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

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Penestoglossa dardoinella (Millière, 1863) (Lepidoptera: Psychidae) recorded for the first time in Albania

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Abstract. In August, 2016 authors spent four nights light collecting in Albania. In this paper we present one new genus and species for Albania - *Penestoglossa dardoinella* (Millière, 1863).

Key words: *Penestoglossa dardoinella*, Psychidae, Albania.

Introduction

In August, 2016 authors spent four nights of light collecting in Albania. One night we collected in Vukopoles River Gorge and collected many interesting species which follow to be published in separate article. In this paper we present one new genus and species for Albania - *Penestoglossa dardoinella* (Millière, 1863). Nahirnić & Beshkov (2016) gave an overview of faunistic data of *P. dardoinella* on the Balkan Peninsula where it is very locally distributed in Croatia, Greece and Bulgaria. Additional records are given in Weidlich (2016) for Ionian Islands of Kefalonia and Ithaka. Weidlich (2013) has been studied Psychidae fauna in Albania from 2006 to 2013 and together with revised literature data listed 21 species for Albania.

Materials and Methods

For light collecting were used two portable traps, each with one 8 watt actinic (368 nm) and another 8 watt "Blacklight" tube, powered by 12 volt batteries, as well as a Finnish "tent trap" with a 160 watt MV bulb at the top of the pole and a 20 watt (368 nm) black light lamp over the catching pot below, powered by 220V generator. An additional 20 watt (368 nm) lamp, powered by the same generator was also positioned about 70 meters from the tent trap. All traps ran all over the night.

Collecting data:

Albania, Berat Region, Poliçan municipality, Vukopoles river gorge, near its confluence to Osumi river, between Vale village and Ibrollara village, N40°33'36"; E020°05'38", 217 m, 10.08.2016, 5 males and 1 female (Fig. 1), leg. S. Beshkov & A. Nahirnić. High maquis in river valley (Fig. 2) with *Arbutus unedo* L., *Cercis siliquastrum* L, *Cystus* sp., *Erica arborea* L., *Ficus carica* L., *Phillyrea latifolia* L., *Pistacia lentiscus* L., *Platanus orientalis* L., *Quercus coccifera* L., *Quercus ilex* L. etc.

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Results and Discussion

P. dardoinella is not reported for Albania so far. This record is in the middle of the big gap between known localities in southern Croatia and Ionian Islands. Our locality is situated (about 55 km from the coast as the crow flies straight line of inland). Another "mainly coastal" species observed there, also following Mediterranean coast and usually not going deep inland, was *Charaxes jasius* (Linnaeus, 1767). It is known that species inhabiting coastal areas can intrude more inland along the rivers such is Osumi River in our case. As habitats where *P. dardoinella* was found are widely distributed and preserved at the Adriatic and Ionian coast of the Balkan Peninsula, it can be supposed that it should not be so local in this region. We stress that further investigations on its presence there are needed.

Fig. 1. *Penestoglossa dardoinella* (Millière, 1863), female, Vukopoles River Gorge, 10.08.2016, leg. S. Beshkov & A. Nahirnić.

Some syntopic and synchronic species collected or observed there are: *Charaxes jasius* (Linnaeus, 1767), *Acherontia atropos* (Linnaeus, 1758), *Isturgia arenacearia* ([Denis & Schiffermüller], 1775), *Nychiodes dalmatina* Wagner, 1909, *Zebeeba falsalis* (Herrich-Schäffer, 1839), *Rhypagla lacernaria* (Hübner, 1813), *Catocala coniuncta* (Esper, 1787), *Eutelia adoratrix* (Staudinger, 1892), *Xanthodes albago* (Fabricius, 1794), *Phyllophylla obliterata* (Rambur, 1833), *Aedia leucomelas* (Linnaeus, 1758), *Aegle semicana* (Esper, 1798), *Cryphia ochsi* (Boursin, 1940), *Proxenus hospes* (Freyer, [1831]), *Sesamia cretica* Lederer, 1857. Some other syntopic species, but collected at different time there are: *Triodia adriaticus* (Osthelder, 1931), *Lemonia strigata* Rougeot et Viette, 1978, *Daphinis nerii* (Linnaeus, 1758), *Campaea honoraria* ([Denis & Schiffermüller], 1775), *Rhoptria asperaria* (Hübner, 1817), *Pachycnemia hippocastanaria* (Hübner, [1799]), *Gnophos sartata* (Treitschke, 1827), *Trigonophora flammea* (Esper, [1785]), *Aporophyla australis* (Boisduval, 1829), *Polymixis serpentina* (Treitschke, 1825), *Mniotype solieri* (Boisduval, 1840), *Noctua tirrenica* Biebinger, Speidel & Hanigk, 1983, *Xestia cohaesa* (Herrich-Schäffer, [1849]).

Fig. 2. Collecting site in Vukopoles River Gorge.

References

Nahirnić, A. & Beshkov, S. (2016) New records of *Penestoglossa dardoinella* (Millière, 1863) and Eochorica balcanica (Rebel, 1919) (Lepidoptera: Psychidae) on the Balkan Peninsula. *Natura Croatica*, 25(2): 305-313.

Weidlich, M. (2013) Zur Psychidenfauna Albaniens unter Berücksichtigung der Albanien-Expedition 1961 des Deutschen Entomologischen Institutes (Lepidoptera: Psychidae). *Beiträge zur Entomologie*, 63(2): 325-338.

Weidlich, M. (2016) Zur Schmetterlingsfauna der Ionischen Inseln Griechenlands mit der Beschreibung neuer Psychiden-Taxa sowie ein Beitrag zu ihrer Köcherfliegenfauna (Lepidoptera, Trichoptera). *Beiträge zur Entomologie*, 66(2): 265-320.

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New data and notes on the distribution of *Lioderina linearis* (Hampe, 1870) (Cerambycidae: Callidiini) in Bulgaria

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Abstract. New records of *Lioderina linearis* (Hampe, 1870) in Bulgaria are presented. The species was collected with light traps in five localities from Black Sea Coast, Rila Mts. and Sredna Gora Mts. Available data on the distribution and host plants of the species in the country are summarized. The species is common in coastal region of Bulgaria and seems not to be rare in lower mountain areas inside the country. The species is attracted to light and can be detected successfully with light traps. Known host plants of *L. linearis* in Bulgaria are species from the genera *Amygdalus* (Mill.), *Juglans* L. and *Pyrus* L.

Key words: Cerambycidae, *Lioderina linearis*, Bulgaria.

Introduction

Lioderina linearis (Hampe, 1870) (Cerambycidae: Callidiini) is distributed in Central, South-Eastern Europe and Asia Minor (after Danilevsky 2017). The species is an obligate saproxylic species. Larvae develop in dead terminal twigs of a number of deciduous and coniferous trees (Sabol 2000, Nardi *et al.* 2010). As host plants of *L. linearis* species of the genera *Amygdalus* (Mill.), *Prunus* L., *Juglans* L., *Pyrus* L., *Abies* Mill. and *Pinus* L. (Sabol 2000) have been reported so far. The species is listed as Data Deficient (DD) in IUCN Red List, its common habitats (traditionally managed orchards) are in decline throughout its distributional range and the current population trend is decrease in numbers (Nardi *et al.* 2010).

In Bulgaria *L. linearis* has been regarded as rare species (Ganev 1984, Georgiev & Hubenov 2006, Migliaccio *et al.* 2007). In the present work new data on the distribution of the species in the country are reported. The available data on the species distribution and host plants in Bulgaria are also summarized.

Materials and Methods

The new data are obtained from regular collection trips for entomological material, carried out by the second author in 2011-2012 in different regions of Bulgaria, as well as a single collection, conducted in the vicinity of Varna (Black Sea Coast) in 2002. All specimens were collected with light traps (combined white and black or white light only). The processing of the material and the identification of *L. linearis* were performed by the first author. The specimens are deposited in the Zoological Collection of Sofia University "St. Kliment Ohridski", Faculty of Biology (BFUS).

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Results

Seven specimens of *L. linearis* - 3 ♂♂ and 4 ♀♀, were collected in five different localities, situated along the Black Sea Coast and at the inland territory of the country (Fig. 1, Fig. 2).

Material examined: Black Sea Coast, Varna, University Botanic garden, 43°14'06.6''N, 28°00'05.94''E, 55 m a.s.l., 07-16.VII.2002, 2 ♂♂, 1 ♀, at light, D. Gradinarov & Y. Petrova leg.; Black Sea Coast, 2,5 km NE Kranevo Vill., Baltata Reserve, 43°21'55.6''N, 28°03'46.20''E, 12 m a.s.l., 22.VII.2011, 1 ♀, at light, O. Sivilov & B. Zlatkov leg.; Black Sea Coast, 1 km SE Kranevo Vill., 43°20'03''N, 28°03'38''E, 150 m a.s.l., 23.VII.2011, 1 ♀, at light, O. Sivilov & B. Zlatkov leg.; Pirin Mts., 1,3 km NE Sugarevo Vill., 41°34'18.32''N, 23°26'11.36''E, 880 m a.s.l., 21.VII.2012, 1 ♀, at light, O. Sivilov & B. Zlatkov leg.; Sredna Gora Mts., 5 km NE Strelcha, 42°33'15''N, 24°20'04''E, 790 m a.s.l., 29.VII.2012, 1 ♂, at light, O. Sivilov & B. Zlatkov leg.

Discussion

Migliaccio *et al.* (2007) listed only two localities for the country's territory – Blagoevgrad (SW Bulgaria, Ganev 1984 cit.) and Ivailovgrad (S Bulgaria). Previously, Sabol (2000) report the species from several distant localities along the Black Sea Coast - Tsarevo (ex Mičurin), Sozopol, Slanchev Bryag and Varna. Distribution of *L. linearis* in Bulgaria, including available literature and the new data is presented in Fig. 2. The species appears to be common along the Black Sea coast and seems not to be rare in lower inland mountain areas, where it was found in several mountains. In the present work the species is newly recorded for Pirin and Sredna Gora Mts. All of our new localities are the first ones with exact coordinates for this species in Bulgaria.

Common method for the species establishment is rearing from larvae, collected together with the inhabited host plant twigs. Such an approach was used in almost all of the earlier reports of *L. linearis* from Bulgaria (Sabol 2000, Migliaccio *et al.* 2007). Mentioned authors report several host plants of the species in the country - *Amygdalus* sp., *Juglans* sp. and *Pyrus* sp. (Sabol 2000) and *Amygladus communis* L. (Migliaccio *et al.* 2007). Our data indicate that adults, both male and female of *L. linearis*, are attracted to light. We consider that light traps are an appropriate method to study the distribution of the species, although it cannot be used directly for the establishment of the host plants.

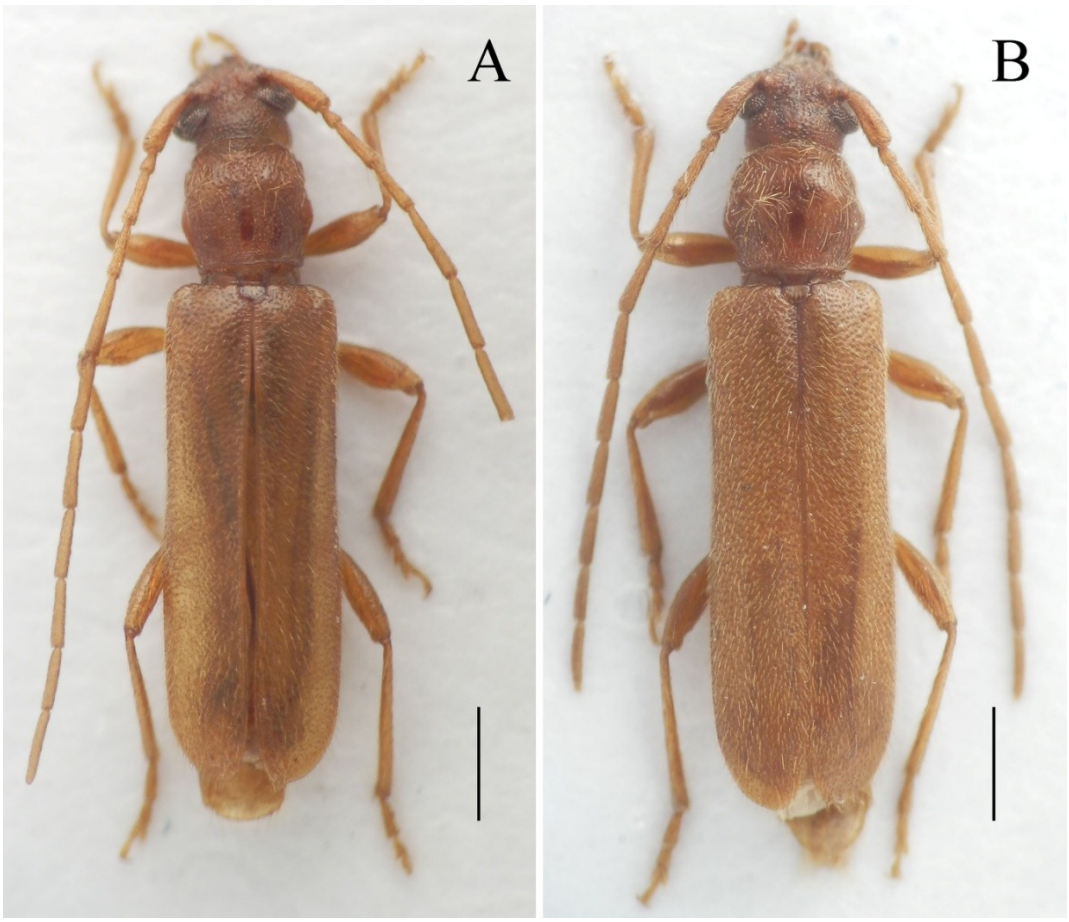

Fig. 1. *Lioderina linearis* (Hampe, 1870). A: Male, Sredna Gora Mts., NE Strelcha, 29.VII.2012; B: Female, Pirin Mts., NE Sugarevo Vill., 21.VII.2012. Scale bars: 1 mm.

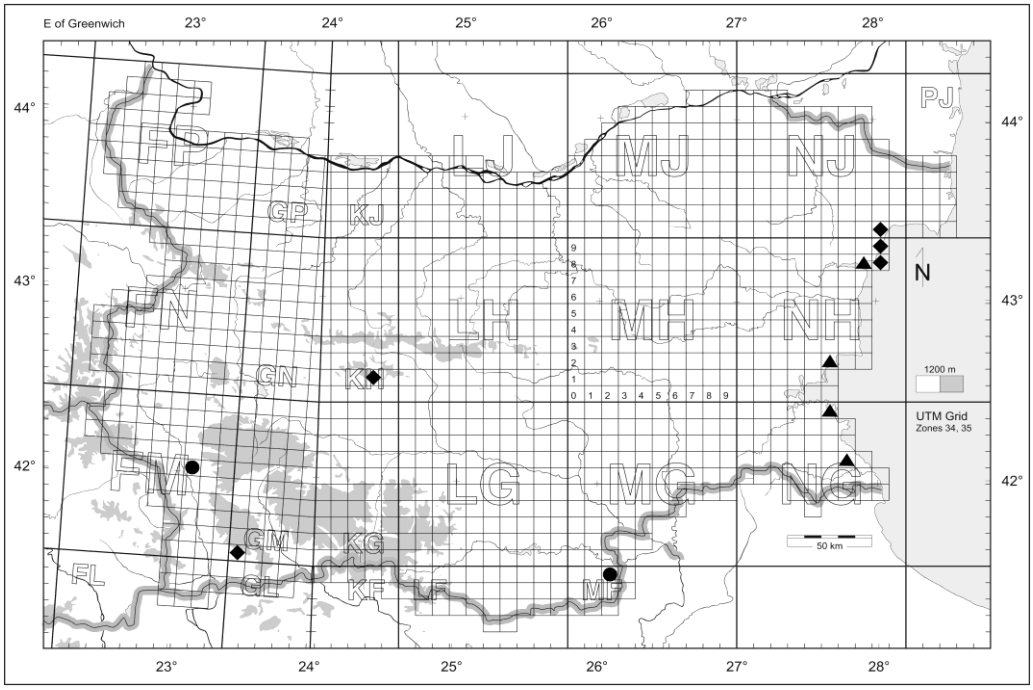

Fig. 2. Localities of Lioderina linearis (Hampe, 1870) in Bulgaria. Legend: ▲ after Sabol (2000); ● after Migliaccio et al. (2007); ♦ new data, Gradinarov & Sivilov (present study).

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References

Danilevsky, M. L. (2017) Catalogue of Palearctic Cerambycoidea. Updated: 20.02.2017. Available at: http://cerambycidae.net/catalog.pdf (Accessed on 22 February 2017).

Ganev, J. (1984) New Records for Bulgarian Cerambycidae (Coleoptera). *Acta Entomologica Jugoslavica*, 20 (1-2): 57-61.

Georgiev, G. & Hubenov, Z. (2006) Vertical distribution and zoogeographical characteristics of Cerambycidae (Coleoptera) family in Bulgaria. *Acta zoologica bulgarica*, 58 (3): 315-343.

Migliaccio, E., Georgiev, G. & Gashtarov, V. (2007) An annotated list of Bulgarian Cerambycids with special view on the rarest species and endemics (Coleoptera: Cerambycidae). *Lambillionea*, 107 (1), Supplément 1: 1-78.

Nardi, G., Tykarski, P., Munteanu, N., Schlaghamersky, J., Istrate, P. & Putchkov, A. (2010) *Lioderina linearis*. In: The IUCN Red List of Threatened Species 2010. Available at: http://dx.doi.org/10.2305/IUCN.UK.2010-1.RLTS.T157695A5126672.en (Accessed on 07 February 2017).

Sabol, O. (2000) Příspěvek k poznání bionomie tesaříka *Lioderina linearis* (Coleoptera: Cerambycidae). *Klapalekiana*, 36: 291-296.

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New records of water mites (Acari: Hydrachnidia) from Iskar River Valley, Bulgaria

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Abstract. The present study gives new data on a poorly studied group of aquatic organisms – water mites. Six species are recorded for the first time for the Bulgarian fauna and one of them is new for the Balkan Peninsula.

Key words: water mites, Hydrachnidia, Balkan Peninsula.

Introduction

Water mites are the most species-rich group of arachnids occurring in standing and running freshwater habitats, with about 6000 species worldwide, from which 382 species and subspecies in 77 genera are recorded from the Balkans (Pešić *et al.* 2010). In Bulgaria water mite fauna is fairly rich, with 213 species in 56 genera (Pešić *et al.* 2010). First studies here are published by Viets (1926, 1935, 1940) and Petrova (1971, 1976, 1985) published several papers on water mites from surface waters. More recent data are given by Pešić (2006) and Gerecke (2009). There are no comprehensive studies of the water mite fauna in Iskar River. Two species were reported from some of its tributaries (Vladaiska and Dragalevska Rivers) by Petrova (1971). Pešić et al. (2010), in a survey on the current state of knowledge regarding the Balkan Peninsula, give additional data on the water mite fauna of the catchment of Iskar River, consisting 26 species.

Materials and Methods

The field trips for collecting zoological material were carried out during May and June 2015. Hydrobiological samples were collected from 12 sampling localities along Iskar River and some of its tributaries (Beli Iskar River and Cherni Iskar River). Benthic samples were collected from different microhabitats, using a hand net with a mesh size of 200 μm. Water mites were sorted in the field, preserved in Koenike's fluid and mounted on microscopic slides as described in Gerecke *et al.* (2007). Information about species' distribution and habitat preference follows Di Sabatino *et al.* (2010) and Gerecke *et al.* (2016).

Results

The following six species are new for the Bulgarian fauna, one of them – *Torrenticola* (*Torrenticola*) *ischnophallus* Lundblad, 1956 is new for Balkan Peninsula:

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Family Hydryphantidae Piersig, 1896

Hydryphantes (*Hydryphantes*) *armentarius* Gerecke, 1996

Collecting site: Iskar River near Dragoshinovo village, 42°21'58.3"N 23°33'21.5"E, 903 m a.s.l., 2.VI.2015, 1 specimen, leg. L. Lyubomirova, L. Kenderov, P. Mitov (LL, LK, PM).

Habitat/Ecological type: Crenobiont; in weakly flowing rheohelocrenes exposed to sunlight.

Distribution: Italy, Balkan Peninsula.

Remarks: In present study it is found in deeper parts of the river with strong current. Its presence suggests inflow of underground waters nearby the collecting site.

Protzia halberti (Walter, 1920)

Collecting site: Beli Iskar River above Beli Iskar village, 42°14'50.7"N 23°32'26.5"E, 1224 m a.s.l., 2.VI.2015, 1 specimen, leg. LL, LK, PM.

Habitat/Ecological type: Middle-order streams.

Distribution: Ireland, Central Europe, Balkan Peninsula.

Remarks: This species is found in the upper reaches of the river.

Family Torrenticolidae Piersig, 1902

Torrenticola (*Torrenticola*) *ischnophallus* Lundblad, 1956 (Fig. 1.)

Collecting site: Iskar River near Rebarkovo village, 43°06'52.2"N 23°40'48.1"E, 240 m a.s.l., 29.V.2015, 2 male specimens, leg. LL, LK, PM.

Habitat/Ecological type: Higher order streams with fast current on sandy or stony substrata.

Distribution: French Alps, Germany, only recently discovered in Turkey (Esen & Erman, 2014), probably with a wider distribution than actually documented (Di Sabatino et al. 2009).

Remarks: Rare and poorly known species. In present study it is found in fast flowing river section with organic pollution, highly corrected riverbed with a rocky substrate.

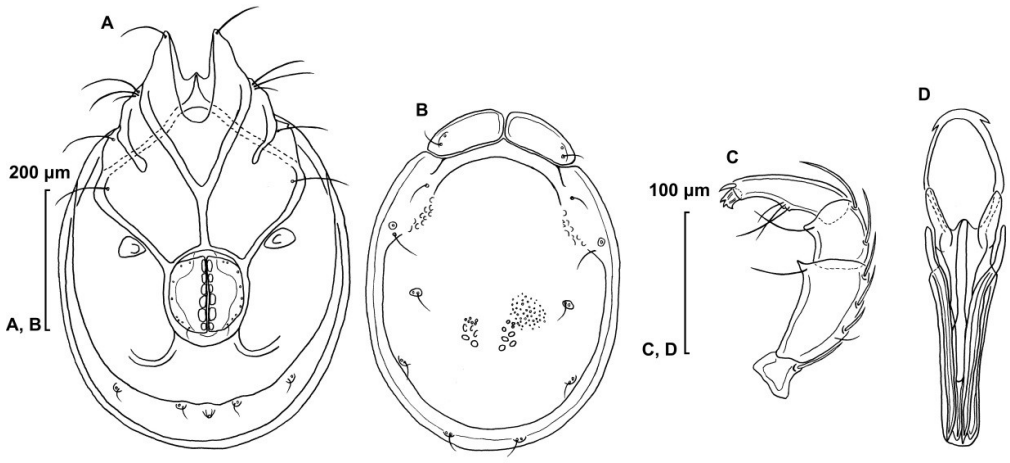

Fig. 1. *Torrenticola ischnophallus* A – idiosoma, ventral side; B – dorsal shield; C – palp; D – ejaculatory complex.

Torrenticola (*Torrenticola*) *oraviensis* (Laska, 1953) (Fig. 2.)

Collecting sites: Iskar River above Samokov town, 42°17'27.3"N 23°32'12.6"E, 1040 m a.s.l., 2.VI.2015, 1 male specimen, leg. LL, LK, PM.; Iskar River above Eliseina village, 43°04'45.7"N 23°28'19.3"E, 320 m a.s.l., 29.V.2015, 1 male specimen, leg. LL, LK, PM.

Habitat/Ecological type: Low- and middle-order streams.

Distribution: South and south-eastern Europe, Asia Minor.

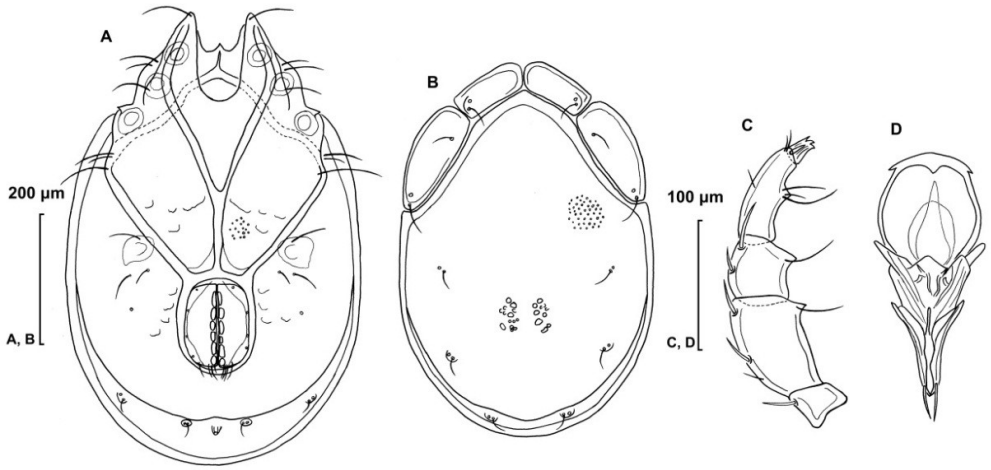

Fig. 2. Torrenticola oraviensis A – idiosoma, ventral side; B – dorsal shield; C – palp; D – ejaculatory complex.

Family Hygrobatidae Koch, 1842

Atractides oblongus (Walter, 1944) (Fig. 3.)

Collecting site: Beli Iskar River above Beli Iskar village, 42°14'50.7"N 23°32'26.5"E, 1224 m a.s.l., 2.VI.2015, 1 female specimen, leg. LL, LK, PM.

Habitat/Ecological type: Rhithrobiont; hyporheophilous.

Distribution: Alps, central Europe, Carpathians, Balkan Peninsula.

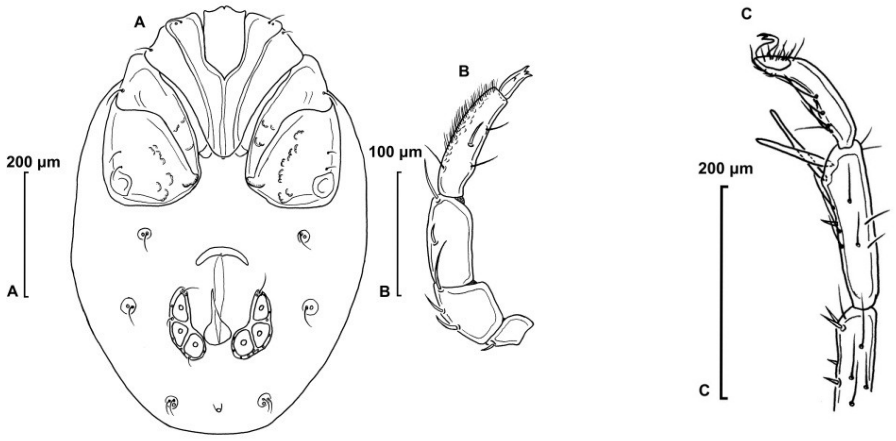

Fig. 3. *Atractides oblongus* A – idiosoma, ventral side; B – palp; C – Leg 1, tibia and tarsus.

Family Pionidae Thor, 1900

Forelia variegator (Koch, 1837)

Collecting site: Iskar River near Dragoshinovo village, 42°21'58.3"N 23°33'21.5"E, 903 m a.s.l., 2.VI.2015, 1 female specimen, leg. LL, LK, PM.

Habitat/Ecological type: In standing (lakes, ponds) and slow running waters.

Distribution: Palaearctic.

Remarks: During this study it is found in riparian area of the river with dense vegetation.

Conclusion

A total of 219 water mite species representing 56 genera, including the new species reported here, are known for Bulgaria. In comparison, on Balkan Peninsula are found 382

species and subspecies in 77 genera. Five of the six water mite species that are newly reported for Bulgaria are found in some of our neighboring countries. This shows the need for further research in the field of water mites.

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References

Di Sabatino, A., Gerecke, R., Gledhill, T. & Smit, H. (2009) On the taxonomy of water mites (Acari: Hydrachnidia) described from the Palaearctic, part 2: Hydryphantoidea and Lebertioidea. *Zootaxa,* 2266: 1-34.

Di Sabatino, A., Gerecke, R., Gledhill, T., & Smit, H. (2010) Süßwasserfauna von Mitteleuropa, Vol. 7/2-2 Chelicerata: Acari II, *Springer Spektrum, Spektrum Akademischer Verlag, München*, 235 pp.

Esen, Y. & Erman, O. (2014) Kahramanmaraş İli Monatractides K. Viets, 1926 ve Torrenticola Piersig, 1896 (Acari: Hydrachnidia: Torrenticolidae) Türleri ve Türkiye Faunası İçin İki Yeni Kayıt. *Firat Univ. Journal of Science*, 26(1): 39-44.

Gerecke, R. (2009) Revisional studies on the European species of the water mite genus Lebertia Neuman, 1880 (Acari: Hydrachnidia: Lebertiidae). *Abhandlungen der Senckenberg Gesellschaft für Naturforschung*, 566: 144 pp.

Gerecke, R., Weigmann, G., Wohltmann, A. & Wurst, E. (2007) Order Acari – General introduction and key to major groups. In: Gerecke, R. (Ed), Süßwasserfauna von Mitteleuropa, Vol. 7/2-1, Chelicerata: Araneae/Acari I, *Springer Spektrum*, *Spektrum Akademischer Verlag, München*, pp. 14-33.

Gerecke, R., Gledhill, T., Pešić, V. & Smit, H. (2016) Süßwasserfauna von Mitteleuropa, Vol. 7/2-3 Chelicerata: Acari III. *Springer Spektrum, Spektrum Akademischer Verlag, München*, 429 pp.

Pešić, V. (2006) New records of water mites (Acari: Hydrachnidia) from springs and running waters in Bulgaria. *Acta Zoologica Bulgarica*, 48 (1): 73-82.

Pešić, V., Smit, H., Gerecke, R. & Di Sabatino, A. (2010) The water mites (Acari: Hydrachnidia) of the Balkan peninsula, a revised survey with new records and descriptions of five new taxa. *Zootaxa*, 2586 (1): 1-100.

Petrova, A. (1971) Sur les hydracariens (Hydrachnellae) du Bulgarie. *Bulletin de l'Institut de Zoologie et Musée, Académie Bulgare des Sciences*, 33: 37-48 (in Bulgarian, French Summary).

Petrova, A. (1976) Prinos kam izuchavaneto na vodnite akari (Hydrachnellae) v Balgaria (Contribution to the study of water mites (Hidrachnelae) in Bulgaria), *Acta zoologica bulgarica*, 4: 54-59 (in Bulgarian).

Petrova, A. (1985) Vliyanie na zamarsyavaneto na reka Vit varhu razpredelenieto i chislenostta na vodnite akari (Hydrachnellae) (Impact of pollution of Vit River on the distribution and abundance of water mites), *Hidrobiologiya*, 24: 48-53 (in Bulgarian).

Viets, K. (1926) Hydracarinen aus Bulgarien. *Zoologischer Anzeiger*, 67 (1-2): 7-27.

Viets, K. (1935) Wassermilben aus Bulgarien. *Zoologischer Anzeiger*, 109 (1-2): 33-39.

Viets, K. (1940) Hydrachnellae, Porohalacaridae und Halacaridae s. str. (Acari) aus Bulgarien. *Zoologischer Anzeiger*, 130: 36-41.

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Distribution of *Amorphocephala coronata* (Germar, 1817) (Coleoptera: Brentidae) in Bulgaria

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Abstract. All the available data about distribution of the rare myrmecophilous species *Amorphocephala coronata* in Bulgaria have been summarized, and new localities of the species have been added.

Key words: myrmecophily, *Camponotus*, Balkans.

Introduction

The first record of *Amorphocephala coronata* (Germar, 1817) for the fauna of Bulgaria was published by Ioakimov (1904). Despite this relatively early record, the species was rarely found at long time intervals and only nine localities have been known until now. A few new localities of the species have been established during the last years as a result of more intense use of light traps and due to focused search for myrmecophilous and soil insects.

These new localities are presented in this study.

The materials are deposited at the National Museum of National History-Sofia (NMNHS) and at the Faculty of Biology at the University of Sofia (BFUS) collections. The map was produced with SimpleMappr (Shorthouse, 2010).

Results

Amorphocephala coronata (Germar, 1817)
(Fig. 1, 2)

Literature data: vicinity of Haskovo Town, 12.05.1900, 1 ex. (Ioakimov, 1904); Slavyanka (Alibotush) Mts., 1000 m, 31.07.1936 (Csiki, 1943); Sozopol, 2.08.1959, 1 ex. (Popov, 1960); Belovo Town, Podkova Village, Plovdiv Town, Petrich Town (Angelov, 1981); Ahtopol, 23.06.2000, 1 ex.; Tsarevo, 07.1977 (Simandl, 2002); Maleshevska Mts. (Guéorguiev & Ljubomirov, 2009); Strandzha Mts., vicinity of Kalovo Village (Lapeva-Gjonova, 2013).

New localities: Dalgopol Village, 19.07.1958, 1 ♀; Burgas, Rosenets (Otmanli) Beach, 10.07.1967, 1 ♂, 1 ♀; Strandzha Mts., 20.06.1973, 1 ♀; Kresna Gorge, Kresnensko Hanche, 7.08.1991, 1 ♀, leg. M. Josifov; Ograzhden Mts., vicinity of Gega Village, N41.46080 E23.00670, 664 m, 06.05.2010, 1 ♀, under stone, with *Camponotus aethiops* (Latreille, 1798), leg. R. Bekchiev; Kresna Gorge, above Sheitan Dere, N41.755833 E23.156395, 308 m, 13.06.2014, 1 ♂, at light, leg. S. Beshkov; East Rhodopes, Kodzhakaya (Likana), between

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Odrintsi and Byalo Pole Villages, Ivaylovgrad District, N41.445555 E26.137511, 276 m, 15.07.2015, 3 ♂♂, 1 ♀, at light, leg. S. Beshkov, B. Zlatkov, C. Plant (NMNHS); Strandzha Mts., Kalovo Village, N42.13639 E27.536389, 330 m, 06.05.2009, 1 ex., under stone, with *Camponotus aethiops*, leg. A. Lapeva-Gjonova; East from Novo Hodzhovo Village at Pirinska Bistritsa River, N41.407377 E23.406988, 115 m, 14.06.2010, 1 ♀, at light, leg. O. Sivilov, B. Zlatkov; Tisata Reserve in Kresna Gorge, N41.745853 E23.153900, 220 m, 21.06.2013, 1 ♀, at light, leg. O. Sivilov, B. Zlatkov (BFUS).

Fig. 1. *A. coronata* with *C. aethiops* (Gega Village, Ograzhden Mt.).

Discussion

All available data about the distribution of this interesting myrmecophilous beetle in the country, totally 19 localities, have been summarized (Fig. 2). Almost all specimens were found in South Bulgaria at low to average altitudes (5-1000 m) corresponding to the species preferences for its usual area of distribution (Mediterranean, including North Africa). The only exception is the single finding at Dalgopol Village in North Bulgaria and so far this has been the most northern established locality of *A. coronata*. The species is new for the region of Kresna Gorge, Ograzhden Mts. and the region of Dobrudzha. The records from East Rhodopes and the region of the town of Petrich are confirmed. The data from Strandzha Mts. are being published now for the first time in their entirety.

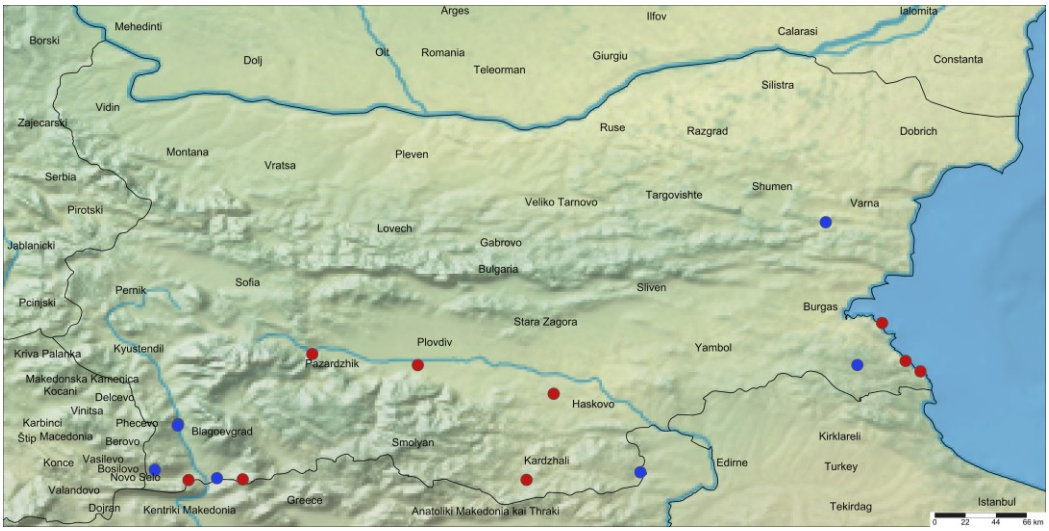

Fig. 2. Distribution of *A. coronata* in Bulgaria (red dots – literature data; blue dots – new data).

References

Angelov, P. A. (1981) *Fauna Bulgarica 11. Coleoptera, Rhynchophora (Urodonidae, Anthribidae, Brenthidae, Rhinomaceridae, Attelabidae)*. Aedibus academiae scientiarum Bulgaricae, Sofia, 112 pp.

Csiki, E. (1943) Coleopteren von Alibotusch-Gebirge in Süd-Bulgarien. *Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten, Sofia*, 16: 214-218.

Guéorguiev, B. & Ljubomirov, T. (2009) Coleoptera and Hymenoptera (Insecta) from Bulgarian section of Maleshevska Planina Mountain: study of an until recently unknown biodiversity. *Acta Zoologica Bulgarica*, 61 (3): 235-276.

Ioakimov, D. (1904) Beitrag zur Insektenfauna Bulgariens – Insecta. I. Coleoptera. *Sammelwerke für Folklor, Wissenschaft und Literatur*, 20: 1-43. (In Bulgarian).

Lapeva-Gjonova, A. (2013) Ant-Associated Beetle Fauna in Bulgaria: A Review and New Data. *Psyche: A Journal of Entomology*, 2013: 1-14.

Popov, A. (1960) Nasekomo s tropicheski proizhod, namereno v Balgaria (An insect of tropical origin found in Bulgaria). *Priroda (Nature)*, 9 (4): 76-77. (In Bulgarian) [Transliterated].

Shorthouse, D. P. (2010) SimpleMappr, an online tool to produce publication-quality point maps. [Retrieved from http://www.simplemappr.net. Accessed March 01, 2017].

Simandl, J. (2002) New and Interesting Records of Beetles (Coleoptera) from Bulgaria. *Acta zoologica bulgarica*, 54 (2): 59-66.

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Shell size and population density of *Cerastoderma glaucum* Poiret 1789 (Mollusca: Bivalvia) in "Pomorie Lake" (Black Sea coast, Bulgaria)

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Abstract. The seasonal population density and population size structure of *Cerastoderma glaucum* of Pomorie Lake (Bulgaria) has been studied. The length of the shells ranged between 2.00 and 27.00 mm. The highest population density was estimated during spring and was 2062 individuals per m^2.

Key words: *Cerastoderma glaucum*, population, lagoon.

Introduction

Cockles are an important component of the salt water ecosystems and a major food source for many species. Bivalves are frequently used to assess the environmental contamination and often considered as a good sentinel and/or bioindicator. The cockle may also be substantial for the monitoring of the macrozoobenthos in the seas (Obolewski *et al.* 2007).

The Lagoon Cockle *Cerastoderma glaucum* (Poiret 1789) is euryhaline bivalve with a wide distribution across the European coasts, ranging from the northern Baltic Sea to the Black Sea and the Caspian Sea, which tolerates salinity between 15 and 35 ppt (Boyden & Russell 1972). According to Hubenov (2015) all *Cerastoderma* at the Black Sea coast of Bulgaria belong to the species *C. glaucum*. This species occurs in non-tidal areas such as lagoons and salt marshes which means it is exposed to a higher salinity while *C. edule* usually occurs in open coasts and estuaries where the salinity has higher daily variations (Reise 2003, Malham *et al.* 2012).

The previous studies on the species in the lake were based on short-term hydrobiological investigations conducted mainly in the 60s. The lack of any present-day malacological studies on *C. glaucum* there motivated the present work.

Materials and Methods

The Pomorie Lake is hyper-saline lagoon of natural origin, located close to the Black Sea and the town of Pomorie. It is relatively shallow water basin with a maximum depth of 1.4 m. It is a part of the Burgas Lakes-complex, which is one of the three most significant wetland complexes along the Bulgarian Black Sea coast for congregations of waterbirds. The Pomorie Lake and the adjacent territories are designated as a protected site according to the Bulgarian legislation and a Ramsar site.

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Seasonal samples have been collected from five different sites in the lagoon (Fig. 1). Every site is characterized with different geographic location, degree of urbanization, pollution and human activity. They have different substrates and hydrochemical conditions:

Site1 is located in the northern part of the lake, near the saltpans where salinity exceeds 30‰. The basic substrates there are muddy sand, covered in some areas with seaweed;

Site 2 is the channel that connects the lake with the sea. It is located near the main road in the town of Pomorie. The substrate is artificial - concrete and rocks;

Site 3 is located in the southern part of the lake. It is an urbanized area visited by many tourists during the warm months. The area is used also for extraction of healing mud;

Site 4 is probably the most urbanized area, with many hotels and resorts. The substrate is mainly sandy;

Site 5 is located in the sand spit that separates the lake from the sea.

Seasonal samples (04/2015, 05/2015, 07/2015, 08/2015 and 10/2015) were collected from different sites in the lagoon in 2015 using a hydrobiological sieve. Samples were taken from the littoral zone of the shore at a depth of 10 cm, using a frame with size 50x50 cm. The material was collected into plastic bottles, preserved in 70% alcohol and transported to the laboratory. Then the samples have been sorted and washed in order to remove the adhering organisms and the other debris. The dead specimens have been separated from the living ones. The cockle specimens have been identified, counted and measured. The length of the shells was measured with accuracy of 0.1 mm.

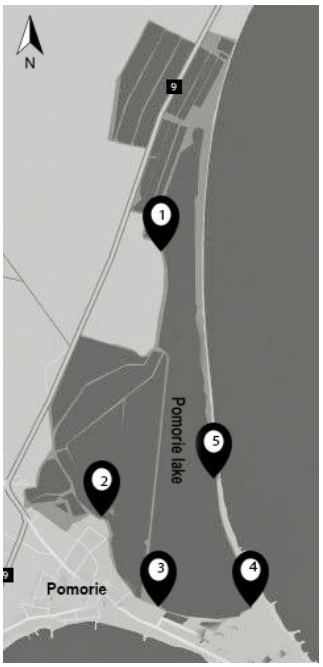

Fig. 1. Map of the studied area (the location of the sampling sites is indicated with numbers).

Results and Discussion

Totally 1000 specimens of *Cerastoderma glaucum* have been collected and measured from the 50 samples, 516 specimens have been obtained in the spring, 415 in the summer and respectively 69 in the autumn. The specimens have been found in all types of substrate. The length of the shell has ranged between 2.00 and 27.00 mm.

The cockles have been wide spread all over the explored sites. Specimens have been found in different types of substrate from muddy-sand to gravel-sand.

Population density

The dynamics of the *C. glaucum* population were studied during three of the seasons. The population density has been calculated per 1m^2. The data shows that recruitment has been observed throughout the year which suggests that the reproductive activity continues during the year. However, the recruitment happens mainly in the spring when population density reached 2064 ind. per m^2 (Fig.2). During summer population density reduced to 1660 ind. per m^2 and mainly adult individuals were collected. According to Labourg & Lasserre, 1980 the adult and juvenile individuals have different distribution. Juveniles (0.5-10 mm) usually attached to filamentous algae by byssus threads. When they reach certain age, they migrate to the adult free-living sediment population. During the autumn population density is significantly reduced (276 ind. per m^2) but still a few recruitments were also recorded in the autumn which indicates again a prolonged reproductive activity.

Population size structure

Three different size groups have been reported during seasons but just two of them dominated through the year (Fig. 2). During the spring the group of small specimens with 0-10 mm shell length (possible juveniles) accounted for 70% of all collected specimens while 29% were in the 11-20 mm class and less than 1% belonged to the 21-30 mm class. During the summer the 11-20mm class (possible adults) was 60% of all collected specimens, 38% were in the 0-10 mm class and 2% were in 21-30mm class. In autumn these ratio was 25% for 0-10mm class; 72% for 11–20mm class and 3% for the 21-30mm class.

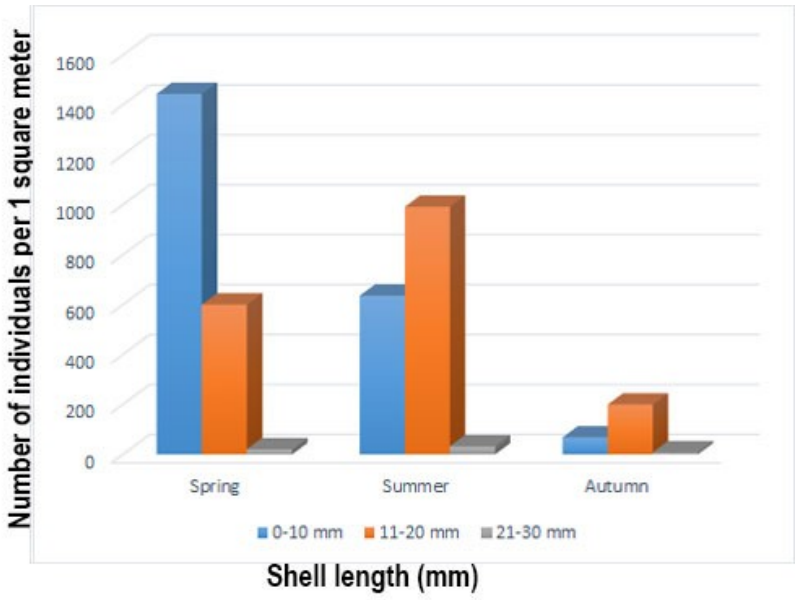

Fig. 2. Population density of *Cerastoderma glaucum* per 1 m^2 of each size group during seasons.

Acknowledgments. I would like to express my gratitude to the Municipality of Pomorie, the Regional Inspectorate of Environment and Water in Burgas and the Info Center of the NGO "Green Balkans" in the town of Pomorie. Special thanks to Assoc. Prof. Dian Georgiev and Assoc. Prof. Dilian Georgiev for their practical assistance during the sampling and the laboratory analysis, for their suggestions and constructive comments, which have improved the quality of the manuscript.

References

Boyden, C. & Russell, P. (1972) The distribution and habitat range of the brackish water cockle (*Cardium* (*Cerastoderma*) *glaucum*) in the British Isles. *Journal of Animal Ecology*, 41, 719-734.

Hubenov, Z. (2015) Species composition of the free living multicellular invertebrate animals (Metazoa: Invertebrata) from the Bulgarian sector of the Black Sea and the coastal brackish basins. *Historia Naturalis Bulgarica*, 21: 49-168.

Labourg, P. & Lasserre, G. (1980) Population Dynamics of *Cerastoderma glaucum* in an Artificial Lagoon of the Arcachon Region. *Marine Biology*, 60: 147-157.

Obolewski, K., Konkel, M., Strzelczak, A., Piesik, Z. (2007) Distribution and the role of *Cerastoderma glaucum* (Poiret, 1789) in the Polish Baltic sea coast. *Baltic coastal zone - Journal of Ecology and Management of the Coastline*, 11: 13-24

Reise, K. (2003) Metapopulation structure in the lagoon cockle *Cerastoderma lamarcki* in the northern Wadden Sea. Helgoland, *Marine Research*, 56: 252-258.

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First exact data on the distribution of saproxylic species *Calchaenesthes oblongomaculata* (Guérin-Méneville, 1844) (Cerambycidae: Purpuricenini) in Bulgaria

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Abstract. Three male specimens of *Calchaenesthes oblongomaculata* (Guérin-Méneville, 1844) (Cerambycidae: Purpuricenini) were collected in foothills of Maleshevska Planina Mts., near Kamenitsa Vill. (SW Bulgaria). The individuals were found on the leaves of Downy oak (Quercus pubescens Willd.) or flying around the tree. The present record confirms the presence of the species in the country.

Key words: Cerambycidae, *Calchaenesthes oblongomaculata*, Bulgaria

Introduction

Calchaenesthes Kraatz, 1863 (Cerambycidae: Purpuricenini) is Western Paleartic genus, includes five accepted species (Özdikmen et al. 2013). Two species are distributed in Europe – *C. oblongomaculata* (Guérin-Méneville, 1844) and *C. sexmaculata* (Reiche, 1861) (Sama & Löbl 2010). According to Sama & Löbl (2010) the distributional areal of *C. oblongomaculata* includes Bulgaria, Greece, Romania, Cyprus, Jordan and Asian Turkey. After Özdikmen *et al.* (2013), however, the species is not distributed in Anatolia, while the records from Cyprus and Jordan require confirmation. The species is included in European Red List of Saproxylic Beetles with DD (data deficient) category (Nieto & Alexander 2010).

For Bulgaria, *C. oblongomaculata* is recorded in the Check-List of Longicorn Beetles of Europe (Althoff & Danilevsky 1997) and in the Catalogue of Palaearctic Coleoptera (Sama & Löbl 2010). Migliaccio *et al.* (2007), however, do not include the species in the list of Bulgarian cerambycids, and currently there is no reliable evidence of the species presence in the country. In the present work first exact data on the species distribution in Bulgaria are reported.

Results

Three male specimens of *C. oblongomaculata* were collected near Kamenitsa Vill., SW Bulgaria in early April 2017 (Fig. 1). The collecting data of the specimens are as follow:
Bulgaria, foothills of Maleshevska Planina Mts., 700 m SE Kamenitsa Vill., 41°38'43.2''N, 23°09'58.9''E, 210 m a.s.l., 02.IV.2017, three males, leg. D. Gradinarov, B. Zlatkov, D. Kaynarov & I. Andreev. The habitat represents shrubs and low woods, dominated by Kermes oak (*Quercus coccifera* L.), with rare solitary young trees of Downy oak (*Quercus pubescens* Willd.), bordering the xerothermic herbaceous communities (Fig. 2 A). The specimens were collected from the leaves of a single flowering *Q. pubescens* tree (Fig. 2 B) or around the same tree at flight, from 11:30 to 13:00 am.

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The specimens collected are deposited in the Zoological Collection of Sofia University "St. Kliment Ohridski", Faculty of Biology (BFUS).

Fig. 1. *Calchaenesthes oblongomaculata*, male, Bulgaria, Kamenitsa Vill. Scale bar: 10 mm.

Discussion

According to Bense (1995: 248-249), in Europe *C. oblongomaculata* is known from Greece and Romania. In the Check-List of Longicorn Beetles of Europe, the species is listed for Bulgaria as well, without specified locality (Althoff & Danilevsky 1997: 21). It seems that the same country record was later used for the Catalogue of Palaearctic Coleoptera (Sama & Löbl 2010: 197) (P. Rapuzzi, personal communication). Thus, the present record provides the first exact data on the distribution of *C. oblongomaculata* in Bulgaria.

C. oblongomaculata is obligate saproxylic species, associated with host plant of genus *Qercus* (Sama *et al.* 2011, Plewa *et al.* 2011, Walczak *et al.* 2014). In Greece, *Q. coccifera* have been indicated as the host plant of the species (Plewa *et al.* 2011). Notably, in the present finding of the species, individuals clearly have been attracted by *Q. pubescens*, despite the prevalence of *Q. coccifera* in the habitat. Further investigations are needed for the establishment the range of food plants of the species in Bulgaria.

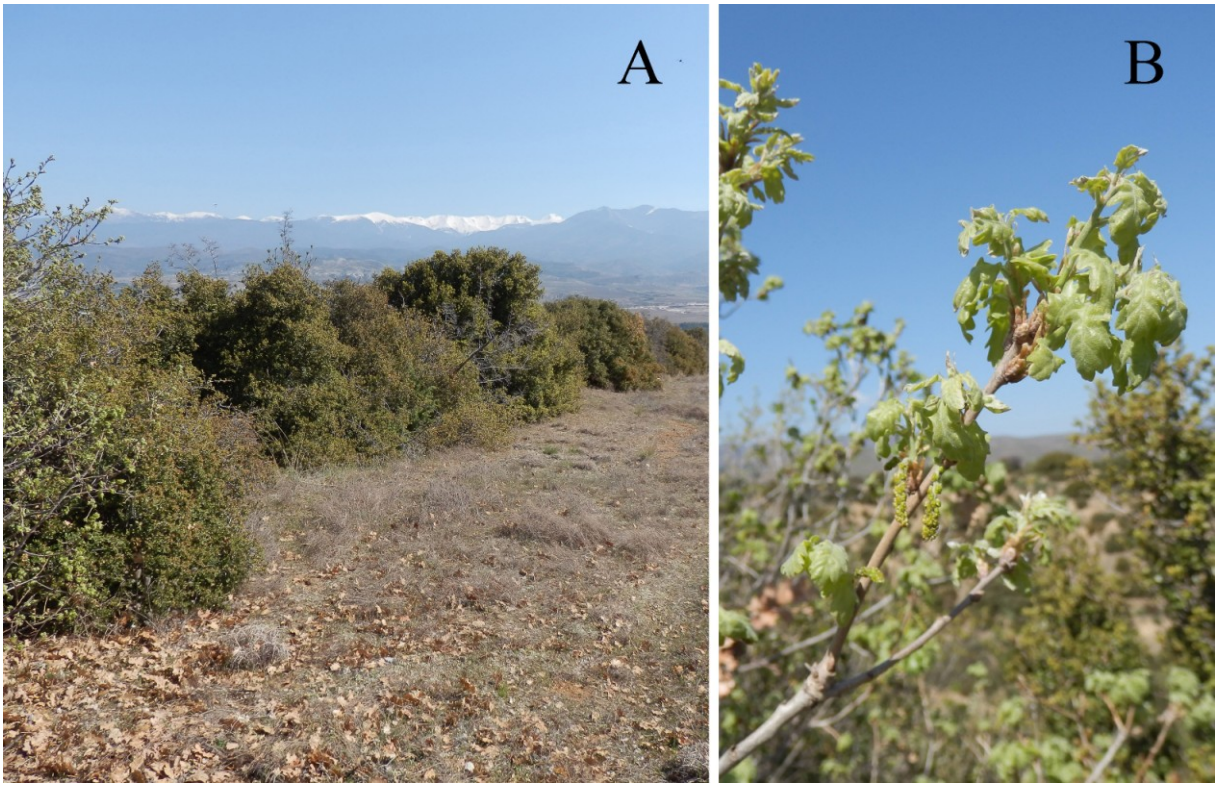

Fig. 2. Collecting site in Maleshevska Planina Mts. A: General view of the habitat. B: Flowering *Quercus pubescens* tree.

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References

Althoff, J. & Danilevsky, M. L. (1997) *A Check-List of Longicorn Beetles (Coleoptera, Cerambycoidea) of Europe*. Slovensko Entomološko Društvo Štefana Michielija, Ljubljana, Slovenia, 64 pp.

Bense, U. (1995) *Longhorn beetles. Illustrated key to the Cerambycidae and Vesperidae of Europe*. Weikersheim, Margraf Verlag, 512 pp.

Migliaccio, E., Georgiev, G. & Gashtarov, V. (2007) An annotated list of Bulgarian Cerambycids with special view on the rarest species and endemics (Coleoptera: Cerambycidae). *Lambillionea*, 107(1), Supplément 1: 1-78.

Nieto, A. & Alexander, K. N. A. (2010) *European Red List of Saproxylic Beetles*. Publications Office of the European Union, Luxembourg, Belgium.

Özdikmen, H., Aytar, F., Cihan, N., Şamlı, N., Özbek, H. & Kaya, G. (2013) A synopsis of Palearctic genus *Calchaenesthes* Kraatz, 1863 with a new species of *C. primis* sp. n. from Turkey (Cerambycidae: Cerambycinae). *Munis Entomology & Zoology*, 8(1): 148-153.

Plewa, R., Łoś, K. & Górski, P. (2011) Nowe dane o rozmieszeniu, biologii I behawiorze gatunków z rodziny kózkowatych (Coleoptera, Cerambycidae) z Grecji. [New data on

the distribution, biology and behavior of some longhorn beetles (Coleoptera, Cerambycidae) from Greece]. *Elateridarium*, 5: 232-247.

Sama, G. & Löbl, I. (2010) Cerambycidae, Western Palaearctic taxa, eastward to Afghanistan, excluding Oman and Yemen and the countries of the former Soviet Union. *In:* Löbl, I. & Smetana, A. (Eds.), *Catalogue of Palaearctic Coleoptera. 6. Chrysomeloidea*. Apollo Books, Stenstrup, pp. 84-334.

Sama, G., Jansson, N., Avci, M., Sarikaya, O., Coskun, M., Kayis, T., & Özdikmen, H. (2011) Preliminary report on a survey of the saproxylic beetle fauna living on old hollow oaks (*Quercus* spp.) and oak wood in Turkey (Coleoptera: Cerambycidae). *Munis Entomology & Zoology*, 6(2): 819-831.

Walczak, M., Woźniak, A., Szczepański, W. T. & Karpiński, L. (2014) The structure of anthophilous longhorn beetles (Col.: Cerambycidae) visiting hawthorns (*Crataegus* spp.) in the Western Palearctic. *Baltic Journal of Coleopterology*, 14(2): 205-217.

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First record of the genus *Dactylobiotus* Schuster, 1980 in Bulgaria (Eutardigrada: Murrayidae)

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Abstract. The first find of a freshwater tardigrade in Bulgaria was reported: unidentified *Dactylobiotus* specimen from the hyporeal waters of Cherni Iskar River.

Key words: Tardigrada, aquatic, hyporheic.

The freshwater tardigrades of Bulgaria have never been studied. There is only one record from Ropotamo River of "*Hypsibius* sp." by Cvetkov & Gruncharova (1977). Yankova *et al.* (2016) stated that "Many aquatic species (i.e., from the genus *Dactylobiotus*) could be found in the inland water basins of the country".

In this short note, we report the first find of a representative of the genus *Dactylobiotus* from Bulgaria.

The specimen was collected by L. Kenderov on 13.11.2004 from the hyporeal waters of Cherni Iskar River downstream, Govedartsi village, Rila Mountains (N 42.285067° E 23.532971°, 1054 m altitude). The sample was taken out from 0.25m depth, from a stony riverbed. Some stygobionts were found together with the *Dactylobiotus* individual: *Lobohalacarus weberi* Romijn & Viets 1924 (Hydracarina), *Bryocamptus* (*Limocamptus*) *dacicus* (Chappuis 1923) and *Paracamptus schmeili* (Mrazek 1893) (Harpacticoida). Hydrochemical analysis of hyporheic waters shows normal conditions for an anthropogenically unpolluted small mountain river: high oxygen concentration (9.5 $mg.dm^{-3}$) and saturation (91%), neutral pH (7.8) and low water temperature (8.2°C).

The material was stored in ethanol. Later it was deposited in the collection of D. Georgiev and mounted on a microscope slide in Hoyer's Medium.

According to the modern identification key of Kaczmarek *et al.* (2012), eggs are needed for accurate species determination. As we rely only on one preserved specimen, it can be classified to genus level. Our specimen morphologically fits the description of Pilato & Binda (2010) of genus *Dactylobiotus*: "Each pair of diploclaws is connected by a cuticular bar. The basal section of the diploclaw is a trapezoidal lamina. The secondary branch is clearly shorter than the primary branch and inserted near the base of the latter. The two branches form an almost right angle.

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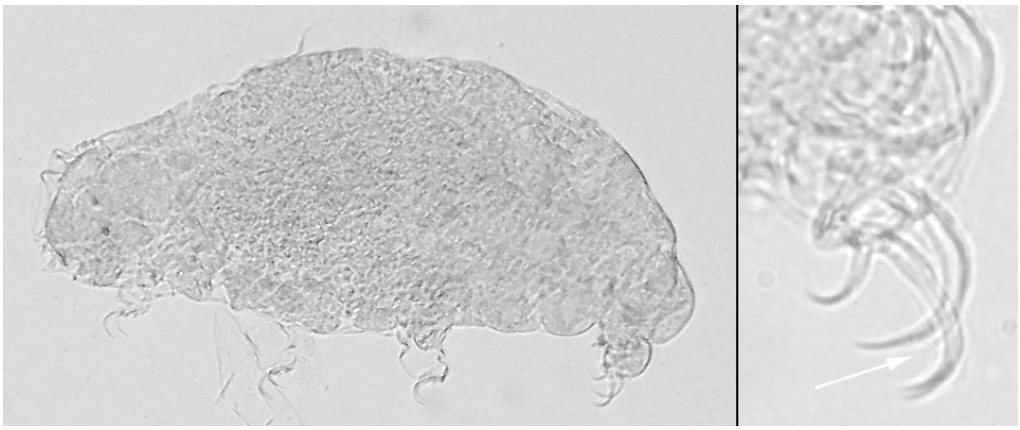

Fig. 1. *Dactylobiotus* sp. from the hyporeal waters of Cherni Iskar: general view (left, 20x) and claws IV with the accessory points shown by an arrow (right, 100x).

References

Cvetkov, L. & Gruncharova, T. (1977) Fouling in the Liman of the Ropotamo river. III. Composition and quantitative development of the zoocoenoses. *Hydrobiology*, 8: 26-43.

Kaczmarek, Ł., Schabetsberger, R., Litwin, M. & Michalczyk, Ł. (2012). New freshwater eutardigrade from Fiji and Vanuatu (Oceania), with remarks on the genus Dactylobiotus. *New Zealand Journal of Zoology*, 39(4): 311-318.

Pilato, G. & Binada, M. (2010) Definition of families, subfamilies, genera and subgenera of the Eutardigrada, and keys to their identification. *Zootaxa*, 2404: 1-54.

Yankova, M., Morek, W., Georgiev, D. (2016) Current knowledge of Tardigrades (Tardigrada: Heterotardigrada and Eutardigrada) from Bulgaria: check list and distribution data. *Acta Zoologica bulgarica*, 68(3): 299-304.

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Fossil record of Tapirs (*Tapirus* Brünnich, 1772) (Tapiridae Gray, 1821 - Peryssodactyla Owen, 1848) in Bulgaria

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Abstract. Fossil record of the tapirs in Bulgaria covers 7 taxa (4 unspecified), the oldest one of Turolian age: *Tapirus arvernensis*, *T. jeanpivetoui*, *T. balkanicus*, as well as *Tapirus* sp. – 1, 2, 3, and 4 of 10 Late Miocene localities. All records came from Sothwest Bulgaria (South of the Balkan Range and West of the Rila-Rhodopes mountain massif). Cranial fragments (mandibulae and maxillae) are the most often among the identified remains. It is concluded that the Balkans were the region of the most varied tapirid megafauna in the Late Neogene (Miocene) in Europe.

Key words: Tapiridae, Balkans, Neogene.

Introduction

In the recent fauna tapirs (*Tapirus* Brünnich, 1772) survived through five species. All they have tropical distribution. Four species are spread in the Neotropical and Indomalayan Realms (Medici 2011, Cozzuol *et al.* 2013).

Territory of Bulgaria, Balkans and all Europe lies out of the recent range of Tapiridae. Although many records of fossil tapirs from Europe documented very well the former distribution of these perissodactyls in the Western Palearctic in the Paleogene (Oligocene) and Neogene (Miocene and Pliocene), data from Bulgaria and Balkans complete their last presence in the extratropics of the Old World before the drastic range restriction to South-East Asia today. Thus, all data on the Miocene distribution of tapirs in Bulgaria have an important significance for tracing the final history of tapirs in the Balkans and South-East Europe. Present study aims to collect all scattered information on the fossil history of tapirs in Bulgaria.

Results

Tapirus arvernensis Croizet & Jobert, 1828

(1) Hrabarsko (Sofia Region). Late Miocene (Pontian; Bakalov & Nikolov 1962). Abandoned coal mines; Gnilyanska formation (Nikolov 1985). Cranial fragment with right maxilla and teeth. Whereabouts: Vertebrates Department, NMNHS - BAS.

(2) Baldevo (Blagoevgrad Region). Late Miocene (Pontian). Kanina coal mine (Baldevska formation; Nikolov 1985). Udescribed and unpublished finds (Geraads *et al.* 2011). Whereabouts: Unknown.

(3) Stanyantsi (Sofia Region). Late Miocene (Turolian, 5.80-5.35 Mya /Miocene-Pliocene boundary/) (Bohme *et al.* 2013). Udescribed and unpublished finds (Geraads *et al.* 2011). Whereabouts: Vertebrates Department, NMNHS - BAS.

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***Tapirus jeanpiveteaui* Boeuf, 1991**

(4) Hadzhidimovo – 1 (Blagoevgrad Region). Late Miocene (Meotian, Nevrokop formation; Spassov 2000). Late Miocene (Turolian - Late Meotian, end of MN 11 - beginning of the MN 12 zone; dated ca. 7.5 Mya; Spassov 2002). Whereabouts: Vertebrates Department, NMNHS - BAS.

***Tapirus balkanicus* Spassov & Ginsburg, 1999**

(5) Hrabarsko (Sofia Region). Late Miocene (Pontian – Upper Turolian). Maxilla dex. with P1-M3, P1-P2 incomplete, and P3-P4 sin. Whereabouts: Paleontological Museum of Sofia "St. Kliment Okhridski" in Sofia (Spassov & Ginsburg 1999).

(6) Balsha (Sofia Region). Late Miocene (Middle Pontian). Fragment of a hemimandibula dex. (Spassov & Ginsburg 1999). Whereabouts: Vertebrates Department, NMNHS - BAS.

***Tapirus* sp. – 1**

(7) Gaber (Sofia Region). Coal mine Beli Breg near the Gaber village. Whereabouts: Unknown. Udescribed and unpublished finds (Geraads *et al.* 2011).

***Tapirus* sp. – 2**

(8) Gabra (Sofia Region). Middle Miocene. Coal mine Chukurovo near Gabra village (Nikolov 1985). Whereabouts: Unknown.

***Tapirus* sp. – 3**

(9) Strumyani – 2 (Blagoevgrad Region). Late Miocene (Turolian). Near the Strumyani village (Geraads *et al.* 2011). Whereabouts: Vertebrates Department, NMNHS - BAS.

***Tapirus* sp. – 4**

(10) Ploski (Blagoevgrad Region). Late Miocene. Udescribed and unpublished finds (Geraads *et al.* 2011). Whereabouts: Unknown.

Conclusions

Fossil and subfossil records of tapirs in Bulgaria covers 7 taxa (4 unspecified) from 10 localities, the oldest one of Turolian (ca. 11-7 Mya). All localities of tapirs in Bulgaria are located in the Southwest part of the country in two regions – Sofia (5) and Blagoevgrad (4). All of them are located South of the Balkan Range and West of the Rila-Rhoropes mountain massif, i. e. in the late Neogene Sofia Lake and the valleys of the larger rivers in the region, Struma and Mesta (Fig. 1). All sites completely confirm locations of the s. c. "Pontian" (late Miocene) 6 large water basins (freshwater inland lakes) after Kojumdzieva (1989) – basins of Stanyantsi, Beli Breg, Aldomirovtsi, Sofia (lacustrine-palustrine sediments), and basins of Sandanski and Gotse Delchev (proluvial sediments).

The variety of forms strongly confirms the former conclusion of Geraads *et al.* (2011), that "… Bulgaria and the northern Balkan area [were] the region with the largest number of Turolian Tapirus remains in Europe." (p. 459). Besides undescribed finds of Gaber, Gabra, Strumyani – 2, and Ploski, the three identified species (*Tapirus arvernensis*, *T. jeanpivetoui*, and *T. balkanicus*) allow to summarize that the Balkans were the region of the most varied tapirid megafauna in the Late Neogene (Miocene) in Europe.

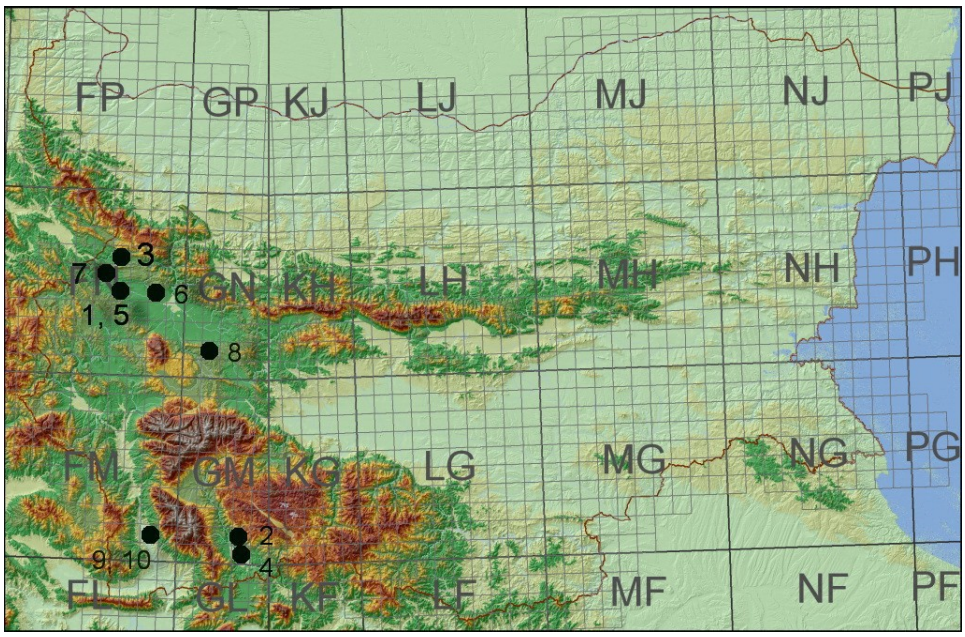

Fig. 1. Localities of fossil tapirs (*Tapirus* spp.) in Bulgaria: Hrabarsko (1, 5), Baldevo (2), Stanyantsi (3), Hadzhidimovo – 1 (4), Balsha (6), Gaber (7), Gabra, (8), Strumyani – 2, (9), Ploski (10).

References

Bakalov, P. & Nikolov, I. (1962) *Mammiferes Tertiaires.* Fossiles de Bulgarie, 10. BAS Publ, Sofia, 1-164 + 82 plts. (In Bulgarian, French summary).

Bohme, M., Aiglstorfer, M., Bullmann, L., Dolezych, M., Havlik, P., Hristova, L., Ilg, A., Markov, G., Ognjanova, N., Prieto, J., Uhl, D., Vasilyan, D. & Spassov, N. (2013) Staniantsi - An exceptional Vertebrate Locality from the Miocene-Pliocene Transition of Western Bulgaria. – *In:* Jagatay, N., Zabci, C. (Eds.). *Book of Abstracts of the RCMNS* 2013. Istanbul Technical University. General Directorate of Mineral Research and Exploration (MTA). Istanbul, 135.

Cozzuol, M. , Clozato, C. , Holanda, E. , Rodrigues, F., Nienow, S., De Thoisy, B., Redondo, R. & Santos, F. (2013) A new species of tapir from the Amazon. *Journal of Mammalogy*. 94(6): 1331.

Geraads D., Spassov N., Hristova L., Markov G. N., Tzankov T. (2011) Upper Miocene mammals from Strumyani, South-Western Bulgaria. *Geodiversitas* 33(3): 451-484.

Kojumdzieva, E. (1989) 2.E.1. Continental Pontian sediments in Southern Bulgaria. *Chronostratigraphie und Neostratotypen. Neogen der Westlichen ("Zentrale") Paratethys. Bd. VIII. Pontien. Aufgenommen in den Naturwissenschatlichcn Klassen am 25.06.1988. in SANU am 4.10.1988. in JAZU.* Jugoslawische Akademie der Wissenschaften und Künste Serbische Akademie de r Wissenschaften und Kiinste. Zagreb – Beograd, pp. 357-359.

Medici, E. (2011) Family Tapiridae (Tapirs). – *In:* Wilson, D.E., Mittermeier, R.A. (Eds.) 2011. *Handbook of the Mammals of the World.* Vol. 2. Hoofed Mammals. Lynx Editions, Barcelona, 182-205.

Nikolov, I. (1985) Catalogue of the localities of Tertiary Mammals in Bulgaria. *Paleontology, Stratigraphy and Lithology*, 25: 43-62.

Spassov, N. (2000) The Turolian Hipparion-fauna and the character of the environment in the Late Miocene of West Bulgaria. *Review of the Bulgarian Geological Society*, 61(1-3): 47-59.

Spassov, N. (2002) The Turolian Megafauna of West Bulgaria and the Character of the Late Miocene 'Pikermian biome'. *Bollettino della Societa Paleontologica Italiana*, 41(1): 69-81.

Spassov, N. & Ginsburg, L. (1999) *Tapirus balkanicus* nov. sp., nouveau tapir (Perissodactyla, Mammalia) du Turolien de Bulgarie. *Annales de Paléontologie*. Elsevier SAS. 85(4): 265-276.

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Agalmatium flavescens (Hemiptera, Issidae) and *Camponotus aethiops* (Hymenoptera, Formicidae) – an unknown trophobiotic association

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Abstract. The knowledge of trophobiosis between ants and planthoppers of the family Issidae is limited to studies of individual cases from Argentina, Mexico, India, the island of Naxos (Cyclades) and an anecdotal report from Italy. This paper reports a previously undescribed ant-attendance of *Agalmatium flavescens* (Olivier, 1791) (Hemiptera, Issidae) by *Camponotus aethiops* (Latreille, 1798). It includes a brief literature review and presents some ecological aspects of this new finding. In additions, live color photographs of *A. flavescens* and interactions with ants are provided.

Key words: ant-attendance, Issidae, *Agalmatium flavescens*.

Introduction

Trophobiosis commonly occurs in Auchenorrhyncha although it is not as common as in aphids and scale insects. There are much more surveys on relations between ants and members of the Cicadomorpha group (mainly family Membracidae from the tropics and subtropics) and much fewer within Fulgoromorpha. Among Fulgoromorpha, more than 70% of reports of ant-attendance concern the Tettigometridae species (Bourgoin 1997). The other fulgoromorphs involved in such associations are from the families Cixiidae, Delphacidae, Hypochthonellidae and Issidae. Little has been published on trophobiosis in issids, and few cases of attendance by ants have been described (Delpino 1875; O'Brien 1988; Dietrich & McKamey 1990; Gnezdilov & O'Brien 2008; Gnezdilov 2016).

Here, we present an observation of trophobiotic interactions between the planthopper species *Agalmatium flavescens* (Olivier, 1791) (Hemiptera, Issidae) and the ant species *Camponotus aethiops* (Latreille, 1798).

Results and Discussion

On the 9th of July 2016, near Ivan Vazovo vill. (GPS N42,4569 E24,7975, 252,23 m a.s.l.), 3 specimens (2♂ and 1♀) of *Agalmatium flavescens* (Olivier, 1791) were found being tended and antennated by ants of *Camponotus aethiops* on a field elm (*Ulmus minor* Mill.). The ant workers actively followed the planthoppers and antennated them, stimulating in this way the secretion of honeydew. Issids, in turn, showed no sessile behaviour and moved up and down the branches of the elm (Fig. 1). Upon approaching the bush for observation and photographing, *Agalmatium* specimens began moving, leaving the branch between them and the observer, where the ants also moved with them. The ants were not interested in numerous specimens of *Hyalesthes luteipes* Fieber, 1876 located on the same plant.

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Agalmatium flavescens (Fig. 2) is a polyphagous species that is most commonly found on bushes. The species is widespread in the Mediterranean. Yet, two species of *Agalmatium*, *A. flavescens* and *A. bilobum* (Fieber, 1877), are known in Bulgaria.

Previously, only 5 known cases of 6 issid species associated with ants had been reported (*Issus* sp. by Delpino (1875); *Asarcopus palmarum* Horvath, 1921 by O`Brien (1988); *Picumna* sp. by Dietrich & McKamey (1990); *Argepara lyra* (Berg, 1883) by Gnezdilov & O`Brien (2008), *Mycterodus colossicus* Dlabola, 1987 and *Agalmatium bilobum* (Fieber, 1877) by Gnezdilov (2016). Only two of the cases are related to Europe, Delpino (1875) and Gnezdilov (2016), and the former is somewhat anecdotal, based probably on misidentification of *Issus* sp. tended by *Formica pubescens* (now *Camponotus vagus* (Scopoli, 1763)). Apart from the observation by Dietrich & McKamey (1990), all others concern relationships with ant species from the *Camponotus genus*.

The present finding complements a recent report by Gnezdilov (2016) about shared presence of *Mycterodus colossicus* Dlabola, 1987 and *Agalmatium bilobum* (Fieber, 1877), together with aphids and coccids, tended by *Camponotus* (*Tanaemyrmex*) *ionius* Emery, 1920.

A. flavescens is a common species, and the lack of such observations until now suggests its facultative relationships with ants, in contrast to the opportunistic relationships seen in some other hemipterian species, in which ants collect honeydew from the substrate. However, in the case presented here, we observed antennation and honeydew drops directly collected by ants from the anal openings of issids.

Ant-attendance, both in the Issidae and the other Fulgoromorpha, are still understudied, and we assume that further detailed studies on the biology of planthoppers will prove that such ant-attendance is much more common than was previously known.

Fig. 1. *Agalmatium flavescens* (Olivier, 1791) and *Camponotus aethiops* (Latreille, 1798).

Fig. 2. *Agalmatium flavescens* (Olivier, 1791).

References

Bourgoin, T. (1997) Habitat and ant-attendance in Hemiptera: a phylogenetic test with emphasis on trophobiosis in Fulgoromorpha. *In*: Grandcolas, P. (Ed.), *The origin of biodiversity in Insects: phylogenetics tests of evolutionary scenarios. Memoirs du Museum d'Histoire Naturelle*, 173: 109-124.

Delpino, F. (1875) Altre osservazioni sui rapporti tra Cicadelle e Formiche. *Bullettino della Società Entomologica Italiana*, 46: 61-65.

Dietrich, C. H. & McKamey, S. H. (1990) Three new idiocerine leafhoppers (Homoptera: Cicadellidae) from Guyana with notes on ant-mutualism and subsociality. *Proceedings of the Entomological Society of Washington*, 92(2): 214-223.

Gnezdilov, V. M. (2016) Thesis of Doctoral Dissertation in Biology. Institute of Zoology, Russian Academy of Sciences.

Gnezdilov, V. M. & O'Brien, L. B. (2008) New taxa and combinations in Neotropical Issidae (Hemiptera: Fulgoroidea). *Insecta Mundi*, 31: 1-26.

O'Brien, L. B. (1988) Taxonomic Changes in North American Issidae (Homoptera: Fulgoroidea). *Annals of the Entomological Society of America*, 81(6): 865-869.

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Data on the distribution of freshwater harpacticoids (Crustacea, Copepoda) in Tierra del Fuego (Argentina)

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Abstract. All available data on the distribution of freshwater harpacticoids (Copepoda) in Grande de Tierra del Fuego Island are summarized. *Attheyella* (*Delachauxiella*) *nuda* Lëffler, 1961 inhabiting wet mosses in the valley of Martial Glacier near Ushuaia is newly established. The site marks the southernmost distribution of the species in Argentina.

Key words: *Attheyella*, Harpacticoida, distribution, South America.

Introduction

The studies on the freshwater harpacticoid fauna of Argentina are relatively scarce. *Attheyella* subg. *Delachauxiella* Brehm, 1925 have been reported in Argentina with five species: *A.* (*D.*) *aculeatus*, (Thiebaut, 1914), *A.* (*D.*) *incae* Brehm, 1936, *A.* (*D.*) *nuda* Lëfler 1961, *A.* (*D.*) *sancarlensis* (Rouch & Matsumura) and *A.* (*D.*) *trigonura* (Ekman, 1905).

Till the end of 20th century the freshwater harpacticoids of the archipelago of Tierra del Fuego were poorly known. Only *Attheyella trigonura* (Ekman, 1905) was signaled for this southernmost part of Argentina. Apostolov studying the fauna of wet mosses of the Martiel Glacier valley near Ushuaia described two new species: *Maraenobiotus australis* Apostolov, 2000 and *Antarctobiotus muscicolus* Apostolov, 2001.

The aim of present communication is to provide additional data for harpacticoid fauna of the Grande de Tierra del Fuego Island.

Material and Methods

2 ♀♀ *Attheyella* (*Delachauxiella*) *nuda* gathered from wet mosses in the valley of Martial Glacier near Ushuaia, Grande de Tierra del Fuego Island, Argentina (54⁰ 47' 13.67" S, 68⁰ 23' 38.12" W), altitude 630 m, 11.01.1999.

Samples were collected by many times rinsing bryophytes and then filtering the water through a hand-held net. The material was fixed in 70% ethanol for long-term storage.

Results and Discussion

The two studied female specimens belongs to *Attheyella* (*Delachauxiella*) *nuda* and completely fit with the original species description given by Löffler (1961) on the basis of female individuals found in two forest lakes: Vilarica and Llianquihue in Southern Chile.

During the study of soil fauna in Argentina Rouch (1962) reported the species *Attheyella* (*Delachauxiella*) *nuda* in South America (Andean Patagonia) at the following six locations without precise coordinates:

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- El Bolson. Sol hummide de Libocedrus;
- Arroyo Pilmaiquen. Réserve du Nahuel Huapi;
- Lago Puelo, Province de Chubut;
- Sable fin avec débrie de Nothofagus;
- Las Azucemas. Province de Tucuman, 1500 m d'altitude;
- Lago Futalaufquen.

A. (*Delachauxiella*) *nuda* mainly inhabits wet mosses. According to Rouch (1962) it successfully colonized *Libocedrus* wet soil and fine sand with Nothofagus debris. As Rouch (op. cit.) points out, the species is still found in the coastal interstitial waters of forest lakes.

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References

Apostolov, A. (2000) Contribution à l'étude de la faune harpacticoïdienne d'eau douce de l'Argentine (Terre de Feu). 1. Genre *Antarctobiotus* Chappuis, 1930 avec description d'une nouvelle espèce des mousses humides. *Rivista di Idrobiologia*, 39(1/2/3): 153-163.

Apostolov, A. (2001) Contribution à l'étude de la faune harpacticoïdienne d'eau douce de l'Argentine (Terre de Feu). 2. Genre *Maraenobiotus* Mràzek, 1893 avec description d'une nouvelle espèce *Maraenobiotus australis* n. sp. *Bolletino del Museo Regionale di Scienze Naturali, Torino*, 18(2): 355-364.

Lëffler, H. (1961) Zur systematic und ökologie der chilensischen süβwasserentomostraken. *Beiträgen zur Neotropischen fauna*, 2(3):146-222.

Rouch, R. (1962) Harpacticoides (Crustaces, Copepodes) d'Amérique du Sud. Biologie de L'Amérique Australe. *Etudes sur la faune du Sol*, 1: 237-280.

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Late Neolithic and Late Antiquity avian finds of Chavdarova Cheshma (Simeonovgrad, Haskovo Region)

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Abstract. A total of 6 taxa of 1(2) domestic and 4(5) wild birds have been identified, among them two critically endangered (*Anser erythropus* and *Otis tarda*), one endangered (*Gyps fulvus*) and one vulnerable (*Aquila chrysaetos*). In addition *Gallus gallus domestica* and *Anser anser* ? *domestica* have been recorded. Chicken find came of Late Antiquity (3-4 century AD), and all other finds are dated Late Neolithic (4900-4850 BC).

Key words: Subfossil, birds, Holocene.

Introduction

The prehistoric settlement is situated in the Chavdarova Cheshma locality in the periphery of the town of Simeonovgrad (Haskovo Region). It was located on the right bank of Maritsa River (Georgiev *et al.*, 2016). The first excavations started in the 1960-s and materials and structures from the Early and Late Neolithic, Chalcolithic, Bronze and Iron ages, as well as Roman and Medieval periods, have been revealed. The rescue excavations in 2014-2015 because of the constructing of the Maritsa Highway in the region revealed best the Late Neolithic settlement of ca. 200 decares. The pottery features allowed to date these materials to the phases III and III/IV of the Karanovo culture (i. e. 2nd half of the 6th millennium BC (Georgiev *et al.*, 2016).

Material and Methods

Recently (May, 2017) a small sample of avian finds been handed for examination by MSc Nadezhda Karastoyanova (NMNHS – BAS). They originated from the archaeological excavations (May-July 2015; depth 4.76-6.89 m) and are dated late Neolithic (Karanovo IV culture), i. e. 4900-4850 BC. Only one find (No 17 237, chicken) came of Late Antiquity (3-4 century AD) (N. Karastoyanova – unpubl. data).

The finds have been identified through the comparative osteological collections of the Vertebrate Animals Department of the National Museum of Natural History, Bulgarian Academy of Sciences. They are kept at the same department.

Results and Discussion

A total of 6 taxa of 1(2) domestic and 4(5) wild birds have been identified (Table 1). Four species are listed in the Bulgarian Red Data Book. Two species are critically endangered (*Anser erythropus* and *Otis tarda*), one is endangered (*Gyps fulvus*) and one is vulnerable (*Aquila chrysaetos*) (Golemanski *et al.*, 2015).

The presence of a find of domestic chicken confirms once again the wide distribution of that bird on the Balkans in the Antiquity. Until now the oldest record of *Gallus gallus domestica* came from the late Chalcolithic settlement near Hotnitsa village (Veliko Tarnovo

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Region) (Boev, 2009a), and the early Bronze Age settlement near Dyadovo village (vicinity of the town of Nova Zagora (Stara Zagora Region) (Boev, 2006), both dated ca. 5000 BC, the Chalcolithic-Early-Bronze-Age settlement near Galabovo (Stara Zagora Region), dated ca. 4000 BC (Boev, 2004), and the early Neolithic settlement near Yabalkovo village (Haskovo Region), dated 4500 BC (Boev, 2009b).

The find of "*Anser anser* (Linnaeus, 1758) cf. *domestica*" could not be identified further as it represents only a distal third of a humeral bone, but dimensionally fits to females of modern non-meat specialized breeds of domestic geese and the wild Graylag goose.

Chavdarova Cheshma is the 2nd record of the Lesser white-fronted goose from the Early Neolithic in Bulgaria. So far it was found in only the settlement of Slatina (pr. Sofia City) (Boev, 2009c). Other species' records came from the early Chalcolithic settlement in Burgas (Boev, 2009d), early Bronze Age (Urdoviza, pr. town of Kiten), medieval capital of Veliki Preslav (9-10th century AD) and Devetashka Cave (Late Pleistocene) (Boev, 1999).
Obviously, both finds of the Great Bustard could be explained by the meat utilization of this highly valuable hunting bird. They once again confirm that the Thracian Plain was one of the largest regions of its distribution in the country in the Neolithic and Chalcolithic. The occurrence of *O. tarda* in Bulgaria until now documented very well the wide former distribution throughout all the country.

Remains of large diurnal raptors (including *Gyps fulvus* and *Aquila chrysaetos*) are found relatively often in the Neolithic, Chalcolithic and Bronze Age settlements in Bulgaria (Boev, 1999, 2004). The location of the site (pr. town of Simeonovgrad) is close (10-15 km away) to two mountains (Sakar and Eastern Rhodopes), providing rock habitats for resting and nesting.

Although not numerous, the avian remains complete the information on the past (Holocene) distribution of some of the rarest at present birds species in Bulgaria in the 5th millennium BC in Bulgaria.

Table 1. Composition and representation of the examined animal remains from Chavdarova Cheshma (Simeonovgrad, Haskovo Region)

№	Taxa	English names	Bone finds	NMNHS collection No
Domestic birds				
1	*Gallus gallus domestica* (Linnaeus, 1758)	Domestic chicken	tarsometatarsus sin. dist. ad.	17 237
2	*Anser anser* (Linnaeus, 1758) cf. *domestica*	Graylag (? domestic) goose	humerus dex. dist. ad.	17 442
Wild birds				
3	*Anser erythropus* (Linnaeus, 1758)	Lesser white-fronted goose	coracoid sin. ad.	17 245
4	*Otis tarda* Linnaeus, 1758	Great bustard	carpometacarpus sin. prox. ad.	17 531
5	*Otis tarda* Linnaeus, 1758	Great bustard	carpometacarpus sin. dist ad.	17 236
6	*Gyps fulvus* (Hablizl, 1783)	Eurasian Griffon	carpometacarpus dex. prox. ad.	17861
7	*Aquila chrysaetos* (Linnaeus, 1758)	Golden Eagle	humerus dex. prox. ad.	17 652

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References

Boev, Z. (1996) Raptors and Owls (Aves: Falconiformes et Strigiformes) in the Archaeological Record of Bulgaria. *Historia naturalis bulgarica*, 6: 83-92.

Boev, Z. (1999) Neogenski i kvaternerny ptitsi (Aves) ot Balgariya (Neogene and Quaternary birds (Aves) from Bulgaria). – Natsionalen prirodonauchen muzey, Balgarska akademiya na naukite, Sofia, D. Sci. Thesis, Tom I, Osnovna chast, 1-243; Tom II, Dopalnenie 1 – Fuguri, 1-135; Tom II, Dopalnenie 2 – Tablitsi, 1-108. [in Bulgarian].

Boev, Z. (2004) Middle and Late Holocene birds from the Eastern Upper Thracian Plane (S Bulgaria). *Historia naturalis bulgarica*, 16: 123-132. [in Bulgarian, English summary].

Boev, Z. (2006) Avian remains from the Early Bronze Age settlement near Dyadovo village (vicinity of the town of Nova Zagora, Stara Zagora Region, SE Bulgaria) *Historia naturalis bulgarica*, 17: 133-135.

Boev, Z. (2009a) Avian remains from the Late Chalcolithic settlement near Hotnitsa Village (Veliko Tarnovo Region, CN Bulgaria). *Acta zoologica bulgarica*, 61(1): 49-54.

Boev, Z. (2009b) Avian Remains from the Early Neolithic Settlement Near Yabalkovo Village (Haskovo Region, South-East Bulgaria). *Acta zoologica bulgarica*, 61(3): 317-322.

Boev, Z. (2009c) Avian remains from the Early Neolithic settlement of Slatina (Present Sofia City, Bulgaria). *Acta zoologica bulgarica*, 61(2): 151-156.

Boev, Z. (2009d) Avian remains from the Early Chalcolithic settlement in Burgas (SE Bulgaria). *Acta zoologica bulgarica*, 61(2): 157-160.

Georgiev, S., Balkanska, E., Boyadzhiev, K., Andonova, A. & Boyadzhiev, Y. (2016) Stone tools features from the Late Neolithic settlement Chavdarova Cheshma – Simeonovgrad, Bulgaria. - Bulgarian Geological Society, National Conference with international participation "GEOSCIENCES 2016", 173-174.

Golemanski, V., Beron, P., Zivkov, M., Popov, A., Popov, V., Beschkov, V., Deltshev, C., Michev, T., Spassov, N., Stoev, P. & Dobrev, D. (Eds) (2015) Red Data Book of the Republic of Bulgaria. Volume 2. Animals. IBEI – BAS & MOEW, Sofia, 1-381.

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Avian finds from the Early Neolithic settlement near Kapitan-Dimitrievo village (Pazardzhik Region)

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Abstract. Two finds of Great bustard (*Otis tarda*) and Rook (*Corvus frugilegus*) have been identified among the materials of the kitchen debris from the Early Neolithic (ca. 6000 BP) settlement near Kapitan-Dimitrievo village (Pazardzhik Region). They indicate open grassland habitats in its vicinities.

Key words: Subfossil, birds, Holocene.

Introduction

The settlement mound is situated in the periphery of the Kapitan-Dimitrievo village (Pazardzhik Region). It was formed during ca. 4000 years through the accumulation of the remains of several dozens of villages, built at the same place one over other. First cultural layers are dated at the beginning of 6th millennium BC. The settlement lasts until the beginning of 2nd millennium BC, being one of the longest-lasting occupied settlements in Europe.

The archaeological excavations started in 1947-1948, followed by a long interruption. Half a century later, they started again in 1998. The environmental conditions were favorable in the past, as a small river (Pishmanka River) flow nearby, besides many springs. Fertile soils in the river valley and forested slopes of the Rhodope Mountains were favorable both for agriculture and hunting.

Up to 2005 a total of 1470 animal bones and mollusk shells have been excavated (Nikolay Spassov, Nikolay Iliev, Zlatozar Boev – unpubl. data) under the leadership of Prof. Vasil Nikolov (National Archaeological Institute and Museum, BAS).

Accotiated fauna: A total of 14 species/forms of wild and domestic animals have been collected: domestic - pig (*Sus scrofa domestica* Erxleben, 1777), sheep (*Ovis aries* Linnaeus, 1758), goat (*Capra hircus* Linnaeus, 1758), cattle (*Bos taurus* Linnaeus, 1758), and dog (*Canis familiaris* (Linnaeus, 1758)); wild – red deer (*Cevus elaphus* Linnaeus, 1758), wild boar (*Sus scrofa* Linnaeus, 1758), roe deer (*Capreolus capreolus* (Linnaeus, 1758)), aurochs (*Bos primigenius* (Bojanus, 1827)), chamois (*Rupicapra rupicapra* Linnaeus, 1758), hare (*Lepus europaeus* Pallas, 1778), red fox (*Vulpes vulpes* (Linnaeus, 1758)), wildcat (*Felis silvestris* Schreber, 1777) and a mollusk (*Unio* Philipsson, 1788 sp. indet.) (identifications of Nikolay Spassov and Nikolay Iliev).

Material and Methods

All animal remains came from the leftovers of the prehistoric dwellers of the settlement, s. c. kitchen debris). The collected bird finds consists in 2 bones of the wings of 2 large birds. They have been identified through the comparative osteological collections of the Vertebrate Animals Department of the National Museum of Natural History, Bulgarian Academy of Sciences, and are kept at the same department.

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Results

Great bustard (*Otis tarda* Linnaeus, 1758). Material: NMNHS 15083, male ad. phalanx digiti majoris dex. Dimensions: general maximal length - 51.45 mm, maximal width of proximal epiphysis – 11.5 mm, maximal width of the distal epiphysis - 7.2 mm. Notes: The site of Kapitan-Dimitrievo lies out of the recent species' breeding range (Hagemeijer & Blair, 1997). The great bustard was found in many sites in the Thracian Plain (Boev, 2003, 2017). With regard to the preferred breeding habitat, *O. tarda* is a dweller of the open grasslands steppes. It is a terrestrial breeding bird and was a traditional hunting object from the Paleolithic to the (almost) modern times (until 1950-s).

Rook (*Corvus frugilegus* Linnaeus, 1758). Material: NMNHS 15084, carpometacarpus sad., dex. Dimensions: general maximal length - 45.8 mm, maximal width of proximal epiphysis – 5.5 mm, thickness at the middle of os metacarpalis majus - 2.8 mm. Notes: The site of Kapitan-Dimitrievo lies out of the recent species' breeding range (Hagemeijer & Blair, 1997). The rook is known 12 sites dated from the late Pleistocene to the Middle Ages Devetashka cave, Cave No 16, Gledachevo, Malak Preslavets, Nicopolis-ad-Istrum, (Boev, 1999, 2004), Gornik Cave (Boev, 2012), Topchii (Mitev & Boev, 2006), Shirokovo, Pisanets, Popmartinova cave, Isperih, and Karapelit (Mitev, 2016). With regard to the preferred breeding habitat, *C. frugilegus* is a dweller of the open tree-less habitats. It nests in the crowns of tall single trees with a wide view around. Rooks could be exploited for meat.

Conclusions

The birds found in the site represent an indication for extensive open spaces in the vicinity of the settlement. Most likely, we have to assume that there were territories to the north of it related to the Thracian lowland. This fact leads to the assumption that this area of the Thracian lowland at the beginning of the Neolithic period was less forested than in the late historic times, when there was evidence of the presence of vast ancient forests (Boev, 2010). Such an assumption corresponds to the appearance of vegetation in the early Holocene in general (Prof. E. Bozhilova, Sofia University - personal comm.).

The hunting in the economy of the Neolithic settlement near Kapitan-Dimitrievo had an important share.

References

Boev, Z. (1999) *Neogenski i kvaternerny ptitsi (Aves) ot Balgariya (Neogene and Quaternary birds (Aves) from Bulgaria)*. – Natsionalen prirodonauchen muzey, Balgarska akademiya na naukite, Sofia, D. Sci. Thesis, Tom I, Osnovna chast, 1-243; Tom II, Dopalnenie 1 – Fuguri, 1-135; Tom II, Dopalnenie 2 – Tablitsi, 1-108. (in Bulgarian).

Boev, Z. (2003) Distribution of the Little Bustard (*Tetrax tetrax* /Linnaeus, 1758/) and the Great Bustard (*Otis tarda* Linnaeus, 1758) (Aves: Otididae Gray, 1845) in Bulgaria during the Late Pleistocene and the Holocene. *Annual of Sofia University "St. Kliment Ochridski"*, Faculty of Biology, Book 1 – Zoology, 93-94, 41-47.

Boev, Z. (2004) Middle and Late Holocene birds from the Eastern Upper Thracian Plane (S Bulgaria). *Historia naturalis bulgarica*, 16: 123-132. (in Bulgarian, English summary).

Boev, Z. (2010) Pliocene and Quaternary paleoenvironment in Bulgaria - a brief review. - *In*: Petkov (Ed.). *Bulgaria and the Bulgarians in Europe*. Union of the Scientists in Bulgaria. Veliko Tamovo Branch. Faber Publ. House, Veliko Tamovo. 266-384. (in Bulgarian, English summary).

Boev, Z. (2012) Sub-recent avian remains from two cave localities of the Devetashko Plateau (Lovech Region, CN Bulgaria). *ZooNotes*, 31: 1-3.

Boev, Z. (2017) Late Neolithic and Late Antiquity avian finds of Chavdarova Cheshma (Simeonovgrad, Haskovo Region). *ZooNotes*, 111: 1-3.

Hagemeijer, W. & Blair M. (eds.) (1997). *The EBCC Atlas of European Breeding Birds*. Their Distribution and Abundance. T & A D Poyser, London, 903 pp.

Mitev, I. (2016) Subfossil fauna of birds and mammals (Aves et Mammalia – Vertebrata) from localities of North-Eastern Bulgaria. – *In*: Mitev, I. 2016. *Collected Works. Vol. 1 Bulgarian Nature*. Logis Publ. House, Sofia, 203-691.

Mitev, I., Boev, Z. (2006) Food spectrum of the Eagle Owl (*Bubo bubo* (L., 1758)) (Aves: Strigiformes) from two Holocene localities in NE Bulgaria. *Historia naturalis bulgarica*, 17: 153-165.

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Updated and corrected list of the inland molluscs of Samothraki Island (N Aegean, Greece)

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Abstract. A list of all valid and published species of freshwater and terrestrial molluscs from Samothraki Island (N Aegean, Greece) is provided. A total of 41 species of inland Mollusca are known from this island: Bivalvia – 1 species, freshwater snails – 6 species and terrestrial snails - 34 species. Some species remained with unclear taxonomic status and need future studies.

Key words: Gastropoda, Bivalvia, Samothraki, Greece.

Introduction

This is a revision of the paper we published in 2010 (Georgiev & Stoycheva 2010). The results of collections during my first visit to the island in 2008, and some new collection trips with data obtained between 08-14.07.2017 allowed me to provide an updated and corrected list of the inland malacofauna of Samothraki Island.

Material and Methods

Literature survey of all published data on terrestrial and freshwater molluscs for Samothraki Island was done (Fuchs & Käufel 1936, Reischütz 1986, 1988; Riedel & Reischütz 1988; Riedel 1992; Wiktor 2001; Nordsieck 2007; Georgiev & Stoycheva 2010; Bank *et al.* 2013; Neubert 2014). Some of my mistakes published in Georgiev & Stoycheva (2010) have been corrected. New materials (shells and living snails) were collected at the following localities on Samothraki Island:

1. Bush and grass areas around hotel Kastro near Paleopoli, N40 30 11.6 E25 31 18.3, 25 m a.s.l., 08-10.07.2017;

2. Grass and phrygana (*Sarcopoterium spinosum*) terrains near Kipos Beach, N40 25 22.9 E25 41 20.4, 10 m a.s.l., 09.07.2017;

3. Bush area and trees along small drying stream (mainly *Olea europaea*, *Platanus orientalis*, *Quercus coccifera* and *Nerium oleander*) near Pachia Ammos Beach, N40 23 42.1 E25 34 45.4, 11 m a.s.l., 09-13.07.2017;

4. Grass and bush (*Pyrus* sp., *Paliurus spina-christii*) terrains near the road Paleopoli-Kamariotissa, N40 30 05.9 E25 34 45.4, 11 m a.s.l., 10.07.2017;

5. A *Platanus orientalis* forest and stream above Therma, N40 29 40.5 E25 36 03.9, 84 m a.s.l., 10.07.2017;

6. A rocky limestone area near and around the cave of Chora, between N40 28 50.1 E25 31 40.3 and N40 28 46.8 E25 31 39.1, 216-245 m a.s.l., 10.07.2017;

7. A small stream and its surroundings below the fort of Chora occupied by *Mentha* sp., *Origanum* sp., *Satureja* sp., *Nerium oleander* and single *Platanus orientalis*, and *Pyrus* sp.

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Results and Discussion

A total of 41 species of inland Mollusca are known from this island: Bivalvia – 1 species, freshwater snails – 6 species and terrestrial snails - 34 species (Tab. 1). Three snail species are new records to Samothraki: *Mastus etuberculatus*, *Rupestrella rhodia* and *Tandonia kusceri* (Fig. 1).

It was evident from previous publications and my recent visit on Samothraki that most species are accumulated at the limestone areas near village of Chora. The highest parts of Fengari Mts. are probably not inhabited by molluscs or they are extremely rare in this area. No snails were found in the cave of Chora. That habitat was completely destroyed by goats.

Vitrea schneideri reported from the bank of the stream of Therma village in Georgiev & Stoycheva (2010) refer to *V. contracta*.

The record of *Monacha subobstructa* (Bourguignat, 1855) was not correct. Anatomically only *M. cartusiana* was proved to occur on the island.

Mastus pupa (Linnaeus 1758) and *Lindholmiola girva* (Frivaldszky 1835), wrongly omitted by me, actually occur on Samothraki.

The taxonomy of the species of the genus *Mastus* on Samothraki is still not clear and has to be revised in future studies. Most problematic is the group *pupa/rossmaessleri/grandis*.

Fig. 1. *Tandonia kusceri* in its habitat on Samothraki: under a stone in a *Platanus orientalis* forest along the stream near Pachia Ammos Beach.

Tab. 1. Updated and corrected list of freshwater and terrestrial molluscs reported from Samothraki. The locality numbers correspond with those in Material and Methods. In grey – new records to the island, lit. – previous records.

Species	Locality/record
Acanthinula aculeata (Müller, 1774)	lit.
Ancylus fluviatilis Müller, 1774	lit.
Balcanodiscus magnus P. L. Reischütz, 1988	lit., 6
Bulgarica mystica (Westerlund, 1893)	lit., 6
Bythinella cabirius (P. L. Reischütz, 1988)	lit.
Carpathica wirthi Forcart, 1971	lit.
Cecilioides acicula (Müller, 1774)	lit.
Cernuella virgata (Da Costa, 1778)	lit., 1
Cornu aspersum (Müller, 1774)	lit.
Deroceras oertzeni Simroth, 1889	lit.
Eobania vermiculata (Müller, 1774)	lit., 1
Ferrissia wautieri (Mirolli, 1960)	lit.
Galba truncatula (Müller, 1774)	lit., 5
Helix figulina Rossmässler, 1839	lit., 1, 2, 3, 4, 6
Helix lucorum Linnaeus, 1758	lit., 1, 2, 3
Idyla bicristata (Rossmässler, 1839)	lit., 6
Islamia bendidis P. L. Reischütz ,1988	lit.
Lauria cylindracea (Da Costa, 1778)	lit.
Lindholmiola girva (Frivaldszky, 1835)	lit., 1
Lindholmiola lens (Férussac, 1832)	lit., 1, 6
Mastus etuberculatus (Frauenfeld, 1867)	6
Mastus pupa (Linnaeus, 1758)	lit.
Mastus rossmaessleri (L. Pfeiffer, 1847)	lit., 1, 6
Metafruticicola noverca (Pfeiffer, 1853)	lit., 1, 6
Monacha cartusiana (Müller, 1774)	lit., 4
Oxychilus glaber (Rossmässler, 1835)	lit.
Paralaoma servilis (Shuttleworth, 1852)	lit.
Pisidium casertanum (Poli, 1791)	lit.
Punctum pygmaeum (Draparnaud, 1801)	lit.
Pupilla triplicata (Studer, 1820)	lit.
Pyramidula rupestris (Draparnaud, 1801)	lit., 6
Rupestrella rhodia (Roth, 1839)	6
Sphyradium doliolum (Bruguière, 1792)	lit.
Tandonia kusceri (Wagner, 1931)	3
Tandonia sowerbyi (Férussac, 1823)	lit.
Theodoxus euxinus (Clessin, 1886)	lit., 7
Trochoidea pyramidata (Draparnaud, 1805)	lit., 1
Truncatellina rothi (Reinhardt, 1916)	lit.
Vitrea schneideri Riedel & P. L. Reischütz, 1988	lit., 6
Xerolenta obvia (Menke, 1828)	lit., 1, 6
Xerotricha conspurcata (Draparnaud, 1801)	lit., 1

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References

Bank, R., Gittenberger, E. & Neubert, E. (2013) Radiation of an eastern Mediterranean landsnail genus: revision of the taxa belonging to *Metafruticicola* von Ihering 1892. *Archiv für Molluskenkunde*, 142(1) : 67-136.

Fuchs, A. & Käufel, F. (1936) Anatomische und systematische Untersuchungen an Land- und Süßwasserschnecken aus Griechenland und von den Inseln des Ägäischen Meeres. *Archiv für Naturgeschichte* N. F. 5(4): 541-662.

Georgiev, D. & Stoycheva, S. (2010) Notes on the ecology and species diversity of the inland molluscs of Samothraki Island (North-Eastern Greece). *North-Western Journal of Zoology*, 6(1): 71-78.

Neubert, E. (2014) Revision of Helix Linnaeus, 1758 in its eastern Mediterranean distribution area, and reassignment of Helix godetiana Kobelt, 1878 to Maltzanella Hesse, 1917 (Gastropoda, Pulmonata, Helicidae). *Contributions to Natural History*, 26: 1-200.

Nordsieck, H. (2007) *Worldwide door snails (Clausiliidae), recent and fossil*. ConchBooks, Hackenheim, Germany, 214 pp.

Reischütz, P. (1986) Beiträge zur Molluskenfauna der Ägäischen Inseln. *Malakologische Abhandlungen*, 11: 93-103.

Reischütz, P. (1988) Beiträge zur Molluskenfauna Thrakiens und Ostmakedoniens, II. *Annalen des Naturhistorischen Museums in Wien*, 90B: 341-356.

Riedel, A. (1992) *The Zonitidae (sensu lato) (Gastropoda, Pulmonata) of Greece*. Faunae Graeciae 5, Natural History Museum of Crete, University of Crete, Irakleio, 194 pp.

Riedel, A. & Reischütz, P. (1988): Beiträge zur Molluskenfauna Thrakiens und Ostmakedoniens: I. *Vitrea schneideri* n. sp. von Samothrake. *Annalen des Naturhistorischen Museums in Wien*, 90B: 149-151.

Wiktor A. (2001) *Fauna Graeciae VIII: The slugs of Greece (Arionidae, Milacidae, Limacidae, Agriolimacidae - Gastropoda, Stylommatophora)*. Natural History Museum of Crete, University of Crete, Irakleio, 241 pp.

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Rubrapterus bavius (Eversmann, 1832), a butterfly genus and species new to Bulgaria (Insecta, Lepidoptera, Lycaenidae)

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Abstract. *Rubrapterus bavius* (Eversmann, 1832), a steppe specialist of conservation concern in Europe, is reported from Sakar Mts. in Bulgaria: the first Bulgarian record of this species and of genus *Rubrapterus* Korshunov, 1987. The reported population has a remarkably late flight time and appears to be trophically connected to *Salvia pratensis* Linnaeus, 1753, not yet recorded as a larval host-plant of *R. bavius* in the wild.

Key words: *Rubrapterus*, *bavius*, Bulgaria.

Introduction

The butterfly *Rubrapterus bavius* (Eversmann, 1832) occurs in the steppes of South-eastern Europe and Western Asia. Its only congener, *R. fatma* (Oberthür, 1890), occurs in Northern Africa (Coutsis 2008). *Rubrapterus* Korshunov, 1987 is usually placed within genus *Pseudophilotes* Beuret, 1958 but molecular analysis shows that these sister taxa are much more diverged from each other than most other well-established sister genera within that section of Lycaenidae (Ugelvig *et al.* 2011). This supports the status of *Rubrapterus* as a distinct genus, as originally described.

The larvae of *R. bavius* feed on flowers of *Salvia* (Lamiaceae): so far, *S. nutans* Linnaeus, 1753 (König 1992), *S. verbenaca* Linnaeus, 1753 (Tolman 1992), *S. palaestina* Bentham, 1835 (ten Hagen 1996), *S. officinalis* Linnaeus, 1753 (Tolman 1997), *S. nemorosa* Linnaeus, 1762 (Budashkin 2003; Tikhonov et al. 2017), and *S. canescens* C.A. Meyer, 1831 (Tikhonov *et al.* 2017) have been recorded in the wild. *R. bavius* is monovoltine; the adults fly for 4-7 weeks from mid-April till mid-May (Crişan *et al.* 2011) or early June (Budashkin 2003), locally even until early July (Pamperis 2009; Tikhonov *et al.* 2017).

In the EU, *R. bavius* is known only from Greece and Romania where is locally threatened by overgrazing (Tolman 1992) or overgrowing (Crişan *et al.* 2011) and is listed on Annexes II and IV of the Habitats Directive 92/43/EEC. The Romanian range of *R. bavius* has generated expectations that it should occur in North-eastern Bulgaria (Abadjiev & Beshkov 2007; Dincă *et al.* 2011), but targeted search there has been futile (Beshkov 2011; pers. observ. 2009-2017). My search for the species in Bulgaria has been more extensive, considering records from neighboring states and the occurrence of recorded host-plants (Assyov *et al.* 2012) in Bulgaria. Since 2009, I have surveyed a total of 54 calcareous sites with various *Salvia* spp. at altitudes up to 1000 m across Bulgaria (Fig. 1).

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Fig. 1. 1 - Records of *Rubrapterus bavius* in the Balkan Peninsula and adjacent regions. Triangles: personally surveyed localities (2009-2017). Solid black dots: confirmed records; white, black-centered dots: old and/or unconfirmed records (after Akimov 2009; Dincă *et al.* 2011; HabiProt 2017; Hesselbarth *et al.* 1995; Kovanci *et al.* 2009; Pamperis 2009; Savchuk 2017; Švara *et al.* 2016; Székely 2008; Székely 2016; Verovnik 2012), red dot: first Bulgarian record (Sakar Mts.) (Map: Google Earth ®). 2 - Upperside, 3 - underside (Fig. 3) of *R. bavius* ♂, Sakar Mts., 12.06.2017, photos: Z. Kolev.

Results and Discussion

In May 2017, as a member of a biological expedition I visited the small Sakar Mts. (maximum altitude 856 m) in South-eastern Bulgaria. On 13.05.2017, in the foothills outside Topolovgrad at below 360 m a.s.l., I located a population of *Salvia nutans* on ca. 2700 m², with ca. 200 plants in full bloom, but found no *R. bavius*. By 12.06.2017, *S. nutans* had ceased flowering but another congener, *Salvia pratensis* Linnaeus, 1753 (R. Vassilev det.), was in full flower. The latter species, widespread in Bulgaria up to 1000 m a.s.l. (Assyov *et al.* 2012), was abundant in woodland glades and ruderal habitats (roadsides and verges of cultivated land) in the visited region. I surveyed a continuous area of ca. 4.9 ha containing mostly *S. pratensis* at varying densities as well as single flowering specimens of *Salvia sclarea* Linnaeus, 1753.

My repeated visits to the area produced a total of three specimens of *Rubrapterus bavius*: 1 ♂ on 12.06.2017 (Fig. 1: 2, 3), 1 ♀ on 21.06.2017, and 1 ♂ on 22.06.2017. They correspond well to the subspecies *Rubrapterus bavius egea* (Herrich-Schäffer, [1852]) which ranges from North-eastern Turkey to the Western Balkans (Hesselbarth *et al.* 1995) except the Peloponnesus (Coutsis 2008). All specimens are very fresh which, considering the lack of adults in mid-May and the warm climate of the region, indicates a very late flight period. No specimens were observed on 20.07.2017. All observations were within 2 m of a *S. pratensis* plant; none were within less than 40 m of the other recorded *Salvia* species. Thus, *S. pratensis* is inferred to be the larval host-plant of *R. bavius* here. All butterflies were found within a patch of ca. 500 m² which was not isolated in any perceivable way from the remaining area with a similar abundance of *S. pratensis*. This agrees with observations on the puzzlingly erratic localisation of *R. bavius* populations within a seemingly uniform habitat in Greece (Tolman 1992), and suggests that the availability of a larval host-plant is not the primary limiting factor for the occurrence of the butterfly. My survey indicates that the population is very small and, given the apparently limited breeding habitat, is probably of conservation concern.

The first definitively proven population of *Rubrapterus bavius* in Bulgaria is remarkable for several reasons. It is far from where the species has been expected to occur in Bulgaria, being ca. 250 km from the nearest Romanian populations (Dincă *et al.* 2011; Székely 2008; Székely 2016). The new locality is also very dissimilar in its climate, which is mild, sub-Mediterranean in Sakar vs. cold, temperate continental in South-eastern Romania. This population is even farther, ca. 300 km, from the nearest populations in Turkey (Kovanci *et al.* 2009). The newly reported locality thus fills a significant gap between the previously known Balkan and Turkish populations of *R. bavius*. Significant new biological data are:

1. the observed close spatial and temporal association of *R. bavius* with, and inferred trophic connection to, *Salvia pratensis* which has not been reported as a larval host in nature despite being accepted by larvae of *R. bavius* in captivity (ten Hagen 1996); and

2. the remarkably late flight period (from the second decade of June till mid-July, based on the limited available observations) under climatic conditions where the butterfly might be expected to fly much earlier.

R. bavius is listed on Annexes II and IV of the Habitats Directive; moreover, the small size of the so far unique confirmed population and the limited area of its habitat indicate that this species has a high conservation priority in Bulgaria. This invites further research for formulating and implementing appropriate conservation measures.

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References

Abadjiev, S. & Beshkov, S. (2007) *Prime butterfly areas in Bulgaria*. Pensoft Publishers, Sofia – Moscow, 222 pp.

Akimov, I. A. (Ed.) (2009) *Chervona kniga Ukraini. Tvarinniy svit* (*Red Data Book of Ukraine. Fauna*). Vidavnitstvo "Globalkonsalting", Kiev, 600 pp. (in Ukrainian).

Assyov, B., Petrova, A., Dimitrov, D. & Vassilev, R. (2012) *Conspectus of the Bulgarian vascular flora. Distribution maps and floristic elements*. 4th revised and updated edition. Bulgarian Biodiversity Foundation, Sofia, 490 pp.

Beshkov, S. (2011) Peperudite v Balgariya, vklyucheni v Natura 2000. Rakovodstvo za polevo opredelyane (*Butterflies and moths in Bulgaria included in Natura 2000. A guide for identification in the field*). Biblioteka Vitosha, Sofia, 151 pp. (in Bulgarian).

Budashkin, Y. (2003) Novye dannye po taksonomii, biologii i rasprostraneniyu bulavousyh cheshuekrylyh (Lepidoptera, Rhopalocera) Kryma (*New data on the taxonomy, biology and distribution of butterflies (Lepidoptera, Rhopalocera) in the Crimean Peninsula*). *Tematicheskiy sbornik nauchnyh rabot "Ekosistemy Kryma, ih optimizaciya i okhrana"*: 45-59 (in Russian).

Coutsis, J. G. (2008) *Pseudophilotes bavius casimiri*, the most differentiated subspecies of the *R. bavius* species-group. *Pseudophilotes fatma*, a distinct species (Lepidoptera: Lycaenidae, Scolitantiditi). *Phegea*, 36(4): 121-125.

Crişan, A., Sitar, C., Craioveanu, C. & Rákosy, L. (2011) The protected Transylvanian Blue (*Pseudophilotes bavius hungarica*): new information on the morphology and biology. *Nota lepidopterologica*, 34(2): 163-168.

Dincă, V., Sylvain Cuvelier, S. & Mølgaard, M. S. (2011) Distribution and conservation status of *Pseudophilotes bavius* (Lepidoptera: Lycaenidae) in Dobrogea (south-eastern Romania). *Phegea*, 39(2): 59-67.

ten Hagen, W. (1996) Tagfalterbeobachtungen in Syrien und Jordanien (2. Beitrag) (Lepidoptera: Papilionoidea, Hesperioidea). *Nachrichten des Entomologischen Vereins Apollo, N.F.*, 17(2): 123-142.

HabiProt (2017) Alciphron [insect database]. Available at: http://alciphron.habiprot.org.rs/index.html. (Accessed on 10 July 2017).

Hesselbarth, G., Oorschot, H. van, & Wagener, S. (1995) *Die Tagfalter der Türkei unter Berücksichtigung der angrenzenden Länder*. Selbstverlag Sigbert Wagener, Bocholt, 1354+847 pp.

Kovanci, O. B., Gencer, N. S. & Kovanci, B. (2009) Lycaenid butterflies (Lepidoptera: Lycaenidae) of northwestern Turkey with notes on their ecology and current status. *Revista Colombiana de Entomología*, 35(2): 275-282.

König, F. (1992) Morphologische, biologische une ökologische Daten über *Philotes bavius hungarica* Diószeghy 1913. Lepidoptera. Lycaenidae. *Entomologische Zeitschrift Essen*, 102(9-10): 168-172.

Pamperis, L. (2009) *The Butterflies of Greece*. 2nd Edition. Editions Pamperis, Athens, 766 pp.

Savchuk, V. (2017) *Babochki Kryma* (*The Lepidoptera of Crimea*). Available at: http://www.lepidoptera.crimea.ua. (Accessed on 10 July 2017) (in Russian).

Švara, V., Popović, M., Peternel, A., Radevski, Đ., Vukotić, K. & Verovnik, R. (2016) Surveys of butterfly and skipper fauna in the southwestern part of the Republic of Macedonia (Lepidoptera: Papilionoidea & Hesperioidea). *Natura Sloveniae*, 18(2): 23-37.

Székely, L. (2008) *Fluturii de zi din România*. C2 Design, Braşov, 305 pp.

Székely, L. (2016) New and Rare Macrolepidoptera (Insecta) from Romanian Dobrogea (South-East Romania). *Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa»*, 59(2): 195-230.

Tikhonov, V., Stradomsky, B., Kuznetsov, G. & Andreev, S. (2017) *Babochki Kavkaza i yuga Rossii* (*The butterflies of Caucasus and southern Russia*). Available at: http://www.babochki-kavkaza.ru. (Accessed on 10 July 2017) (in Russian).

Tolman, T. (1992) On the life-history of *Pseudophilotes bavius* (Eversmann, 1832) in S. Greece, its distribution in the Peloponnesos and a new record for N. Greece (Lepidoptera: Lycaenidae). *Phegea*, 20(1): 35-39.

Tolman, T. (1997) *Butterflies of Britain and Europe*. *Collins Field Guide.* Harper Collins Publishers, London-New York, 320 pp., 104 colour plates.

Ugelvig, L., Vila, R., Pierce, N. & Nash, D. (2011) A phylogenetic revision of the *Glaucopsyche* section (Lepidoptera: Lycaenidae), with special focus on the *Phengaris–Maculinea* clade. *Molecular Phylogenetics and Evolution*, 61: 237-243.

UNECE (2017) *UN/LOCODE Code List by Country*. Available at: http://www.unece.org/cefact/locode/service/location. (Accessed on 10 July 2017).

Verovnik, R. (2012) Contribution to the knowledge of the spring butterfly fauna of the Republic of Macedonia (Lepidoptera: Papilionoidea & Hesperioidea). *Natura Sloveniae*, 14: 39-50.

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On the daily activity of the Red Fox (*Vulpes vulpes*) in two village areas of Bulgaria: a case study

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Abstract. The study was carried out by digital camera traps in two village areas of South Bulgaria. Total of 99 photos of Red Fox (*Vulpes vulpes*) were made in the villages of Byaga and Isperihovo. They were compared with 1133 photos made in "Sinite Kamani" Nature Park (published by Georgiev *et al.*, 2015). It was evident that there was no any activity during daylight in the villages studied, compared with the natural habitats.

Key words: camera traps, activity, Red Fox.

Introduction

The activity of the predatory mammals depends on species and individual characteristics, climate, relief, prey availability, human disturbance and other (Kachamakova & Zlatanova, 2014; Hisano *et al.*, 2014; 2015; Peeva, 2015; Peeva & Raichev, 2016).

The Red Fox (*Vulpes vulpes* Linnaeus, 1758) inhabits a variety of habitats, ranging from semi-arid desert to tundra, from agro areas to boreal forests. Generally, heterogeneous and fragmented landscapes are preferred as fox habitats (Lloyd, 1980; Catling & Burt, 1995; Popov & Sedevchev, 2003). The ability to hunt seems to be the most important factor influencing habitat use (Halpin & Bissonette, 1988; Jones & Theberge, 1982; Phillips & Catling, 1991).

The Red Fox prefers bush vegetation habitats in the winter, while the wooded areas with developed tree vegetation are avoided, probably due to the greater snow accumulations and low hardness of the snow (Halpin & Bissonette 1988; Theberge & Wedeles, 1989). In the anthropogenic regions, foxes are more abundant in residential suburbs and less in industrial and commercial areas (Harrisand & Rayner, 1986).

In this article I present a brief note considering the activity of the Red Fox (*Vulpes vulpes*), studied by camera traps in two anthropogenic habitats – village areas of Byaga and Isperihovo (99 photos). It was compared with previously published data for "Sinite Kamani" Nature Park (1034 photos) by Georgiev *et al.* (2015).

Material and Methods

The camera traps (LTL-5210A) in the area of the villages Byaga and Isperihovo were shot for two years from March 2015 to March 2017. The traps were checked weekly and the pictures were taken every 30 seconds. To attract the animals dog and cat baits (in some cases fish and others) were used.

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The villages of Byaga and Isperihovo are located in a valley surrounded by hills (Besaparski Heights and the slopes of Western Rhodopes). Agriculture in the area is well developed and most of the exploited areas are occupied by orchards.

Results and Discussion

Based on the photos taken by Georgiev *et al.* (2015): 1034 (Sinite Kamani Natural Park) and made by me: 99 (the village of Byaga and the village of Isperihovo), I found that the activity of the red fox is different in the two habitats.

In the natural forest habitats, activity was observed almost throughout the day, with peaks at the the time intervals of 15-9 hours and 12-14 hours (Figure 1).

In anthropogenically influenced habitats there is an increase of activity during the intervals between 00-09h and 18-00h. No any activity was registered during daylight (Figure 2). In the studied anthropogenically influenced habitats, the fox has a night-slimy activity and is inactive during the real part of the day. The largest number of pictures of the species was taken between 19:00 and 00:00 and fewer are photos taken in the morning until 05:00.

Fig. 1. Red Fox (*Vulpes vulpes*) feeding in front of a camera trap, Isperihovo village.

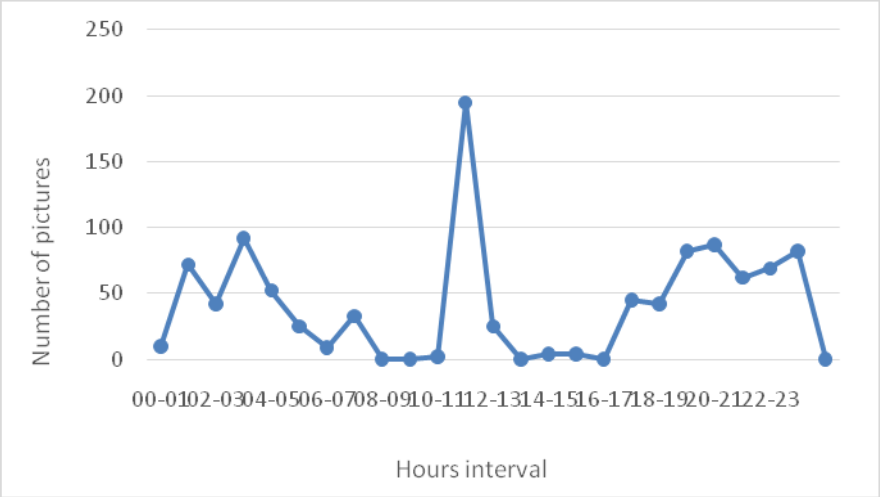

Fig.2. Number of all pictures of the red fox (*Vulpes vulpes*) made in 24 hours interval (number of images per hour) for NP "Sinite Kamani" (Georgiev *et al.*, 2015).

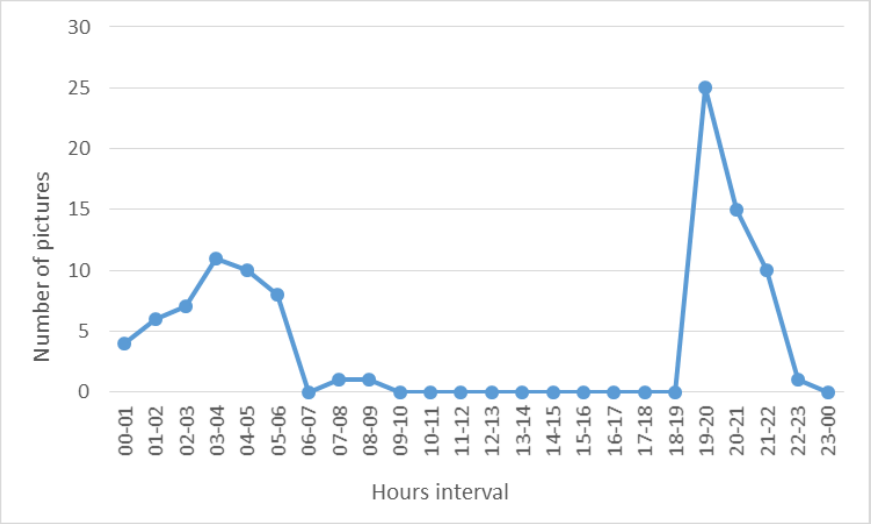

Fig. 3. Number of all pictures of the fox (*Vulpes vulpes*) made in 24 hours interval (number of images per hour) for the villages of Byaga and Isperihovo.

References

Catling, P. & Burt, R. (1995) Why are red foxes absent from some eucalypt forest in eastern New South Wales? *Wildlife Research*, 22: 535-546.

Georgiev D., Mechev A., Stoeva E., Dilovski G. & Pavlova A. (2015) On the activity of two medium-sized canids: the Golden Jackal (*Canis aureus*) and the Red Fox (*Vulpes vulpes*) in the Natural Bark “Sinite Kamani” (Bulgaria) revealed by camera traps. *ZooNotes*, 69: 1-4.

Halpin, P. & Bissonette, J. (1988) Influence of snow depth on the availability and habitat use by red fox. *Canadian Journal of Zoology*, 66: 587-592.

Harris, S. & Rayner, J. M. V. (1986) Urban fox (*Vulpes vulpes*) population estimates and habitat requirements in several British cities. *Journal of Animal Ecology*, 55: 575-591.

Hisano, M., Raichev, E., Peeva, S., Georgiev, D., Tsunoda, H., Masuda, R. & Kaneko, Y. (2014) Notes on autumn-winter stomach contents of the stone marten (*Martes foina*) in the Balkan mountains, Central Bulgaria. *ZooNotes*, 56: 1-6.

Hisano M., Raichev, E., Peeva, S., Tsunoda, H., Newman, C., Masuda, R., Georgiev, D. & Kaneko, Y. (2015) Comparing the summer diet of stone martens (*Martes foina*) in urban and natural habitats in Central Bulgaria, *Ethology Ecology & Evolution*, 28(3): 295-311.

Kachamakova, M. & Zlatanova, D. (2014) Behaviour of Eurasian Lynx, *Lynx lynx* (L.), in Captivity during the Breeding Season. *Acta Zoologica Bulgarica*, 66 (3): 365-371.

Lloyd, H. G. (1980) Habitat requirements of the red fox. *In:* E. Zimen (Ed.) *The Red fox, Symposium on Behavior and Ecology*. Biogeographica, Vol. 18, Dr. W.Junk Publishers, The Hague, 7-25 pp.

Jones, D. B. & Theberge J. B. (1982) Summer home range and habitatutilization of the red fox (Vulpes vukpes) in a tundra habitat, northwest British Columbia. *Canadian Journal of Zoology*, 60: 807-812.

Peeva, S. (2015) Study of places, related to the marking reflex of the stone marten (Martes foina Erxl). *Trakia Journal of Sciences*, 13(2): 315-320.

Peeva, S. & Raichev, E. (2016) Stone marten (*Martes foina*, Erxl., 1777) and villagers: Human-wildlife social conflict. *Agriculture science and technology*, 8(2): 158-161.

Phillips, M & Catling, P. (1991) Home range and activity patterns of red fox in Nadgee nature reserve. *Wildlife Research*, 18: 677-686.

Popov, V. & Sedevchev, A. (2003) *Mammals in Bulgaria*, pp. 175.

Theberge, J. B. & Wedeles (1989) Pray selection and habitat partitioningin sympatric coyote and red fox population, southwest Yukon. *Canadian Journal of Zoology*, 67: 1285-1290.

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Notes on the defensive behavior and activity of *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) in Bulgaria

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Abstract. The defensive behavior of the Snake-eyed skink is reported for the first time. It includes different strategies as hiding, spiral winding of the body, moving the tail in a worm-like manner, detaching the tail and limbs, thanatosis and even biting. Data on the observed activities of the species in the wild are also provided.

Key words: skink, tail, thanatosis.

Introduction

The Snake-eyed skink *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) is one of the smallest scincid species in the world. Most of the studies concerting the species accented on distribution and taxonomy (Štepánek 1937, 1944; Mertens 1952; Fuhn 1969, 1970; Schmidtler 1997; Ljubisavljević *et al.* 2002), while the biology and ecology of the lizard remain poorly investigated (Pasuljević 1965, 1966, 1975, 1976; Gruber 1981; Herczeg *et al.* 2007). So far information on the behavior of the skink is almost lacking.

In the current study data on the defensive behavior and activity of the species are presented.

Material and Methods

The general observations come from a four-year (2013–2016) population study of *A. kitaibelii* in the northwestern part of Bulgaria. The studied area is located on Pastrina hill, near the town of Montana, and covers ca. 0.6 ha of the ecotone zone between oak forest and a meadow, at an altitude of 280 m. The coordinates of the studied area are N43.384828, E23.301825 (Datum: WGS84, GCS). After being caught by hand, each individual (n = 415) was photographed with Sony Cyber–Shot DSC–HX300, its geographic coordinates were recorded, and then it was released at the same location. Some behavioral data collected in different parts of Bulgaria were also included.

Results and Discussion

In general, if dangerous situation is present, the Snake-eyed skink tries to hide quickly, most often burying itself in dense grass and soil or hiding in cracks in the ground and under stones, leafs, etc. (Fejérváry 1912; Beshkov & Nanev 2006). This protective behavior is the principal one described for this species.

It was established that the tail of the Snake-eyed skink had a very important role for the survival of individuals. A total of 59.3% of all caught individuals had missing or re-grown tails. In juveniles the tail is bright orange-reddish (Fig. 1); with age it becomes darker, ultimately matching the body color. This presumably benefits young lizards because the bright color draws the attention of the predators to the tail. The juveniles even can move the

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tip of their tails in a worm-like manner for additional attraction. When buried in the substrate or in the open, many of the juveniles spiral, with the tail being wound over the body for protection. Similar behavior was observed in adult individuals as well (Fig. 2).

Fig. 1. Juvenile *A. kitaibelii* from Pancharevo, Sofia with orange-reddish tail. Photography: N. Tzankov.

Fig. 2. Spirally wound adult individual of *A. kitaibelii* from "Sinite Kamani" area, Sliven town. Photography: A. Dyugmedzhiev.

In addition to missing tails, individuals with missing fingers and whole limbs were observed, probably a result of twisting their bodies in order to escape when bitten in by a predator. Rotter (1962) mentioned as potential predators for the Snake-eyed skink other reptiles: *Lacerta viridis* (Laurenti, 1768), *Zamenis longissimus* (Laurenti, 1768), *Coronella austriaca* Laurenti, 1768, *Lanius collurio* Linnaeus, 1758, as well as mammals such as Eulipotyphla and Mustelidae.

Another interesting behavior is the observed fake death (thanatosis) in both an adult (Fig. 3) and a juvenile specimen. This behavior is intended to deceive predators and deny their choice of prey.

Fig. 3. Thanatosis in an adult individual of *A. kitaibelii* from Pastrina hill, Montana.

Thanatosis of *A. kitaibelii* was also observed in an adult individual near Rozino village, Karlovo municipality on 13.06.2009 (G. Popgeorgiev, pers. comm.).

Another curious observation was the attempts of animals to bite. This occurred in several skinks during escape attempts while being held in hand by the researcher. The individuals were twisting their bodies, trying to free themselves, and eventually bit the fingers. Apparently, this is the final measure for obviating a predator.

Pasulević (1965) mentioned that the species is most active in the morning between 9:00 and 11:00 h and in the afternoon between 16:00 and 17:00 h., i.e. it has a bimodal activity. The shortest daily activity interval is observed in the summer. The author also mentioned that in spring and August its activity increases and the interval between the two activity peaks decreases. Similar observations of the activity of the species are reported by Rotter (1962). Rotter (1962) and Herczeg *et al.* (2007) mention that the skink is not active during the summer, and the hot months of the year. In the present study during the summer months, bimodal activity was observed – in the early morning and in the late afternoon to darkness. No night activity was noticed in this species on the territory of Bulgaria. In the spring, individuals are active throughout the day, which is possibly related to the breeding season of the species and the more active search for food. Active individuals

were also observed during drizzling rain, especially in warm weather. No activity was observed during heavy rain.

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References

Beshkov, V. & Nanev, K. (2006) *The Amphibians and Reptiles in Bulgaria*. Pensoft Series Faunistica 46, 120 pp.

Fejérváry, G. (1912) Über *Ablepharus pannonicus* Fitz. *Zoologische Jahrbuch Abteilung für Systematik, Geographie und Biologie der Tiere*, Jena, 33: 547-574.

Fuhn, I. (1969) Revision and redefinition of the genus *Ablepharus* Lichtenstein, 1823. (Reptilia, Scincidae). *Revue Roumaine de Biologie, Zoologie*, Bucarest, 14(1): 23-41.

Fuhn, I. (1970) Über die Unterarten von *Ablepharus kitaibelii* (Bibron & Bory de St. Vincent, 1833) (Sauria, Scincidae). *Věstník Československé zoologické společnosti*, Praze, 34(1): 9-17.

Gruber, U. (1981) *Ablepharus kitaibelii* Bibron and Bory 1883 – Johannisechse. *In*: Böhme, W. (Ed.), *Handbuch der Reptilien und Amphibien Europas, Echsen I.* Wiesbaden, Akademische Verlagsgesellschaft, 1: 292-307.

Herczeg, G., Kovaćs, T., Korsós, Z. & Török, J. (2007) Microhabitat use, seasonal activity and diet of the snake-eyed skink (*Ablpharus kitaibelii fitzingeri*) in comparison with sympatric lacertids in Hungary. *Biologia,* Bratislava, 4: 482-487.

Ljubisavljević, K., Džukić, G. & Kalezić, M. (2002) Morphological differentiation of the Snake-eyed Skink *Ablepharus kitaibelii* (Bibron & Bory, 1833), in the north-western part of the species' range: systematic implications. *Herpetozoa*, 14(3/4): 107-121.

Mertens, R. 1952. Über den Glattechsen-Namem *Ablepharus pannonicus*. *Zoolodische Anzeiger*, 149(1/2): 48-50.

Pasuljević, G. (1965) Ritam dnevne i sezonske aktivnosti *Ablepharus kitaibelii* (Bibron et Bory) u Jugoslaviji. *Glasnik Prirodnjačkog Muzeja u Beogradu Serija,* 20: 311-314.

Pasuljević, G. (1966) Prilog poznavanju ekologije *Ablepharus kitaibelii* (Bibron et Bory). *Zbornik Filozofskog Fakulteta u Prištini*, 3: 459-463.

Pasuljević, G. (1975) Ishrana populacija *Ablepharus kitaibelii* (Bibron et Bory, 1833) u Jugoslaviji. *Zbornik radova Prirodno-matematičkog fakulteta Univerziteta u Prištini*, 3: 39-60.

Pasuljević, G. (1976) Characteristics of habitat and factors determining distribution and activity of the species *Ablepharus kitaibelii* (Lacertilia, Scincidae). *Acta Biologiae et Medicinae Experimentalis*, Priština, 1-2: 57-63.

Rotter, J. (1962) Biologische Beobachtungen an der nördlichen Johannisechse, *Ablepharus kitaibelii fitzingeri* Mertens, 1952. *Zoologische Garten*, Leipzig, N. F., 26: 312-318.

Schmidtler, J. (1997) Die *Ablepharus kitaibelii* – Gruppe in Süd–Anatolien und benachbarten Gebieten. *Herpetozoa*, 10(1/2): 35-63.

Štepánek, O. (1937) Zweiter Beitrag zur Herpetologie der Insel Kreta. *Věstník Československé zoologické společnosti*, Praze, 5: 77-79.

Štepánek, O. (1944) Zur Herpetologie Griechenlands. *Věstník Československé zoologické společnosti*, Praze, 9: 123-147.

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On the sex and age structure of the Stone Marten (*Martes foina*) population from Sarnena Sredna Gora Mts. (Central Bulgaria)

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Abstract. The sex and age structure of the Stone Marten (*Martes foina* Erxleben, 1777) population from Sarnena Sredna Gora Mts. (Central Bulgaria) was studied. A total of 67 skulls were divided into three age groups using different methods. The population structure showed a male-biased sex ratio with adults predominating over yearlings.

Key words: stone marten, population structure, age ratio.

Introduction

The parameters that define demographic characteristic of animal species are birth rate, mortality, life expectancy, density and population dynamics. The sex and age compositions of individuals in a population can provide important insights into the dynamics of the population (Beckmann & Berger 2003). The effects of management of population and accurate estimates of population structure are critical to understanding animal population ecology (Meffe & Carroll 1997). Sex and age ratios are dynamic and vary temporally and spatially and "characteristic" ratios may be difficult to define (Feldhamer *et al.* 2003).

Close monitoring of the American Marten population is important for the conservation and sustainable management of this species (Flynn & Shumacher 2009). The Stone Marten (*Martes foina* Erxleben, 1777) is a medium-sized carnivore widely distributed in Bulgaria. Studies on its population parameters on the Balkans are scarce.

The aim of the study is to obtain some information on the sex and age ratios in a Stone Marten population from Sarnena Sredna Gora Mts. (Central Bulgaria).

Material and Methods

A total of 67 skulls of specimens of Stone Martens (49 males and 18 females) were examined. Most of the samples were provided by hunters and gamekeepers between 1st of November and 1st of March (2013-2015), using different hunting methods from Sarnena Sredna Gora region. Other part of the samples was obtained from road killed animals in the same region.

The age-groups classification was made by the shape of the temporal ridges on the skull (Albayrak *et al.* 2008), the size of the pulp cavity in canine teeth (Foresman 2012) and by the maxillary teeth attrition and the number of dentinum annuli according to Klevezal (2007). After the examination specimens were divided into three age groups: yearlings (7-11 months), between one and two years (19-23 months) and older than two years (31+ months), taking into account Stone Marten's bearing offspring in spring - early March to the middle of April (Canivenc *et al.* 1981).

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Results and Discussion

The data revealed that males prevailed in the three age groups: yearlings – 26.9% M vs 13.4% F; between one and two years – 23.95% M vs 10.4% F and older than two years – 22.4% vs 3% respectively (Fig. 1).

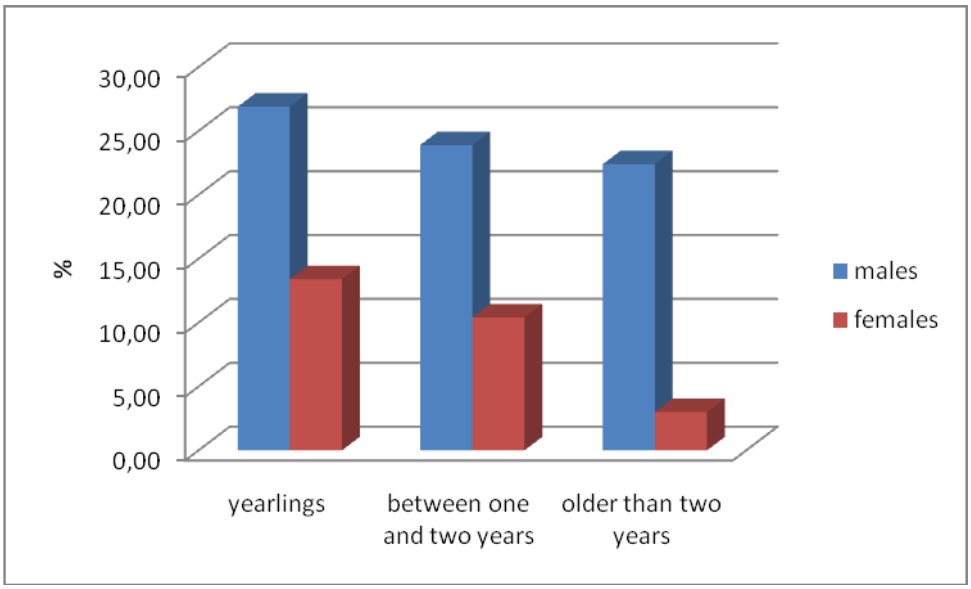

Fig. 1. Sex-age classes of Stone Marten population from Central Bulgaria, %.

The yearling males were numerous (26.9%) and their number declined gradually with age. The same but stronger tendency was observed for females. The oldest animals detected were 4 and 5 years old. The average age for males was 1.6 years and 1.3 years for females. The sex ratio varied with age. It was 2M : 1F in yearlings; changed to 2.3M : 1F in group between one and two years old and 7.5M :1 F in older than two years. Average sex ratio was 2.7M : 1F.

Even this sample is showing sex and age ratio of a sample of killed animals providing data more on the mortality and not for a population group, some conclusions can be made, and some questions can be raised.

Male biases in samples of various mustelid species were described by Buskirk & Lindstedt (1989) and interpreted as resulting from sex-specific home range sizes and higher locomotor activity in males. Such mechanisms might explain the high percentage of males in the present study. Otherwise, males are more exposed to trapping pressure (Larroque *et al.* 2016). Contrary, Stankevičiūtė *et al.* (2013) have found that the number of closely relative yearling pine marten females in Lithuania was larger than the yearling males. The reason for that was because young females get entrapped more often due to the lack of experience (Grakov 1981).

Highly variable sex ratios for closely relative mustelids were described. Sex ratio for the American Marten is higher but similar than that in present study. It has been 3.5 : 1 with male biased (Flynn & Shumacher 2009) and it changed with the years and depended on sampling method. Live trapping showed sex ratios of 1.5M : 1F whereas carcasses showed 3M : 1F (Clark *et al.* 1989). The average proportion of males collected in kill traps has been usually around 75% in common weasels and around 60% to 65% in stoats (King 1975).

The Stone Marten population from Central Bulgaria is with a male-biased sex ratio which may indicate the population serves as a sink as Beckmann & Berger (2003) described for mammals. This statement is supported by the fact that adults predominate over

yearlings. Otherwise, it can be speculated that the males and the yearlings are the groups of higher mortality in this population.

References

Albayrak, I., Ozen, A. & Kitchener, A. (2008) A contribution to the age-class determination of *Martes foina* Erxleben, 1777 from Turkey (Mammalia: Carnivora). *Turkish journal of zoology,* 32: 147-153.

Beckmann, J. & Berger, J. (2003) Rapid ecological and behavioral changes in carnivores: the responses of black bears (*Ursus americanus*) to altered food. *Journal of Zoology,* 261(2): 207-212.

Buskirk, S. & Lindstedt, S. (1989) Sex biases in trapped samples of Mustelidae. *Journal of Mammalogy,* 70: 88-97.

Canivenc, R., Mauget, C., Bonnin, M. & Aitken, R. (1981) Delayed implantation in the beech marten (*Martes foina*). *Journal of Zoology,* 193: 325-332.

Clark, T., Campbell, Th., Hauptman, T. (1989) Demographic characteristics of American marten populations in Jackson Hole, Wyoming. *Great Basin Naturalist,* 49(4): 587-596.

Feldhamer, G., Thompson, B. & Chapman, J. (2003) *Wild mammals of North America: Biology, Management and Conservation.* Johns Hopkins University Press, Baltimore and London, 1232 pp.

Flynn, R. & Shumacher, Th. (2009) Temporal changes in population dynamics of American martens. *Wildlife management,* 73(8): 1269-1281.

Foresman, K. (2012) Carnivores in hand. *In:* Boitani, L. & Powell, R. (Eds.), *Carnivore Ecology and Conservation.* Oxford University Press Inc., New York, pp. 130-151.

Grakov, N. (1981) *Lesnaya kunitsa (European pine marten).* Izdatelstvo nauka (Nauka Publishing House), Moskva, 107 pp. (in Russian).

Klevezal, G. A. (2007) *Principles and Methods of Determining the Age of Mammals.* KMK Scientific Press, Moscow, 280 pp.

Larroque, J., Ruette, S., Vandel, J., Queney, G. & Devillard, S. (2016) Age and sex-dependent effects of landscape cover and trapping on the spatial genetic structure of the stone marten (*Martes foina*). *Conservation genetics,* 17: 1293-1306.

Meffe, G. & Carroll, C. (1997) *Principles of conservation biology, 2nd ed.* Sinauer Associated Inc., Sunderland, Massachusetts, 729 pp.

Stankevičiūtė, J., Pėtelis, K., Brazaitis, G. & Šidlauskas, G. (2013) The age structure of the pine marten (*Martes martes* L.) population in the Lithuanian mixed-deciduous forest. *Acta Biologica Universitatis Daugavpiliensis,* 13(1): 115-120.

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First records of the American wasps *Sceliphron caementarium* (Drury, 1770) and *Isodontia mexicana* (de Saussure, 1867) (Hymenoptera: Sphecidae) from Bulgaria

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Abstract. Two alien sphecid species are reported for the first time for Bulgaria. Nearctic species *Sceliphron caementarium* (Drury, 1770) and *Isodontia mexicana* (de Saussure, 1867) were found in Sofia. The first species is collected as well from the Bulgarian Black Sea Coast, near Varna.

Key words: *Isodontia mexicana*, *Sceliphron caementarium*, Bulgaria.

Introduction

In August 2017, specimens from Sphecidae (Hymenoptera), identified later as the alien for Europe species *Isodontia mexicana* (de Saussure, 1867), were accidentally collected by the author in the city of Sofia, Bulgaria. During examination of the Zoological Collection of Sofia University "St. Kliment Ohridski", Faculty of Biology (BFUS), specimens from second alien sphecid species - *Sceliphron caementarium* (Drury, 1770), collected by students in a field practice in Zoology near Varna, NE Bulgaria, were identified. In the collection of the Institute of Biodiversity and Ecosystem Research (IBER) in Sofia, specimens from the both species were also found. Both species have not been reported for the country to date. In the present article the available data on the distribution of the both alien species in Bulgaria are reported.

Results and Discussion

Sceliphron caementarium (Drury, 1770) (Fig. 1).

Material examined: Bulgaria, Sofia, Druzhba II sub., 30.IV.2012, 1 ♀, T. Ljubomirov leg. & det. (IBER); Bulgaria, Black Sea Coast, Varna, University Botanic garden, 43°14'06.6''N, 28°00'05.94''E, 55 m a. s. l., 11.VI.2012, 1 ♀, A. Gerasimov leg., D. Gradinarov det. (BFUS); the same locality, but 24-28.VII.2013, 1 ♀, D. Dimitrova leg., D. Gradinarov det. (BFUS).

Natural distribution of the species from genus *Sceliphron* Klug, 1801 includes temperate and tropical areas, as the most of the species are found in the Old World (Bohart & Menke 1976). In Bulgaria, three native species of the genus are presented - *S. destillatorium* (Illiger, 1807), *S. spirifex* (Linnaeus, 1758) and *S. madraspatanum tubifex* (Latreille, 1809) (Pulawski 2017). Along them, alien Asian species *S. curvatum* (F. Smith, 1870) have been reported for Bulgaria (Jacobs, 2005) and recently it is widely distributed in the country (Guéorguiev & Ljubomirov, 2009). *S. caementarium*, native for North and Central America (Bohart & Menke 1976), is now presented in many region of the World (Pulawski 2017). The species has been accidentally introduced to Europe, probably several times (Bogusch & Macek 2005). To date, in Europe, *S. caementarium* is established for

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Belgium, Luxembourg, France, Germany, Austria, Switzerland, Czech Republic, Slovakia, Croatia, Italy, Spain, Portugal and Ukraine (Turrisi & Altadonna 2017).

Fig. 1. Female of *Sceliphron caementarium* from Varna locality, 11.VI.2012.

Isodontia mexicana (de Saussure, 1867) (Fig. 2).

Material examined: Bulgaria, Sofia, Hipodruma sub., 42°40'58''N, 23°17'34''E, 582 m a. s. l., 23.VII.2016, 1 ♀, in a hollow of a metallic pipe (part of security fence along a boulevard), T. Ljubomirov leg. & det. (IBER); Bulgaria, Sofia-city district, res. area Lyulin 2, 42°43'18.3''N, 23°15'15.00''E, 570 m a. s. l., 11.VIII.2017, 1 ♀, 11:30 to 13:00 h., on flowering *Solidago canadensis* L., D. Gradinarov leg. & det., (BFUS); Bulgaria, Sofia-city district, res. area Lyulin 2, 42°43'15.1''N, 23°15'11.9''E, 575 m a. s. l., 27.VIII.2017, 1 ♂, 1 ♀, on flowering *Fallopia japonica* (Houtt.), D. Gradinarov leg. & det. (BFUS).

The species from the genus *Isodontia* Patton, 1880 are distributed mainly in Neotropical and Oriental Regions (Bohart & Menke 1976). Two native species of the genus are known from Europe - *I. paludosa* (Rossi, 1790) and *I. splendidula* (A. Costa, 1858), both presented in Bulgaria (Pulawski 2017, Guéorguiev & Ljubomirov 2009 e.g.). *I. mexicana*, a North American species, was established in France in the early 1960s and recently is east and north-eastwards spreading in Europe (Ćetković *et al.* 2012). To date, the known range of the species in Europe include France, Italy, Spain, Switzerland, Slovenia, Croatia, Germany, Hungary, Austria, Netherlands, Serbia, Belgium, Czech Republic, Slovakia, Crimea, Greece and Great Britain (Semelbauer 2015, Pulawski 2017).

Fig. 2. Female of Isodontia mexicana from Sofia, Lyulin locality, 27.VIII.2017.

This discovery of both *S. caementarium* and *I. mexicana* in Bulgaria is not unexpected. In the case of *S. caementarium*, which was found in two distant regions of the country, a significantly wider recent distribution in Bulgaria can be expected.

Like other species of *Sceliphron*, females of *S. caementarium* build mud-nests and utilize as prey a variety of Aranaeae species. The females of *I. mexicana* are nonfossorial and nest in pre-existing natural cavities, e.g. hollow branches and stems (Ćetković *et al.*, 2012). Normally, prey of *Isodontia* species are members of ensifer families Gryllidae and Tettigoniidae (Bohart & Menke 1976). It is difficult to assess the existence of negative impact of the both alien species on the spider and ensifer populations in Bulgaria, as well as the impact on the native digger wasps of the respective genera. Further investigations are desirable to clarify the distribution of the both species in the country, including in natural habitats, as well as the species composition of their prey in Bulgaria.

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References

Bogusch, P. & Macek, J. (2005) *Sceliphron caementarium* (Drury, 1773) in the Czech Republic in 1942 – first record from Europe? *Linzer biologische Beiträge,* 37: 1071-1075.

Bohart, R. M., & Menke, A. S. (1976) *Sphecid wasps of the world. A generic revision.* University California Press, Berkeley, Los Angeles, London, 695 pp.

Ćetković, A., Čubrilović, B., Plećaš, M., Popović, A., Savić, D. & Stanisavljević, L. (2012) First records of the invasive American wasp *Isodontia mexicana* (Hymenoptera: Sphecidae) in Serbia. *Acta Entomologica Serbica*, 17(1/2): 63-72.

Guéorguiev, B. V. & Ljubomirov, T. (2009) Coleoptera and Hymenoptera (Insecta) from Bulgarian section of Maleshevska Planina Mountain: study of an until recently unknown biodiversity. *Acta zoologica bulgarica*, 61: 235-276.

Jacobs, H.-J. (2005) *Lindenius anatolicus* Beaumont 1967 – Erstnachweis in Europa und weitere Angaben zur Grabwespenfauna Bulgariens (Hymenoptera: Sphecidae, Crabronidae). *Linzer Biologische Beiträge*, 37: 435-456.

Pulawski, W. J. (2017) *Catalog of Sphecidae sensu lato.* California Academy of Sciences, Golden Gate Park, San Francisco, California, USA. Available at: https://www.calacademy.org/scientists/projects/catalog-of-sphecidae (accessed on 17 November 2017).

Semelbauer, M. (2015) American wasp *Isodontia mexicana* (Hymenoptera: Sphecidae) in Slovakia. *Entomofauna Carpathica*, 27(2): 10-11.

Turrisi, G. F. & Altadonna, G. (2017) A report on two alien invasive species of the genus *Sceliphron* Klug, 1801 (Hymenoptera Sphecidae) from Sicily, with a brief faunistic update on the native species. *Biodiversity Journal*, 8(2): 753-762.