákosy, 1996).
- Catephia alchymista* (Linnaeus, 1758): Pasărea, Pustnicu, 21.V.-1.VIII.1997-2009, very rare. Further records: București, 20.VII.1905, coll. Salay, Pantelimon, (Popescu-Gorj, 1964; Rákosy, 1996).
- Aedia funesta* (Esper, 1786): București, Buftea, Comana, Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996).
- Aedia leucomelas* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 15.V.-6.VIII.1997-2010, common. Further records: Băneasa, București, Giurgiu, Pantelimon (Popescu-Gorj, 1964; Rákosy, 1996). Subtropical migratory species, distributed in S.-Europe, N.-Africa, Asia Minor, Middle-East, S.-Asia, China, Japan. In Romania it was considered as a rare species, but it has become more and more frequently recorded in the southern part of the country. It is currently known from Muntenia, Dobrogea and the Danube Delta.

*Tyta luctuosa* ([Denis & Schiffermüller], 1775): Brănești, Comana, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, common. Further records: București, Comana, Filaret, Jilava, Pantelimon (Popescu-Gorj, 1964; Rákósy, 1996).

*Callistege mi* (Clerck, 1759): Pasărea, 3.V.2002, rare. Further records: Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Euclidia glyphica* (Linnaeus, 1758): Brănești, Pasărea, 25.VII.-1.VIII.1997-2009, rare. Further records: Brănești, Comana, Chitila (Popescu-Gorj, 1964; Rákósy, 1996).

*Gonospileia triquetra* ([Denis & Schiffermüller], 1775): Țigănești, 13.VIII.1915 (Popescu-Gorj, 1964; Rákósy, 1996).

*Laspeyria flexula* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964; Rákósy, 1996).

*Scoliopteryx libatrix* (Linnaeus, 1758): Pasărea, 8.VIII.1997, 1 ♀. Further records: București, Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Calyptra thalictri* (Borkhausen, 1790): Afumați, IX.1880, coll. Salay (Popescu-Gorj, 1964).

*Hypena proboscidalis* (Linnaeus, 1758): Pasărea, 3.VIII.2002, 1 ♀. Further records: București (Rákósy, 1996).

*Hypena rostralis* (Linnaeus, 1758): București (Popescu-Gorj, 1964; Rákósy, 1996).

*Phytometra viridaria* (Clerck, 759): Pasărea, 25.VII.-8.VIII.1996-98, rare. Further records: Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Rivula sericealis* (Scopoli, 1763): Brănești, Pasărea, 30.V.-25.VII.1996-2003, common. Further records: București, Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Parascotia fuliginaria* (Linnaeus, 1761): Pasărea, 25.VII.1997, 1 ♀. Further records: București, 2.VIII.1919 (Popescu-Gorj, 1964; Rákósy, 1996).

*Epizeuxis calvaria* ([Denis & Schiffermüller], 1775): Giurgiu (Popescu-Gorj, 1960).

*Colobochyla salicalis* ([Denis & Schiffermüller], 1775): Pasărea, 25.VII.-1.VIII.1996-2001, rare. Further records: Comana (Popescu-Gorj, 1964)

*Eutelia adulatrix* (Hübner, 1813): București, 12.IX.1912, coll. Salay (Popescu-Gorj, 1964; Rákósy, 1996).

*Lamprotes c-aureum* (Knoch, 1781)\*: Pasărea, Pustnicu, 25.VII.-1.VIII.1996-99 very rare. *New record for the Romanian Plain.*

*Diachrysia chrysitis* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 21.V.-8.VIII.1996-2009, rare. Further records: București (Popescu-Gorj, 1964, 1977; Rákósy, 1996).

*Diachrysia nadeja* (Oberthür, 1880): Pasărea, 25.VII.2001, 1 ♂. Further records: București (Rákósy, 1996).

*Diachrysia chryson* (Esper, 1789): București, 1.VIII.1890, coll. Salay (Popescu-Gorj, 1964; Rákósy, 1996).

*Macdunnoughia confusa* (Stephens, 1850): Pasărea, Pustnicu, 7.V.-8.VIII.1996-2009, common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Plusia festucae* (Linnaeus, 1758): Brănești, Pasărea, 17.VII.-2.VIII.1996-99, common. Further records: București (Popescu-Gorj, 1964; Rákósy, 1996).

*Autographa gamma* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 21.V.-3.X.1996-2010, common. Further records: București, Comana, Jilava (Popescu-Gorj, 1964; Rákosy, 1996).

*Autographa bractea* ([Denis & Schiffermüller], 1775): Chitila, 8.IX.1910, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Plusidia cheiranthi* (Tauscher, 1809) (Fig. 2 K): Cislău, 21.VI.-9.VII.1997-99, common. Further records: București, 1880-1935 (Popescu-Gorj, 1964; Rákosy, 1996).

*Trichoplusia ni* (Hübner, 1803): Brănești, Pasărea, 6-20.X.1997-99, very rare. Further records: București (Rákosy, 1996).

*Chrysodeixis chalcites* (Esper, [1789])\* (Fig. 2 J): Pasărea, 1.VIII.2000, 1 ♀, (Székely & Stanciu, 2002).

Subtropical migratory species widely distributed across Eurasia, Africa, Oceania and Australia. In Europe it is resident only in the southern parts. Recorded for the first time in Romania two decades ago (Rákosy & Neumann, 1990), the species seems to have become more and more common during the last years. Although it is currently known in Romania only from Dobrogea and Muntenia (Rákosy & Neumann, 1990; Székely & Stanciu, 2002; Dincă, 2006; Székely, Dincă & Juhász, 2011). *New record for the Romanian Plain.*

*Abrostola asclepiadis* ([Denis & Schiffermüller], 1775)\*: Brănești, Comana, Pasărea, Pustnicu, 21.V.-8.VIII.1996-2010, very common.

*Abrostola triplasia* (Linnaeus, 1758) (= *trigemina* Werneburg, 1864): Brănești, Pasărea, 30.V.-8.VII.1997-2009, common. Further records: București (Montandon, 1900; Popescu-Gorj, 1964).

*Emmelia trabealis* (Scopoli, 1763): Brănești, Comana, Pasărea, Pustnicu, 21.V.-9.VIII.1996-2010, very common. Further records: Mihai Bravu (Popescu, 1939); București, Comana, Jilava (Popescu-Gorj, 1964).

*Tarachidia candefacta* (Hübner, [1831])\* (Fig. 2 E, L): Manolache (surroundings of Bucharest, Ilfov county), 11.V.2010 (1 spec., leg. Cristian Mihai). It is a species of Nearctic origin described from Pennsylvania (USA). It is widely distributed in North America, ranging from southern Canada to Mexico. *Tarachidia candefacta* has been intentionally introduced in southern Russia (the Krasnodar region) in the years 60 of the 20th century as a biological control measure against the invasive *Ambrosia artemisiifolia* (Schurov, 1998; Poltavsky & Artokhin, 2006; Poltavsky et al., 2008). The species is therefore rapidly expanding to the west through the steppes north of the Black Sea (Hacker, Legrain & Fibiger, 2008). Recently reported that new for the fauna of Romania (Székely, Dincă & Juhász, 2011). The specimen from Manolache represent the first records of *T. candefacta* from Muntenia and confirm its expansion to the west. *T. candefacta* has already been collected in Bulgaria on the southern banks of the Danube next to the Romanian border (appreciatively south of the Romanian town Corabia) (S. Beshkov, pers. comm.). *New record for the Romanian Plain.*

*Acontia lucida* (Hufnagel, 1776): Brănești, Pasărea, 25.VII.-8.VIII., rare. Other remarks: București, Comana (Montandon, 1900; Popescu-Gorj, 1964; Rákosy, 1996).

*Phylophilla obliterated* (Rambur, 1833)\*: Pasărea, Cernica, 30.V.-1.VIII.1996-99, common.

*Protodeltote pygarga* (Hufnagel, 1766)\*: Pasărea, Pustnicu, 21.V.-2.VIII.1997-2009, common.

*Deltote uncula* (Clerck, 1759): Pasărea, 26.V.2001, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Deltote bankiana* (Fabricius, 1775): Pasărea, 17-25.VII.1996-99, very rare. Further records: Călugăreni (Popescu-Gorj, 1964; Rákosy, 1996).

*Pseudeustrotia candidula* ([Denis & Schiffermüller], 1775)\*: Pasărea, 25.VII.1997, rare. Further records: București (Rákosy, 1996).

*Calymma communimacula* ([Denis & Schiffermüller], 1775): Pasărea, Cernica, 25.VII.-11.VIII.1997-99, rare. Further records: București (Rákosy, 1996).

*Eublemma respersa* (Fabricius, 1794): Pasărea, 24.VII.-7.VIII.1997-99, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Eublemma purpurina* ([Denis & Schiffermüller], 1775)\*: Pasărea, Cernica, Pustnicu, 24.VII.-8.VIII.1996-2009, common. *New record for the Romanian Plain.*

*Trisateles emortualis* ([Denis & Schiffermüller], 1775)\*: Pasărea, 25-31.VII.1996-98, rare. *New record for the Romanian Plain.*

*Cucullia absinthii* (Linnaeus, 1758)\*: Pasărea, 8.VIII.1997, 1 ♀. *New record for the Romanian Plain.*

*Cucullia umbratica* (Linnaeus, 1758): Pasărea, Cernica, 24-31.VII.1997-99, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Cucullia tanacetii* ([Denis & Schiffermüller], 1775): București, 18.V.1904, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Shargacucullia lychnitis* (Rambur, 1833): Chitila, 20.V.1884, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Shargacucullia blattariae* (Esper, 1790): București (Rákosy, 1996).

*Shargacucullia verbasci* (Linnaeus, 1758): Pasărea, 3.V.1999, 1 ♂. Further records: București, 20.IV.1911 (Popescu-Gorj, 1964; Rákosy, 1996).

*Shargacucullia scrophulariae* ([Denis & Schiffermüller], 1775)\*: Pustnicu, 21.V.2009, 2 ♂♂. *New record for the Romanian Plain.*

*Shargacucullia prenanthis* Boisduval, 1850: București (Rákosy, 1996).

*Calophasia lunula* (Hufnagel, 1766): Pasărea, Cernica, 24-25.VII.1996-99, rare. Further records: București, Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Pyrois cinnamomea* (Goeze, 1781): Afumați, 30.VIII.1880, leg. Siebrecht (Salay, 1910; Rákosy, 1996).

*Amphipyra pyramidea* (Linnaeus, 1758): Pasărea, Pustnicu, 28.VII.-8.VIII.1996-2008, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Amphipyra berbera svenssoni* Fletscher, 1968: Afumați, București, Comana (Popescu-Gorj, 1977).

*Amphipyra livida* ([Denis & Schiffermüller], 1775)\*: Pasărea, Pustnicu, 28.VII.-2.VIII.1997, rare.

*Amphipyra tragopoginis* (Clerck, 1759): Pasărea, 1-8.VIII.1997-99, rare. Further records: București (Rákosy, 1996).

*Asteroscopus sphinx* (Hufnagel, 1766): București, 15.X.1916 (Popescu-Gorj, 1964; Rákosy, 1996).

*Diloba caeruleocephala* (Linnaeus, 1758): Pasărea, București, 20.X.-24.XI.2001, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Panemeria tenebrata* (Scopoli, 1763): București (Popescu-Gorj, 1964).

*Aegle koekeritziana* (Hübner, 1759): Pasărea, 26.V.2001., very rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Schinia scutosa* ([Denis & Schiffermüller], 1775): Brănești, Cernica, Pasărea, Pustnicu, 21.VII.-9.VIII.1996-2009, common. Further records: București, Țigănești (Popescu-Gorj, 1964).

*Heliothis viroplaca* (Hufnagel, 1766): București, Brănești, Comana, Jilava (Popescu-Gorj, 1964; Rákosy, 1996).

*Heliothis maritima bulgarica* Draudt, 1938: Pasărea, 1.VIII.2004, 1 ♂. Further records: București, Comana, (Popescu-Gorj, 1964; Rákosy, 1996).

*Heliothis peltigera* ([Denis & Schiffermüller], 1775): Pasărea, 1-8.VIII.1996-2001, rare. Further records: Mihai Bravu (Popescu, 1939; Rákosy, 1996).

*Helicoverpa armigera* (Hübner, 1808)\*: Pasărea, Pustnicu, 21.VII.-8.VIII.1996-2008, common.

*Pyrrhia umbra* (Hufnagel, 1766): Pasărea, Pustnicu, Cernica, 30.V.-21.VII.1996-99, rare. Further records: București (Rákosy, 1996).

*Periphanes delphinii* (Linnaeus, 1758) (Fig. 2 I): Pasărea, Cernica, Pustnicu, 21.VII.-9.VIII.1997-99, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Elaphria venustula* (Hübner, 1790)\*: Brănești, Pasărea, Pustnicu, 28.VII.-9.VIII.1996-2009, rare. *New record for the Romanian Plain.*

*Caradrina morpheus* (Hufnagel, 1766)\*: Pasărea, Cernica, 24-31.VII.1996-99, rare.

*Platyperigea kadenii* (Freyer, 1836): Pasărea, 3.VIII.2002, 2 ♂♂. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Paradrina clavipalpis* (Scopoli, 1763): București, Chitila, Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Hoplodrina blanda* ([Denis & Schiffermüller], 1775)\*: Pasărea, 15.IX.2001, rare. *New record for the Romanian Plain.*

*Hoplodrina octogenaria* (Goeze, 1781): București (Rákosy, 1996).

*Hoplodrina ambigua* ([Denis & Schiffermüller], 1775)\*: Pasărea, Pustnicu, 21-30.V.1996-99, rare.

*Hoplodrina respersa* ([Denis & Schiffermüller], 1775): București (Rákosy, 1996).



*Charanyca trigammica* (Hufnagel, 1766): Brănești, Pasărea, 21.VII.-8.VIII.1996-2010, very common. Further records: București, Comana (Popescu-Gorj, 1964).

*Spodoptera exigua* (Hübner, 1808): Pasărea, 8.VIII.1997, 1 ♂. Further records: București (Rákossy, 1996).

*Chilodes maritima* (Tauscher, 1806)\*: Pasărea, 26.V.2001, 1 ♂. *New record for the Romanian Plain.*

*Athetis gluteosa* (Treitschke, 1835)\*: Pasărea, Pustnicu, 28.VII.-8.VIII.1996-2001, rare. Further records: Comana (Rákossy, 1996).

*Dypterygia scabriuscula* (Hufnagel, 1766): Pasărea, Pustnicu, 28.VII.-8.VIII.1997-2009, common. Further records: București, 12.VI.1928 (Popescu-Gorj, 1964; Rákossy, 1996).

*Thalpophila matura* (Hufnagel, 1766)\*: Pasărea, 15-16.IX.2001, rare.

*Trachea atriplicis* (Linnaeus, 1758): Pasărea, 30.V.-2.IX.1996-2010, rare. Further records: București, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Euplexia lucipara* (Linnaeus, 1758): Pasărea, 26.V.-17.VIII.1997-2009, rare. Further records: Afumați, București, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Phlogophora meticulosa* (Linnaeus, 1758): Pasărea, 15-16.IX.2001, rare. Further records: București, Chitila (Popescu-Gorj, 1964; Rákossy, 1996).

*Actinotia polyodon* (Clerck, 1759): Pasărea, Cernica, 30.V.-31.VII.1997-2009, rare. Further records: București (Rákossy, 1996).

*Enargia abluta* (Hübner, 1808)\*\*: București, 1911-1928, coll. Salay (Popescu-Gorj, 1964).

*Ipimorpha subtusa* ([Denis & Schiffermüller], 1775): București, 1911-1928, coll. Salay (Popescu-Gorj, 1964).

*Mesogona acetosellae* ([Denis & Schiffermüller], 1775): Pasărea, 20.X.2001, rare. Further records: București, 1915-1919 (Popescu-Gorj, 1964).

*Mesogona oxalina* (Hübner, 1803): București (Rákossy, 1996).

*Dycicla oo* (Linnaeus, 1758): București (Rákossy, 1996).

*Parastichtys suspecta* (Hübner, 1817): București (Rákossy, 1996).

*Cosmia diffinis* (Linnaeus, 1767)\*: Comana, Pasărea, 12.VII.-1.VIII., rare. *New record for the Romanian Plain.*

*Cosmia pyralina* ([Denis & Schiffermüller], 1775): Pasărea, 19.VII.-15.IX.1996-99, very common. Further records: București, 1889, coll. Salay (Popescu-Gorj, 1964).

*Cosmia affinis* (Linnaeus, 1758): Comana (Rákossy, 1996).

*Cosmia trapezina* (Linnaeus, 1758): Pasărea, Cernica, Pustnicu, 30.V.-9.VIII.1997-2009, common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Atethmia centrargo* (Haworth, 1803)\*: Pasărea, 15-16.IX.2001, common. *New record for the Romanian Plain.*

*Atethmia ambusta* ([Denis & Schiffermüller], 1775): Pasărea, 15-16.IX.2001, rare. Further records: București (Rákossy, 1996).



*Xanthia togata* (Esper, 1788)\*: Pasărea, 6.X.2001, 1 ♂. Further records: Comana (Rákosy, 1996).

*Xanthia sulphurago* ([Denis & Schiffermüller], 1775)\*: Pasărea, 15.IX.-6.X.2001, very common. *New record for the Romanian Plain.*

*Xanthia gilvago* ([Denis & Schiffermüller], 1775)\*: Pasărea, 15.IX.-6.X.2001, common. Further records: Comana (Rákosy, 1996).

*Xanthia citrigo* (Linnaeus, 1758): Pasărea, 6.X.2001, rare. Further records: Comana (Rákosy, 1996).

*Agrochola lychnidis* ([Denis & Schiffermüller], 1775): Pasărea, 15.IX.-20.X.2001, rare. Further records: București, Chitila (Popescu-Gorj, 1964; Rákosy, 1996).

*Agrochola circumcellaris* (Hufnagel, 1766): Pasărea, 15.IX.-6.X.2001, common. Further records: București, 1891-1906, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Agrochola lota* (Clerck, 1759)\*: Pasărea, 15.IX.-6.X.2001, common. *New record for the Romanian Plain.*

*Agrochola macilenta* (Hübner, 1809)\*: Pasărea, 6.X.2001, common. *New record for the Romanian Plain.*

*Agrochola nitida* ([Denis & Schiffermüller], 1775): Pasărea, 6-20.X.2001, rare. Further records: București (Rákosy, 1996).

*Agrochola helvola* (Linnaeus, 1758): Pasărea, 15.IX.-6.X.2001, rare. Further records: Comana (Rákosy, 1996).

*Agrochola litura* (Linnaeus, 1758): Pasărea, 6-20.X.2001, common. Further records: Comana (Rákosy, 1996).

*Agrochola laevis* (Hübner, 1803)\*: Pasărea, 6.X.2001, rare.

*Eupsilia transversa* (Hufnagel, 1766): București, Pasărea, 15.IX.-6.X.2001, rare. Further records: Comana (Popescu-Gorj, 1964; Rákosy, 1996).

*Jodia craceago* ([Denis & Schiffermüller], 1775): București, 1890-1916 (Montandon, 1900; Popescu-Gorj, 1964; Rákosy, 1996).

*Conistra vaccinii* (Linnaeus, 1761): Pasărea, 15.IX.-20.X.2001, common. Further records: București, Chitila (Popescu-Gorj, 1964; Rákosy, 1996).

*Conistra rubiginea* ([Denis & Schiffermüller], 1775): București, 1889-1896, coll. Salay (Popescu-Gorj, 1964; Rákosy, 1996).

*Conistra ligula* (Esper, 1791): București, 1.VII.1900, coll. Salay (Popescu-Gorj, 1964).

*Orbona fragariae* (Vieweg, 1790)\*\*: București, 1885-1889, coll. Salay (Popescu-Gorj, 1964).

*Ulochlana hirta* (Hübner, 1813)\*\*: București (Montandon, 1900), București, 6.XI.1929 (Popescu-Gorj, 1964). Acceptable historical record, the species being recorded from the northern territories of Bulgaria (Danube River, Somovit near Gulyantsi) (S. Beshkov, pers. comm.).

*Aporophyla lutulenta* ([Denis & Schiffermüller], 1775): Pasărea, 6-20.X.2001, rare. Further records: Comana (Rákosy, 1996).

*Lithopane ornithopus* (Hufnagel, 1766): Pasărea, 3-4.V.2002, rare. Further records: București, Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Xylena exsoleta* (Linnaeus, 1758)\*: Pasărea, 3.V.2002, 1 ♀. *New record for the Romanian Plain.*

*Allophytes oxyacanthae* (Linnaeus, 1758): Pasărea, 20.X.2001, rare. Further records: Comana (Rákósy, 1996).

*Dichonia aprilina* (Linnaeus, 1758): București, VII.1882, coll. Salay (Popescu-Gorj, 1964).

*Ammoconia caecimacula* ([Denis & Schiffermüller], 1775): Pasărea, 6-20.X.2001, common. Further records: București, 1911-1932 (Popescu-Gorj, 1964; Rákósy, 1996).

*Valeria oleagina* ([Denis & Schiffermüller], 1775): București (Rákósy, 1996).

*Apamea crenata* (Hufnagel, 1766)\*: Pasărea, 30-31.V.1998, rare. *New record for the Romanian Plain.*

*Apamea remissa* (Hübner, 1809): București (Rákósy, 1996).

*Eremobina pabulatricula* (Brahm, 1791)\*: Comana, 12.VII.1997, 4 ♂♂, 2 ♀♀. *New record for the Romanian Plain.*

*Oligia strigilis* (Linnaeus, 1758): București (Popescu-Gorj, 1964; Rákósy, 1996).

*Oligia latruncula* ([Denis & Schiffermüller], 1775): Pasărea, 30.V.1998, common. Further records: București, Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Oligia versicolor* (Borkhausen, 1775)\*: Comana, Pasărea, 30.V.-12.VII.1996-99, common.

*Mesoligia furuncula* ([Denis & Schiffermüller], 1775): București, 1915-1919 (Popescu-Gorj, 1964; Rákósy, 1996).

*Mesapamea secalis* (Linnaeus, 1758)\*: Pasărea, 25-31.VII.1997-99, rare. *New record for the Romanian Plain.*

*Luperina testacea* ([Denis & Schiffermüller], 1775)\*: Pasărea, 15.IX.2001, 1 ♂. *New record for the Romanian Plain.*

*Rhizedra lutosa* (Hübner, 1803): București, coll. Salay (Popescu-Gorj, 1964).

*Amphipoea oculatea* (Linnaeus, 1758): Pasărea, 1.VIII.1997, 1 ♂. Further records: Comana, 1915-1916 (Popescu-Gorj, 1964).

*Gortyna flavago* ([Denis & Schiffermüller], 1775)\*: Pasărea, 1.VIII.-15.IX.1998-2001, rare. *New record for the Romanian Plain.*

*Calamia tridens* (Hufnagel, 1766)\*: Pasărea, 1.VIII.2001, 1 ♂.

*Staurophora celsia* (Linnaeus, 1758)\*\*: București (Rákósy, 1996).

*Nonagria typhae* (Thunberg, 1784): Pasărea, 25.VII.2001, 1 ♀. Further records: București, 21.X.1905, coll. Salay (Popescu-Gorj, 1964).

*Discestra trifolii* (Hufnagel, 1766): Brănești, Pasărea, 25.VII.-15.IX.1996-2010, common. Further records: București (Popescu-Gorj, 1964).

*Lacanobia w-latinum* (Hufnagel, 1766): Brănești, Pasărea, 1-9.VIII.1996-2002, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Lacanobia splendens* (Hübner, 1808)\*: Pasărea, 30.V.1997, 1 ♂.

*Lacanobia oleracea* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 28.VII.-9.VIII.1996-2009, rare. Further records: București, Chitila, Comana, Filaret, Jilava, Țigănești (Popescu-Gorj, 1964).

*Lacanobia thalassina* (Hufnagel, 1766): București, Comana (Popescu-Gorj, 1964).

*Lacanobia suasa* ([Denis & Schiffermüller], 1775): București, Comana (Popescu-Gorj, 1964).

*Lacanobia blenna* (Hübner, 1824): București, 25.VIII.1932 (König, 1975).

*Hecatera dysodea* ([Denis & Schiffermüller], 1775): Pasărea, 25-31.VII.1997-2008, rare. Further records: București (Popescu-Gorj, 1964).

*Hecatera bicolorata* (Hufnagel, 1766)\*: Pasărea, 1.VIII.1997, 1 ♂, Pustnicu, 28.VII.2008, rare. *New record for the Romanian Plain.*

*Hecatera cappa* (Hübner, [1803])\*: Pasărea, 21-22.VII.1997, rare. *New record for the Romanian Plain.* Distributed in S.-Europe, Asia Minor, S.-Ukraine, S.-Russia, Altai. In Romania known only from Oltenia, Muntenia and Dobrogea.

*Hadena bicurris* (Hufnagel, 1766)\*: Pasărea, 1.VIII.1997, 1 ♂.

*Hadena luteago* ([Denis & Schiffermüller], 1775): Pasărea, 3-4.VIII.2002, rare. Further records: București (Popescu-Gorj, 1964).

*Hadena albimacula* (Borkhausen, 1792)\*: Pasărea, 21.VII.1997, 2 ♂♂. *New record for the Romanian Plain.*

*Hadena rivularis* (Fabricius, 1775): București (Popescu-Gorj, 1964).

*Hadena perplexa* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).

*Melanchra persicariae* (Linnaeus, 1758): Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Mamestra brassicae* (Linnaeus, 1758): Pasărea, Pustnicu, 24.VII.-8.VIII.1996-2009, rare. Further records: București, Chitila, Comana, Filaret, Țigănești (Popescu-Gorj, 1964).

*Mythimna turca* (Linnaeus, 1758): Pasărea, Cernica, 30.V.-8.VIII.1997-2008, common. Further records: București (Rákósy, 1996).

*Mythimna ferrago* (Fabricius, 1787): Brănești, Pasărea, 21.VII.-16.VIII.1996-2008, rare. Further records: Comana (Popescu-Gorj, 1964; Rákósy, 1996).

*Mythimna albipuncta* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, Pustnicu, 21.V.-20.X.1996-2010, common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).

*Mythimna vitellina* (Hübner, 1790): Brănești, Pasărea, Cernica, Pustnicu, 21.V.-20.X.1996-2010, common. Further records: București (Rákósy, 1996).

*Mythimna impura* (Hübner, 1808): Afumați, 1880, coll. Salay (Popescu-Gorj, 1964).

*Mythimna pallens* (Linnaeus, 1758): Brănești, Comana, Pasărea, 12.VII.-8.VIII.1996-2010, rare. Further records: București (Rákósy, 1996).

*Mythimna obsoleta* (Hübner, 1803): Pasărea, 25-30.V.1996-99, rare. Further records: Comana (Rákósy, 1996).

*Mythimna comma* (Linnaeus, 1758)\*: Pasărea, 25.VII.-1.VIII.1997-99, rare. *New record for the Romanian Plain.*

*Mythimna l-album* (Linnaeus, 1758): Pasărea, 1.VIII.-6.X.1996-2009, rare. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).

*Orthosia incerta* (Hufnagel, 1766): Pasărea, 3-26.V.1997-2010, rare. Further records: Comana (Rákossy, 1996).

*Orthosia gothica* (Linnaeus, 1758): Pasărea, Pustnicu, 3-21.V.1997-2010 common. Further records: București, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Orthosia cruda* ([Denis & Schiffermüller], 1775): Pasărea, 2-3.V.2001, rare. Further records: București (Popescu-Gorj, 1964; Rákossy, 1996).

*Orthosia miniosa* ([Denis & Schiffermüller], 1775): Brănești, 2.IV.1903, coll. Salay (Popescu-Gorj, 1964, Rákossy, 1996).

*Orthosia cerasi* (Fabricius, 1775): Pasărea, Pustnicu, 3-21.V.1997-2009, common. Further records: București (Popescu-Gorj, 1964; Rákossy, 1996).

*Egira conspiciellaris* (Linnaeus, 1758): Pasărea, Pustnicu, 3-21.V.1997-2009, common. Further records: București (Popescu-Gorj, 1964; Rákossy, 1996).

*Tholera decimalis* (Poda, 1761): Pasărea, 15.IX.2001, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Axylia putris* (Linnaeus, 1758): Pasărea, Pustnicu, 30.V.-1.VIII.1996-2009, rare. Further records: București, Chitila (Popescu-Gorj, 1964).

*Ochropleura plecta* (Linnaeus, 1758): Brănești, Pasărea, 21.V.-15.IX.1996-2010, common. Further records: București, Chitila (Popescu-Gorj, 1964).

*Diarsia brunnea* ([Denis & Schiffermüller], 1775)\*: Pasărea, 19.VII.2001, 1 ♂.

*Diarsia dahlui* (Hübner, 1813): București (Rákossy, 1996).

*Noctua pronuba* (Linnaeus, 1758): Brănești, Comana, Pasărea, Pustnicu, 21.V.-20.X.1996-2009, common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964; Rákossy, 1996).

*Noctua orbona* (Hufnagel, 1766): Pasărea, 31.VII.-16.VIII.1996-2009, rare. Further records: București (Rákossy, 1996).

*Noctua fimbriata* (Schreber, 1759): Comana, Pasărea, Pustnicu, 12.VII.-7.VIII.1996-2009, rare. Further records: București, Comana (Rákossy, 1996).

*Noctua janthina* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 21.VII.-15.IX.1996-99, rare. Further records: București (Popescu-Gorj, 1964; Rákossy, 1996).

*Noctua haywardi* (Tams, 1926)\* (Fig. 2 H): Pasărea, 19.VII.2001 and 1.VIII.2001, 2 ♂♂.

Signaled as a new species for the Romanian fauna in 2002 (Székely & Stanciu, 2002). A West-Asian element, spread on the Balkan Peninsula (in Greece, Bulgaria, Croatia, Macedonia), the south of Hungary, the Crimean Peninsula (Fibiger, 1993; Efetov & Budashkin, 1990), Cyprus and the western territories of Turkey, a very rare species, known in the Romanian fauna only from this area. *New record for the Romanian Plain.*

*Spaelotis ravida* ([Denis & Schiffermüller], 1775): București, 12.VII.1919 (Popescu-Gorj, 1960, 1964; Rákossy, 1996).

- Rhyacia simulans* (Hufnagel, 1766): Brănești, Pasărea, 2.VIII.-15.IX.1997-2001, rare. Further records: București, 2.VII.1960 (König, 1975; Rákósy, 1996).
- Opigena polygona* ([Denis & Schiffermüller], 1775): București, 5.VI.1889, coll. Salay (Popescu-Gorj, 1964).
- Eugraphe sigma* ([Denis & Schiffermüller], 1775): București (Rákósy, 1996).
- Xestia c-nigrum* (Linnaeus, 1758): Pasărea, Cernica, Pustnicu, 21.V.-15.IX.1996-2009, common. Further records: București, Comana (Popescu-Gorj, 1964).
- Xestia ditrapezium* ([Denis & Schiffermüller], 1775): Pasărea, 21.VII.-1.VIII.1997-2009, rare. Further records: București (Rákósy, 1996).
- Xestia triangulum* (Hufnagel, 1766): Pasărea, 19.VII.-1.VIII.1997-2009, rare. Further records: București (Rákósy, 1996).
- Xestia rhomboidea* (Esper, 1790)\*: Pasărea, 7.VIII.1997, 1 ♀.
- Xestia xanthographa* ([Denis & Schiffermüller], 1775)\*: Pasărea, 15.IX.-6.X. 2001, very common. *New record for the Romanian Plain.*
- Cerastis rubricosa* ([Denis & Schiffermüller], 1775): Pustnicu, 21.V.2009, common. Further records: București, 13.VI.1916 (Popescu-Gorj, 1964; Rákósy, 1996).
- Cerastis leucographa* ([Denis & Schiffermüller], 1775)\*: Pustnicu, 21.V.2009, common. *New record for the Romanian Plain.*
- Naenia typica* (Linnaeus, 1758): Afumați, București, 1891-1906, coll. Salay (Popescu-Gorj, 1964).
- Anaplectoides prasina* ([Denis & Schiffermüller], 1775): Comana, 1890-1916 (Popescu-Gorj, 1964; Rákósy, 1996).
- Peridroma saucia* (Hübner, 1808): Brănești, Pasărea, 15.VIII.-2.X.1997-2002, rare. Further records: București (Popescu-Gorj, 1964; Rákósy, 1996).
- Actebia praecox* (Linnaeus, 1758): București, 1913, coll. Salay (Popescu-Gorj, 1964; Rákósy, 1996).
- Euxoa aquilina* ([Denis & Schiffermüller], 1775): Comana, 12.VII.1997, 1 ♂. Further records: București, 7.VII.1928 (Popescu-Gorj, 1964; Rákósy, 1996).
- Euxoa obelisca* ([Denis & Schiffermüller], 1775): București (Rákósy, 1996).
- Euxoa temera* (Hübner, 1808): Pasărea, 15.IX.2001, 1 ♂. Further records: Băneasa (Popescu-Gorj, 1960).
- Euxoa nigricans* (Linnaeus, 1758): Pasărea, 27.V.2001, 1 ♂. Further records: Comana, 30.VI.1894 (Popescu-Gorj, 1964; Rákósy, 1996).
- Euxoa tritici* (Linnaeus, 1758): Comana, 12.VII.1997, rare. Further records: București (Rákósy, 1996).
- Agrotis crassa* (Hübner, 1803): Pasărea, 1.VIII.-15.IX.1997-2001, common. Further records: București (Rákósy, 1996).
- Agrotis ipsilon* (Hufnagel, 1766): Pasărea, Pustnicu, 3.V.-15.IX., common. Further records: București, Chitila, Comana (Popescu-Gorj, 1964).
- Agrotis exclamationis* (Linnaeus, 1758): Brănești, Pasărea, Cernica, Pustnicu, 21.V.-9.VIII.1996-2010, common. Other remarks: Mihai Bravu (Popescu, 1939); București, Chitila, Comana (Popescu-Gorj, 1964).



*Agrotis segetum* ([Denis & Schiffermüller], 1775): Brănești, Cernica, Pustnicu, 1.V.-2.X.1996-2010, common. Further records: Mihai Bravu (Popescu, 1939); București, Chitila, Comana (Popescu-Gorj, 1964).

*Calocasia coryli* (Linnaeus, 1758): Pasărea, Pustnicu, 3-26.V.1997-2009, rare. Further records: Comana, 1915-1924 (Popescu-Gorj, 1964; Rákosy, 1996).

#### Family Lymantriidae

*Lymantria monacha* (Linnaeus, 1758)\*\*: Comana, 16.VII.1916 (Popescu-Gorj, 1964).

*Lymantria dispar* (Linnaeus, 1758): Brănești, Comana, Pasărea, Pustnicu, 12.VII.-17.VIII.1996-2010, common. Further records: Brănești, Comana, București, Chitila, Jilava, Țigănești (Popescu-Gorj, 1964).

*Callitaera pudibunda* (Linnaeus, 1758)\*: Pustnicu, 21.V.2009, common. *New record for the Romanian Plain.*

*Dicallomera fascelina* (Linnaeus, 1758)\*\*: București, 1906-1919, coll. Salay (Popescu-Gorj, 1964).

*Orgyia antiqua* (Linnaeus, 1758): Brănești, Pasărea, Pustnicu, 21.VII.-9.VIII.1997-2008, common. Further records: București, Comana (Popescu-Gorj, 1964).

*Euproctis chrysorrhoea* (Hübner, 1822): Pasărea, 25.VII.-9.VIII.1996-2009, rare. Further records: București, Brănești, Comana, Chitila, Țigănești (Popescu-Gorj, 1964).

*Euproctis similis* (Fuessly, 1767): Pasărea, Cernica, 21.VII.-11.VIII.1996-2010, rare. Further records: București, Brănești, Chitila, Comana, Țigănești (Popescu-Gorj, 1964).

*Penthophera morio* (Linnaeus, 1758): Afumați, 8.V.1881, coll. Salay (Popescu-Gorj, 1964).

*Leucoma salicis* (Linnaeus, 1758): Comana, Pasărea, 12.VII.-1.VIII.1996-99 common. Further records: București, Chitila, Comana, Țigănești (Popescu-Gorj, 1964).

*Arctornis l-nigrum* (Müller, 1764)\*: Comana, Pasărea, Cernica, Pustnicu, 12.VII.-8.VIII.1996-2010, very common.

#### Family Nolidae

*Meganola togatalis* (Hübner, 1798): București (Popescu-Gorj, 1964; Rákosy, 1996).

*Meganola strigula* ([Denis & Schiffermüller], 1775)\*: Brănești, Pustnicu, Pasărea, Cernica, 21.V.-9.VIII.1998-2009, very common. *New record for the Romanian Plain.*

*Meganola kolbi* (Daniel, 1935)\*: Pasărea, 30.V.1998, 2 ♂♂. *New record for the Romanian Plain.*

*Nola cuculatella* (Linnaeus, 1758)\*: Pasărea, 8.VIII.1997, 1 ♀. *New record for the Romanian Plain.*

*Nola cristatula* (Hübner, 1793)\*: Brănești, Pasărea, 7-8.VIII.1997, rare. *New record for the Romanian Plain.*



*Nycteola asiatica* (Krulikowsky, 1904)\*: Pasărea, 19-26.VII.2001, rare. Further records: Comana (Rákosy, 1996).

*Bena bicolorana* (Fuessly, 1775) (= *prasinana* auct., nec Linnaeus): Brănești, Pasărea, 25-31.VII.1997-2009, rare. Further records: București (Rákosy, 1996).

*Pseudoips prasinanus* (Linnaeus, 1758) (= *faganus* Fabricius, 1781): Brănești, Pasărea, 31.V.-25.VII.1997-2008, rare. Further records: București (Popescu-Gorj, 1964; Rákosy, 1996).

*Earias clorana* (Linnaeus, 1758): Pasărea, 25-31.VII.1997-99, rare. Further records: București (Popescu-Gorj, 1964; König, 1975; Rákosy, 1996).

*Earias vernana* (Fabricius, 1787)\*: Pasărea, 21.VII.-8.VIII.1997-99, rare. *New record for the Romanian Plain.*

#### Family Arctiidae

*Miltochrista miniata* (Forster, 1771) (Fig. 2 U): Brănești, Comana, Pustnicu, Cernica, 21.V.-16.VIII.1996-2010, very common. Further records: Băneasa (Popescu-Gorj, 1964); *Miltochrista miniata* - form. *fasciata*, Rebel, 1915 (Fig. 2 U): Pasărea, Brănești, Pustnicu, rare.

*Cybosia mesomella* (Linnaeus, 1758): Brănești, Pasărea, 26-27.V.2001, very common. Further records: Chitila, Țigănești (Popescu-Gorj, 1964).

*Pelosia muscerda* (Hufnagel, 1766)\*: Pasărea, Pustnicu, 26.V.-1.VIII.1997-2001, common.

*Pelosia obtusa* (Herrich-Schäffer, 1847)\*: Pasărea, 17.VII.-1.VIII.1996-2002, rare. *New record for the Romanian Plain.*

*Atolmis rubicollis* (Linnaeus, 1758): Pasărea, 21.VII.-8.VIII.1996-2001, rare. Further records: București (Popescu-Gorj, 1964).

*Lithosia quadra* (Linnaeus, 1758): Brănești, Pasărea, 21.VII.-15.IX.1996-2008, rare. Further records: Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Eilema complana balcanica* (Daniel, 1939)\*: Pasărea, 25.VII.-8.VIII.1996-99, rare. *New record for the Romanian Plain.*

*Eilema pseudocomplana* (Daniel, 1939)\*: Pasărea, 7-8.VIII.1997, 2 ♂♂. *New record for the Romanian Plain.*

*Eilema sororcula* (Hufnagel, 1766): Pasărea, Pustnicu, 25.VII.-8.VIII.1997-2009, common. Further records: Comana, 1914-1915, coll. Salay (Popescu-Gorj, 1964).

*Amata phegea* (Linnaeus, 1758): Otopeni, Românești, Săftica, 15.VI.2009, very common. Further records: București, Chitila, Filaret, Jilava (Montandon, 1900; Popescu-Gorj, 1964).

*Dysauxes ancilla* (Linnaeus, 1767): Pasărea, 25-31.VII.1996-99, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Phragmatobia fuliginosa* (Linnaeus, 1758): Pasărea, Pustnicu, 21.V.-8.VIII.1996-2010, rare. Further records: București, Comana (Popescu-Gorj, 1964).

*Spilosoma lutea* (Hufnagel, 1766): Brănești, Pasărea, Cernica, 21.VII.-9.VIII.1996-99, common. Further records: București, Comana (Popescu-Gorj, 1964).

*Spilosoma lubricipeda* (Linnaeus, 1758): Brănești, Comana, Pasărea, Pustnicu, 12.VII.-9.VIII.1996-2009, very common. Further records: Comana (Popescu-Gorj, 1964).

*Spilosoma urticae* (Esper, 1789): București, Comana, Filaret (Popescu-Gorj, 1964).

*Hyphantria cunea* (Drury, 1773)\*: Pasărea, Pustnicu, 21.VII.-6.VIII.1997-2001, rare.

*Diaphora mendica* (Clerck, 1759): București, Chitila (Popescu-Gorj, 1964).

*Rhyparia purpurata* (Linnaeus, 1758): Comana, 26.VI.1918 (Popescu-Gorj, 1964).

*Diacrisia sannio* (Linnaeus, 1758): Pasărea, 3-4.VIII.2002, common. Further records: Comana, Chitila, Țigănești (Popescu-Gorj, 1964).

*Arctia caja* (Linnaeus, 1758)\*: Pasărea, 3.VIII.2004, 1 ♂. *New record for the Romanian Plain.*

*Arctia villica* (Linnaeus, 1758): Pasărea, 26-27.V.2001, rare. Further records: București, Chitila (Popescu-Gorj, 1964).

*Callimorpha dominula* (Linnaeus, 1758)\*\*: Comana, 1911-1916 (Popescu-Gorj, 1964).

*Euplagia quadripunctaria* (Poda, 1761) (Fig. 2 T): Pasărea, 25.VII.-7.VIII.1996-2001, rare. Further records: București, Mihai Bravu (Popescu, 1939; Popescu-Gorj, 1964).

#### Family Eriocraniidae

*Eriocrania subpurpurella* (Haworth, 1828): Băneasa, Pasărea, Ștefănești, leg. A. Popescu-Gorj (Kovács & Kovács, 1998).

#### Family Hepialidae

*Triodia sylvina* (Linnaeus, 1758): Brănești, Pasărea, 15-16.IX.2001, very common. Further records: București, Țigănești (Popescu-Gorj, 1964).

#### Family Nepticulidae

*Ectoedemia lousiella* (Sircom, 1849): București (Drăghia, 1970).

#### Family Incurvariidae

*Incurvaria pectinea* (Haworth, 1828): Pasărea, 29.VIII.1972, leg. I. Drăghia (Kovács & Kovács, 2000).

*Incurvaria masculinella* ([Denis & Schiffermüller], 1775): Păd. Andronache, Mogoșoaia, Săbăreni (Kovács & Kovács, 2000).

#### Family Tineidae

*Eupilecamus anthracinalis* (Scopoli, 1763): Pasărea, 21.VII.-8.VIII.1997-99, rare. Further records: București, Păd. Andronache, Comana, Pantelimon (Căpușe, 1968).

*Morophaga boleti* (Fabricius, 1777): București (Căpușe, 1968).

*Neurothaumasia ankerella* (Mann, 1867): Pasărea, 8.VIII.1997, 1 ♂. Further records: București (Căpușe, 1968).

*Nemaxera emortuella* (Zeller, 1839): Băneasa (Căpușe, 1968).

- Nemapogon granellus* (Linnaeus, 1758): Bucureşti (Căpuşe, 1968).  
*Nemapogon cloacellus* (Haworth, 1828): Bucureşti (Montandon, 1900; Căpuşe, 1968).  
*Nemapogon personellus* (Pierce & Metcalfe, 1934): Bucureşti (Căpuşe, 1968).  
*Haplotinea ditella* (Pierce & Metcalfe, 1934): Bucureşti (Căpuşe, 1968).  
*Cilicornella relicinella* (Herrich-Schäffer, 1851): Bucureşti, Comana (Căpuşe, 1968).  
*Tricophaga tapetzella* (Linnaeus, 1758): Bucureşti (Căpuşe, 1968).  
*Tineola biseliella* (Hummel, 1828): Bucureşti (Căpuşe, 1968).  
*Niditinea fuscipunctella* (Haworth, 1828): Bucureşti (Căpuşe, 1968).  
*Tinea pelionella* Linnaeus, 1758: Bucureşti (Căpuşe, 1968).  
*Tinea leonhardi* Petersen, 1957: Bucureşti (Căpuşe, 1968).  
*Tinea turicensis* Müller-Rutz, 1920: Bucureşti (Căpuşe, 1968).  
*Tinea lanella* Pierce & Metcalfe, 1934: Bucureşti (Căpuşe, 1968).  
*Monopis rusticella* (Hübner, 1776): Bucureşti (Căpuşe, 1968).  
*Monopis monachella* (Hübner, 1776): Pasărea, 8.VIII.1997, 1 ex. Further records: Bucureşti, Ştefăneşti (Căpuşe, 1968).  
*Monopis crocicapitella* (Clemens, 1859): Bucureşti, Ştefăneşti (Căpuşe, 1968).  
*Monopis imella* (Hübner, 1813): Bucureşti (Căpuşe, 1968).  
*Tenaga rhenania* (G. Petersen, 1962): Bucureşti (Căpuşe, 1968).  
*Monopis nigricantella* (Milliere, 1872): Bucureşti (Caradja, 1901; Căpuşe, 1968).  
*Infurcitinea ignicomella* (Herrich-Schäffer, 1851): Bucureşti (Montandon, 1900; Căpuşe, 1968).  
*Infurcitinea albicomella* (Herrich-Schäffer, 1851): Comana, Mironeşti (Căpuşe, 1968).

#### Family Psychidae

- Psychidea nudella* (Ochsenheimer, 1810): Bucureşti (Caradja, 1903).  
*Epichnopteryx plumella* ([Denis & Schiffermüller], 1775): Bucureşti (Popescu-Gorj, 1964).  
*Caneophora hirsuta* (Poda, 1761): Pasărea, 6.VI.1998, ex. larva, 1 ♂. (leg. S. M. Stanciu). Further records: Afumaţi, Bucureşti (Popescu-Gorj, 1964).  
*Pachytelia vilosella* (Ochsenheimer, 1810): Bucureşti, Filaret (Popescu-Gorj, 1964).  
*Megalophanes viciella* ([Denis & Schiffermüller], 1775)\*: Pasărea, 30.V.1998, 1 ♂.  
*Sterrhoptrix fusca* (Haworth, 1809)\*: Pasărea, 30.V.-25.VII.1996-99, common.

#### Family Gracillariidae

- Callisto denticulella* (Thunberg, 1794)\*: Brăneşti, Pasărea, 25.VII.-7.VIII.1996-99, rare.  
*Phyllonorycter platani* (Staudinger, 1870): Bucureşti (Drăghia, 1970; Rákossy & Momeu, 2009).  
*Cameraria ochridella* Deschka & Dimic, 1986: Bucureşti (Rákossy, Goia & Kovács, 2003).

## Family Yponomeutidae

*Yponomeuta evonymella* (Linnaeus, 1758)\*: Brănești, Pasărea, 21.VII.-8.VIII.1996-99, common.

*Yponomeuta padella* (Linnaeus, 1758): București, Chitila, Comana (Popescu-Gorj, 1964), Pasărea, 13.VI.1960 (König, 1975).

*Yponomeuta malinellus* Zeller, 1838\*: Brănești, Pasărea, 31.VII.-8.VIII.1996-99, common.

*Yponomeuta irrorella* (Hübner, 1796): București, Comana (Popescu-Gorj, 1964).

*Yponomeuta plumbella* ([Denis & Schiffermüller], 1775): Pasărea, 8.VIII.1997, 1 ♂.

Further records: București, Comana (Popescu-Gorj, 1964).

## Family Ypsolophidae

*Ypsolophus scabrella* (Linnaeus, 1758)\*: Pasărea; 1.VIII.1998, 1 ♂.

## Family Plutellidae

*Plutella xylostella* (Linnaeus, 1758): Brănești, Pasărea, 25-31.VII.1996-2001, common. Further records: Pasărea, 7.V.1946, 17.VII.1960 (König, 1975).

*Eidophasia messingiella* (Fischer v. Röslerstamm, 1840): Pasărea, 30.V.1998, common. Further records: Pasărea, 9.VI.1961 (König, 1975).

## Family Ethmiidae

*Ethmia funerella* (Fabricius, 1787)\*: Pasărea, 30.V.1998, common.

*Ethmia bipunctella* (Fabricius, 1775)\*: Pasărea, 30.V.1998, rare.

## Family Depressariidae

*Agonopteryx propinquella* (Treitschke, 1835): București (Popescu-Gorj, 1964).

*Agonopteryx alstromeriana* (Clerck, 1759): Pasărea, 1.VIII.1998, 1 ♂. Further records: Băneasa, 29.VIII.1960 (König, 1975).

## Family Chimabachidae

*Diurnea fagella* ([Denis & Schiffermüller], 1775): Păd. Andronache, 18-23.III.1936 (König, 1975).

## Family Oecophoridae

*Epicallima formosella* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 30-31.V.1997-99, very common. Other remarks: București (Popescu-Gorj, 1964).

*Esperia oliviella* (Fabricius, 1794): Băneasa, 12.VI.1950, 18.VII.1961 (König, 1975).

*Alabonia staintoniella* (Zeller, 1850): Băneasa, 24.V.1961 (König, 1975).

*Harpella forficella* (Scopoli, 1763)\*: Brănești, Pasărea, 21.VII.-8.VIII.1997-99, rare.

*Carcina quercana* (Fabricius, 1775)\*: Pasărea, 7.VIII.1997, 1 ♂.

## Family Lecithoceridae

*Lecithocera nigrana* (Duponchel, 1836): București (Popescu-Gorj, 1964).

*Homalexastis briantella* (Turati, 1879)\*: Pasărea, 21-25.VII.1996-99, rare.

## Family Coleophoridae

*Coleophora frischella* (Linnaeus, 1758)\*: Pasărea, Pustnicu, 31.V.-9.VIII.1996-2001, rare.

*Coleophora mayrella* (Hübner, 1813): București (Montandon, 1900).

## Family Pterolonchidae

*Pterolonche albescens* Zeller, 1847: Pasărea, 1.VIII.2001, 2 ♂♂. Further records: Pasărea, 18.VII.1978 (Popescu-Gorj, 1986).

## Family Argyresthiidae

*Argyresthia arcella* (Fabricius, 1771)\*: Pasărea, 31.VII.-7.VIII.1997-2001, very common.

## Family Autostichidae

*Oegoconia quadripuncta* (Haworth, 1828): București, 5.VI.1947 (König, 1975).

## Family Amphisbatidae

*Hypercallia citrinalis* (Scopoli, 1763)\*: Pasărea, 30.V.1998, 1 ♂.

*Anchinia daphnella* ([Denis & Schiffermüller], 1775)\*: Pasărea, 1.VIII.2001, 1 ♂.

## Family Cosmopterigidae

*Pyroderces argyrogrammos* (Zeller, 1847): București (Popescu-Gorj, 1964).

## Family Gelechiidae

*Pseudotelphusa scalella* (Scopoli, 1763): Băneasa, 13.VIII.1961 (König, 1975).

*Helcistogramma trianulella* (Herrich-Schäffer, 1854): București (Popescu-Gorj, 1964).

*Atremaea lonchoptera* (Staudinger, 1871)\*: Comana, 12.VII.1997, rare.

## Family Limacodidae

*Apoda limacodes* (Hufnagel, 1766)\*: Pasărea, Pustnicu, 21.V.-28.VII.1996-2009, common.

## Family Zygaenidae

*Rhagades pruni* ([Denis & Schiffermüller], 1775): București, Comana (Popescu-Gorj, 1964).

*Jordanita globulariae* (Hübner, 1793)\*: Pasărea, 25.VII.-6.VIII.1996-99, rare.

*Zygaena purpuralis pluto* Ochsenheimer, 1808: Comana, Țigănești (Popescu-Gorj, 1964).

*Zygaena loti balcanica* Reiss, 1922: București, Comana (Popescu-Gorj, 1964).

*Zygaena carniolica caliacrae* Reiss, 1931: București, Chitila, Comana (Popescu-Gorj, 1964).

*Zygaena viciae dacica* Caradja, 1893: Comana (Popescu-Gorj, 1964).

*Zygaena filipendulae* (Linnaeus, 1758): Brănești, Comana, Țigănești (Popescu-Gorj, 1964).

*Zygaena lonicerae* (Scheven, 1777): Comana (Popescu-Gorj, 1964).

*Zygaena angelicae transcarpathina* Hormuzachi, 1902: Comana (Popescu-Gorj, 1964).

*Zygaena contaminei* Boisduval, 1834: Comana (Popescu-Gorj, 1964).

*Zygaena ephialtes pannonica* Holik, 1972: București, Comana, Filaret (Popescu-Gorj, 1964).

#### Family Sesiidae

*Sesia apiformis* (Clerck, 1759): București (Popescu-Gorj, 1964).

*Paranthrene tabaniformis* (Rottenburg, 1775): București, Chitila (Popescu-Gorj, 1964).

*Synanthedon tipuliformis* (Clerck, 1759): Filaret–București (Popescu-Gorj, 1964).

*Synanthedon vespiformis* (Linnaeus, 1758): Căldărușani, Pasărea (Popescu-Gorj, 1964).

*Synanthedon conopiformis* (Esper, 1782)\*: Pustnicu, 21.V. 2009, 2 ♂♂.

*Bembecia scopigera* (Scopoli, 1763): Comana (Popescu-Gorj, 1964).

*Chamaesphecia annellata* (Zeller, 1847): București, Comana (Popescu-Gorj, 1964).

*Chamaesphecia masariformis* (Ochsenheimer, 1808): Comana (Popescu-Gorj, 1964).

*Chamaesphecia empiformis* (Esper, 1783): Comana, Pasărea (Popescu-Gorj, 1964).

#### Family Cossidae

*Cossus cossus* (Linnaeus, 1758): Pasărea, Pustnicu, 21.VII.-6.VIII.1996-2009, rare. Further records: București (Popescu-Gorj, 1964).

*Zeuzera pyrina* (Linnaeus, 1761): Brănești, Pasărea, Cernica, Pustnicu, 21.VII.-9.VIII.1996-2010, common. Further records: București, Țigănești (Popescu-Gorj, 1964).

*Phragmataecia castaneae* (Hübner, 1790): Pasărea, Pustnicu, 30.V.-28.VII.1997-2009, rare. Further records: București (Popescu-Gorj, 1964).

*Parahypopta caestrum* (Hübner, 1808): Pasărea, 2.VIII.2002, 1 ♂. Further records: București (Montandon, 1900).



## Family Tortricidae

- Pterochroa schreibersiana* (Fröhlich, 1828): Păd. Andronache, 28.IX.1936, leg. A. Popescu-Gorj (Kovács & Kovács, 2001).
- Agapeta hamana* (Linnaeus, 1758): Pasărea, 1.VIII.1998, 1 ♀. Further records: București (Popescu-Gorj, 1964).
- Agapeta zoegana* (Linnaeus, 1758)\*: Pasărea, 1-8.VIII.1998, rare.
- Cochylidia phaleratana* (Herrich-Schäffer, 1840)\*: Pasărea, 1-8.VIII.1998, rare.
- Eugnosta magnificana* (Rebel, 1914)\*: Pasărea, 30.V.1998, 1 ♂. Further records: Pasărea (Popescu-Gorj, 1974).
- Eugnosta lathoniana* (Hübner, 1800)\*: Pasărea, 30.V.1998, rare.
- Tortrix viridana* (Linnaeus, 1758): Brănești, Pasărea, 30-31.V.1996-2010, common. Further records: București (Popescu-Gorj, 1964).
- Acleris holmiana* (Linnaeus, 1758)\*: Pasărea, 25-31.VII.1996-99, rare.
- Acleris forsskaleana* (Linnaeus, 1758): Pasărea, 25-31.VII.1997-99, rare. Further records: Pasărea, 20.VII.1973 (König, 1975).
- Acleris lorquiniana* (Duponchel, 1835): Pasărea, 5.VIII.1971, 1 ♀ (Karisch, 2004).
- Acleris kochiella* (Goeze, 1783): Pasărea, 5.VIII.1971, 1 ♂ (Karisch, 2004).
- Argyrothaenia pulchellana* (Haworth, 1811)\*: Pasărea, 21-31.VII., common.
- Cnephasia communana* (Herrich-Schäffer, 1851): Brănești, Pasărea, 30-31.V.1997-2001, rare. Further records: Pasărea, 7.V.1961 (König, 1975).
- Sparganothis pilleriana* ([Denis & Schiffermüller], 1775): București, 10.VIII.1936 (König, 1975).
- Archips podana* (Scopoli, 1763): Pasărea, 30.V.1998, common. Further records: București, Filaret (Montandon, 1900; Popescu-Gorj, 1964); Pasărea (König, 1975).
- Archips rosana* (Linnaeus, 1758)\*: Pasărea, 21-25.VII.1997-99, common. Further records: Pasărea, 16.VI.197(?) , 1 ♂ (Karisch, 2010).
- Archips crataegana* (Hübner, 1799)\*: Pasărea, 30.V.1998, rare.
- Ptycholoma lacheana* (Linnaeus, 1758): Păd. Andronache, 28.V.1913 (König, 1975).
- Pandemis heparana* ([Denis & Schiffermüller], 1775): Pasărea, 1.VIII.1998, 2 ♂♂. Further records: Băneasa, 21.VIII.1961 (König, 1975).
- Bactra lanceolana* (Hübner, 1799)\*: Pasărea, 1-8.VIII.1997-98, rare.
- Bactra furfurana* (Haworth, 1811)\*: Pasărea, 1-8.VIII.1997-98, rare.
- Celypha striana* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 1-8.VIII., 1997-99 rare. Further records: București (Montandon, 1900), Băneasa, 15.VIII.1959 (König, 1975).
- Celypha lacunana* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).
- Celypha rivulana* (Scopoli, 1763): București (Popescu-Gorj, 1964).
- Hedya nubiferana* (Haworth, 1811)\*: Pasărea, 30.V.1998, rare.
- Aleimma loeflingiana* (Linnaeus, 1758)\*: Pasărea, 30.V.1998, rare.
- Olethreutes arcuella* (Clerck, 1759): Pasărea, 30.V.1998, 1 ♂. Further records: Băneasa, 6.V.1951 (König, 1975).

- Notocelia uddmanniana* (Linnaeus, 1758)\*: Pasărea, 30-31.V.1998-2001, rare.
- Thiodia citrana* (Hübner, 1799)\*: Brănești, Pasărea, 25.VII.-8.VIII.1997-99, rare.
- Epinotia festivana* (Hübner, 1799): Băneasa, București (Popescu-Gorj, 1974).
- Eucosma metzneriana* (Treitschke, 1830)\*: Comana, Pasărea, 12-25.VII.1997-99, rare.
- Eucosma pupillana* (Clerck, 1759): Pasărea, 27.VI.1954 (König, 1975).
- Epiblema scutulana* ([Denis & Schiffermüller], 1775): Pasărea, 25.VII.-8.VIII.1997-99, common. Further records: București (Popescu-Gorj, 1964).
- Epiblema foenella* (Linnaeus, 1758)\*: Pasărea, 25.VII.1997, rare.
- Ancylis comptana* (Fröhlich, 1828): Băneasa, 18.V.1960 (König, 1975).
- Ancylis badiana* ([Denis & Schiffermüller], 1775)\*: Pasărea, 30.V.1998, rare.
- Ancylis mitterbacheriana* ([Denis & Schiffermüller], 1775)\*: Brănești, Pasărea, 30-31.V.1997-99, rare.
- Cydia splendana* (Hübner, 1799)\*: Pasărea, 1-8.VIII.1997-99, rare.
- Cydia pomonella* (Linnaeus, 1758): Brănești, Pasărea, 1-9.VIII.1996-2009, very common. Further records: București (Popescu-Gorj, 1964).
- Cydia fagiglandana* (Zeller, 1841)\*: Pasărea, 1-8.VIII.1997-99, rare.
- Lathronympha strigana* (Fabricius, 1775)\*: Pasărea, 1-8.VIII.1996-2001, rare.
- Choristoneura hebenstriatella* (Müller, 1764)\*: Pasărea, 30.V.1998, rare.
- Phalonidia contractana* (Zeller, 1847)\*: Pasărea, 7-8.VIII.1997, rare. Further records: București, 5.VII.1973 (Karisch, 1999).
- Phalonidia manniana* (Fischer von Röslerstamm, 1839): Pasărea, 5.VIII.1971 (Karisch, 1999).
- Gynnidomorpha permixtana* (Denis & Schiffermüller], 1775): Pasărea, 6.VIII.1973 (Karisch, 2003).
- Gynnidomorpha alimana* (Ragonot, 1883): Pasărea, 5.VIII.1971, 2 ♂♂ (Karisch, 1999).
- Aethes francillana* (Fabricius, 1794): București, 5.VII.1973, 3 ♂♂, 1 ♀ (Karisch, 1999).
- Cochylidia implicitana* (Wocke, 1856): Pasărea, București, 5-6.VII.1972, 2 ex. (Karisch, 1999, 2003).
- Cochylis epilinana* Duponchel, 1842: Pasărea, 5.VIII.1971, 1 ♂ (Karisch, 1999).
- Cochylis salebrana* (Mann, 1862): Pasărea, 5.VIII.1971, 1 ♂; 6.VIII.1973, 2 ♂♂ (Karisch, 1999).
- Cochylis posterana* Zeller, 1847: București, 5.VII.1973, 1 ♂, Pasărea, 5.VIII.1971, 1 ♂ (Karisch, 1999).

#### Family Alucitidae

- Alucita hexadactyla* (Linnaeus, 1758)\*: Pasărea, 6.X.2001, 2. ex.

## Family Pterophoridae

*Oxyptilus chrysodactyla* ([Denis & Schiffermüller], 1775): Pasărea, 21.VII.1997, 1 ♂. Further records: București (Montandon, 1900), Chitila (Popescu-Gorj, 1964).

*Pterophorus tridactyla* (Linnaeus, 1758)\*: Pasărea, Cernica, 21-24.VII.1996-99, rare.

*Pterophorus pentadactyla* (Linnaeus, 1758): Pasărea, 30.V.-1.VIII.1997-99, common. Further records: București (Popescu-Gorj, 1964); Păd. Andronache, Băneasa (König, 1975).

*Emmelina monodactyla* (Linnaeus, 1758): București, Comana (Popescu-Gorj, 1964; König, 1975).

*Stenoptilia pterodactyla* (Linnaeus, 1761): Comana (Popescu-Gorj, 1964).

## Family Pyralidae

## Subfamily Galerinae

*Melissoblaptes zelleri* Joannis, 1932: Pasărea, 1-8.VIII.1996-2001, rare. Further records: București (Popescu-Gorj, 1964).

*Lamoria annella* ([Denis & Schiffermüller], 1775)\*: Pasărea, 1.VIII.2001, 1 ♂.

*Galleria mellonella* (Linnaeus, 1758): Pasărea, 6.X.2001, 1 ♂. Further records: București (Popescu-Gorj, 1964).

## Subfamily Pyralinae

*Synaphe moldavica* (Esper, 1794): Păd. Andronache, 6.VI.1937 (König, 1975).

*Pyralis farinalis* (Linnaeus, 1758): Brănești, Comana, Pasărea, 12.VII.-9.VIII.1996-2001, common. Further records: București (Popescu-Gorj, 1964; König, 1975).

*Pyralis regalis* ([Denis & Schiffermüller], 1775)\*: Brănești, Pasărea, 7-9.VIII.1996-99, very rare.

*Aglossa signicostalis* Staudinger, 1871: Comana (Popescu-Gorj, 1964).

*Aglossa caprealis* (Hübner, 1809): București, Comana (Popescu-Gorj, 1964; König, 1975).

*Aglossa pinguinalis* (Linnaeus, 1758): Pasărea, 15.IX.2001, rare. Further records: București, Pasărea (Popescu-Gorj, 1964; König, 1975).

*Hypsopygia costalis* (Fabricius, 1775): Pasărea, 21.VII.-9.VIII.1996-99, common. Further records: București (Popescu-Gorj, 1964).

*Herculia rubidalis* ([Denis & Schiffermüller], 1775): Pasărea, 21.VII.1997., rare. Further records: Păd. Andronache, 13.VI.1934 (König, 1975).

*Herculia incarnatalis* (Zeller, 1847)\*: Pasărea, 21.VII.1997, 1 ♂.

*Orthopygia glaucinalis* (Linnaeus, 1758): Pasărea, 21.VIII.-11.VIII.1997-99, rare. Further records: București (Popescu-Gorj, 1964); Păd. Andronache (König, 1975).

*Endotricha flammealis* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 21.VII.-9.VIII.1997-99, very common. Further records: București, Păd. Andronache, 1940-1958 (König, 1975).

## Subfamily Phycitinae

*Trachonitis cristella* ([Denis & Schiffermüller], 1775): Pasărea, 6.VI.1960 (König, 1975).

*Elegia similella* (Zinken, 1818): Băneasa, 8.VIII.1962 (König, 1975).

*Etiella zinkenella* (Treitschke, 1832): Brănești, Pasărea, 21.VII.-9.VIII.1996-99, very common. Further records: Păd. Andronache (König, 1975).

*Oncocera semirubella* (Scopoli, 1763): Brănești, Comana, Pasărea, 12.VII.-9.VIII.1996-2010, common. Further records: București, Chitila, Filaret, Băneasa, 23.VI.1948, 23.VII.1939 (König, 1975).

*Oxybia transversella* (Duponchel, 1836)\*: Brănești, Comana, Pasărea, 12.VII.-9.VIII.1996-99, very common.

*Pempelia formosa* (Haworth, 1811): Pasărea, 21.VII.1997, 1 ♂. Further records: Ștefănești, 7.VI.1961 (König, 1975).

*Psorosa dahliella* (Treitschke, 1832): București, 15.VI.1947 (König, 1975).

*Dioryctria abietella* ([Denis & Schiffermüller], 1775)\*: Brănești, Pasărea, 30.V.-8.VIII.1996-2001, very common.

*Phycita metzneri* (Zeller, 1846): Pasărea (Popescu-Gorj, 1964).

*Hypochalcia dignella* (Hübner, 1799): Giurgiu (Popescu-Gorj, 1960).

*Epischnia prodromella* (Hübner, 1799): Giurgiu, 6.IX.1946 (König, 1975).

*Nyctegretis achatinella* (Hübner, 1824)\*: Pasărea, 30.V.1998, rare.

*Nephopterix angustella* (Hübner, 1769): Băneasa, 14.VI.1946, 2.IX.1949 (König, 1975).

*Trachycera advenella* (Zinken, 1818): Băneasa, 7.VIII.1960 (König, 1975).

*Episcythrastis tetricella* ([Denis & Schiffermüller], 1775): Pasărea, 21.VII.-9.VIII.1997-99 common. Further records: Păd. Andronache, 21.VI.1947 (König, 1975).

*Myelois circumvoluta* (Fourcroy, 1785): Pasărea, 27.VII.-8.VIII.1997-2008, common. Further records: Pasărea, 12.VI.1948 (König, 1975).

*Gymnancyla canella* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).

*Euzophera pinguis* (Haworth, 1811)\*: Pasărea, 25.VII.1997, 1 ♂.

*Euzophera bigella* (Zeller, 1848): București (Popescu-Gorj, 1964).

*Homoeosoma sinuella* (Fabricius, 1794)\*: Brănești, Pasărea, 1-8.VIII.1996-2009, rare.

*Homoeosoma nebulella* ([Denis & Schiffermüller], 1775): Brănești, Pasărea, 31.VII.-9.VIII.1996-99, rare. Further records: București (Popescu-Gorj, 1964).

*Plodia interpunctella* (Hübner, 1813): Pasărea, 25.VII.1997, 1 ♂. Further records: București (Popescu-Gorj, 1964; König, 1975).

*Ephestia elutella* (Hübner, 1796): București (Popescu-Gorj, 1964; König, 1975).

*Anerastria lotella* (Hübner, 1813)\*: Pasărea, 21.VII.1997, 1 ♂.

*Ematheudes punctella* (Treitschke, 1833): Pasărea, 1-8.VIII.1996-99, rare. Further records: București (Popescu-Gorj, 1964).

## Subfamily Scopariinae

*Scoparia manifestella* (Herrich-Schäffer, 1848): Pasărea, 30.V.1998., rare. Further records: București (Popescu-Gorj, 1964).

*Scoparia mercurella* (Linnaeus, 1758): București (Popescu-Gorj, 1964).

## Subfamily Crambinae

*Euchromius ocella* (Haworth, 1811)\*: Pasărea, 1-8.VIII.1997-2002, rare.

*Euchromius bella* (Hübner, 1796): Brănești, Pasărea, Cernica, 21.VII.-9.VIII.1996-99, very common. Further records: Băneasa (König, 1975).

*Chilo phragmitella* (Hübner, 1824)\*: Pasărea, 25.VII.1997, 1 ♂.

*Friedlanderia cicatricella* (Hübner, 1824): Comana, 20.VII.1963 (König, 1975).

*Agriphila tristella* ([Denis & Schiffermüller], 1775): Pasărea, 1-8.VIII.1997-2002, rare. Further records: Comana (Popescu-Gorj, 1964).

*Agriphila inquinatella* ([Denis & Schiffermüller], 1775): Comana (Popescu-Gorj, 1964); Pasărea, 13.VII.1960 (König, 1975).

*Catoptria pinella* (Linnaeus, 1758)\*: Pasărea, 21.VII.-8.VIII.1997-98, rare.

*Calamotropha paludella* (Hübner, 1824): București (Montandon, 1900); Pasărea, 1.VIII.1997, rare.

*Crambus ericellus* (Hübner, 1813)\*: Pasărea, 1-2.VIII.1997, rare.

*Chrysocrambus linetellus* (Fabricius, 1781)\*: Pasărea, 21.VII.-8.VIII.1997-98, common.

*Chrysocrambus craterella* (Scopoli, 1763): Comana, Pasărea, 12.VII.-8.VIII.1997-99, common. Further records: Băneasa, 9.VI.1946 (König, 1975).

*Pediasia contaminella* (Hübner, 1796)\*: Pasărea, 1-8.VIII.1997-99, rare.

## Subfamily Schoenobiinae

*Schoenobius gigantella* Duponchel, 1836: Snagov, 24.VII.1957 (König, 1975).

*Scirpophaga praelata* (Scopoli, 1763): Pasărea, 25.VII.-8.VIII.1996-2009, rare. Further records: București, 8.VII.1974 (König, 1975).

## Subfamily Acentropinae

*Elophila nymphaeta* (Linnaeus, 1758): București (Montandon, 1900); București, Chitila (König, 1975).

*Acentria ephemerella* ([Denis & Schiffermüller], 1775): Giurgiu, 1.VII.1946 (König, 1975).

*Cataclysta lemnata* (Linnaeus, 1758): Pasărea, 25.VII.-8.VIII.1996-99, common. Further records: București, Păd. Andronache, 1935-1950 (König, 1975).

*Parapoynx stratiotata* (Linnaeus, 1758): Pasărea, 25.VII.-8.VIII.1997-99, common. Further records: București (Popescu-Gorj, 1964; König, 1975).

*Parapoynx nivalis* ([Denis & Schiffermüller], 1775): București (Popescu-Gorj, 1964).

## Subfamily Odontinae

*Aporodes floralis* (Hübner, 1809): Pasărea, 1.VIII.1997, 1 ♂. Further records: Pasărea, 22.VII.1958 (König, 1975).

*Cynaeda dentalis* ([Denis & Schiffermüller], 1775)\*: Pasărea, 7.VIII.1997, 1 ♂.

*Epacestria pustulalis* (Hübner, 1823)\*: Pasărea, 25.VII.-11.VIII.1997-98, rare.

*Titanio normalis* (Hübner, 1796): Păd. Andronache, 9-21.VIII.1945 (König, 1975).

## Subfamily Evergestinae

*Evergestis frumentalis* (Linnaeus, 1758)\*: Pasărea, 1-8.VIII.1996-99, rare.

*Evergestis forficalis* (Linnaeus, 1758)\*: Pasărea, 1-8.VIII.1997-99, very rare.

*Evergestis extimalis* (Scopoli, 1763): Pasărea, Cernica, 24-31.VII.1996-2009, rare.

Further records: Băneasa, 7.VIII.1960 (König, 1975).

*Evergestis limbata* (Linnaeus, 1758)\*: Pasărea, 30.V.1998, very rare.

## Subfamily Pyraustinae

*Udea ferrugalis* (Hübner, 1796): Brănești, 9.VIII.1997, 1 ♂. Further records: București (Montandon, 1900); Păd. Andronache, 28.VIII.1960 (König, 1975).

*Margaritia sticticalis* (Linnaeus, 1758): București (Montandon, 1900); Pasărea, 21.VII.-15.IX.1997-2009, common.

*Ecpyrrhorrhoe rubiginalis* (Hübner, 1796): Pasărea, 21.VII.-1.VIII.1997-2008, rare.

Further records: Păd. Andronache, 27.VII.1956 (König, 1975).

*Pyrausta sanguinalis* (Linnaeus, 1761)\*: Pasărea, 7.VIII.1997, 1 ♂.

*Pyrausta purpuralis* (Linnaeus, 1758): Pasărea, 26.VII.1953 (König, 1975).

*Sitochroa palealis* ([Denis & Schiffermüller], 1775): Pasărea, 1.VIII.2001, 2 ♂♂.

Further records: Comana (Popescu-Gorj, 1964); Păd. Andronache (König, 1975).

*Phlyctaenia coronata* (Hufnagel, 1767): Pasărea, Putnicu, 21-31.V.1997-2009, common. Further records: București (Popescu-Gorj, 1964; König, 1975).

*Matuuraia terrealis* (Treitschke, 1829): Pasărea, 25.VII.-9.VIII.1997-99, rare. Further records: București (Popescu-Gorj, 1964).

*Sclerocoma acutella* (Eversmann, 1842): Pasărea, 25.VII.-1.VIII.1997-99, rare.

Further records: București, Snagov (Popescu-Gorj, 1960).

*Anania verbascalis* ([Denis & Schiffermüller], 1775)\*: Pasărea, 30.V.-9.VIII.1997-2001, rare.

*Ostrinia nubilalis* (Hübner, 1796): Pasărea, 1-8.VIII.1996-2010, rare. Further records: București (Montandon, 1900; Popescu-Gorj, 1964); Pasărea, 13.VIII.1961 (König, 1975).

*Pleuroptya ruralis* (Scopoli, 1763): Brănești, Pasărea, 21.VII.-9.VIII.1996-2009, common. Further records: București (Popescu-Gorj, 1964).

*Agrotera nemoralis* (Scopoli, 1763): Pasărea, 21.VII.-9.VIII.1997-2008, common. Further records: București (Popescu-Gorj, 1964); Băneasa, 10.V.1937 (König, 1975).

*Nomophila noctuella* ([Denis & Schiffermüller], 1775): Pasărea, Putnicu, 30.V.-2.X.1996-2009, common. Further records: București, Comana (Montandon, 1900; Popescu-Gorj, 1964; König, 1975).



## DISCUSSIONS

Even if tentative, the results are not encouraging, especially if we consider that from the high biodiversity (over 600 species) recorded 100 years ago only a bit more than half were found again in recent times. This does not mean that half of the Lepidoptera fauna of Bucharest has disappeared because the recent research work includes over 180 species that were not reported in the past. We refer first of all to species characteristic to sub-mountainous areas. Such species, even if they existed once, today they cannot find their favorable habitats in Bucharest and its surroundings, such as *Lycaena helle* ([Denis & Schiffermüller], 1775), *Apatura iris* (Linnaeus, 1758), *Limenitis populi* (Linnaeus, 1758), *Erebia ligea* (Linnaeus, 1758), *Euthrix potatoria* (Linnaeus, 1758). Similarly, the species characteristic to sub-mountainous areas reported from the forests of northern Dobrogea around the year 1865 (Mann, 1866) have become extinct in that region. The disappearance of these species is most likely due to climate changes (climate aridisation, which led to the disappearance of such species). On the other hand, these alterations were determined directly by man's intervention through the massive forest clear cuts both in Dobrogea and in Wallachia.

Nowadays, it is relevant the immense poverty of the region in butterflies if compared to the data found in literature. Many old records can be considered as doubtful ones nowadays, e.g.: *Lycaena hippothoe* (Linnaeus, 1758), *Polygonia egea* (Cramer, 1775), *Melitaea arduinna* (Esper, 1784), from the butterflies or *Hemaris croatica* (Esper, 1779), *Menophra abruptaria* (Thunberg, 1792) or *Staurophora celsia* (Linnaeus, 1758) from the nocturnal. Species considered probably extinct, but still to be recorded could be many more, e.g.: *Zerynthia polyxena* ([Denis & Schiffermüller], 1775), *Kirinia roxelana* (Cramer, 1777) or *Perisomena caecigena* (Kupido, 1825). Thus, a lot of species which were considered "probably extinct" in those areas were recorded again in the period 1996-2010, such as: *Catocala dilecta* (Hübner, 1808), *Plusidia cheiranthi* (Tauscher, 1809) or *Dolbina elegans* Bang-Haas, 1912.

As for the general features of the Lepidoptera-fauna of this region we refer to its main present day features which are the following:

- The Lepidoptera-fauna from this area still preserves some sub-mountainous elements, which lack in the sylvosteppe forests of Dobrogea. Therefore, this region still represents a transition point from the sub-mountainous to that of the steppe and sylvosteppe, e.g.: *Aglaia tau* (Linnaeus, 1758), *Moma alpium* (Osbeck, 1778), *Trisateles emortualis* ([Denis & Schiffermüller], 1775), *Xestia rhomboidea* (Esper, 1790), etc.
- It still comprises many elements of Anatolian-Balkan origin, as a conclusion these forests had uninterrupted connection to the forests from the southern Balkan, for example *Dolbina elegans*, *Perisomena caecigena* and *Noctua haywardi*.

However, the Lepidoptera-fauna underwent through numerous alterations and transformations due to human intervention, the most important being the following ones:

The significant share of the adventive species (imported by means of human activity) and of pest presence. They are dominant in the large majority of the research sites from the surroundings of the capital.

The quite significant share of the steppe-species, since the forest has been restraining continuously in this region and many elements specific to steppe areas are adapting more easily to the farm-ecosystems than the species characteristic to forests.

The anthropic pressure upon the fauna of this region determined some particular features compared to other regions of the country, such as:

The small number of the individuals within the populations of many species, even in the case of species with vigorous populations elsewhere in the country. The reasons are similar to the ones presented before. In some other instances the alteration of environmental factors can determine population gradations of some species (species that are under normal conditions very scarce in other regions of the country) as it was observed with: *Marumba quercus* ([Denis & Schiffermüller], 1775), *Catocala promissa* ([Denis & Schiffermüller], 1775), *Catocala nymphagoga* (Esper, 1788), *Plagodis pulveraria* (Linnaeus, 1758) with more than 100 individuals per night. In the case of butterflies phenomena of this kind could be recorded in 1997-1998 for *Neozephyrus quercus* (Linnaeus, 1758) with more than 50 individuals per day, this butterfly disappearing completely in the years to come. Even with very rare species we sometimes noticed unexpected population effectiveness: e.g. *Dolbina elegans*, with more than 25 individuals per evening on 26-27 July 2001.

Even if the last aspects may represent natural phenomena, the ones presented overleaf are an alarm signal. Therefore we may conclude that the Lepidoptera fauna of this region has altered considerably in the last 100 years, the populations of many species diminished, many species disappeared and transformations occurred in the biology of the species. The region comprises an important number of species protected by European and Romanian laws (Tab. 1). Given the negative changes in habitats presented above, urgent measures are to be taken in order to save the flora and fauna of the region, measures that unfortunately do not seem to be implemented!

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Table 1

Taxa protected by law at European or national level.

Taxon	Habitats Directive 92/43/EEC	Romania (national level) (Rákósy, 2003, 2005)	Features
<i>Parnassius mnemosyne</i>	x		local, very common
<i>Euphydryas maturna</i>	x		local, very common
<i>Lycaena dispar rutila</i>	x		local, rare
<i>Lopinga achine</i>	x		local, common
<i>Euplagia quadripunctaria</i>	x	x	local, rare
<i>Cupido alcetas</i>		x	very local, rare
<i>Neptis sappho</i>		x	very local, common
<i>Apatura metis</i>	x		local, rare
<i>Dolbina elegans</i>		x	local, common
<i>Plusidia cheiranthi</i>		x	very local, rare
<i>Zerynthia polyxena</i> *	x		Extinct
<i>Lycaena helle</i> *	x		Extinct
<i>Maculinea arion</i> *	x		Possible extinct
<i>Nymphalis vaualbum</i> *	x		Extinct
<i>Kirinia roxelana</i> *		x	Possible extinct
<i>Lycaena hippothoe</i> *		x	Extinct
<i>Schistostegia decussata</i> *		x	Possible extinct

## LEPIDOPTERELE DIN BUCUREȘTI ȘI ÎMPREJURIMI (ROMÂNIA)

## REZUMAT

Lucrarea reprezintă o sinteză a cunoștințelor actuale privind fauna de lepidoptere din București și zonele limitrofe pe o rază de 50 km din jurul capitalei României. Sunt prezentate toate datele despre componența faunei de lepidoptere publicate începând cu sfârșitul secolului al XIX-lea, precum și rezultatele noi din ultimii 15 ani. Cercetările întreprinse de autor după 1996 au ca rezultat semnalarea pentru prima dată a prezenței în această regiune a 180 de specii. Chiar dacă cadrul natural din această regiune s-a schimbat radical în secolul XX, ea mai conservă o faună destul de bogată și interesantă. Pădurile adăpostesc bogate populații ale sfingidului *Dolbina elegans* A. Bang-Haas, 1912, una dintre cele mai rare specii de sfingid din Europa, precum și alte specii de mare valoare faunistică și zoogeografică ca *Noctua haywardi* (Tams, 1926) (semnalată pentru prima dată în fauna României din această zonă), *Catocala dilecta* (Hübner, 1808), *Tarachidia candefacta* (Hübner, [1831]), *Chrysodeixis chalcites* (Esper, [1789]), *Aedia leucomelas* (Linnaeus, 1758) și *Hecatera cappa* (Hübner, [1809]). De asemenea, este prezentată pentru prima dată și situația actuală a speciilor ocrotite de legislația europeană și națională din zona capitalei României.

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## NOTE ON THE HERPETOFAUNA OF THE VÂLCAN MOUNTAINS AND THEIR FOOTHILLS (SOUTHERN CARPATHIANS, ROMANIA)

ALEXANDRU IFTIME, OANA IFTIME

**Abstract.** The results of herpetological studies in the south-facing slope of the Vâlcău mountain massif and associated foothills (Gorj county, Romania), are presented. 20 amphibian and reptile species (and hybrids between *Bombina bombina* and *B. variegata*, as well as the hybridogenetic kleptotaxon *Pelophylax kl. esculentus*) were identified in the field in 22 sites investigated.

**Résumé.** On présente les résultats des études herpétologiques sur le versant sud des montagnes du Vâlcău et de son piémont (département de Gorj, Roumanie). 20 espèces d'amphibiens et reptiles (tout comme des hybrides entre *Bombina bombina* et *B. variegata*, et le kleptotaxon hybridogénétique *Pelophylax kl. esculentus*) ont été identifiées sur le terrain dans 22 locations étudiées.

**Key words:** Vâlcău, mountains, foothills, amphibians, reptiles, records, distribution, hybridization.

### INTRODUCTION

The Vâlcău Mountains are an important component of the Southern Carpathians of Romania, constituting the southern and eastern arm of the greater Retezat-Godeanu-Țarcu massif, and gradually descending into the sub-Carpathian depression of Țârgu Jiu-Cărbunești (Fig. 1 A, B). The herpetofauna of this area is incompletely and/or imprecisely known: Fuhn (1960) records *Salamandra salamandra* from Tismana, *Mesotriton alpestris* from Cloșani, *Bufo bufo*, *Rana temporaria*, *R. dalmatina* and *Pelophylax ridibundus* from Dobrița; Fuhn & Vancea (1961) records, *Lacerta agilis* from Pițicu, *Lacerta viridis* and *Podarcis muralis* from Dobrița, *Natrix natrix* and *Coronella austriaca* from the upper Motru valley, and *Vipera ammodytes* from Tismana and Sohodol. Andrei (1993) has some imprecise data in or close to this area<sup>1</sup>, pertaining to *Bombina variegata*, *Bufo viridis*, *Pelophylax kl. esculentus*, *Podarcis muralis* and *Anguis fragilis*, and Cogălniceanu, Aioanei & Matei (2000) add to the area records of *Bombina variegata*, *Bufo bufo*, *B. viridis*, *Rana temporaria*, *R. dalmatina* and *Pelophylax ridibundus*<sup>2</sup>. More recently, Petrescu et al. (2004), Tudor et al. (2004), Iftime et al. (2008), Covaciu-Marcov et al. (2009 a, 2009 b) and Covaciu-Marcov (2010) have worked on the herpetofauna of regions close to the study area, and Iftime & Iftime (2011) discuss

<sup>1</sup> See a more detailed discussion of Andrei's 1993 data in Iftime et al., 2008.

<sup>2</sup> We follow mostly Speybroeck et al. (2010) for the nomenclature, with some exceptions, i.e. following Carretero et al. (2009) in the use of *Mesotriton*.

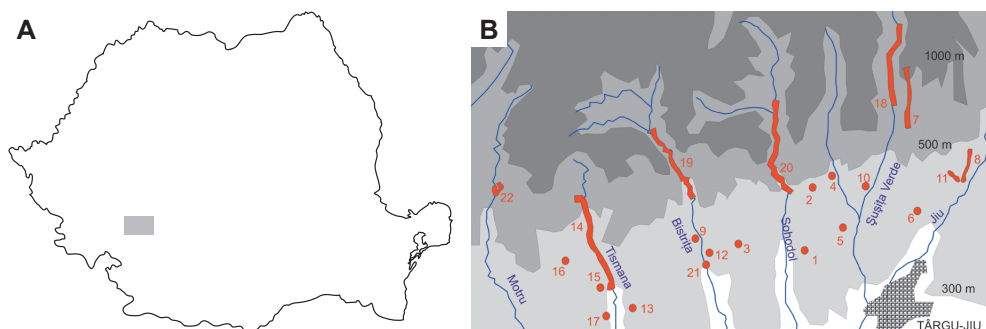


Fig. 1 - A, Location of the study area on the map of Romania; B, General location map of the investigated localities, numbered as in the text. Longer transects are shown as red lines, shorter ones as red dots.

a population of *Triturus cristatus* at the limit of this area, noting the accompanying herpetofauna (*Pelophylax ridibundus*, *Natrix natrix*). We surveyed the herpetofauna of the southern cline and the foothills of this depressionary area by focusing on the southward-flowing valleys of the Vâlcan mountains, from the upper Motru valley to the limits of the Defileul Jiului (Jiu Gorges) National Park.

#### MATERIAL AND METHODS

*Area description.* The Vâlcan Mountains form a chain which is oriented roughly east-west, from the Jiu Gorges to the headwaters of the Motru and Cerna. Their altitude reaches 1846 m in the Oslea peak. These mountains are mainly crystalline, but with a significant component of Mesozoic limestone, especially on the southern slope. They are connected to the Retezat-Godeanu massif in the area between the headwaters of the Motru, Cerna and Western Jiu (this last river delimitates the massif on the north). The Vâlcan massif descends towards the south in a series of sub-Carpathian hills, which grade into the hill-enclosed lowland of Târgu Jiu-Cărbunești. This southern slope of the Vâlcan Mountains is crossed by several roughly north-south oriented valleys of rivers originating in the Vâlcan chain: the upper Motru, the Tismana, the Bistrița, the Jaleș, the Suseni, the Șușița etc. The vegetation of this area consists of deciduous forests, dominated by oak species (*Quercus cerris*, *Q. petraea*, *Q. frainetto*, *Q. robur*) and hornbeam up to ca. 1000 m, further up by beech stands, and on the uppermost ridges by beech-fir-spruce forest, and rarely by pure spruce forests. The grasslands are secondary in all these zones, being created for the necessities of pasturing (Măciu et al., 1982; personal observations).

*Methodology.* Field work was performed in March and April 2010. Amphibians were searched for in both terrestrial habitats and aquatic basins. The study was carried following the active transects method (after Heyer et al., 1994, and McDiarmid, 1992, in Cogălniceanu, 1997). 22 stations were checked, with transect length between 200 m and ca. 11 km (see table 1).

Table 1

## Studied locations.

Station no.	Location	Coordinates (of studied points or, if case, transect ends)	Altitude	Observations
1	Between Târgu Jiu and Runcu	45°04.950'lat N/ 23°10.143'long E	249	Grassland with ponds
2	Between Dobrița and Lelești	45°08.700'lat N/ 23°11.859'long E	410	Hayfields, orchards and small ponds
3	Between Runcu and Peștișani	45°05.307'lat N/ 23°05.233'long E	261	Hayfields, orchards and small ponds
4	Dobrița	45°08.202'lat N/ 23°11.956'long E	391	Grassland with ponds
5	Lelești	45°06.852'lat N/ 23°12.313'long E	339	Grassland with ponds, forest edge
6	Turcinești	45°07.069'lat N/ 23°17.940'long E	342	Orchard with temporary pond
7	Road to Vâlcăn pass	Between 45°11.047'lat N/ 23°17.393'long E and 45°13.430'lat N/ 23°16.951'long E	663-1021	Beech wood, grassy clearings, small ponds
8	Sâmbotin-Schela	Between 45°08.524'lat N/ 23°20.997'long E and 45°10.525'lat N/ 23°21.830'long E	230-302	Hayfields, orchards and small ponds (often polluted with household waste)
9	Gurani	45°05.916'lat N/ 23°02.346'long E	237	Grassland with ponds and bushes
10	Stănești	Between 45°08.303'lat N/ 23°14.892'long E and 45°08.574'lat N/ 23°14.424'long E	325-336	Grassland with ponds and bushes
11	Arsuri	Between 45°08.443'lat N/ 23°20.596'long E and 45°09.221'lat N/ 23°20.060'long E	282-320	Mixed forest with river and ponds
12	Peștișani	45°04.672'lat N/ 23°03.389'long E	212	Small lakes within poplar grove
13	Between Peștișani and Tismana	45°02.306'lat N/ 22°58.789'long E	210	Meadows of a small river
14	Tismana	Between 45°02.978'lat N/ 22°56.583'long E and 45°07.240'lat N/ 22°54.658'long E	222-506	Mixed forest grading into beech forest, small river with ponds
15	Between Tismana and Pocruia	45°02.919'lat N/ 22°56.370'long E	230	Orchard with temporary pond
16	Pocruia	45°04.000'lat N/ 22°53.505'long E	290	Mixed forest with small river
17	West of Pocruia	45°01.301'lat N/ 22°56.290'long E	203	Grassland with ponds
18	Șușița Verde valley	Between 45°12.075'lat N/ 23°16.095'long E and 45°16.067'lat N/ 23°16.301'long E	498-713	Mixed forest grading into beech forest, limestone rocks, small river with ponds
19	Bistrița valley	Between 45°08.095'lat N/ 23°01.834'long E and 45°10.870'lat N/ 22°59.760'long E	1243-2089	Mixed forest grading into beech forest, limestone rocks, small river with ponds
20	Sohodol valley	Between 45°07.916'lat N/ 23°08.937'long E and 45°12.730'lat N/ 23°07.994'long E	378-535	Mixed forest grading into beech forest, limestone rocks, small river with ponds
21	Hobița	45°03.260'lat N/ 23°03.510'long E	224	Orchard with temporary pond
22	Upper Motru valley	Between 45°07.300'lat N/ 22°48.892'long E, 45°07.115'lat N/ 22°48.630'long E and 45°07.475'lat N/ 22°48.533'long E	400-491	Mixed forest grading into beech forest, limestone rocks, small river with ponds

Photographs were taken whenever possible. The records were completed by checking the collections of the “Grigore Antipa” National Museum of Natural History, Bucharest (MGAB collection).

For the identification of *Bombina* species and hybrids, we used the system described in Iftime & Iftime (2007) (see references therein).

### RESULTS

20 species (eleven of amphibians, nine of reptiles) and two hybrids between amphibian species were recorded by us (see table 2 for their occurrence in the checked transects).

Table 2

Species found.

Species	Distribution in investigated sites
<i>Salamandra salamandra</i> (Fig. 2 A)	14, 18, 20
<i>Lissotriton vulgaris</i> *	1, 6, 8, 13
<i>Triturus cristatus</i> * (Fig. 2 B)	4, 8, 11, 13
<i>Bombina variegata</i>	7, 10, 19, 22
<i>Bombina bombina</i> *	8, 12, 13, 17
<i>Bombina bombina</i> X <i>B. variegata</i> *	11, 15, 19
<i>Bufo bufo</i> (Fig. 3 A)	4, 5, 9, 10, 13, 22
<i>Bufo viridis</i>	8, 10, 19, 22
<i>Hyla arborea</i> *	2, 3, 4, 9, 13, 17
<i>Rana temporaria</i> (Fig. 3 B)	11, 13, 14, 16, 18, 19, 20, 22
<i>Rana dalmatina</i>	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 21
<i>Pelophylax ridibundus</i>	5, 8, 9, 10, 11, 12, 13, 14, 17
<i>Pelophylax kl. esculentus</i>	1
<i>Emys orbicularis</i> * (Fig. 4 A)	12, 13
<i>Lacerta agilis</i>	7, 19, 20
<i>Lacerta viridis</i>	2, 8, 9, 11, 12, 22
<i>Podarcis muralis</i>	14, 16, 19, 20, 22
<i>Natrix tessellata</i> *	5
<i>Natrix natrix</i>	11, 12
<i>Zamenis longissimus</i> * (c)	20
<i>Coronella austriaca</i> (c)	20
<i>Vipera ammodytes</i> (Fig. 4 B)	19, 20

An asterisk marks species firstly recorded within the study area.

A (c) marks records from the MGAB collection; all others are from field records.

### DISCUSSIONS

13 out of the 21 species (including the kleptotaxon, *Pelophylax kl. esculentus*) recorded by us were already known from previous studies. Our study added four amphibian and three reptile species to the known herpetofauna of this area, as well as a case of hybridization (between *Bombina bombina* and *B. variegata*) and new records for all found species. Two species found previously within the area or close to it (*Mesotriton alpestris* and *Anguis fragilis*) were not encountered by us; however, this does not exclude the possibility of their presence, as the investigated area seems hospitable for *Anguis*, and *Mesotriton* may well occur at greater altitudes than reached by us.





Fig. 2 - A, *Salamandra atra*, in water, Șușița Verde (Photo by O. Iftime); B, *Triturus cristatus*, Dobrița (Photo by O. Iftime)





Fig. 3 - A, *Bufo bufo*, upper Motru valley (Photo by O. Iftime); B, *Rana temporaria*, pair in amplexus, on snow, Sohodol (Photo by A. Iftime)





Fig. 4 - A, *Emys orbicularis*, in habitat, Peștișani (Photo by A. Iftime); B, *Vipera ammodytes*, Sohodol (Photo by A. Iftime)

While the herpetofauna of this area is characteristic for sub-Carpathian areas, with *Vipera ammodytes* the only “sub-Mediterranean” species present, the most interesting phenomenon is the presence of *Bombina bombina* and its introgressive hybridization with *B. variegata*. The lowland species *B. bombina* is present in the Târgu Jiu-Cărbunești depressionary area, which is a significant extension of its Romanian distribution (as given by, e.g., Cogălniceanu et al., 2000, or Iftime, 2005), and hybridizes with *B. variegata* in the adjacent foothills – explaining the occurrence of *B. bombina* – like characters in *B. variegata* recorded by Covaciu-Marcov (2009 b) in a neighbouring area. On the Bistrița valley, a distance of ca. 10 km separates the “pure” *B. bombina* and *B. variegata* populations that we recorded, a hybrid population being found almost midway between them; otherwise the distance between *B. bombina* and hybrid populations found by us is smaller (ca. 1.3 km in Sâmbotin area, ca. 2.7 km in Pocruia area). Of course, our samples do not comprise the totality or even the majority of *Bombina* populations, but they indicate the narrowness of the hybridization area.

## NOTĂ ASUPRA HERPETOFAUNEI MUNȚILOR VÂLCAN ȘI DEALURILOR LOR SUBCARPATICE (CARPAȚII MERIDIONALI, ROMÂNIA)

### REZUMAT

Sunt prezentate rezultatele unor investigații herpetologice pe versantul sudic al masivului Vâlcă și în zona asociată de dealuri subcarpatice (jud. Gorj, România). Au fost identificate în teren 20 specii (și, de asemenea, hibrizi între speciile *Bombina bombina* și *B. variegata*, precum și kleptotaxonul hibridogenetic *Pelophylax kl. esculentus*) în 22 localități investigate.

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## PRELIMINARY DATA ON THE ISOLATED *TESTUDO GRAECA* POPULATION FROM THE “CETATEA HISTRIA” MUSEUM COMPLEX, THE DANUBE DELTA BIOSPHERE RESERVE (ROMANIA)

GABRIEL BUICĂ

**Abstract.** The land of the “Cetatea Histria” Museum Complex, the Danube Delta Biosphere Reserve, holds a large population of *Testudo graeca*, relatively well isolated due to the existing fence around the land of museum and the lack of suitable habitat in the vicinity. The relative high density of individuals in this area, 1.68 individuals / ha, and low recapture rates, 9.25%, suggests a large population size. The presence of juveniles and the lack of individuals with tick infestation or traces of human violence on carapace or plastron indicate a viable population which occupies an area with limited human activity.

**Résumé.** Le périmètre du Complexe Muséal «Cetatea Histria», Réserve de la biosphère du Delta du Danube, est habité par une importante population de *Testudo graeca* relativement bien isolée en raison de la barrière existante et le manque d'habitat convenable à proximité. La forte densité relative des individus dans ce domaine et la recapture faible suggèrent une grande population. La présence de nombreux juvéniles et aucune infestation de tiques observées ou de violence humaine sur la carapace ou le plastron, montrent une reproduction de la population qui occupe une superficie où l'activité humaine est limitée.

**Key words:** *Testudo graeca*, population structure, Romania, Danube Delta.

### INTRODUCTION

Spur-thighed Tortoise (*Testudo graeca* Linnaeus, 1758) is an attractive species for ecological studies because of its status of priority species for conservation (92/43/EEC), long life, high catchability and the opportunity for permanent individual marking due to structure of carapace. Land tortoises are also important flagship species for conservation since they attract public attention (Walpole & Leader-Williams, 2002).

The distribution of *T. graeca* in Dobrogea is uneven, with larger populations in the north, Măcin Mountains (Cogălniceanu et al., 2007) and in southern forested areas (Cogălniceanu et al., 2008). Between those areas only small isolated populations survive (Covaciu-Marcov et al., 2006). One of these is located on the northern tip of Saele Sand Bank (Băcescu, 1966), in the enclosed area of “Cetatea Histria” Museum Complex. This population is relatively well separated from other populations, because of habitat discontinuity, water bodies or fenced areas. The current population of the species occupies an area characterized by low human impact, abundant vegetation and complex landscape with large number of pits and hillocks from past archeological sites. The study of this population is a part of long term monitoring focused on the evaluation of the population's structure, distribution, health and human impact.

The present work describes the preliminary results of the monitoring carried out in 2010.



### MATERIAL AND METHODS

This preliminary study was done from May, 2010 to October, 2010, in the enclosed area of the “Cetatea Histria” Museum Complex (Fig. 1). The study area has a surface of 32 ha and a perimeter of 2.3 km with limited archeological activity. The perimeter of the area is fenced, which keeps it safe from potential predators, domestic animals or tourists, and at the same time limiting dispersal of tortoises.



Fig. 1 - Location of “Cetatea Histria” Museum Complex (Dobrudja = Dobrogea).

Air temperature was also recorded (Lascar EL-USB-2 temperature data loggers). For juveniles and subadult animals age estimation (Germano & Bury, 1998) was done by counting the number of rings on at least three carapace scutes (Bertolero et al., 2005).

The study area was covered by 24 transects with an average length of 400 m and a combined length of 10 km. They were repeated ten times, between 9:00 and 14:00 hrs. (Hill et al., 2007). The distance between two adjacent transects was 20 m, because of abundant vegetation which prevents optimum observation of tortoises (Mazerolle et al., 2007). The location of the tortoises along transects was recorded with a handheld GPS Garmin eTrex. Individuals were sexed, measured with a caliper (40 cm size, 0.01 mm precision) for straight carapace length, curved carapace length and height, weighed with a portable electronic balance (Momert portable electronic balance, maxim weight 3kg, with 1g precision) and temporary marked with a marker (Stubbs et al., 1984). Each tortoise was photographed from both dorsal (carapace) and ventral (plastron) side for later in detail measurements.

### RESULTS

During the study period 54 individuals of *T. graeca*, 27 females, 21 males and six juveniles, were registered. The sex ratio was 0.77, males by females, and juvenile age was between three and seven years. No tortoise under three years of age was captured, probably due to small size, camouflage colors, dense vegetation and less active behavior. The average sighting rate per day of the study was four



tortoises, with a minimum of three and a maximum of 16 tortoises. The recapture rate was extremely low, 9.25%, with only five tortoises recaptured (three females, one male and a single juvenile). Tortoises were located mainly within the border area of the land, on sun exposed area of hillocks, with the central part having a very low animal density. In relation to the study area the numbers of captured tortoises was 1.68 individuals/ ha, lower than those obtain by Kaddour et al., (2006) in the Central Jbilets in Morocco.

The weight and straight carapace length of captured individuals of *T. graeca* are presented in table 1.

Table 1

Weight and straight carapace length of captured *T. graeca*.

	Weight (g)						Straight carapace length (cm)					
	min	Max	Average	SD	SE	CI	min	Max	Average	SD	SE	CI
Females	359	2883	1525.48	±481.16	92.60	1.00	10.1	21.8	15.90	±2.66	0.51	1.00
Males	1516	1965	1718.28	±230.92	50.39	98.76	14.5	19	16.76	±1.26	0.27	0.54
Juveniles	26	291	136.5	±118.95	48.56	95.17	4.7	8	6.81	±1.97	0.61	1.20

SD = Standard Deviation; SE = Standard Error, CI= Confidence Interval

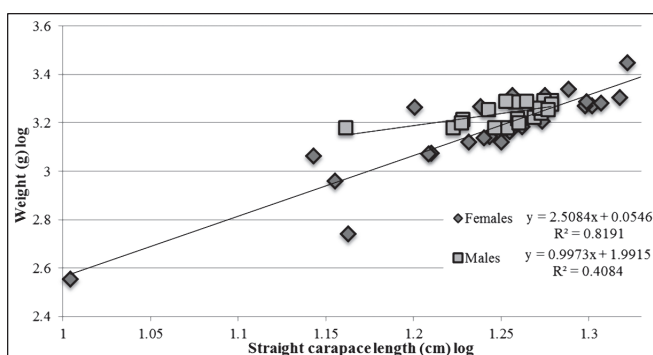


Fig. 2 - Correlation between weight and straight carapace length of captured *Testudo graeca* for n=27 for females and n=21 for males.

There is a statistically significant correlation between weight and straight carapace length (Fig. 2), with female weight increasing faster than in males, what was in concordance with studies performed on *T. graeca* in other parts of species area (Türksozan et al., 2003).

Only one tortoise showed injuries attributed to human activity; all tortoises had no tick infestation.

## DISCUSSIONS

The data collected in this study follows the pattern observed in other studies on *T. graeca* regarding population size, structure and body parameters (Kaddour et al., 2006). Captured adults represent 88.88% of all captures and juveniles only 11.11%. This population structure resembles the population structure from a study in Măcin Mountains National Park, situated at over 100 km north of Cetatea Histria. In the Măcin Mountains study (Cogălniceanu et al., 2007) the juveniles represented 6.7% of the 310 tortoises captured. The population's structure dominated by adults may indicate a low reproductive rate. This may not be accurate because the proportion of juveniles in a population is difficult to estimate due to their behavior which makes them difficult to observe and to capture (Kaddour et al., 2006). Also the tortoise density is higher in Cetatea Histria, 1.68/ha, comparing it to 0.27/ha in Măcin Mountains, which has a surface of 1132 ha. The suitable habitat of Cetatea Histria which attracted tortoises from the nearby overgrazed and humid habitats is the most probable the explanation for the higher density of tortoises in Cetatea Histria area (Preda et al., 2009). This concentration effect and the number of captures and recaptures tend to indicate a large tortoise population. The low detectability and recapture rate is due to the abundant vegetation and high temperatures in the spring and summer of 2010. The low tortoise density in the central area might be explained by the landscape characteristics with abundant vegetation and less hillocks or sun exposed areas (Ioannidis & Bousbouras, 1997).

The Cetatea Histria captured tortoises are smaller both in size and weight comparing with those from Măcin Mountains. The smaller body signification can't be explained in this preliminary study due to limited data, but it can be related to the age of the captured tortoises, food source availability or environmental factors. In both areas, the female tortoises have increased body size parameters comparing to males and females increase their weight faster with the increasing of the straight carapace length. This sexual size dimorphism is most likely due to sexual selection and fecundity selection (Carretero et al., 2005). Adult sex-ratio (males: females) is of 0.77:1 in Cetatea Histria, with fewer males in contrast with Măcin Mountains where sex-ratio is of 1:0.57 (Cogălniceanu et al., 2007). This difference is probably caused by the local habitat characteristics and by the behavior of these tortoises, males being prone to a more active life, which affects catchability.

This preliminary result shows that *T. graeca* maintains a viable population in the study area, with its population structure extending from juveniles, with lower weight and straight carapace length to older individuals with weight over 2800 g in females and straight carapace length over 20 cm. Animals also lack ticks and the carapace is free from man-made scars as frequently is the case in other populations.

### Conclusion

This preliminary study showed that the *T. graeca* from the enclosed area of “Cetatea Histria” Museum Complex might be isolated from other similar tortoise populations due to fenced perimeter of Complex and unsuitable nearby habitats (swamps and salty areas). Inside the studied perimeter there is a healthy population which tends to aggregate in well exposed to sunlight spots.

The low recapture rate suggests a larger population. The fact that this population is free of tick infestation and almost absent man-made scars on carapace shows it resides in an area without intense human activity.

### ACKNOWLEDGEMENTS

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### DATE PRELIMINARE PRIVIND O POPULAȚIE IZOLATĂ DE *TESTUDO GRAECA* DIN COMPLEXUL MUZEAL “CETATEA HISTRIA”, REZERVAȚIA BIOSFEREI DELTA DUNĂRII (ROMÂNIA)

### REZUMAT

Țestoasa de uscat dobrogeană *Testudo graeca* are în interiorul Complexului Muzeal “Cetatea Histria” o populație care poate fi considerată izolată de populațiile din imediata apropiere datorită împrejuririi cu gard a Complexului și a lipsei de habitat specific în proximitate. Acest studiu preliminar a arătat existența unei densități a indivizilor acestei specii destul de ridicate pentru suprafața studiată, 1,68 indivizi/ ha, dar și a unui succes scăzut al recapturării, 9,25%, fapt ce sugerează o populație mult mai numeroasă. Capturarea și recapturarea de indivizi juvenili arată o populație viabilă, iar lipsa infestării cu căpușe precum și lipsa urmelor de violență umană asupra carapacei arată că această populație ocupă un teritoriu cu activitate umană limitată.

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## OBSERVATIONS ON THE BAT FAUNA (MAMMALIA: CHIROPTERA) OF ROȘIA MONTANĂ (ROMANIA)

DUMITRU MURARIU, DORIN ALEXANDRU POP

**Abstract.** The observation and identification of some bat species of the families Rhinolophidae and Vespertilionidae from Roșia Montană led to the completion of the list of the bat fauna, known from this locality, to a number of 12 species. This fact proves a certain state of the ecosystem complex from Roșia Montană, knowing that the bats are good indicators of the biodiversity state of an area. The bat species identified by the authors and added to the species list for Roșia Montană are: *Rhinolophus hipposideros*, *Myotis brandtii* and *Pipistrellus* (= *Hypsugo*) *savii*. *Rhinolophus hipposideros* is included in the Annex II of the Directive of Habitats, and it is the key species in the National Programme for Bat Monitoring.

**Résumé.** Les galeries des mines (destinées à l'exploitation ou à l'exploration géologique) des Monts Metaliferi (département Alba) peuvent offrir un bon refuge pour l'hibernation de quelques espèces de chauve-souris. Dans ce travail il s'agit de l'identification dans une galerie d'exploration géologique de l'espèce *Rhinolophus hipposideros*, qui n'a pas été mentionnée dans les précédentes investigations de la zone. En plus de cette espèce, qui est incluse dans l'Annexe II de la Directive des Habitats, quatre exemplaires de vespertilionides, appartenant aux espèces *Myotis myotis* (2 ex.), *M. brandtii* et *Pipistrellus* (= *Hypsugo*) *savii* ont été recueillis à la fin du mois de novembre 2010, étant trouvés morts dans le grenier de l'église gréco-catholique de Roșia Montană. Les deux dernières espèces sont signalées pour la première fois de la zone investiguée, ce qui fait monter la liste des chauve-souris, qui sont un bon indicateur pour la richesse de la biodiversité, à 12 espèces.

**Key words:** bat species, underground roosts, foraging habitats, Roșia Montană.

### INTRODUCTION

#### *Characteristics of the surveyed area*

Locality Roșia Montană is in Transylvania, in the south-east side of the Apuseni Mountains of Romania, in Metaliferi Mountains (Fig. 1). These mountains are limited to south by the Mureș River (section between Alba Iulia and Căpruța), to north by the rivers Arieș and Abrud, to west by the Căpruța - Slatina de Mureș – Gurahonț corridor and to east by the Ampoi River Valley. From the administrative point of view, locality Roșia Montană belongs to

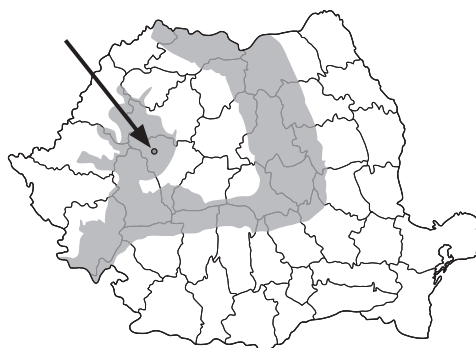


Fig. 1 - Geographic position (arrow) of Roșia Montană locality.

Alba county. Being a part of the “gold square” of the Western Carpathians, Roșia Montană is known for its gold-silver deposits, since antiquity. Gold exploitation from Roșia developed almost continuously since the 3<sup>rd</sup> – 1<sup>st</sup> centuries B.C., according to some French-Romanian archaeological studies (Cauuet et al., 2003). The geological context, of a remarkable diversity, determines not only the underground richness but also the landscape diversity. Therefore, the relief is made by the diversity of the geological formations, existing an interpenetration of the volcanic formations with the sedimentary ones.

Volcanic formations are represented by Neogene volcanic and sub-volcanic bodies of dacite and andesite, represented by massifs of over 1000 m altitude, as Cărnic (with spectacular formations, as Piatra Corbului), Cetate, Orlea. Sedimentary formations created a soft relief, of hills and gentle slopes. The landscape of Roșia Montană surroundings has also an important anthropic element, because the method of gold ore extraction and processing in this area required an administration of waters, its hydrography being generous. Between 1752 and 1779, during the Habsburg Empire period, large hydrotechnical work for water accumulations, named by local people “tăuri” were made. So, Tăul Mare, Orlea, Corna, Țarina and Găuri appeared, which can be observed even now. The landscape resulted after geological processes, climate and anthropic activity has a special patrimonial value, especially from the point of view of the European Convention of Landscape, adopted in Florence in 2000 and ratified by Romania in 2002, by the Law 451.

### *Diversity of the ecosystems*

A very diverse landscape means a mosaic of ecosystems, according to the “Landscape Ecology”, with specific structure and functions resulted from the spatial and functional interactions between different included ecosystems (see Turner, 1989). A large diversity of the ecosystems on a spatial scale, not very large (the present study focuses on a surface of 25 km<sup>2</sup>), presumes a large diversity of the ecological niches and, as a result, of the species of flora and fauna. The present study brings some new information on the diversity of the bat fauna and proposes a preliminary ecological interpretation of it.

If the mosaic of habitats present in Roșia Montană offers a diversity of foraging places for bat species, the presence of some anthropic elements can offer shelter or hibernating places. Therefore, some mine galleries (of exploitation of geological explorations) from the massifs from Roșia Montană locality represent a chance for the troglophilous fauna, for finding resting places during the day and for hibernation, and some older buildings of the locality are used by the chiropteran fauna as shelters for nursing colonies.

Usually, some bat species (*Nyctalus noctula*, *Vespertilio murinus*) are considered house or anthropophilous because they use the settling and their annexes for sheltering; others are considered forest species (*Myotis daubentonii*, *Eptesicus serotinus*), because they shelter mainly in tree hollows, but also in



the empty spaces left after branches break or under the bark; the species which prefer the caves (*Rhinolophus ferumequinum*, *R. hipposideros*, *R. mehelyi*, *Myotis myotis*, *M. brandtii*, *Plecotus auritus*, *Pipistrellus pipistrellus*), mine galleries, those of geological exploitation, rock crevices are named cave species. Out of these three categories, most of the species roost in caves of anthropogenic galleries for hibernation, from where they spread in spring to other shelters, usually smaller and warmer, for forming breeding shelters. Also, there are cases with optimum temperatures for raising young in summer, through which thermal waters pass or spring; thermal waters offer them a high temperature all along the year. In most of the cases, the caves are left for the spreading of the hibernation colonies, the decreasing of the competition for food within a limited area and for being much closer to the feeding habitats, as diversified as possible. There are numerous papers on the distribution of bat species: Dumitrescu et al. (1962 - 1963), Valenciuc (1982), Decu et al. (2003), Borda (2001, 2002), Coroiu & Szántó (1996), Coroiu et al. (2007), Coroiu & David (2008), Reiter (2004), Ifrim & Valenciuc (2006) and others, referring to all bat species of the Romanian fauna or to punctual reports for a certain species from a certain roost.

By the present paper, we report the presence of some bat species in a gallery of geological exploitation from Cârnic Massif (from the area of Roșia Montană locality) and in the loft of the Greek-Catholic Church from Roșia Montană.

#### MATERIAL AND METHOD

Between 27<sup>th</sup> and 29<sup>th</sup> of November 2010, one of the authors (Dorin Alexandru Pop) visited Roșia Montană and its surroundings – Cetate, Cârnic and Jig-Văidoaia massifs. During this trip, he investigated a gallery of geological exploitation from Cârnic Massif, between the natural monument Piatra Despicată and Cârnicel Peak (Fig. 2). Then, outer temperature of the gallery was under 0°C, and a snow layer of about 15 cm. Investigated gallery was in the area 34 N, with the coordinates UTM 654863.573406485 and 5095992.170619755 and geographical coordinates 46°17'47"N and 23°07'40"E. For finding the last coordinates we used GPS Microsport Evidence 2010, and for temperature measuring we used a thermometer with alcohol.

In the gallery, two specimens of *Rhinolophus hipposideros*, in a latency state, were found and photographed. Also, other galleries of the Cârnic Massif were inspected, without going deeper. Guano was observed on the ceiling, without representing important accumulations, this thing showing their accidental use or that they were a passage to the hibernation places or nursery colonies.

On 28<sup>th</sup> of November 2010, the loft of the Greek-Catholic Church of the Roșia Montană locality was inspected in order to verify the presence of a nursery and/or hibernation colony. Location was chosen after the information got from a member of ARA Association, by which a project for the restoration of some buildings of the

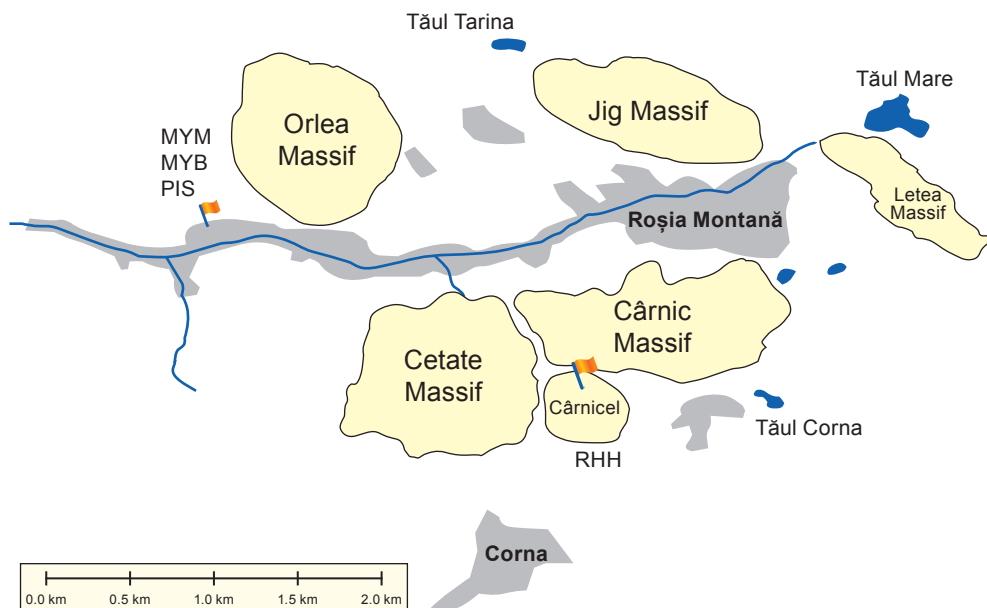


Fig. 2 - Localization of the identified bat species from Roșia Montană. (27-28.11.2010)

locality was carried out. Traces of a nursery colony were identified (guano in large quantities and bat bodies) and the bodies of four specimens were collected: two of *Myotis myotis*; one of *M. brandtii*; one of *Pipistrellus* (= *Hypsugo*) *savii*. The species identification was made in laboratory, using the binocular. The skull and dentition of the four bodies were preserved (at least partially), the last one being very important among the identification criteria. Dental formula of each individual was correlated with the forearm length.

### RESULTS AND DISCUSSIONS

The choice for bat roosts is influenced by the environment conditions from the studied areas. Transylvania includes the Western Carpathians, with altitudes below 1900 m, as the Metaliferi Mountains where there is the Cârnic Massif. Caves, cracks of the rocks and mine galleries can offer good refugees for the cave bats. Optimum conditions refer to the lack of the air currents, which generates temperature and relative humidity fluctuations.

#### Family Rhinolophidae

Therefore, in the studied area, such conditions were found in a gallery of geological exploitation, where *Rhinolophus hipposideros* was identified. The gallery is placed at 990 m altitude, in an area of birch and pine young culture, on the south-eastern slope of the Cârnic Massif, between Piatra Despicată and Cârnicel Peak. The entrance is directed towards Corna Valley – a mosaic of forest habitats,

balks, rocks (especially in the upper side, on the south-eastern slope of the Cărnic Massif), secondary lawns, greenlands, meadows, gardens and Corna mine. In winter, the temperature does not fall below 10°C - 9°C in that gallery, and the wet walls maintain a relative humidity of 50 – 55%. After the single gallery entrance (Fig. 3) there is a descending section of about 2 m, from where two “T”-shaped asymmetrical ramifications start of about 3 m in the left ramus and of 5 – 6 m in the right one. The height of the left ramus gallery, where the two specimens of Lesser horseshoe bats were found, is of about 1.5 m. Location of the gallery entrance, chosen by *Rhinolophus hipposideros* for hibernation, in a young of pine plantation and birch can be correlated with the species preference of hunting in the bushes and young wood (Bontandina et al., 2002; Motte & Libois, 2002; Spitzenberger & Hutson, 2008). When the gallery was visited, only two individuals of *Rhinolophus hipposideros* (Fig. 4) were observed – species which was not reported from Roșia Montană, up to now.



Fig. 3 - In the geological exploration gallery close to Cărnicele Peak (Photo: D. A. Pop).



Fig. 4 - One of the *R. hipposideros* (Photo: D. A. Pop).

Information on the chiropteran fauna of Roșia Montană area base on two studies: „Studiu de condiții inițiale privind biodiversitatea” [“Study of initial conditions on biodiversity”] for achieving the Impact Evaluation on the Environment of the project of gold exploitation, requested by Roșia Montană Gold Corporation S.A. and carried on within the period May – August 2003 by Stantec Consulting Corporation, and the study „Specii de lilieci și statutul lor de protecție la Roșia Montană” [“Bat species and their protection statute in Rosia Montană”], carried on within the period 9-11 September 2003 by the Association for Bat Protection of Romania (Nagy, 2003). Both groups of researchers visited the mining galleries and different habitats from Roșia Montană and identified the same 9 bat species.

According to these two studies, 7 of the 9 identified species shelter for hibernation in caves, mining galleries and tunnels. Two of the 7 species (*Myotis myotis* and *M. oxygnathus*) are included in the Annex II of the Directive of the Habitats (H.D. 92/43EEC). In the same annex, all 5 Rhinolophidae species of the Romanian fauna are included. Therefore, to the bat species listed in the Annex II of the ECHD, previously reported for Roșia Montană, a third species is added - *R. hipposideros*, by this study. These three species are also included in the Annex no. 3 of the Emergency Ordinance no 57/20<sup>th</sup> of June 2007 of national legislation on the regime of the protected areas, of conservation of natural habitats, of wild flora and fauna. The species included in the Annex 3 need the specification of the special conservation areas, if they meet the requirements on the population livestocks and their representativeness for their national distribution range. In the Annex no 4 of the same document, there are all bat species of the Romanian fauna which need a strict protection.

*R. hipposideros* is considered a thermophilic stenothermal species (Crucitti & Cavalletti, 2002), but the presence of some roosts with favourable microclimatic conditions (with a temperature varying between 2 - 13°C) allowed it the distribution in latitude, up to the southern Poland (Wegiel & Wegiel, 1996; Wołoszyn, 1976, 2001). On the other hand, in Poland it is considered a rare species, because of the complex pollution forms as well as because of the habitat fragmentations and damages (Stebbing et al., 1988) – the reason why it vanished from Holland, Belgium and north-western Boemia along the last 50 years (Jacobs et al., 1957).

In Romania, it is a wildspread species, but without forming colonies of hundreds of individuals. Also in Romania, it is considered species in decline (Eurobats Report of Impl. of Agreem. in Ro. 2008). The leaving of the hibernation roosts (caves, tunnels, mine galleries, rock cracks) and the installation in church steeples, in attics and event under the house eves from rural localities is due to the sex separation, on the one hand, females creating maternal colonies, and males grouping separately on the other hand, both types of colonies increasing their approaching chances and a better use of the feeding habitats, partially avoiding the competition for food with the permanent cave species. As regards this species, it is not about migrations, because the seasonal travels of the individuals from a type of shelter to another are made on distances of only 3 - 5 km.

It has to be mentioned that not all exploitation galleries or those of geological exploration from Roșia Montană are proper for sheltering bats, because many of them are connected to a large gallery net, coal pits and faces, situated in several levels and with several access possibilities, this aspect creating some air currents not favourable to hibernation. But fissures or pockets might be present where the necessary conditions for roosting of some species exist. In this respect, an indication is represented by guano on the floor of some galleries from Cârnic Massif. Therefore, we recommend to carry on these studies in order to identify new hibernation locations or summer roosts of the bat species from Roșia Montană.

## Family Vespertilionidae

As it was mentioned before, from the attic of the Greek-Catholic Church of Roșia Montană locality the bodies of four individuals of three different species were collected: *Myotis myotis* (two individuals), *M. brandtii* – one individual, and *Pipistrellus* (=Hypsugo) *savii* – one individual (Fig. 5). If *Myotis myotis* was identified also by the two referential studies for Roșia Montană, *M. brandtii* and *Pipistrellus* (=Hypsugo) *savii* are new species, not reported till now for this location from Romania.



Fig. 5 - Mummified bats from Roșia Montană locality: left – *Myotis myotis*; middle – *M. brandtii*; right – *Pipistrellus* (=Hypsugo) *savii*.

Although the conservation state of the four bodies is not good, we could examine the dental formula and could measure (without an important error), the forearm length. Therefore, for the two individuals of *M. myotis*, the dental formula was:  $I = 2/3$ ;  $C = 1/1$ ;  $Pm = 3/3$ ;  $M = 3/3 \times 2 = 38$ . The length of the forearms was of 54, and respectively 55 mm.

As regards *M. brandtii*, the dental formula was:  $I = 2/3$ ;  $C = 1/1$ ;  $Pm = 3/3$ ;  $M = 3/3 \times 2 = 38$ , and the forearm length = 51 mm.

Finally, for *Pipistrellus* (=Hypsugo) *savii*, dental formula was:  $I = 2/3$ ;  $C = 1/1$ ;  $Pm = 2/2$ ;  $M = 3/3 \times 2 = 34$ , and the forearm length = 38 mm.

It has to be remarked the advanced degree of wear, excepting one of the two specimens of *M. myotis* (Fig. 6 - left). The wear state of dentition, on the one hand, makes us to consider that all specimens were adult, and on the other one, allows the supposition according to which the death of those bats happened when they reached their maximum longevity. Some incisors and premolars remained acicular or were blunt till the neck (Fig. 6 – middle and right).

If for *M. myotis* it is known that in the northern part of the range it is an anthropophilous species, in summer preferring the artificial shelters (Hutson et al., 2008), and in the southern part of its range, it is a cave species, in the Romanian territory it prefers the underground roosts, both for hibernation and for nursery





Fig. 6 - Dentition to: *Myotis myotis* (left); *M. brandtii* (middle); *Pipistrellus* (=Hypsugo) *savii* (right).

colonies. But sometimes, in summer, it can stay in the building attics, as the specimens of the present study. As regards *M. brandtii*, it is known its preference for the artificial shelters, nesting in the spaces between the root boarding and sheet or between laths and tiles – inaccessible dark places. As foraging habitats, it prefers the mixed forests or the deciduous ones, with pools near them, and as hibernation roosts, it prefers the caves, basements and mine galleries (Boye (2004); Boye et al. (1999); Ifrim & Valenciuc (2006); Nagy et al. (2005)). So that, nursery roosts are left in autumn, when mixed colonies gather again for mating, and then withdraw in caves or galleries for hibernation. At the same time, the species is known as an occasionally migratory one (Hutterer et al., 2005 in Hutson et al., 2008), seasonal trips being of 200 – 250 km sometimes. That is why, we have to take into account the habit of the individuals of changing the hibernation places every year, when estimating the populations of *M. brandtii*; the results of the observations made during the same period, for 2 - 3 years, may be closer to the real tendencies of the populations of this species.

*Pipistrellus* (=Hypsugo) *savii* was reported in Romania only from 2 localities: the cave from Canaraua Fetii, from Dobrogea (Murariu, 2005; Murariu et al., 2009) and that from Baziaș, in Banat (Barti, 2005). At present, it has a population estimated at less than 100 specimens for Romania (Murariu, 2005). For hunting, it prefers the forest belts, lawns and wetlands, but sometimes the areas of public lighting in rural localities; it hibernates in rock crevices, buildings, and rarely under the old tree bark or in underground habitats (Hutson et al., 2008).

If we have to compare the number of the bat species in Roșia Montană, which reaches now 12, with the number of the bat species of the entire region of Moldavia, which reaches 19 (Ifrim & Valenciuc, 2006), or of Romania, which reaches 34 (Murariu, unpubl.), or of Europe, which reaches 45 species (Nagy et al., 2005), a very high diversity of bat species results for a relatively small surface (the surface of the Roșia Montană commune is of 4161 ha). Further on, we present a synoptic table of the bat species from Roșia Montană, with their conservation statute in international conventions, European and national legislation and their priority in the Programme of the Monitoring National Strategy of chiropteran fauna.



Table 1

Bat species of Roșia Montană, their national conservation priority and their conservation statute.

No.	Species	National priority	Conserv. statute*	Bern Conv.	Bonn Conv.	ECHD	OUG 57/2007
1	<i>Rhinolophus hipposideros</i> **	H	Vu	AII	AII	AII, AIV	3A, 4A
2	<i>Myotis myotis</i> **	M	En	AII	AII	AII, AIV	3A, 4A
3	<i>Myotis oxygnathus</i>	M	En	AII	AII	AII, AIV	3A, 4A
4	<i>Myotis nattereri</i>	M	En	AII	AII	AIV	4A
5	<i>Myotis daubentonii</i>	L	Cr En	AII	AII	AIV	4A
6	<i>Myotis brandtii</i>	L	En	AII	AII	AIV	4A
7	<i>Eptesicus serotinus</i>	L	Vu	AII	AII	AIV	4A
8	<i>Plecotus austriacus</i>	L	En	AII	AII	AIV	4A
9	<i>Plecotus auritus</i>	L	Vu	AII	AII	AIV	4A
10	<i>Nyctalus noctula</i>	L	-	AII	AII	AIV	4A
11	<i>Pipistrellus pipistrellus</i>	L	-	-	AII	AIV	4A
12	<i>Pipistrellus savii</i>	L	Vu	AII	AII	AIV	4A

National priority (H = high; M = medium; L = low)

\* = According to the Red Book of Romanian Vertebrate.

\*\* = Key species for the National Bat Monitoring Programme.

Vu: vulnerable species; En: endangered species; Cr En: critically endangered species.

As it is known, dimensions, form and space/fragments diversity of a landscape influence the abundance patterns of the species (Turner, 1989). Therefore, if on a reduce surface (from the landscape ecology point of view, at a small scale) we have more then a third of the bat species present in the Romanian fauna, that means that the landscape is very diverse and offers some proper habitats.

At the same time, a large diversity of the bat species may prove us a high biodiversity, knowing that the bats are good biodiversity indicators, demonstrating the species diversity and richness in a certain area (Jones et al., 2009). Also, due to their position within the trophic chain, to their diverse food and their sensibility to pollution and habitat changing, bats are considered ecological indicators (they can offer a perspective on the ecological processes) and of environment (they can be used as indicators for a series of impact fact or on the environment (cf. Jones et al., 2009). Basing on these observations we postulate the presence of a rich trophic network within the area of Roșia Montană commune.

### Conclusions

General context of the country and of the continent is that of population numerical diminishing of most of the bat species, in the same tendency joining the bat fauna of the Apuseni Mountains. National monitoring programmes of the Transylvanian bat species released a situation of these species, pointing out their faunal and protective importance.

When visiting Roșia Montană locality and its surrounding, another three bat species were reported (*Rhinolophus hipposideros*, *Myotis brandti* and *Pipistrellus savii*), their local list reaching now 12 bat species. This large diversity of bat species may indicate a high diversity of the habitats, a relative good state of their conservation (excepting lotic ecosystems, knowing the heavy metal pollution of the tributaries of Roșia stream), and a large diversity of the floral and faunal species, this thing requiring the inclusion of this area in a coherent programme of biodiversity conservation.

## OBSERVAȚII ASUPRA FAUNEI DE LILIECI (MAMMALIA: CHIROPTERA) DE LA ROȘIA MONTANĂ (ROMÂNIA)

### REZUMAT

Galeriile miniere (de exploatare sau de explorare geologică) din Munții Metaliferi (județul Alba) pot fi un bun refugiu pentru hibernare, cel puțin pentru unele specii de lilieci. În acest articol este vorba despre identificarea într-o galerie de explorare geologică a liliacului mic cu nas potcoavă - *Rhinolophus hipposideros*, neraportat cu ocazia investigațiilor anterioare efectuate în zonă. Pe lângă această specie, care figurează în Anexa II a Directivei Habitare, au mai fost colectate la sfârșitul lunii noiembrie 2010, cadavrele a patru exemplare de vespertilionide, aparținând următoarelor specii: *Myotis myotis* (2 ex.), *M. brandtii* și *Pipistrellus* (= *Hypsugo*) *savii*, din podul bisericii greco-catolice din Roșia Montană. Ultimele două specii sunt la prima semnalare din zona cercetată. Pe baza acestor rezultate privind fauna de lilieci reiese faptul că biodiversitatea locală este bogată și încă într-o stare bună de conservare, de unde nevoia continuării documentării științifice și în privința altor specii de interes comunitar, în vederea propunerii de includere a ecosistemelor de la Roșia Montană într-un program coerent de conservare a biodiversității.

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## TROUBLE-MAKING BROWN BEAR *URSUS ARCTOS* LINNAEUS, 1758 (MAMMALIA: CARNIVORA) – BEHAVIORAL PATTERN ANALYSIS OF THE SPECIALIZED INDIVIDUALS

LEONARDO BERECKZY, MIHAI POP, SILVIU CHIRIAC

**Abstract.** In Romania more than 500 damage cases caused by large carnivores are reported by livestock owners and farmers each year. This is the main reason for hunting derogation despite the protected species status. This study is the result of detailed examination of 198 damage cases caused by bears in 2008 and 2009, in the south- eastern Carpathian Mts in Romania. The goal of the study was to examine whether an individual-specific behavioural pattern among problematic bears exists. We looked for bears which showed repeated killing of livestock, a phenomenon claimed by livestock owners to indicate the presence of a problematic individual in the area. In 27% of the observed cases the problematic bears exhibited specific behaviour patterns: clear specialization on a certain type of damage, high degree of tolerance for humans, selectivity for certain prey items, returning back to the damage site in less than 8 days. Fast adaptation and taking advantage of easily obtainable food around human created artificial sources is characteristic for all bear species, due to their high learning capacity and ecological plasticity, but from the conservation and management point of view dealing with individuals which specialize to live mainly around artificial areas becomes a “problem”. Thus defining and identifying individual behaviour patterns oriented towards conflicting behaviour might be useful for wildlife managers in identifying “problem individuals” in order to apply the proper control methods.

**Résumé.** En Roumanie il y a plus de 500 cas par an de dommages provoqués par les grands carnivores, ce qui est la principale cause des dérogations accordées au statut d'espèces protégées, afin de récolter ces exemplaires. Cette étude est le résultat d'observations détaillées concernant 198 cas où les ours ont causé des dommages au cours des années 2008 et 2009 dans la zone de sud-est des Carpates Orientales en Roumanie. Le but de ces études a été d'identifier si il existe un modèle de comportement individuel dans le cas des ours qui provoquent des dommages. Nous avons cherché à identifier les individus qui ont présenté une certaine «personnalité» surtout en tuant d'une façon répétée du bétail, phénomène souvent associé par les fermiers à l'existence d'un individu «problème». En 27% des cas observés, les exemplaires d'ours qui ont causé des dommages ont démontré une claire spécialisation pour divers cas d'attaque, présentant un haut degré de tolérance envers les hommes, une sélectivité pour certains types de proie, revenant à l'endroit où ils ont provoqué le dommage en moins de 8 jours. Ce comportement n'en est pas un anormal dans le cas des espèces d'ours, si l'on tient compte de leur grande capacité d'apprendre ainsi que de leur haute plasticité écologique. Toutefois, du point de vue du management et de la conservation de l'espèce, la présence de tels individus devient un «problème». Ainsi, la définition du «modèle de comportement» qui permet l'identification des «individus problème» orientés vers la production des dommages, peut devenir utile du point de vue de l'administration correcte de cette espèce et pour l'application de mesures correctes pour la contrôler.

**Key words:** damage, brown bear, problem individuals, damage control Carpathians Mts, Romania.

### INTRODUCTION

There are likely few populations of bears anywhere in the world whose behaviour has not been significantly influenced by man (Stirling & Derocher, 1989). This may confound our understanding of their behaviour and ecology. Remaining populations of bears may not be able to adapt successfully to the combined effects of human predation, disappearing habitat, and climatic change unless profiting on their learning capacity and plasticity to different food sources even if the result is a compromise called by us "habituation" or "specialized individual".

Bears are omnivorous animals, with the most complex diet, feeding behaviour and ecological plasticity among large carnivores (Swenson et al., 2000). Their predatory or vegetarian feeding behaviour seems to show a big variation among geographical distribution ranges and also a great deal of individual variation in feeding strategies as a result of learning (Stirling & Derocher, 1989). There are evidences especially in North America that sometimes bears are more active predators than previously thought (Cole, 1972; Mysterud, 1973; Franzmann et al., 1980; Stewart et al., 1985; Reynolds & Garner, 1987; Boertje et al., 1988; Stirling & Derocher, 1989; Mattson, 1996). Observations showed that most of kills made by adult bears are done after a short rush from ambush or after stalking to close range and that most kills that require a longer chase will be made by smaller sized females or subadults (Cole, 1972; Reynolds & Garner, 1987). Although in many documented cases and areas bears seem to behave as true predators, there are also studies which concluded that bears use less than 20% animal protein and feed more on vegetal food (Swenson et al., 2000; Bereczky, 2004; Shinsuke, 2009; Paralikidis et al., 2009). Especially in European analyzes, the results showed that bears eat a wide range of plant species, insects, and some percent of meat resulted from scavenging or depredation on different mammalian species (Swenson et al., 2000; Bereczky, 2004; Shinsuke, 2009; Paralikidis et al., 2009). Hurst et al. (1982) found that the energy required for a plantigrade animal like a bear to move is about double that for most of other mammals. To move at the modest speed of 7 km/h, uses 13 times more energy than lying (Hurst et al., 1982). That is probably why bears pass so fast from predatory feeding to vegetarian and also why some big adult individuals take advantage on their learning skills.

In general, biologists who have worked with bears have been impressed with how variable the behaviour of individuals appears to be. There are few quantitative studies about the ability of bears to learn, such as Bacon & Burghardt (1976), but generally, in the literature there is an appreciation of their ability to learn or remember things. The success that circuses have had with training bears also suggests that they are good to learn new tasks. We have many observations on the learning abilities of bear cubs performed in an ongoing orphan bear rehabilitation project in the Romanian Carpathians. As long-lived mammals that spend most of their lives within a home range and show strong seasonal fidelity to particular



locations, bears probably learn much about the area, including where and how to find food under a variety of circumstances (Stirling & Derocher, 1989). The variability in the way bears from the same population behave within a particular area may be influenced by both genetic factors and learning (Mazur & Seher, 2007; Breck et al., 2008). It is generally accepted that bears vary their feeding manners according to habitat and the presence of human (Zunino & Herrero, 1972; Swenson et al., 2000). Thus, through learning, some bears may develop individual differences in food preference, vary in the degree to which they prey on live animals, or respond to human disturbance. Individuals will develop behavioural patterns that are modelled by their own experiences (Stirling & Derocher, 1989). Similarly, some behaviour will be learned by cubs while accompanying their mothers during the long period before weaning (Mazur & Seher, 2007).

We presume that all the above mentioned specific behaviour particularities make bears to be able to develop so called “individuality” or “personality”. Predation on livestock animals or feeding in agricultural fields, orchards or beehives might be considered the behavioural response of bears to the existing multi-use landscape conditions characteristic of Europe (Swenson et al., 2000). Our assumption is that within this natural behavioural response, exist several undesired patterns, which could lead at the definition of the “problem” individual. Most researchers who have studied individuals of any mammalian species are likely to have subjectively recognized that different individuals appear to behave slightly differently (Bekoff, 1977). Primatologists have long recognized individuality and have started to use the expression “personality” to describe individuals with different behaviour (Stevenson-Hinde, 1983). Linell et al. (1999) describe several cases when predator individuals show a particular behaviour pattern. In this paper we try to analyze different depredation cases on domestic animals, in which the behaviour of the individuals showed certain characteristics repeatedly. Such behaviour patterns have been associated empirically by people with the “problem individual” reputation. The paper addresses a basic problem related with bear management in Romania: how to recognize/define a trouble-making bear which should be removed from the population due to its high potential of conflict. We observed that there is a difference in shyness, boldness or other characteristics between individuals involved in trouble situations. After analyzing many damages caused by bears, we speculate that at brown bears (*Ursus arctos* Linnaeus, 1758) there is a predisposition of some individuals to take advantage on easy to catch prey situations, thus exhibiting higher opportunism. Our observations led to the assumption that some individuals learn that in certain areas depredating on livestock is the easiest way to obtain good quality food. Inside of this phenomenon we were interested in the behaviour of those individuals which developed a “personal preference” towards searching areas with such opportunistic circumstances.

At the moment, in Romania, the brown bear harvest is restricted due to the European legislation. The existing derogation for bear hunt is explained as

being a prevention method for the control of problem causing individuals. But in the same time there is no clear definition of the “problem” bear and implicitly no clear suggestion for the right control methods in certain trouble situations. Thus any bear can be considered to have problem causing feeding habits, since there are clear observations and documentations in the literature that most individuals of large carnivore species will at least occasionally kill livestock or cause other type of damage where grazing or husbandry techniques create a favourable circumstance for that (Linnell et al., 1999). Since the result of a conflict situation is a consistent loss in people’s welfare, it is obvious that it will have a negative impact on the image of the whole species, lowering the acceptance of local people towards bears and large carnivores in general. Thus the recognizing of specific behaviour patterns and applying the right control methods (either lethal or non lethal) on livestock killing specialized individuals or individuals with problem causing feeding habits will have a better effect than leaving them in the population.

#### STUDY AREA

The study area is overlapping the Central and South Eastern surface of the Eastern Carpathians, remarkable by the presence of favourable habitats for large carnivores. The area comprehends the core of maximal brown bear population concentration in Romania (Fig. 1).

The whole surface of Harghita, Covasna and Vrancea counties is 15196 km<sup>2</sup>. Approximately 5500 km<sup>2</sup> are covered by forests and represent bear habitats. Estimations made by the local wildlife management units on the whole region of the project indicate the size of the bear population at approximately 2300 individuals (according with data from the Ministry of Environment’s web site). According with the up mentioned numbers, the medium density of bears on the project’s area is 4.3 bears/1000 ha (10 km<sup>2</sup>). This density is variable in different seasons and on different areas. The landscape in the study area is dominated by forests with the following main vegetation levels: until 800 m the main vegetation is dominated by oak and oak mixtures (*Quercus* spp.); between 800-1200 m it is the deciduous level, the main specie being represented by beech (*Fagus sylvaticus*) or beech mixed with other broad leaved species and Scots pine *Pinus sylvestris*) or silver fir (*Abies alba*). On this level the forested areas are intersected with bush lands, covered mainly with shrubs and small tree species as hazel (*Corylus avellana*), wild rose (*Rosa canina*), gelan (*Prunus avium*) and others; between 1200-1800 m, on the boreal level, the coniferous forests are dominating, mainly spruce (*Picea abies*) or mixed with other coniferous species; over 1800 m there is the sub-alpine level, with different specific bush and alpine vegetation covers, whereas the landscape is mainly mountainous with altitudes up to 2000 m. Topography is characterized by alternating big massifs and valleys and more or less steep slopes with elevation ranges from 500 m to 2000 m. In the regions of lower altitude (300-800 m) there is an abundance of agricultural

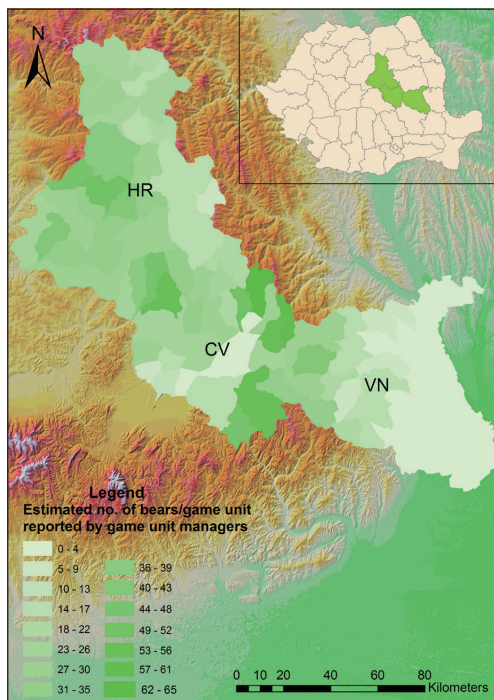


Fig. 1 - Map of the study area and evaluated brown bear population density in different management units (HR - Harghita county; CV - Covasna county; VN - Vrancea county).

fields in bear habitats or very near the bear habitats. The study area is sparsely populated by humans at elevations over 1000 m, but densely inhabited below this elevation. Isolated houses and mid-traffic roads are also dense at altitudes below 1000 m. On the study area there are 173 human settlements, occupying a total area of 3293 km<sup>2</sup>, 90% of them being situated below 1000 m altitude elevation.

### METHODS

The observations have been performed in the frame work of an ongoing large carnivore conservation project. During the field data collection, we directly surveyed the farmers which suffered different damages caused by bears, and also other livestock owners from the area. During the field data collection, we directly surveyed the implicated farmers and livestock owners. The location of every damage case has been registered and overlaid on the map of the area. Analyzing each case, the following aspects were observed:

- The period when the damage occurred, in the monitoring interval (June 2008 until October 2009).
- Distance of the damage site from human settlements or any urban area.

- Favourable habitat factors which can enhance the approaching of the bears to the damage site.
- Used protective methods (e.g. solid or electric fences, guarding dogs, no. of shepherds, etc.) – obstacles over the bear had to pass in order to enter into the farm or other damage site.
- When the damage occurred repeatedly within one week, a field crew tried to identify the damage causing bear with direct observations, in order to assess whether the same bear was always coming. Information was gathered also from eye witnesses. Descriptions matching for the same bear (i.e. size of the bear, specific colour variation like black or very light, white spotted, etc.) were considered evidence for the presence of the same individual.
- More incidents were reported in the same day/night in the area?
- Number of hours/days passed between the occurrences of next attacks in the same place.
- Damaged item: domestic animals species, beehives, agriculture field, etc.

We considered that any incident repeated within 8 days in the same spot, showing similarity in operation method and killed item, indicates the existence of a “specialized” individual with increased “preference” towards livestock killing. In such cases the application of a lethal or non lethal control method or, depending on the circumstance, looking for the right damage prevention method is recommended.

### RESULTS

In the study period, we recorded totally 198 livestock depredation cases. Fig. 2 shows the density of bear damages in the three counties and fig. 3 the locations of the observed cases. In every case when attacks were signalled in a range of maximum 15 km, with a repetition not passing 8 days, performed by the same individual, we considered that the bear shows significant specialized behaviour and preference for livestock killing.

Among the observed attacks we founded 11 cases (Tab. 1), when specialized behaviour could be claimed as follows:

- Case of Barcani: the median of day no. passed between the attacks was 5. As we can observe from the table, between 26 June and 19 September the bear returned nearly every day to the damage site, making totally 12 victims. He showed a clear preference for swine. He developed a special strategy to enter into the stables and used that strategy repeatedly.
- Case of Bodoc: the median of attack repetition was 6 days. The bear preferred only beehives, coming into the beekeeper's yards during 2 months.
- Oituz case: the median of attack repetition was 3 days. The bear showed preference for only small domestic animals like rabbits and domestic birds.



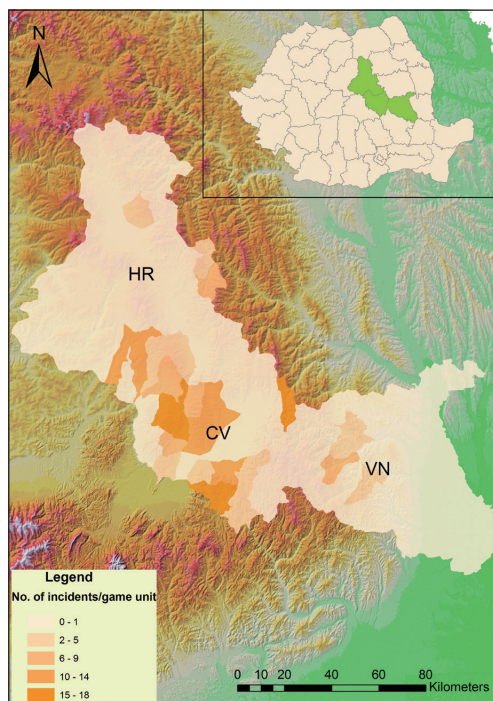


Fig. 2 - Densities of bear damages in Vrancea, Covasna and Harghita counties (HR - Harghita county; CV - Covasna county; VN - Vrancea county).

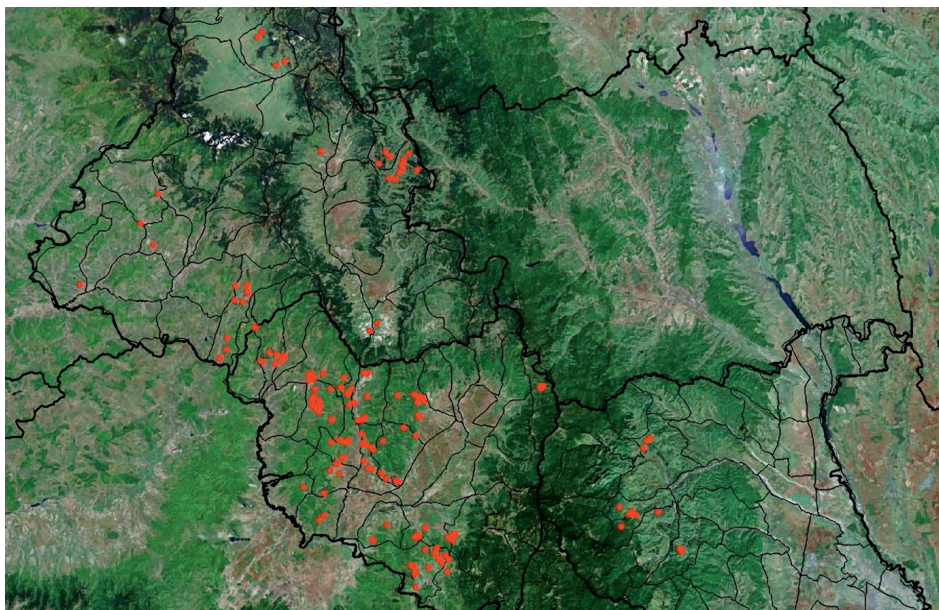


Fig. 3 - Locations of observed damage cases in Vrancea, Covasna and Harghita counties.

Table 1

## Specialized bear cases.

Specialized bear identification area	Date of first attack (month/day)	Period between attacks (days)												Date of last attack	No. of incidents (*)	Preyed species	Place of occurrence (*)	The median of days between attacks
Year 2008																		
Barcani	6/2	1	2	1	5	7	2	9	2	16	18	22	9/19	12	Swine	stable	5	
Bodoc	6/29	0	5	1	9	16	1	7					8/6	7	beehives	yard	5	
Oituz	9/9	7	5	11	11	1	8	7	18	11	1		11/29	11	Rabits and birds	yard	8	
Year 2009																		
Turia	6/30	3	11	1	2	1	8						8/25	7	swine	stable	3	
Podul Șchiopului	6/10	30	4	11	20								8/14	5	cattle	During grazing	16	
Aita Seacă	7/20	12	5	9	1	4							9/20	6	cattle	Night corral	5	
Zălan	8/7	6	4	18	23								9/28	5	cattle	During grazing	12	
Moacșa	9/14	3	1										9/18	3	Rabbits and birds	yard	2	
Valea Mare	10/23	4	2										10/29	3	Birds and sheep	yard	3	
Lunca de Sus	Six attacks at cattle night shelters															Cattle	Night corral	
Barcani - Zagon	6/21	5	1	3	2	11	1	4	2	7	1		9/27	11	Swine	Stable	3	

(\*) The conflicts registered in the discontinuous urban areas are marked with gray.

- Turia case: the median of attack repetition was 3 days. The bear preferred only swine.
- Podul Șchiopului, Zălan, Lunca de Sus and Aita Seacă cases: the bears attacked repeatedly the cattle during grazing. Attack repetition median: 4 days.
- Barcani-Zagon case: similar swine preference and attack repetition like in Barcani.
- Moacșa case: the bear preferred domestic birds and sheep. Attack repetition median: 3 days.

As we can observe the period of the attacks of these bears was between June-September. Field investigations revealed the following facts:

- Sometimes the bear came back several times in the same night.
- 77% of the attacks occurred in discontinuous urban areas according with Corine Land Cover map of Romania (Fig. 4).
- When incidents occurred in urban areas, the preferred prey items were small sized domestic animals (sheep, goats, birds, etc.).
- In every case, the bears had to pass over different obstacles: fences, stables and others, or had to avoid guarding dogs and people.



- In the majority of cases the farms or yards where the damages occurred were very close to forest areas or the environment facilitated the approach of the bear (e.g. shrub lands or bush vegetation around).
- Bears with approximated body weight over 100 kg showed preference for bigger prey items, whereas smaller individuals preferred smaller prey species like sheep, birds, beehives.
- The circumstance in all of these cases offered other predation opportunities as well like other domestic animals, or food sources around the farms/households, but the bears showed clear preference for a certain type of prey. In one of the cases (Barcani) the bear was killing only sows, even if on its way encountered male pigs and piglets.

Field observations made us to believe that the bear implicated in the Barcani (2008) and Zagon (2009) cases was the same individual. Preferred prey items, operation “style” and description of the bear by eye witnesses was similar. After the damage occurrence in 2009 that particular area, hunters from the area shared that they shot a bear near this damage spot and they assumed to be the trouble maker. Fact is that the bear damages decreased considerably after that in the surrounding areas.

Among the 198 observed incidents, 70 matched the described behaviour patterns and have been considered to be done by bears specialized to obtain food in human created artificial areas. These incidents represent 27% of the studied cases. Their typology showed a big number of similarities and offered sufficient information for identifying behaviour patterns describing a “specialized individuals”. 54 of these 70 cases (77%) occurred in discontinuous urban areas. In all other incidents, when the bears didn’t show a clear predation pattern (128 cases), we can’t affirm that each case can be attributed to a different individual. There is an unquantifiable probability that some damages from different areas have been done by the same

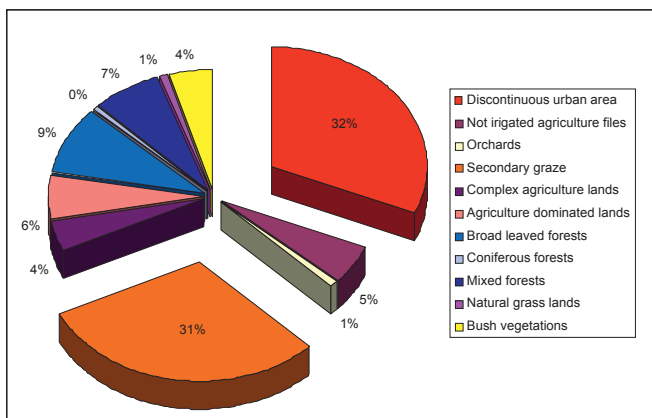


Fig. 4 - Habitat type around the damage occurrence area.

individual, considering the seasonal and daily movement patterns of the bears in the area. Though in the majority of cases the troubles done by “specialized” individuals occurred on areas between 1-10 km<sup>2</sup> (Oituz, Bodoc, Valea Mare), in Barcani-Zagon case, the area surface is over 100 km<sup>2</sup>. We hypothesize that livestock herding techniques and the surrounding environment are main factors leading to the possible formation of “specialized” individuals. In many analyzed cases the cattle herd was kept free during the night without any guarding. The graze lands are near forest areas and the vegetation offers good cover to an approaching predator. In many cases when the bear entered into a settlement, in people’s yards, we founded garbage thrown around, with food remnants and sometimes even animal carcasses. It is unlikely that in such circumstances a brown bear will avoid to come closer to a potential abundant food source. The existing easy catchable prey in the area is a chance which probably would be interesting to any bear. In systems where domestic animals are constantly herded, kept in opened fields, or confined at night inside a corral, predation on livestock requires learning and development of specialized behaviour by the predator (Linnell et al., 1999). To successfully kill livestock, the predator has to either pass by the shepherd and his dogs, enter open habitat, or cross physical barriers. Individuals must learn how to access this food source.

We founded also a relation between the approximate size of the bear and the size of the prey species specialized on. As table 2 shows, individuals with body weight approximated below 100 kg showed a preference towards small sized domestic animals such as birds, sheep, beehives, etc. whereas bigger bears preferred bigger prey like pigs and cattle. Body weight has been approximated with observations performed by experienced persons (hunters, foresters or members of our field crew). It is obvious that the body size of the predator influences not only his predation capability, but also its ability to carry away the prey. In an environment where guarding dogs, people, and other disturbing factors are present, a captured prey brings much bigger benefit to the predator if it is able to carry it away and consume it in a quiet place. Sometimes the big body size gives the power to defend himself during the consumption of the prey in the same place. We speculate that this logical aspect could enhance somehow the specialization of some individuals to certain prey species.

Body size/weight is documented to influence the way how different individuals develop their attacking and hunting strategy (Rosenvig, 1966; Gittleman, 1985; Vezina, 1985; Stirling & Derocher, 1989). In our case, the observations showed that bigger individuals took advantage on their power in order to obtain bigger quantity of food even if it was necessary to destroy a wood beam constructed stable, or to attack a herd which was guarded by many dogs. Observations showed that bigger individuals attack fast after sunset, showing less prudence whereas smaller ones were waiting after middle of the night, when the disturbing factors (people’s activity) decreased. Big bears consumed part of the prey directly at the killing site, coming back next day to the carcass, whereas smaller individuals tried to transport

Table 2

Approximate body weight of the specialized bears and preferred prey species.

Specialized bear	Approximated weight of the bear (kg)	Preferred domestic prey species
Barcani	150-200	Swine
Bodoc	50-100	Beehives
Oituz	50-100	Rabbits and domestic birds
Turia	100-150	Swine
Podul Șchiopului	Over 250	Cattle
Aita Seacă	150-200	Cattle
Zălan	200-250	Cattle
Moacșa	Below 50	Rabbits and domestic birds
Valea Mare	50-100	Sheep and domestic birds
Lunca de Sus	Over 250	Cattle
Zagon	150-200	Swine

their capture away in bush or forest covered areas. We presume that the energetic efficiency strategy plays an essential role in the development of specialized behaviour in some individuals, which will profit on their learning skills and power in order to get better quality and quantity of food. This theory is somehow sustained also by the fact that most of attacks occurred in late summer or fall, in the period when bears need big amounts of food/energy.

### DISCUSSIONS

Surveying the people which suffered damages, we observed that the problem was considered much bigger when occurred repeatedly. The problem was fast forgotten when occurred accidentally (more than 500 damage cases caused by large carnivores are reported each year), but people highly condemned the carnivores when the predation occurred within several days, and when livestock depredation or damage occurred within a range of 15 km. It seems that the biggest problem consists not in that bear accidentally take the opportunity to feed on livestock items, but when certain habituation signs show up. Presuming that each predation case was done by different individuals, we can assume that on the study area a number of 198 potentially “specialized” bears exists, which would represent 8% of the existing 2300 individuals reported by the wildlife management units. Practically, these are bears which took advantage of opportunistic moments to feed on easily obtainable food sources around livestock, circumstances which existed within their home-ranges. The fact that 35% of these damages have been done by only 11 bears, it is obvious that our presumption is false. According to the observations, only these individuals manifested a “special” behaviour pattern, risking repeatedly their lives approaching systematically to food sources around humans. Since any predator takes advantage of favourable factors as habitat, lack of protection measures, human negligence, etc., in order to obtain better quality food, it is unlikely that all the other cases were habituated “specialized” individuals. Thus, having a brown bear

population estimated at 2300 individuals in the study area, the proportion of the “specialized” individuals is 0.4%. Specialization in these individuals is oriented towards predation on livestock. In the 11 described cases, the bears demonstrated a high adapting capacity to an environment with high human activity. They identified and used narrow moving corridors between people’s yards. They showed a high learning capacity, in many cases finding the best entrance into the stables or protecting fences.

### *Conclusions*

According to our study, there is a reason to believe that individuals within a bear population can show different behavioural trails. When in a certain area within a range of 15 km damages are reported with a smaller frequency than 8 days, there is enough reason to assume the presence of a “specialized” individual. We assume that exhibiting such individual specialized behaviour is in most of the cases associated with higher degree of intelligence. These identified behaviour typologies could be used in the future for signalling in utile time the existence of a specialized bear, in order to apply the right prevention methods or removing the individual out of the population. We hypothesize that most individuals within a bear population will at least occasionally kill accessible livestock they encounter in their home-range. If true, this implies that problem individual control will need to remove preferably those individuals which show a high degree of human acceptance, and the following observable indices like:

- Predation in a place where passing through human created obstacles is required.
- It was necessary to develop a special strategy for passing over protective items.
- Selective preference for prey items.
- The frequency of new predations: repetition within 8 days.

We consider that damage control and prevention problematic must be oriented especially towards limiting occasional incidents, enhanced by the lack of proper protection methods, and not towards the bear population of which only a very small percent represents an imminent danger for farmers and livestock owners. Because changing the behaviour of bears is not a directly controllable process, the management objectives should regard first of all the elimination of those factors which enhance the occurrence of damage cases. Husbandry techniques and environmental factors which enhance the development of problem individuals should be seriously regarded by wildlife managers. Improving of livestock pasturing methods and equipments are highly required especially when farmers move with their livestock close to carnivore’s habitats.

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PAGUBE PROVOCATE DE URSUL BRUN *URSUS ARCTOS* LINNAEUS, 1758  
(MAMMALIA: CARNIVORA) – ANALIZA UNOR TIPARE COMPORTAMENTALE  
ALE INDIVIZILOR SPECIALIZAȚI

REZUMAT

În România, sunt peste 500 de cazuri de pagube provocate de carnivore mari semnalate anual, aceasta fiind principala cauză pentru care se acordă derogări de la statutul de specii protejate, în vederea recoltării unor exemplare. Acest studiu este rezultatul unor observații detaliate a 198 de cazuri în care urșii au produs pagube în anii 2008 și 2009 în zona sud-estică a Carpaților Orientali în România. Scopul studiilor a fost de a identifica dacă există un model comportamental individual în cazul urșilor care produc pagube. Am căutat identificarea indivizilor care au prezentat o oarecare „personalitate” în special prin omorârea repetată a animalelor domestice, fenomen deseori asociat de către fermieri cu existența unui individ „problemă”. În 27% din cazurile observate, exemplarele de urs care au produs pagube au arătat o specializare clară la diferite tipuri de atacuri, prezentând un grad ridicat de toleranță față de oameni, selectivitate pentru anumite tipuri de pradă, întorcându-se la locația pagubei în mai puțin de 8 zile. Acest comportament nu este unul anormal în cazul speciilor de urs, datorită capacității lor înalte de învățare și plasticității ecologice ridicate, dar din punct de vedere al managementului și conservării speciei prezența unor asemenea indivizi devine o „problemă”. Astfel definiția „modelului de comportament” care duce la identificarea „indvizilor problemă” orientați către producerea pagubelor, poate fi util din punct de vedere a gospodăririi corecte a acestei specii și în vederea aplicării unor măsuri corecte de control.

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## DISTRIBUTION OF SHREWS FROM GENUS *SOREX* LINNAEUS, 1758 (MAMMALIA: INSECTIVORA) ON THE TERRITORY OF REPUBLIC OF MOLDOVA

VICTORIA NISTREANU

**Abstract.** The studies were accomplished between 2003-2007 in various natural and anthropogenic ecosystem types from different zones of R. Moldova. At the whole 127 Common shrews (*Sorex araneus*) and 98 Lesser shrews (*S. minutus*) were collected. Statistical, body and cranial morphological parameters were studied. *S. araneus* is common and the most spread species and more tolerant to the environment conditions and to anthropogenic activity by comparing to other shrew species. It was recorded in the majority of studied natural and anthropogenic biotopes (frequency = 94%). The lesser shrew is also rather spread all over the republic territory (frequency = 88%), but it is less numerous (abundance = 33% among shrews).

**Résumé.** Les études ont été réalisées entre 2003-2007, dans différents types d'écosystèmes naturels et anthropiques de différentes zones de R. Moldova. Les animaux ont été capturés par des pièges à ressort. Ont été prélevés 127 individus de musaraigne carrelet (*Sorex araneus*) et 98 de musaraigne pygmée (*S. minutus*). Les paramètres corporels et crâniens morphologiques ont été étudiés et processés statistiquement. *S. araneus* est une espèce commune et la plus répandue chez les musaraignes, elle est plus tolérante à l'environnement et envers les conditions de l'activité anthropique en comparaison aux autres espèces de musaraignes. Il a été enregistré dans la majorité des biotopes naturels et anthropiques étudiés (fréquence = 94%). Le musaraigne pygmée est également assez répandue dans le territoire de la République (fréquence = 88%), mais elle est moins nombreuse (abondance = 33% chez les musaraignes).

**Key words:** common shrew, lesser shrew, distribution, ecology.

### INTRODUCTION

The insectivores are a wide spread group of mammals and are of great importance in nature and in human economy. They are a very important link within the animal trophic chain: they use for food different invertebrates, reptiles and small rodents, at their turn they serve as trophic source for many bird and mammalian predators.

In the past century, in Republic of Moldova, this group was rather poorly studied in comparison with other mammals. Until present we don't know exactly the distribution of shrew species over the republic territory. Data regarding the shrews can be found in the monograph "Animal world of Moldova" in "Mammals" volume (Lozan, 1979) and in some other papers, where shrew species are mentioned (Averin, 1975; Averin et al., 1984; Munteanu & Savin, 1992). The most serious paper concerning the insectivore species in Moldova was published by Lozan

(1975), where data on distribution, ecology, morphology, paleontology of shrews can be found. More fundamental and extended studies of this group of mammals started after 2000. In several papers shrew species are mentioned as components of small mammal communities in natural reserves, agricultural ecosystems and urban ecosystems (Munteanu, 2005, 2007; Tikhonov, Kotenkova et al., 2009; Tikhonov, Munteanu et al., 2009; Tikhonova et al., 2009). In the last years, shrew species were studied more detailed from zoogeographical, ecological, morphological point of view (Nistoreanu, 2007, 2008; Nistoreanu et al., 2008, 2009). The paper contains some data concerning the distribution and ecology of two shrew species of genus *Sorex* on the territory of Moldova.

#### MATERIALS AND METHODS

The studies were accomplished in 2003-2007 in various ecosystems from different zones of Republic of Moldova. In the northern region of Moldova the studies were accomplished in Soroca, Râșcani, Briceni, Glodeni, Edineț, Rezina, Drochia, Fălești, Ocnîța districts, in the centre of the republic – in Orhei, Strășeni, Călărași, Ungheni, Nisporeni, Anenii-Noi, Criuleni districts and Chișinău city with suburbs; in the southern region in Ștefan-Vodă, Căușani, Cahul, Cantemir. The studies were performed on the territory of „Codri”, „Plaiul Fagului”, „Pădurea Domnească” and „Prutul de Jos” forest reserves, in various types of woods, meadows, pasture ecosystems, as well as in anthropogenic ecosystems. The shrew species were collected with snap-traps. The data were statistically processed using the indexes of abundance (dominance, D) and frequency (F).

#### RESULTS AND DISCUSSIONS

At the whole 127 Common shrews (*Sorex araneus* Linnaeus, 1758) and 98 Lesser shrews (*S. minutus* Linnaeus, 1766) were collected. The common and the pigmy shrews were recorded in all studied districts, in the most of the ecosystems (Fig. 1).

*Sorex araneus* is common and the most spread species among shrews (D = 43%). It is more tolerant to the environment conditions and to anthropogenic activity by comparing to other shrew species. It was recorded in the majority of studied natural and anthropogenic biotopes (F = 94%). In the southern zone of Moldova the species was registered in natural reserves “Codrii Tigheci”, “Prutul de Jos” (Beleu Lake), on the coast of Manta Lake and in agroecosystems near the lake, in swampy sectors, in humid ditches with hygrophilous vegetation, in woods, at forest edges and in forest shelter belts, in reed vegetation from the districts Cahul, Cantemir, Ștefan Vodă, Căușani. In the center of the republic the species is wide spread in “Codri” and “Plaiul Fagului” reserves in various types of biotopes. The common shrew was also recorded in different natural and anthropogenic ecosystems of districts Strășeni, Orhei, Ungheni, Nisporeni, Hâncești, Criuleni, Anenii-Noi. In Chișinău district

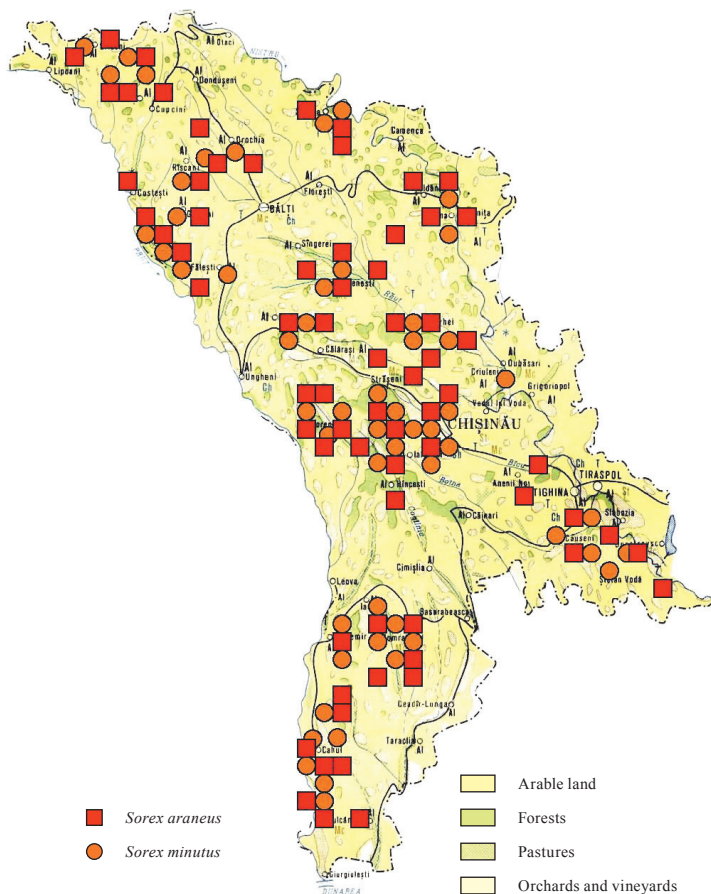


Fig. 1 - Distribution of *Sorex* shrew species on the territory of Moldova.

the species was recorded on river and lake banks, in woods, in humid ditches with hygrophilous vegetation of localities Ialoveni, Durlești, Dănceni, Sociteni, Horăști, as well as within city limit near water basins. In the northern zone *S. araneus* is widespread on the territory of “Pădurea Domnească” reserve, in majority of studied ecosystems. It was also registered in woods, forest edges, acacia stands, insular forests, near aquatic basins (ponds, lakes, fish farms, rivers) of districts Râșcani, Glodeni, Briceni, Rezina, Drochia, Fălești, Ocnița, Soroca, as well as in various types of agroecosystems (Fig. 1).

Previously, the Common shrew was recorded in “Codri” forest reserve (Averin et al., 1984; Lozan, 1979), in “Plaiul Fagului” (Munteanu, 2005), „Pădurea Domnească” (Munteanu, 2007) forest reserves, in forest shelter belts (Munteanu & Savin, 1992), mostly in those with high humidity conditions situated near the forest stands. After the study of shrew collection from the Museum of Terrestrial Vertebrates laboratory of the Institute of Zoology of ASM (Nisteanu, 2007) we

also established that the Common shrew was widely spread on the whole territory of “Codri” forest reserve. The distribution of this species in Nistru and Prut meadow, in the insular woods from the northern part of the republic, in lower Nistru and Prut was recorded in the previous years by other researchers (Lozan, 1979).

The Pigmy shrew (*S. minutus*) is also rather spread all over the republic territory with a frequency of 88%, but it is less abundant ( $D = 33\%$ ). It prefers the same habitats as the Common shrew and in biotopes that satisfy the ecological needs of the species, it can be even more abundant than the common one. Thus, the Lesser shrew was recorded in all the studied districts and in the majority of studied ecosystems. In the southern zone of Moldova the species were registered in natural reserves “Codrii Tigheci”, “Prutul de Jos” (Beleu Lake), on the coast of Manta Lake and in agroecosystems near the lake. The species was observed in swampy sectors, in humid ditches with hygrophilous vegetation, in woods, at forest edges, in reed vegetation from the districts Cahul, Cantemir, Ștefan Vodă, Căușani. In the center and northern part of Moldova the species is widespread in “Codri”, “Plaiul Fagului” and “Padurea Domnească” reserves in various types of biotopes. In woods the preferred habitats are the humid abrupt valleys, swampy sectors, humid ditches with hygrophilous vegetation, forest edges; it avoids forest shelter belts and acacia plantations. Unlike the Common shrew the lesser one avoids the recreational sectors of the forests.

Near aquatic basins and on their banks the Lesser shrew is often more abundant than the common one. It can be rather often met in agroecosystems, but only in those situated near some water source. In Chișinău city the species was found even in people’s gardens situated near Bic River. Within city limits and its suburbs the lesser shrew was found on the banks of lakes and rivers, in woods with recreational sectors, in forest edges, in humid gullies with hygrophilous vegetation of the localities Ialoveni, Durlești, Dănceni, Sociteni, Horăști, as well as within the city limits near aquatic basins (Sculeni Lakes, Bic River). In the northern zone of the republic the species was recorded in woods, forest edges, forest belts, meadow forests, near and on the banks of various water basins (ponds, lakes, fish farms, rivers) of Drochia, Ocnița, Soroca, Briceni, Rezina, Fălești districts, as well as in different types of agroecosystems, such as orchards, cultivated lands and even near Soroca canning factory.

In other researchers’ studies the Pigmy shrew was recorded in “Codri” (Averin et al., 1984; Lozan, 1979), “Plaiul Fagului” (Munteanu, 2005), „Pădurea Domnească” (Munteanu, 2007) forest reserves, in the insular woods from the northern part of the republic, in meadow forests of the rivers, in wet zones of lower Nistru and Prut (Lozan, 1979).

Among other shrew species (genera *Sorex* and *Crocidura*) the common shrew is dominant in the studied biotopes and constitutes almost 45% from all the registered shrews (Fig. 2). The Pigmy shrew, although recorded in many studied biotopes, had a lower abundance, less than 15%.

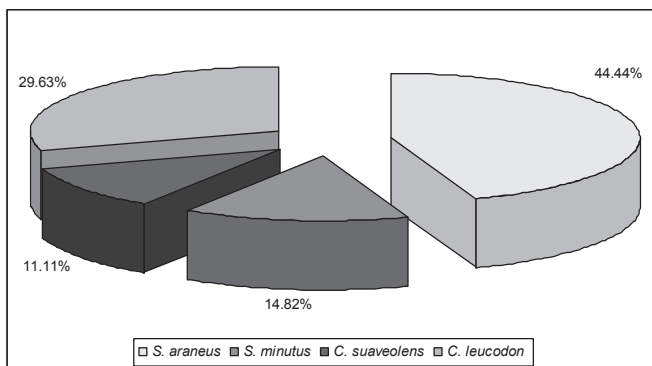


Fig. 2 - Abundance of shrew species registered in the study period.

On the whole, all the shrew species are hygrophilous and can be met mostly near some aquatic basins or in humid sectors. Furthermore, the shrews prefer the natural ecosystems, less affected by human activity. Thus, the maximum species number and the widest spreading of the individuals were recorded in “Codri” forest reserve, in humid sectors of the wood, in the abundant water vegetation of aquatic basins, where the human access and activity are limited. In this regard the shrews can serve as biologic indicators of natural ecosystems.

### Conclusions

The Common and Lesser shrews are widespread insectivore species on the territory of Republic of Moldova. Both shrew species have high abundance in natural forest reserves, therefore the natural reserves are important territories in fauna conservation. The lands affected by anthropic activity are avoided by the shrew species.

### ACKNOWLEDGEMENTS

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### RĂSPÂNDIREA CHIȚCANILOR GENULUI *SOEX* LINNAEUS, 1758 (MAMMALIA: INSECTIVORA) PE TERITORIUL REPUBLICII MOLDOVA

### REZUMAT

Cercetările au fost efectuate între anii 2003-2007 în diverse tipuri de ecosisteme din diverse zone, pe o mare parte a teritoriului Moldovei. Au fost înregistrați: 127 chițcani comuni (*Sorex araneus*), 98 chițcani mici (*S. minutus*). *S. araneus* este o specie comună și cea mai răspândită dintre soricide. Este mai tolerantă față de condițiile mediului și față de activitatea antropogenă în comparație

cu alte specii de chițcani. A fost semnalată în majoritatea tipurilor de biotopuri studiate, atât în cele naturale, cât și în cele antropogene. *S. minutus* este tot atât de răspândită ca și specia precedentă, însă este mult mai puțin numeroasă. Preferă aceleași habitate ca și chițcanul comun, iar în biotopurile care satisfac necesitățile ecologice ale chițcanului mic poate fi mai abundent decât cel comun.

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# LETTER TO THE EDITOR

## NOTICE OF PLAGIARISM

On the 1<sup>st</sup> of December 2011, at our editorial office, we have received a letter which informed us that the paper "The importance of forest islands for invertebrate biodiversity: a case study in Western Poland" (Authors: Traian Manole, Józef Banaszak, Halina Ratyńska, Irina Ionescu Mălăncuș, Eugenia Petrescu, Gabriela Mărgărit), published in volume 54 issue 1 (Pp. 263-281) of the journal *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"* is an identical copy of another paper entitled "Preliminary investigations on biocenoses of forest islands in an agricultural landscape" (Authors: Józef Banaszak, Tomasz Cierznia, Sławomir Kaczmarek, Leon Kozacki, Traian Manole, Barbara Piłacińska, Halina Ratyńska, Wojciech Szwed, Henryk Wiśniewski), published in 1996, in volume 12 (Pp. 45-74) of the journal *Zeszyty Naukowe Wyższej Szkoły Pedagogicznej w Bydgoszczy, Studia Przyrodnicze*.

We have compared the two papers and we remarked that they are almost identical indeed, clearly being a plagiarism (partially could be considered even a self-plagiarism). The responsibility of this unacceptable fact entirely belongs to the first author (Traian Manole).

Editorial staff of *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"* strongly condemns this unethical behaviour and apologizes to all the other authors of the original variant of the paper, published in 1996, for this unpleasant situation.

We will report this case of plagiarism also in the on-line edition of the journal.

Further on, we present a copy of the letter received by our editorial office of the journal and mentioned above.



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1<sup>st</sup> December, 2011

**Dr. Dumitru MURARIU**  
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**I need to inform you that Mr Traian Manole is responsible for plagiarism.** The article published in 2011 in *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"*, vol. LIV (1): 263-281, entitled "The importance of forest islands for invertebrate biodiversity: a case study in western Poland" (by Traian Manole, Józef Banaszak, Halina Ratyńska, Irina Ionescu-Mălăncuș, Eugenia Petrescu, Gabriela Mărgărit) is nearly identical to an article published in 1996 in Poland, in *Zeszyty Naukowe Wyższej Szkoły Pedagogicznej w Bydgoszczy, Studia Przyrodnicze*, vol. 12: 45-74, entitled "Preliminary investigations on biocenoses of forest islands in an agricultural landscape" (by Józef Banaszak, Tomasz Cierznia, Sławomir Kaczmarek, Leon Kozacki, Traian Manole, Barbara Piłacińska, Halina Ratyńska, Wojciech Szwed, Henryk Wiśniewski). **I emphasize that he did it without informing me and the other authors about it.**

Please see the attached original article of 1996. He copied the text, omitted some authors (graciously leaving me and Prof. Ratyńska only), next made himself the first author, and added to the list of authors, without any clear reason, three people whom I do not even know. His behaviour is unethical and needs to be condemned and punished.

On behalf of all the other authors of the original article of 1996, I must ask you to publish this letter or place a suitable disclaimer in your journal.

If we do not receive any answer and no action is taken by editors of *Travaux du Muséum National d'Histoire Naturelle*, we will have to take action ourselves.

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