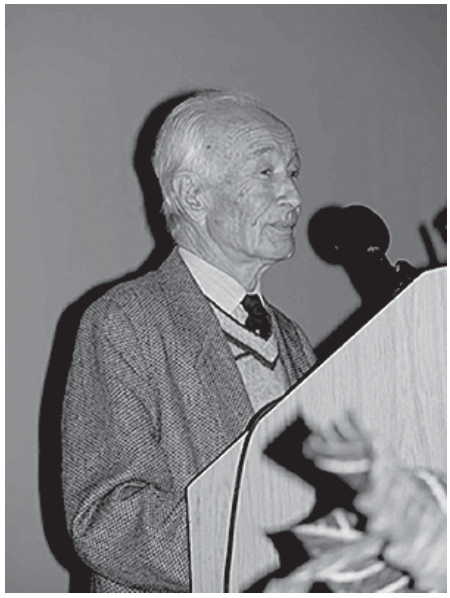
Historia naturalis bulgarica,
16: 5, 2004

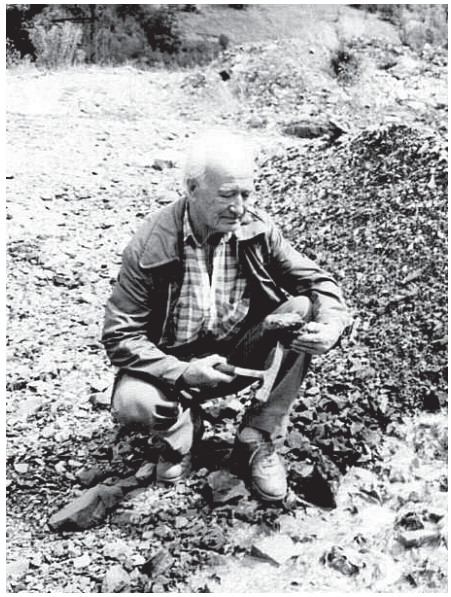
Академик Иван Костов (24.XII.1913–31.III.2004) – in memoriam



Настоящият брой на Historia naturalis bulgarica е посветен на световноизвестния минералог академик Иван Костов, почетен член на БАН и директор на Националния природонаучен музей от 1974 до 1988 г. Броят трябваше да ознаменува неговата 90 – годишнина (24 декември 2003 г.), но на 31 март 2004 г. големият учен премина в един по-добър свят. Неговите заслуги за науката и за възстановяването на Музея ще се помнят и ще живеят в делата на по-младите поколения. На нашия дългогодишен директор и истински природоизпитател – последно сбогом!

Historia naturalis bulgarica,
16: 6, 2004

Professor Ivan Kostov (24.XII.1913–31.III.2004) – in memoriam



Shortly aftre his 90-th anniversary the most prominent Bulgarian mineralogist, Prof. Ivan Kostov, passed away. He was born on 24.12.1913 in Plovdiv, and graduated in Sofia University (1936). Specialized in Royal School of Mines, Imperial College of Science and Technology, London (1940-1945). Professor of mineralogy and crystallography (University of Sofia), member of the Bulgarian Academy of Sciences, the German Academy 'Leopoldina' and the Russian Academy of Sciences. Honorary member of the Mineralogical Society, the Geological Society and the Geologists' Association of the United Kingdom, of the Russian Mineralogical Society and the Ukrainian Mineralogical Society. Past President of IMA and Former Vice-President of IAGOD, as well as IGCP expert at UNESCO. Former director of the National Museum of Natural History in Sofia and of the Geological Institute of the Bulgarian Academy of Sciences. Honorary President of the Bulgarian Mineralogical Society. Author of textbooks on mineralogy and crystallography, as well as of over 260 publications.

Historia naturalis bulgarica,
16: 7-45, 2004

Dedicated to
Prof. Ivan Kostov (1913-2004),
prominent Bulgarian mineralogist

A catalogue of the mineral species in the National Museum of Natural History, Sofia (Part 2) Silicates

Chavdar KAROV, Iliya DIMITROV

KAROV Ch., DIMITROV I. 2004. A catalogue of the mineral species in the National Museum of Natural History, Sofia (Part 2) Silicates. – Historia naturalis bulgarica, **16**: 7-45.

Abstract. Part 2 of the catalogue includes mineral species, belonging to the biggest mineral class – Silicates, in the collection of the National Museum of Natural History Sofia. The collection comprises 356 species, 67 varieties, and 8 groups of not precisely determined mineral species.

Key words: Catalogue, Mineral species, Silicates, National Museum of Natural History Sofia

The new museum catalogue of the mineral species is based on the systematics of KOSTOV (1993), and the names of mineral species are given after MANDARINO (1999). The catalogue includes all specimens registered in the main museum fund until 2001 year. Part 2 of the mineral catalogue includes mineral species belonging to the biggest and most widespread mineral class – Silicates, according to the systematics of KOSTOV (1993). Here are presented 356 species in 5528 pieces, 67 varieties and 8 groups of not precisely determined mineral species.

Legend:

Column: **Mineral classes, sub-classes, assemblages, groups, species and varieties**

– Names of mineral species are given after MANDARINO (1999) and KOSTOV (1993), following their Bulgarian translation in brackets.
– All mineral species are in bold. For example: **Quartz (Кварц)**
– The mineral varieties are in bold and italic. For example: - ***Heliotrope* (*Хелиотроп*)**
– Groups of not precisely determined minerals are in square brackets, bold and italic. For example: **[*Scapolite*] [*Скаполит*]**

– Mineral species or variety followed by "II" means a species or variety of secondary importance in the sample. For example: **Merlinoite II (Мерлиноит II) -** ***Cacholong II*** **(*Кахолонг II*)**

Column: **Localities, region, country**

– The list of localities follows the scheme: it always begins with localities in Bulgaria, followed by localities in other European countries, Asia, Africa, North and South America, Australia and Antarctica.
– All localities in one region are separated by commas.
– All localities in one country are separated by semicolons.
– Countries are separated by dots.

Table 1

A catalogue of the mineral species in the National Museum of Natural History, Sofia (KOSTOV 1993) (part 2) Silicates

Mineral classes, sub-classes, assemblages, groups, species and varieties	pieces	Localities, region, country
1	2	3
CLASS 5. SILICATES		
1. Silicates with (Si, Al): M^{2+}=4:1 to 3:1		
1.1. Free SiO_2 and free of aluminium silicates		
1.1.1. Quartz group		
Quartz (Кварц)	1462	Strashimir, Mogilata, Osikovo, Kroushev Dol, Petrovitsa, Borieva Reka, Gyudyurska, Gradishte, Konski Dol, Murzyan, Golyam Palas, Batantsi, Spoluka, Karaalievsko mines - Madan reg.; Arda, Gyurgen dere mines - Madzharovo reg.; Chernomorets quarry, Vurli bryag, Surneshko kladenche mine - Burgas reg.; Pozharevo vill., Zapachitsa dep., near Bov vill., Kremikovtsi dep., Lipata quarry, Vitosha Mt., Lozen Mt., Lyulin Mt., Sofia reg.; Kara-dere valley, Varna reg.; Markova trapeza, Zlokuchene vill., Kalkovo vill., Samokov reg.; Narechenski bani, Stoikite, Davidkovo, Mihalkovo, Yugovo, Banite, Galabovo, Chepelare villages - Smolyan reg.; Dyadovtsi, Lyaskovo, Latinka, Sipalar villages, Ardino reg.; Boevo vill., Zlatograd reg.; Vlaykov vrah, Panagyurishte reg.; Topolovgrad reg.; Petlite summit, Bliznaka Lake, Rila Mt.; Persenk, Govedarnika mine - Luki reg.; Osigovo, Marchevo, Teshevo vill. - G. Delchev reg.; Nova Mahala vill., Batak reg.; Ivaylovgrad Dam; Ribnovo vill., Palat vill., Blagoevgrad reg.; Divisilovo vill., Gorna Kula vill., Krumovgrad reg. Sushevo vill., Momchilgrad reg.; Vishteritsa quarry, W. Rhodopi Mts; Gluhar, Gledka, Karamfil, Gruevo, Shiroko pole, Podkova, Kostino, Pepelishte villages, Zvezdel dep., Galenit mine, Enyovche mine, Kurdzhali reg.; Mineralni bani vill., Brusevtsi vill., Mareshnitsa mine, Haskovo reg.; Smilovene quarry, Koprivshtitsa reg. Bukite, Ruen mines - Osogovo Mt.; Eliseyna mine, Boyadjik
- *Aventurine* (*Авантюрин*)	1	
- *Amethyst* (*Аметист*)	115	
- *Morion* (*Морион*)	10	
- *Chalcedony* (*Халцедон*)	95	
- ***Heliotrope* (*Хелиотроп*)**	1	
- *Carnelian II* (*Карнеол II*)	3	
- *Sard II* (*Сердер II*)	1	
- *Chrysopras* (*Хризопраз*)	8	
- *Agate* (*Ахат*)	115	
- *Jasper* (*Яспис*)	29	

1	2	3
Quartz and varieties (continuation)		vill., Yambol reg.; Vlak summit, Sredna gora Mt.; Strandzha mine, M. Turnovo reg.; Chiprovtsi mine, Montana reg.; Ezerovo vill., Plovdiv reg. (Bulgaria). Freiberg, Altenberg, Annaberg, Schlema, Schneeberg, St. Egidien, Erzgebirge; Schneckenstein; Bergen; Ilfeld, Clausthal, Andreasberg, Neudorf mine, Harz; Iserlohn, Sauerland; Kaiserstuhl, Baden; Heidelberg; Dreislar, Sauerland; Oberstein; Rheinbreitbach; Hochstein (Germany). Trepca (Serbia). Piemonte; Praborna mine, Rio Marina mine, Elba; Capurru quarry, Sassari prov., Sardinia; Bottino, Tuscany (Italy). Styria (Austria). Loukhumi (Georgia). Upsala (Sweden). Compostela (Spain). Stalvedrostollen; Turbenalp, Lengenbach, Binntal; St. Gotthard, Tessin; Mont Blanc (Switzerland). Saint Prics, Saone et Loire; Cap Garonne, Sand, Bas-Rhin (France). Rozna, Dolni Bory, Dobra Voda, Nova Ves, Moravia; Jachymov; Rakosh; Krupka; Vrancice, Pribram; Bohemia; Kozakov; Horni Slavkov; Kutna Hora; Trebic; Cinovec mine; Zeleznice; Moldava riv.; Bestvina; BochoviceKremze; Kisselka quarry, Moravia (Czech Republic). Vodno vill., Skopje (Macedonia). Nagol'nyi Kryazh, Donetsk Basin; Lvov reg.; Ukrainka vill.,Crimea; Volodarsk-Volynskii; Zaporoz'e; Dzhambulskia deposit (Ukraine). Nowy Kosciol, Sudety; Strzegom; Ieglova (Poland). Cavnic; Baia de Aries; Baia Sirne (Romania). Salm - Chateau; Blaton, Hainant (Belgium). South Shetland islands; Dry Gill (England). Ilimaussaq (Greenland). Alavus; Outokumpu (Finland). (Iceland) (Norway). Mir kimberlite pipe, Yakutia; Chupa, Karelia; Kovdor, Khibiny, Korabl' Cape, Kola pen.; Slyudyanka, Tazheranskii massif, Sededema riv., Siberia; Dalnegorskoye dep.; Magadan; Chukotka; Transbaikalia; Timanskii Kryazh; Orsk; Tselina, Rostot Prov.; Cape Taygonos; Ohotskoe coast, Golotvino; Beloretskaya kirov Prov.; Buryatia (Russia). L'ubietova; Banska Stiavnica (Slovakia). Dashkesan (Azerbaidzhan). Altay Mt., Karaagach (Kazakhstan). Khash Rud (Afghanistan). Khan Bogdo; Modoto; Gorikho; Henteyn Mts. (Mongolia). Hunan; Guishou (China). Dara-Pioz (Tadzhikistan). Shaba; Poona; Anrangabad (India). Lebombo; Alto Ligonha; Manica (Mozambique). Hamadala (Libya). (Zimbabwe). Nishinomaki mine, Gumma pref; Senhoshi Mt. (Japan). (Burundi). Gatumba (Rwanda). Reneville,

1	2	3
Quartz and varieties (continuation)		(Congo). Dalan (Somalia). Jos Plateau (Nigeria). Tamagot mine (Mauritania). Tsaobismund (Namibia). Guerrero (Mexico). Caluquembe (Huila). Kuacra (Angola). Mt. Ida, Arkansas; Crawford, Nebrasca; Bisbee, Arizona; Copper Creek Dist. Arizona; Hansonburg mine, New Mexico; Qeen mine, California (USA). Mt. St.-Hilaire (Canada). Huaron; Pasto Bueno; Huancavelica (Peru). Minas Gerais; Boquira mine, Bahia, Rio Grande do Sul; Gamba (Brazil). Broken Hill (Australia).
Tridymite (Тридимит)	5	Popintsi vill., Panagyurishte reg. (Bulgaria). Kiselka quarry, Moravia (Czech Republic). Cagliari, Sardinia (Italy). Bellerberg, Eifel (Germany). Japan.
Melanophlogite (Меланофлогит)	2	Rio Fortullino, Livorno, Tuscany (Italy)
Cristobalite (Кристобалит)	3	Gledka vill., Kurdzhali reg. (Bulgaria). Sand, Bas-Rhin; Puy de Dome (France).
- *Lussatite* (*Люсатит*)	1	Lussat, Creuse (France).
Opal (Опал)	68	Mineralni bani vill., Dragoyna vill., Haskovo reg.; Boyadjik vill., Goliamo Sharkovo vill., Yambol reg.; Osigovo vill., G. Delchev reg.; Svetoslav vill., Kurdzhali reg.; Lozen Mt., Sofia reg. (Bulgaria). Menelmontaun (France). Vinnytsya Prov.; Lvov reg. (Ukraina). Galicia; Caldes de Mallavela, Catalonia (Spain). Nedvedice, Nova Ves, Moravia; Valec; Bohemia; Kremze; Bohouskovice (Czech Republic). L'ubietova; Dubnik; Cervenica (Slovakia). Szklary (Poland). Tai - Keu, Ural (Russia). Kaiserstuhl, Baden; Schinkelberg; Osnabruck; Uberkassel; Steinhembei Hanau (Germany). Karaagach (Kazakhstan). (Zimbabwe). Zimapan (Mexico). Quilpy, Queensland; Cooper Pedy; White Cliffs, New South Wales (Australia).
- *Hyalite* (*Хиалит*)	4	
- *Cacholong II* (*Кахолонг II*)	1	
1.1.2. Magadiite group		
Magadiite (Магадиит)	1	Kanem (Chad).
1.2. Aluminosilicates		
1.2.1. Feldspar group		

1	2	3
Hyalophane (Хиалофан)	6	Busovaca (Bosnia and Herzegovina). Sivets, Prilep; Selechka Mt. (Macedonia). Siberia (Russia).
Albite (Албит)	93	Vishteritsa quarry, W. Rhodopi Mts; Belite brezi hut, Marchaevsko kale, Shipeto, Lipata quarry, Vitosha Mt.; Gorni Okol vill., Sofia reg.; Fetikler vill., Momchilgrad reg.; Smilovene quarry, Koprivshtitsa reg. Chernomorets quarry, Burgas reg.; Dyadovtsi vill., Latinka vill., Banite vill., Galabovo vill., Ardino peg.; Chepelare, Smolyan reg.; Urdini Lakes, Rila Mt.; Parvenets vill., Yambol reg. (Bulgaria). Tyrol (Austria). Val Canaria, Ticino; Binnschlucht, Wallis (Switzerland). Dobra Voda, Rozna, Dolni Bory; Cyrilov, Markovice, Moravia (Czech Republic). San Piero in Campo, Elba (Italy). Bergen (Germany). Lovozero massif, Khibiny, Kola pen.; Ilmeny, Ural; Chupa, Karelia, Mutkovski volkano, Kamchatka (Russia). Strzegom; Wroclaw, Lower Silesia (Poland). Kvanefield, Ilimaussaq (Greenland). Byrud, Minenesud; Kongsberg (Norway). Volodarsk-Volynskii; Golovino, Zhitomir (Ukraine). Eycott Hill, Cumbria (England). Nampula Prov. (Mozambique). Mt. St.-Hilaire, Quebec (Canada). Gorikho (Mongolia). Jugoppe Shiraoi, Hokkaido (Japan). Minas Gerais (Brazil). Harbor Trust quarry, Portland, Victoria (Australia).
- *Oligoclase* (*Олигоклаз*)	16	
- *Andesine* (*Андезин*)	3	
- *Labradorite* (*Лабрадор*)	12	
- *Bytownite* (*Битовнит*)	1	
Anorthite (Анортит)	2	
Orthoclase (Ортоклаз)	11	Stoikite vill., Galabovo vill., Chepelare, Smolyan reg.; Latinka vill., Ardino reg.; Nova Mahala vill., Batak reg.; Tsarvaritsa vill., Kyustendil reg.; Pirin Mt.; Rosen mine, Burgas reg. (Bulgaria). Karlovy Vary (Czech Republic). Banska Stavnica (Slovakia). Hounrie; Lindenberg mine; Hannover; Gundbruck (Germany). Kongsberg (Norway). Volodarsk-Volynskii (Ukraine). Felbertal, Salzburg; Elbachalm, Amertal; Schwarzenstein, Tyrol (Austria). Fibbia, St. Gotthard (Switzerland). Val di Vizze, Tyrol; Bozen, San Piero in Campo, Elba (Italy). Khibiny, Kola pen. (Russia). Senhoshi Mt. (Japan). Mt. St.-Hilaire, Quebec (Canada).
- *Adularia* (*Адулар*)	47	
Microcline (Микроклин)	59	Dolen vill., Zlatograd reg.; Galabovo vill., Chepelare, Smolyan reg.; Kalkovo vill., Samokov reg.; Karakaya summit, Velingrad reg.; Vishteritsa quarry, W. Rhodopi Mts; Smilovene quarry, Koprivshtitsa reg. Chernomorets quarry,
- *Amazonite* (*Амазонит*)	15	

1	2	3
		Burgas reg.; Belite brezi, Marchaevsko kale, Shipeto, Lipata quarry, Vitosha Mt., Dolni Okol vill., Sofia reg. (Bulgaria). Khibiny, Kola pen. (Russia). Volodarsk-Volynskii; Donets Basin (Ukraine). Bergen (Germany). Dolni Bory, Moravia (Czech Republic). Broyes, Saone et Loire; An Nivit, Cotes (France). Ilimaussaq (Greenland). Khan Bogdo (Mongolia). Mt. St.-Hilaire, Quebec (Canada). Peak area, Colorado (USA). Broken Hill (Australia).
Sanidine (Санидин)	31	Gyueshevo vill., Tsarvaritsa vill., Osogovo Mt.; Kyustendil reg.; Komuniga vill., Kurdzhali reg.; Kremen vill., Dobrinishte vill., Blagoevgrad reg.; Babeshino vill., Luki reg. (Bulgaria). Drachenfels; Belerberg, Eifel (Germany).
Celsian II (Целзиан II)	2	Busovaca (Bosnia and Herzegovina). Shiramaru mine, Tokyo pref. (Japan).
Cymrite (Кумрит)	5	Nezilovo vill. (FYRO Macedonia). Shiramaru mine, Tokyo pref. (Japan).
Slawsonite (Слаусонит)	1	Kagami, Kochi pref. (Japan).
1.2.2. Scapolite group		
- [*Scapolite*] [*Скаполит*]	15	Burdtse mine, M. Turnovo reg.; Mihalkovo vill., Chepelare, Smolyan reg. (Bulgaria). Sentenac d'Oust (Italy). Dobra Voda, Moravia (Czech Republic). Arendal (Norway). Karelia; Slyudyanka, Siberia (Russia). Belaora (Madagascar).
Meionite (Мейонит)	27	Belia uluk, Rila monastery; Urdini Lakes, Petlite summit, Rila Mt. (Bulgaria). Mc Gregor lake, Quebec (Canada).
Ussingite (Усингит)	5	Ilimaussaq (Greenland). Lovozero massif; Khibiny, Kola pen. (Russia).
1.2.3. Nepheline group		
Nepheline (Нефелин)	16	Yukspor Mt., Khibiny, Kola pen.; Ilmeny, Ural (Russia). Donets Basin (Ukraine). Selse Dell·Osa; Valle Ranello; Latium; Osa, Rome (Italy). Ilimaussaq (Greenland). Davis Hill, Bancraft, Ontario (Canada). Hoy Las Minas, E. of Huijo, El Progresso Dept. (Guatemala).
Kalsilite (Калсилит)	1	San Venanzo (Italy).
1.2.4. Cancrinite group		

1	2	3
Cancrinite (Канкринит)	3	Vishnevye Gory, Ural (Russia). Mt. St.-Hilaire, Quebec; Blue Mountain, Ontario (Canada).
Vishnevite (Вишневит)	1	Loch Borrolan, Scotland (Great Britain).
Afghanite (Афганит)	1	Pitigliano, Grosseto, Tuscany (Italy).
Liottite (Лиотит)	2	Pitigliano, Grosseto, Tuscany (Italy).
Cancrisilite (Канкрисилит)	1	Alluaiv Mt., Lovozero, Kola pen. (Russia).
1.2.5. Petalite group		
Petalite (Петалит)	5	Uto(e) island (Sweden). Nova Ves, Moravia (Czech Republic). Alto Ligonha (Mozambique).
Leifite (Лейфит)	2	Karnasurt Mt., Lovozero, Kola pen. (Russia). Mt. St.-Hilaire, Quebec (Canada).
1.2.6. Leucite group		
Leucite (Левцит)	4	Capo di Bove, Rome; Vesuvius, Naples; Roccamonfina, Gaeta (Italy).
Ammonioleucite (Амониолевцит)	1	Fujioka, Sanbagawa, Gumma pref. (Japan).
Pollucite (Полуцит)	4	Karelia; Khibiny, Kola pen. (Russia). Maine state (USA). Bernic lake, Manitoba (Canada).
1.2.7. Sodalite group		
Sodalite (Содалит)	9	Donets Basin; Oktyabr'skii massif; Vinnytsya Prov. (Ukraine). Lovozero, Kola
- *Hackmanite* (*Хакманит*)	2	pen. (Russia). Ilimaussaq (Greenland). Davis Hill Bancroft, Ontario; Mt. St.-Hilaire, Quebec (Canada).
Haüyne (Хаюин)	2	Niedermendig, Laacher See, Eifel (Germany). Taiarapu (Taihti).
Lazurite (Лазурит)	14	Malaya Bystraya, Lake Baikal; Slyudyanka, Siberia (Russia). Altay Mt. (Kazakhstan). Pamir (Tadzhikistan).
1.3. Zeolites		
1.3.1. Zeolites from Na-Ca assemblages		
1.3.1.1. Natrolite group		
Natrolite (Натролит)	37	

1	2	3
- *Tetranatrolite* (*Тетранатролит*)	1	Banevo vill., Burgas reg.; Parvenets vill., Yambol reg.; Tursko pole vill., Madzharovo reg. (Bulgaria). Hammerunterwiesental, Erzgebirge; Ortenberg, Hessen (Germany). Karnasurt Mt., Lovozero; Kukisvumchorr Mt., Khibiny, Kola pen. (Russia). Casal do Penedo Monsanto (Portugal). Kvanefield-tinnel, Ilimaussaq (Greenland). Usti nad Labem (Czech Republic). Tvedalen, Langensund (Norway). Hardap (Namibia). Mt. St.-Hilaire, Quebec (Canada) Willowtree; Flinders, Pioneer quarry, Victoria; Harkaway (Australia).
Gonnardite (Гонардит)	8	Banevo vill., Burgas reg. (Bulgaria). Kloch, Styria (Austria).
Mesolite (Мезолит)	5	Petlite summit, Seven Rila Lakes, Rila Mt. (Bulgaria). King George isl., South Shetland islands (Great Britain). Pashan, Poona (India).
Thomsonite (Томсонит)		
- *Faroelite* (*Фароелит*)	35	Banevo vill., Burgas reg.; Urdini Lakes, Rila Mt.; Parvenets vill., Yambol reg.;
	1	Vitosha Mt., Sofia reg. (Bulgaria). Hammerunterwiesenthal (Germany). Dobra i Decina; Hamry (Czech Republic). Parkgate quarry (Ireland). Langasandur (Denmark). Drain, Douglas Co.; Burnt Cabin Creek, Spray, Wheeler Co., Oregon (USA). Flinders area, Victoria (Australia).
Scolecite (Сколецит)	5	Banevo vill., Burgas reg. (Bulgaria). Teigarhorn (Iceland). Rio das Antas, Rio Grande do Sul; Minas Gerais (Brazil).
Paranatrolite (Паранатролит)	1	Vishnevye Gory, Ural (Russia).
1.3.1.2. Laumontite group		
Laumontite (Ломонтит)	21	Banevo vill.; Chernomorets quarry; Trud; Rosen; Vurli bryag mines; Burgas reg.; Strandzha mine, M. Turnovo reg.; Komuniga vill., Kurdzhali reg. (Bulgaria). Ukrainka vill., Crimea (Ukraine). Kola pen. (Russia). Pashan, Poona (India). Drain, Douglas Co.; Tillamook Co., Oregon; Skookumshuck Dam, Tenino, Washington; Mineral Co. Colorado; Pine Creek mine, Bishop, California (USA). Rio das Antas, Rio Grande do Sul (Brazil). Garravilla (Australia).
1.3.1.3. Mordenite group		

1	2	3
Mordenite (Морденит)	21	Sushevo vill., Momchilgrad reg.; Gruevo vill., Kurdzhali reg.; Mihalkovo vill., Smolyan reg (Bulgaria). Vivi riv., Siberia (Russia). Bombay (India).
Dachiardite (Дакиардит)	7	Alpe di Siusi; Orli di Fassa, Bolzano (Italy). Zeilberg, Maroldsweisach, Franconia (Germany). Cape Lookoutð Tillamook Co., Oregon (USA).
Ferrierite (Фериерит)	7	Zvezdel dep., Kurdzhali reg. (Bulgaria). Schio-Vicenza (Italy). Berrys Beach, Phillip Isl., Victoria (Australia).
Erionite (Еритонит)	4	Akhaltsikhe (Georgia). Iki isl., Kynshu (Japan). Clifton, Arizona; Rock Island Dam, Washington (USA).
Offrétite (Офретит)	4	Mont Simiouse (France). Rock Island Dam, Washington (USA).
1.3.1.4. Stilbite group		
Stilbite (Стилбит)	57	Fotinovo vill., Momchilgrad reg.; Lipata quarry, Vitosha Mt., Pancharevo, Khyazhevo, Marchaevo, Malo Buchino villages - Sofia reg;. Madzharovo reg.; Stoikite vill., Smolyan reg.; Strelcha vill., Medet mine, Panagyurishte reg; Vurli bryag mine, Burgas reg. (Bulgaria). Andreasberg; Hernborn, Hessen (Germany). Sumperk, Moravia (Czech Republic). Strzegom (Poland). Dunabogdany (Hungary). Sokolovskii mine (Kazakhstan). Sardinia (Italy). Leitisvatn, Vagar (Denmark). (Iceland). King George isl., South Shetland islands (England). Klichka, Transbaikalia; Vivi riv., Siberia; Buryatia; S. Yakutia (Russia). Pashan, Poona (India). Pennsylvania; Skookumchuck Dam, Thurston Co., Washington (USA). Garravila, New South Wales; Arkaroola (Australia).
Heulandite (Хейландит)	23	Antenata, Lipata quarries, Vitosha Mt., Sofia reg.; Madzharovo reg.; Stoikite vill., Smolyan reg. (Bulgaria). Kozakov (Czech Republic). Karadag, Crimea (Ukraine). Strzegom (Poland). Tyrol (Austria). Sardinia; Valle di Fassa (Italy). Kedykverpahk, Lovozero, Kola pen.; Yakutia (Russia). Akhaltsikhe (Georgia). Poona (India). Prospect Park, New Jersey; Rock Island Dam, Washington (USA).
Epistilbite (Епистилбит)	2	Su Marralzu, Osilo, Sassari, Sardinia (Italy).
Barrerite (Барерит)	3	Monastir, Sardinia (Italy).

1	2	3
Cowlesite (Коулсит)	1	Old quarry, Green Road (Ireland).
Yugawaralite (Югаваралит)	5	Osilo, Sassari, Sardinia (Italy). Seikoshi mine, Shizuoka pref. (Japan). Khandivali quarry, Bombay (India).
Clinoptilolite (Клиноптилолит)	6	Zvezdel dep., Kurdzhali reg.; Popintsi vill., Panagyurishte reg. (Bulgaria). Hongova (Russia). Tillamook, Oregon (USA).
Stellerite (Стелерит)	2	Alghero, Sardinia (Italy). Ritter Hot Springs, Grant Co., Oregon (USA).
1.3.1.5. Gismondite group		
Gismondine (Жисмондин)	3	Teichelberg, Bavaria; Aresberg, Zilsdorf (Germany). Dobrzanka (Czech Republic).
Gobbinsite (Гобинсит)	2	Hills Port, Antrim Co., Northern Ireland (Great Britain).
Garronite (Гаронит)	1	Garron Plateau, Antrim Co., Northern Ireland (Great Britain).
1.3.1.6. Chabazite group		
Chabazite (Хабазит)	32	Nova Mahala vill., Batak reg.; Urdini Lakes.; Petlite summit, Rila Mt.; Chernomorets quarry, Burgas reg.; Madzharovo reg.; Stoikite vill., Smolyan reg. (Bulgaria). Strzegom (Poland). Dunabogdany (Hungary). Maglovec (Slovakia). Repcice (Czech Republic). Langd, Hessen; Ostenberg; Andreasberg (Germany). Tyrol (Austria). Antrim Co. (Ireland). Clifton, Arizona (USA). Melbourne, Victoria; Gads Hill, Tasmania (Australia).
- *Phacolite* (*Факолит*)	3	
Gmelinite (Гмелинит)	4	Ukrainka vill.,Crimea (Ukraine). Dobra Voda (Czech Republic). Flinders area, Victoria (Australia).
Levyne (Левин)	3	Iki isl., Kynshu (Japan). Burnt Cabin Creek, Spray, Wheeler Co., Oregon (USA). Victoria (Australia).
Wilhendersonite (Уилхендерсонит)	2	Vispi quarry, San Venanzo, Umbria (Italy).
1.3.1.7. Analcime group		
Analcime (Аналцим)	53	Baratsi vill., Krumovgrad reg. Parvenets vill., Yambol reg.; Banevo vill., Burgas reg.; Madzharovo reg. (Bulgaria).Tyrol (Austria). Sierra de Monchique (Portugal). Glenarm, Antrim Co., Northern Ireland (Great Britain). Taseq Slope; Kvanefjeld, Ilimaussaq (Greenland). Bor mine (Serbia). Farra (Italy). Tungusk; Siberia

1	2	3
Analcime (continuation)		(Russia). Kumansi (Georgia). Hardap (Namibia). Mt. St.-Hilaire, Quebec (Canada). Spring area, Arizona (USA). Willowtree; Flinders area, Victoria (Australia).
Wairakite (Вайракит)	1	Hachimantai (Japan).
Paulingite (Паулингит)	2	Chase Creek, British Columbia (Canada). Ritter, Grant Co., Oregon (USA).
1.3.2. K-Ba zeolite assemblages		
Brewsterite (Брюстерит)	1	Strontian, Argyllshire, Scotland (Great Britain).
Amicite (Амицит)	2	Howengg, Hegau (Germany). Kukisvumchorr Mt., Khibiny, Kola pen. (Russia).
Phillipsite (Филипсит)	16	Hammerunterwiesenthal; Langd, Hessen; Arensberg, Zilsdorf, Eifel; Andreasberg. (Germany). Ronca, Varese (Italy). Ukrainka vill., Crimea (Ukraine). Beech Creek, Oregon; Burro Creek Campground, Arizona; Rock Island Dam, Washington (USA).
Merlinoite II (Мерлиноит II)	1	Howenegg, Hegau (Germany).
Harmotome (Хармотом)	7	Iskra vill., Kurdzhali reg. (Bulgaria). Andreasberg (Germany). Tyrol (Austria). D. Rosinka (Czech Republic). Kornas (Finland). Bellesgrove mine, Strontian (Great Britain). Desamparaditos (Costa Rica).
Mariocopaite (Мариокопаит)	1	Moon Anchor mune, Tonopah, Maricopa Co., Arizona (USA).
2. Silicates with (Si, Al): M^{2+}=3:1 to 1:1		
2.1. Be-Al-Mg(Fe) assemblages		
2.1.1. Axial		
2.1.1.1. Bavenite group		
Bavenite (Бавенит)	5	Smilovene quarry, Koprivshtitsa reg. (Bulgaria). Strzegom (Poland). Izumrudnye kop'i, Ural (Russia).
Sörensenite (Сьоренсенит)	1	Kvanefjeld Plateau, Ilimaussaq (Greenland).
2.1.1.2. Pyroxene group		
Enstatite (Енстатит)	14	Brusevtsi vill., Haskovo reg. (Bulgaria). Miedzianka, Silesia (Poland). Skorasice;
- *Hypersthene* (*Хиперстен*)	1	Nova Ves, Moravia (Czech Republic). Harz (Germany). Michimata, Iwate pref. (Japan).

1	2	3
Clinoenstatite (Клиноенстатит)	1	Bad Harzburg, Harz (Germany).
Diopside (Диопсид)	45	Petlite summit, Bliznaka Lake, Urdini Lakes, Belya uluk, Rila monastery, Skakavitsa Lake, Rila Mt.; Chepelare, Smolyan reg.; Propada mine, M. Turnovo reg.; Enyovche mine, Kurdzhali reg.; Vacha riv., Antonivanovtsi Dam, Krichim reg. (Bulgaria). Wurtitz pres, Bayreuth. Arendal (Norway). Smrci, Kozakov, (Czech Republic). Guleman (Turkey). Hodrusa (Slovakia). Valle Ranello; Praborna; Piemonte (Italy). Outokumpu (Finland). Slyudyanka; Tazheran; Siberia; Kovdor, Kola pen.; Inagli massif, Yakutia (Russia). Dara-Pioz (Tadzhikistan). Himalayas. Belaora (Madagascar).
- *Chromdiopside* (*Хромдиопсид*)	7	
- *Fassaite* (*Фасаит*)	1	
Hedenbergite (Хеденбергит)	14	Lyubovna cheshma mine, Ardino reg.; Sharenka, Osikovo mines - Madan reg. (Bulgaria). Arendal (Norway). Dalnegorskoye deposit (Russia). Burgillos del Cerro (Spain). Elba Island (Italy). Etats-Unis (French Guiana).
Johannsenite (Йохансенит)	17	Sharenka, Gradishte, Osikovo mines - Madan reg.; Enyovche mine, Kurdzhali reg. (Bulgaria). Iron Cap mine, Arizona (USA).
Omphacite II (Омфацит II)	1	Hoy Las Minas, El Progresso, Depart. (Guatemala).
Augite (Авгит)	21	Krushevets vill., Lozenets vill., Burgas reg.; Parvenets vill., Yambol reg.; Hrabrino vill., Sotir vill., Plovdiv reg. (Bulgaria). Paskopole; Cernosin (Czech Republic). Osa, Rome (Italy). Ilimaussaq (Greenland). Olot (Spain). Val di Fassa, Tyrol (Italy). Boreslav, Mitelgebirge (Germany). Harbour Trust quarry, Victoria (Australia).
- *Diallague* (*Диалаг*)	4	
Aegirine (Егирин)	83	Krivoi Rog (Ukraine). Ilimaussaq, Tuperssuatsiait (Greenland). Hazlov (Czech Republic). Hedrum, Vestfol (Norway). Kirovskii mine, Kukisvumchorr Mt., Rasvumchorr Mt., Khibiny, Lovozero, Yukspor Mt., Kola pen.; Chara river,

1	2	3
Aegirine (continuation)		Siberia (Russia). Êvanefjeld, Dara-Pioz (Tadzhikistan). Khan Bogdo (Mongolia). Mt. St.-Hilaire; Kipawa River, Quebec (Canada).
Jadeite (Жадеит)	4	Itokaua; Satoshi Muto (Japan). Hoy Las Minas, El Progresso, Depart. (Guatemala).
Spodumene (Сподумен)	10	Nova Ves, Dobra Voda, Moravia (Czech Republic). Brandrucken, Koralpe,
- *Kunzite II* (*Кунцит II*)	2	(Austria). Siberia; Kola pen. (Russia). Ambatofotsikeli (Madagascar). Tassiest (Mauritania). (Mozambique). Pala, Chif mine, California (USA).
Bikitaite (Бикитаит)	5	Bikita (Zimbabwe).
2.1.1.3. Amphibole group		
- [***Amphibole***] **[*Амфибол*]**	47	Smilovene quarry, Koprivshtitsa reg. Bliznaka Lake, Urdini Lakes, Elenski Lakes, Rila Mt.; Vladaya vill., Sofia reg.; Strandzha mine, M. Turnovo reg.; Stoikite vill., Smolyan reg.; Chernomorets quarry, Cherveno zname, Rosen mines - Burgas reg.; Oreshino vill., Ivaylovgrad reg. (Bulgaria). Bor mine (Serbia). Markovice, Kosstenblatt, Dobra Voda, Moravia (Czech Republic). Sentenac d'Oust (Italy). Zillertal, Tyrol (Austria). Bourg d'Oisans, Dauphine (France). Ilimaussaq, Tuperssuatsiait (Greenland). Transbaikalia, Siberia (Russia). Hissar Mts. (Tadzhikistan). Ondor - Tsagan (Mongolia). Bayan Obo (China). Mt. St.-Hilaire, Quebec; Ezonville, Ontario (Canada). Etats Unis (French Guiana).
Anthophyllite (Антофилит)	13	Dobromirtsi dep., Zlatograd reg.; Golyamo Kamenyane vill., Avren vill.,
- *Anthophyllite asbestos*	10	Krumovgrad reg.; Yakovitsa vill., Kurdzhali reg.; Ihtiman reg. (Bulgaria).
(*Антофилитов азбест*)		Hermanov, Moravia (Czech Republic).
Holmquistite (Холмквистит)	5	Brandrucken, Carinthia (Austria). East Siberia (Russia). Kirengo (Rwanda).
Cummingtonite (Къмингтонит)	1	Krivoi Rog (Ukraine).
Mangancummingtonite	1	Chvaletice (Czech Republic).
(Манганокъмингтонит=Данеморит)		
Tremolite (Тремолит)	34	Zeleni rid, Seven Rila Lakes, Urdini Lakes, Elenski Lakes, Petlite summit, Rila
Actinolite (Актинолит)	21	Mt.; Bela reka, N Pirin Mt.; Dorkovo vill., Velingrad reg.; Stipon quarry,
- *Nephrite* (*Нефрит*)	6	Ihtiman reg. Avren vill., Krumovgrad reg. Pletena vill., G. Delchev reg.; Strandzha

1	2	3
Actinolite and varieties (continuation)		mine, M. Turnovo reg. (Bulgaria). St Gotthard (Switzerland). Wroclaw, Lower Silesia (Poland). Sabotin bei Sumperk; Olesnice, Moravia (Czech Republic). Tresebourg, Harz, Freiberg (Germany). Piemont (France). Lorca, Navarra (Spain). Zillertal, Tyrol; Brennkogelkees, Salzburg (Austria). Kyle of Lochalsh, Scotland. Vegarshei (Norway). Val di Vizze, Tyrol (Italy). Transbaikalia, Onot riv., Siberia; Eastern Sayan Mts.; Karelia (Russia). Kipawa River, Quebec (Canada). Northern Feinders Range (Australia).
Pargasite (Паргасит)	1	Parainen, Turku (Finland).
Hastingsite (Хейстингсит)	2	Damga summit, Rila Mt. (Bulgaria). Almunge (Sweden).
Richterite (Рихтерит)	6	Langban (Sweden). Ezonville; Wilberforce; Ontario (Canada).
Winchite (Винчит)	1	Sitapar, Chindwara distr. (India).
Magnesiokatophorite (Магнезиокатофорит)	1	Kipawa, Quebec (Canada).
Glaucophane (Глаукофан)	2	Brittany (France). Kirengo (Rwanda).
Riebeckite (Рибекит)	3	Alter Pedroso (Portugal). Krivoi Rog (Ukraine). South Africa, Lakseelv, (Greenland). Rzhanovo (Macedonia). Salzburg (Austria). Krivoi Rog, (Ukraine).
- *Crocidolite* (*Крокидолит*)	2	
- *Crossite* (*Кросит*)	2	
- *Rhodusite* (*Родузит*)	1	
Arfvedsonite (Арфведсонит)	9	Selechka Mt. (Macedonia). Ilimaussaq (Greenland). Khibiny, Kola pen. (Russia). Dara-Pioz (Tadzhikistan). Mt. St. Hillary, Quebec (Canada).
2.1.1.4. Palygorskite - Sepiolite group		
Palygorskite (Палигорскит)	9	Sedmochislenitsi dep., Vratsa reg.; Surneshko kladenche mine, Burgas reg.; Strandzha mine, M. Tutnovo reg. (Bulgaria). Zhezhelev, Zhitomir; Lozovoye vill., Crimea (Ukraine). Lord Brassey mine, Heazlewood, Tasmania (Australia).
Sepiolite (Сепиолит)	1	Mehun-sur-Ye'vre, Cher (France).
- *Parasepiolite* (*Парасепиолит*)	1	Hohe Tauern, Salzburg (Austria).
Yofortierite (Йофортиерит)	3	Karnasurt Mt., Lovozero (Russia). Mt. St.-Hilaire, Quebec (Canada).

1	2	3
Tuperssuatsiaite (Туперсуамсиаит)	1	Tuperssuatsiait Bay, Ilimaussaq (Greenland).
2.1.1.5. Howieite - Deerite group		
Howieite (Хауиит)	3	Mendocino Co., California (USA).
Deerite (Дирит)	1	Mendocino Co., California (USA).
Carpholite (Карфолит)	7	Mansfeld, Thuringia; Wippra, Harz (Germany). Moldava; Horni Slavkov (Czech Republic).
2.1.2. Planar		
2.1.2.1. Eudidymite group		
Eudidymite (Евдидимит)	1	Langesundfjord (Norway).
Epididymite (Епидидимит)	1	Taseq slope (Greenland).
2.1.2.2. Kaolinite - Pyrophyllite group		
Kaolinite (Каолинит)	7	Glavanak vill., Haskovo reg.; Zhablyano vill., Pernik reg.; Vitosha Mt., Sofia reg. (Bulgaria). St. Austell, Cornwall (England). (Poland). Gorikho (Mongolia).
- *Nacrite* (*Накрит*)	1	
- *Anauxite* (*Анаксит*)	1	Kawazu mine (Japan). San Benito Co., California (USA).
Dickite (Дикит)	2	Nova Ruda, Sudety (Poland).
Allophane (Алофан)	1	Greu d'olorde, Barcelona (Spain).
Hisingerite (Хизингерит)	1	Langban (Sweden).
Halloysite (Халуазит)	8	Vlaykov vrah, Panagyurishte reg.; Glavanak vill., Haskovo reg. (Bulgaria). Priazovye (Ukraine).
Pyrophyllite (Пирофилит)	2	Ovruch, Zhitomir (Ukraine). Saranovskoye dep., Urals (Russia).
2.1.2.3. Antigorite - Talc group		
- [*Serpentine*] [*Серпинтин*]	17	Kresna defile, Blagoevgrad reg.; Krumovo vill., Yambol reg. (Bulgaria). Lizard, Cornwall (England). Naslawice, Sudety (Poland). Valle del Rodano (Switzerland). Pechenga, Kola pen. (Russia). Brewster, New York (USA). (Zimbabwe). Lord Brassey mine, Heazlewood, Tasmania (Australia).

1	2	3
Antigorite (Антигорит)	2	Dobrevo vill., Kratovo reg. (Macedonia). Lord Brassey mine, Heazlewood, Tasmania (Australia).
-*Garnierite* (*Гарниерит*)	1	Noumea, New Caledonia, Pacific Ocean (France). Naslawice, Sudety,
- *Serpophite* (*Серпофит*)	1	(Poland). Gornoslav vill., Asenovgrad reg. (Bulgaria). Reichenstein, Silesia,
- *Cerolite* (*Керолит*)	1	(Poland). Tuva Respublika; N Buryatia; Ural (Russia). Lord Brassey mine,
Chrysotile (Хризотил - Азбест)	6	Heazlewood, Tasmania (Australia).
Pecoraite (Пекораит)	2	Lord Brassey mine, Heazlewood, Tasmania (Australia).
Talc (Талк)	22	Gruevo vill., Djebel vill., Kurdzhali reg.; Avren vill., Krumovgrad reg. Pletena
- *Steatite II* (*Стеатит II*)	1	vill., G. Delchev reg.; Zeleni rid, Seven Rila Lakes, Urdini Lakes, Rila Mt.; Koshava vill., Vidin reg. (Bulgaria). Sobotin bei Sumperk, Hohe Gesenue, Vernirovice; N. Moravia. (Czech Republic). Ural; Eastern Sayan Mts. (Russia). Pamir (Tadzhikistan). Huandchu; Liaoning (China). Roden mine, Thein (Myanmar). Griqualand (South Africa).
Cronstedtite (Кронщедтит)	1	Harz (Germany).
Lizardite (Лизардит)	1	Brosso mine, Piemonte (Italy).
Minnesotaite (Минесотаит)	2	Hagendorf, Bavaria (Germany).
2.1.2.4. Mica group		
Muscovite (Мусковит)	111	Ahryane vill., Shiroko pole vill., Kurdzhali reg.; Banite vill., Vishnevo vill.,
- *Sericite II* (*Серицит II*)	7	Chepelare, Smolyan reg.; Vishteritsa quarry, W. Rhodopi Mts; Badinovo vill.,
- *Alurgite* (*Алургит*)	2	E Rhodopes; Seven Rila Lakes, Musala summit, Vurli summit; Irechek summit,
- *Fuchsite* (*Фуксит*)	4	Rila Mt.; Chernooki vill., Krumovgrad reg. Markova trapeza, Samokov reg.; Dolen vill., Zlatograd reg.; Smilovene quarry, Koprivshtitsa reg. Bugarchevo vill., Blagoevgrad reg.; Pastra vill., Kyustendil reg. Dyadovtsi vill., Latinka vill., Ardino reg. (Bulgaria). Sivets, Prilep; Selechka Mt. (Macedonia). Dolni Bory, Cyrilov, Marsikov, Moravia; Trhove Sviny (Czech Republic). Zaporoz'e (Ukraine). Untersulbachtal, Salzburg (Austria). Altenberg, Erzgebirge; Bergen, Vogtland; Hagendorf (Germany). Binntal (Switzerland). Kovdor, Kola pen.; Chupa, Karelia (Russia). Kalbinskii Range (Kazakhstan). (Afghanistan). Ondor

1	2	3
Muscovite and varieties (continuation)		- Tsagan (Mongolia). Liaoning (China). Alto Ligonha (Mozambique). Ruwenzori Mt. (Zaire). Minas Gerais (Brazil). Yinnietharra (Australia).
Paragonite (Парагонит)	2	Bockau, Erzgebirge (Germany). (Switzerland).
Chernykhite (Чернихит)	1	Goble, Columbia Co., Oregon (USA).
Phlogopite (Флогопит)	67	Seven Rila Lakes, Urdini Lakes, Rila Mt.; Surneshko kladenche mine, Burgas reg.; Bela reka, N. Pirin Mt. (Bulgaria). Hermanov, Moravia (Czech Republic). Habachtal, Salzburg (Austria). Byrud, Minnesud (Norway). Izumrudnye kop'i, Ural; Slyudyanka, Tazheran, Siberia; Kovdor; Kola pen. (Russia). (Uzbekistan). Hoh Sai Hu (China). Phalaborwa Complex, Transvaal (South Africa). Maria III, Zambezia (Mozambique).
Tetra-ferriphlogopite (Тетраферифлогопит)	2	Kovdor, Kola pen. (Russia).
Biotite (Биотит)	60	Stoikite vill., Chepelare, Smolyan reg.; Lipata quarry, Vitosha Mt., Sofia reg.;
- *Manganophyllite* (*Манганофилит*)	1	Smilovene quarry, Koprivshtitsa reg.; Ardino reg.; Kurdzhali reg.; Bliznaka
- *Anomite* (*Аномит*)	1	Lake, Rila Mt. (Bulgaria). Untersulzbachtal, Salzburg; Brandrucken, Koralpe; Stublban, Schellgaden; Rotgulden, Lungan (Austria). Vesuvius (Italy). Hermanov, Moravia; Brno massif (Czech Republic). An Nivit, Cotes du Nord (France). Iveland; Arendal (Norway). Bastogne (Belgium). Altenberg mine, Erzgebirge; Bergen (Germany). Naslawice (Poland). Krivoi Rog (Ukraine). Amur reg. Kitelya, Karelia; Kola pen.; Murunskii, Yakutia; Vishnevye Gory, Ural (Russia). Dara - Pioz (Tadzhikistan). Altay Mt. (Kazakhstan). Henteyn Mts. (Mongolia). Kivu (Congo). Mogulu riv. (Pakistan). Himalayas. Nisia (Angola). Ebounja, near Kribi (Cameroon). Grants Valencia Co.; Mina Tiro De Estrella, Lingiln Co. New Mexico (USA). Davis Hill Bancroft, Ontario (Canada). Harts Range (Australia).
Lepidolite (Лепидолит)	56	Rozna; Dobra Voda; Dolni Bory; Drahonin, Moravia (Czech Rebublic). Gualba, Catalonia (Spain). Fibbia, St. Gotthard (Switzerland). Uto(e) isl.; Varutask (Sweden). Turgenevskoye deposit, Far East; Kola pen. (Russia). (Mongolia). Alto Ligonha (Mozambique). Tassiest (Mauritania).

1	2	3
Polylithionite (Полилитионит)	3	Ilimaussaq (Greenland). Dara-Pioz (Tadzhikistan). Mt. St.-Hilaire, Quebec (Canada).
Zinnwaldite (Цинвалдит)	6	Altenberg, Erzgebirge (Germany). Cinovec (Czech Republic).
2.1.2.5. Hydromica group (Illites)		
Glauconite (Глауконит)	1	Sanidinovo vill., Pleven reg. (Bulgaria).
- *Hydromuscovite II* (*Хидропусковит II*)	5	Belite brezi hut, Vitosha Mt., Sofia reg.; Chepelare, Smolyan reg.; Deveti Septemvri mine, Madan reg. (Bulgaria).
Celadonite (Селадонит)	10	Malo Buchino vill., Sofia reg.; Gruevo vill., Kurdzhali reg. (Bulgaria). Ukrainka vill., Crimea (Ukraine). Anrangabal (India). Colorado (USA). Sokoro (Mexico).
Stilpnomelsne (Стилпномелан)	1	Strzegom (Poland).
Zussmanite (Зусманит)	1	Long Vale quarry, Mendocino Co., California (USA).
Naujakasite (Науякасит)	1	Naujakasik (Greenland).
Caryopilite (Кариопилит)	1	Molinello mine, Genova (Italy).
2.1.2.6. Brittle mica group		
Margarite (Маргарит)	3	Urdini Lakes, Rila Mt. (Bulgaria). Zillertal, Tyrol (Austria).
Anandite (Анандит)	1	Fresno Co., California (USA).
Ottrelite (Отрелит)	2	Ottrez; Salm-Chateau (Belgium).
Chloritoid (Хлоритоид)	5	Rila monastery, Rila Mt. (Bulgaria).
2.1.2.7. Chlorite group		
- [*Chlorite*] [*Хлорит*]	30	Seven Rila Lakes., Rila Mt.; Borovishka riv., Stoikite vill., Belitsa vill., Smolyan reg., Rhodopes; Strandzha mine, M. Turnovo reg.; Surneshko kladenche mine, Burgas reg.; Krumovo vill., Yambol reg.; Zhivkovo vill., Ihtiman reg. (Bulgaria). Zillertal, Tyrol; Brennkogelkees, Groglocknergruppe, Salzburg; Hollgraben bei Werfen (Austria). Hermanov, Dolny Bory; Moravia (Czech Republic). Salm - Chateau (Belgium). Fibbia, St. Gotthard (Switzerland). Strzegom (Poland). Val d'Ala, Piemonte. (Italy). Chelyabinsk, Ural (Russia). (Armenia). Fort Wrangel, Alaska (USA).
- *Striegovite* (*Стриговит*)	2	
- *Pennine* (*Пенин*)	1	

1	2	3
Clinochlore (Клинохлор)	13	Zeleni rid, Elenski Lakes, Seven Rila Lakes, Urdini Lakes, Rila Mt. (Bulgaria).
- *Ripidolite* (*Рипидолит*)	1	Bas-Vallon Mor bihan (France). Zlatoust, Ural (Russia). Oldman Ravich Encampment, Wyoming (USA).
Cookeite (Кукеит)	7	Trebsko, Pribram; Rozna, Moravia (Czech Republic). Muiane mine, Alto Ligonha (Mozambique). (Zimbabwe). Onachita National Forest, Saline Co., Arkansas (USA).
2.1.2.8. Smectite group		
Montmorillonite (Монтморилонит)	3	Mihalkovo vill., Smolyan reg.; Ignatievo vill., Varna reg. (Bulgaria).
Saponite (Сапонит)	2	Santa Monica Mtns., Ventura Co., California (USA).
Nontronite (Нонтронит)	1	Hagendorf, Bavaria (Germany).
Vermiculite (Вермикулит)	6	Talc quarry, Ihtiman reg.; Avren vill., Krumovgrad reg. Dorkovo vill., Velingrad reg. (Bulgaria). Ukrainka vill., Crimea (Ukraine). Kovdor, Kola pen. (Russia). (Afghanistan). Phalaborwa Complex (South Africa).
Rectorite (Ректорит)	1	Allevard, Isere (France).
2.1.3. Pseudoisometric		
2.1.3.1. Beryl group		
Beryl (Берил)	101	Seven Rila Lakes, Urdini Lakes, Rila Mt.; Smilovene quarry, Koprivshtitsa reg. Vishteritsa quarry, W. Rhodopi Mts; Vlak summit, Sredna gora Mt.; Panagyurski koloni, Panagyurishte reg.; Galabovo, Vishnevo, Yugovo, Chepelare villages - Smolyan reg.; Chuka vill., Zlatograd reg.; Dyadovtsi vill., Ardino reg. (Bulgaria). Vezna, Marsikov, Moravia; Otov (Czech Republic). Volodarsk-Volynskii (Ukraine). Habachtal, Salzburg (Austria). Franqueira (Spain). Byrud, Minnesud (Norway). Tokovaya, Izumrudnye kop'i, Ural; Scherlovaya Gora, Transbaikalia (Russia). Ondor - Tsagan (Mongolia). (Pakistan). Kalbinskii Range (Kazakhstan). Kash Rud (Afghanistan). Gatumba (Rwanda). Gile mine, Zambezia, Maria III; Alto Ligonha (Mozambique). Maine (USA). Queensland (Australia).
- *Smaragd = Emerald* (*Смарагд*)	15	
- *Aquamarine* (*Аквамарин*)	11	
- *Morganite* (*Морганит*)	2	
- *Heliodor II* (*Хелиодор II*)	1	
Cordierite (Кордиерит)	15	Dyadovtsi vill., Ardino reg.; Galabovo vill., Smolyan reg. (Bulgaria). Dolni

1	2	3
- *Pinite* (*Пинит*)	1	Bory, Moravia (Czech Republic). Michimato; Ashio, Tochigi Pref. (Japan). (Sri Lanka). Gads Hill, Liena, Tasmania (Australia).
Sekaninaite (Секенинаит)	6	Dolni Bory, Moravia (Czech Republic).
2.1.3.2. Osumilite group		
Osumilite (Осумилит)	6	Funtanafigu, Cagliari, Monte Arci, Sardinia; Cava Funtanafigu, Marrubin (Italy). Shimizu, Kagoshima; Magahama, Hajato (Japan).
Milarite (Миларит)	1	Vezna, Moravia (Czech Republic).
Sogdianite (Согдианит)	2	Dara-Pioz (Tadzhikistan).
Emeleusite (Емелеусит)	1	Igdlutalik (Greenland).
Steenstrupine (Стенструпин)	1	Taseq slope, Ilimaussaq (Greenland).
2.2. Zr-Ti-Nb assemblages		
2.2.1. Axial		
2.2.1.1. Neptunite - Narsarsukite group		
Neptunite (Нептунит)	10	Khibiny, Kola pen. (Russia). Habri, Tisnova (Czech Republic). Kvanefjeld, Ilimaussaq (Greenland). San Benito Co., California (USA). Mt. St.-Hilaire, Quebec (Canada).
Mangan - neptunite (Манганнептунит)	1	Khibiny, Kola pen. (Russia).
Narsarsukite (Нарсарсукит)	2	Igdlutalik (Greenland). Mt. St.-Hilaire, Quebec (Canada).
Lorenzenite (Лоренценит)	8	Khibiny, Kola pen. (Russia). Poudrette quarry, Mt. St.-Hilaire, Quebec (Canada).
Tinaksite (Тинаксит)	2	Murunskii complex, Yakutia (Russia).
Zorite (Зорит)	1	Lovozero, Kola pen. (Russia).
2.2.1.2. Kostylevite group		
Umbite (Умбит)	1	Lovozero, Khibiny, Kola pen. (Russia).
2.2.2. Planar		
2.2.2.1. Astrophyllite group		

1	2	3
Astrophyllite (Астрофилит)	10	Khibiny, Kola pen. (Russia). Nana-Pegmatite, Ilimaussaq (Greenland). Mt. St.-Hilaire, Quebec (Canada).
Kupletskite (Куплетскит)	1	Little Rock, Arizona (USA).
Lamprophyllite (Лампрофилит)	6	Kirovskii mine, Kukisvumchorr Mt., Khibiny, Kola pen. (Russia).
Penkvilksite (Пенквилскит)	2	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Baratovite (Баратовит)	1	Dara- Pioz (Tadzhikistan).
Raite (Раит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
2.2.2.2. Baotite - Joaquinite group		
Muirite (Мюирит)	1	Fresno Co., California (USA).
Traskite (Траскит)	1	Fresno Co., California (USA).
Joaquinite (Джоакинит)	1	San Benita Co., California (USA).
2.2.3. Pseudoisometric		
2.2.3.1. Benitoite - Catapleiite group		
Benitoite (Бенитоит)	3	Gem mine, San Benita Co., California (USA).
Bazirite (Бацирит)	1	Big Creek, Fresno Co., California (USA).
Wadeite (Вадеит)	1	Khibiny, Kola pen. (Russia).
Catapleiite (Катаплеит)	4	Khibiny, Kola pen. (Russia). Ilimaussaq (Greenland). Mt. St.-Hilaire, Quebec (Canada). Little Rock, Arizona (USA).
Gaidonnayite (Гейдонеит)	1	Rasvumchorr Mt., Khibiny, Kola pen. (Russia).
2.2.3.2. Dalyite - Eudialyte group		
Armstrongite (Армстронгит)	4	Khan Bogdo (Mongolia).
Elpidite (Елпидит)	3	Khan Bogdo (Mongolia). Mt. St.-Hilaire, Quebec (Canada).
Eudialyte (Евдиалит)	36	Rasvumchorr Mt., Khibiny; Lovozero; Kola pen. (Russia). Ilimaussaq (Greenland). Norra Karr, Granna (Sweden). Kipawa, Quebec (Canada).
Lovozerite (Ловозерит)	1	Rasvumchorr Mt., Khibiny, Kola pen. (Russia).

1	2	3
2.3. Ca-Mn-Ba Assemblages		
2.3.1. Axial		
2.3.1.1. Pectolite group		
Pectolite (Пектолит)	12	Aheloy, Burgas reg. (Bulgaria). Marburg (Germany). Kostalov; Zelechy, N. Bohemia (Czech Republic). Kirovskii mine, Kukisvumchorr Mt., Khibiny, Kola pen. (Russia). Mt. St.-Hilaire; Jeffrey mine, Quebec (Canada).
Serandite (Серандит)	2	Mt. St.-Hilaire, Quebec (Canada).
Fenaksite (Фенаксит)	1	Rasvumchorr Mt., Khibiny, Kola pen. (Russia).
Canasite (Канасит)	2	Khibiny, Kola pen.; Murunskii complex, Yakutia (Russia).
Agrellite (Агрелит)	3	Kipawa complex, Quebec (Canada).
2.3.1.2. Wollastonite - Rhodonite group		
Wollastonite (Воластонит)	32	Beliya uluk, Rila monastery, Petlite summit, Rila Mt.; Burdtse mine, M. Turnovo reg. (Bulgaria). Dognecea, Banat (Romania). (Czech Republic). Gualba, Catalonia (Spain). Dalnegorskoye dep. (Russia). Kushiro, Hiroshima Pref. (Japan). Zulova bei Jesenik; Bludov; Mount Everest, Himalayas. Jeffrey mine, Quebec (Canada).
Rhodonite (Родонит)	41	Sharenka, Gradishte, Osikovo mines - Madan reg.; Govedarnika mine, Luki reg.; Enyovche mine, Kurdzhali reg.; Madzharovo reg.; Ruen mine, Osogovo Mt.; Obrochishte vill., Dobrich reg. (Bulgaria). Chvaletice (Czech Republic). Sacaramb (Romania). Langban (Sweden). Sedel'nikovo, Adervielle mine, Louron (France). Ural (Russia). Abata mine, Gumma Pref. (Japan). Broken Hill (Australia). Franklin Hill, New Jersey (USA). Akatore Creek, South Island (New Zealand).
Xonotlite (Ксонотлит)	4	Golyamo Kamenyane vill., Krumovgrad reg. Iglika vill., Yambol reg. (Bulgaria).
Bustamite (Бустамит)	7	Gradishte mine, Madan reg.; Govedarnika mine, Luki reg.; Ruen mine, Osogovo Mt. (Bulgaria). Meldon, Devonshire (England). Langban (Sweden).
Pyroxmangite (Пироксмангит)	2	Chvaletice (Czech Republic). El Molar (Spain).

1	2	3
Babingtonite (Бабингтонит)	3	Baveno, Piemonte (Italy). Goose Creek quarry, Leesburg, Virginia (USA).
Manganbabingtonite (Манганбабингтонит)	2	Iron Cap mine, Arizona (USA).
Miserite (Мизерит)	3	Dara- Pioz (Tadzhikistan). Mt. St.-Hilaire, Quebec (Canada).
Neotocite (Неотокит)	2	Kremikovtsi dep. Sofia reg. (Bulgaria).
Nambulite (Намбулит)	1	Gozaisho mine, Fukushima pref. (Japan).
Charoite (Чароит)	12	Murunskii complex, Yakutia (Russia).
Yuksporite (Юкспорит)	1	Khibiny, Kola pen. (Russia).
2.3.2. Planar		
2.3.2.1. Reyerite - Tobermorite group		
Gyrolite (Гиролит)	2	Erachimo riv., Siberia (Russia). Khandivali quarry, Bombay (India).
Okenite (Окенит)	4	Poona (India).
Tobermorite (Тоберморит)	2	Heguri, Chiba pref. (Japan).
Clinotobermorite (Клинотоберморит)	2	Fuka mine, Okayama Pref. (Japan).
Plombierite (Пломбиерит)	3	Scawt Hill, Antrim Co., Northen Ireland (Great Britain). Crestmore quarry, Riverside Co., California (USA).
Tungusite (Тунгусит)	1	Tura, Nizhnyaya Tunguska, Siberia (Russia).
Fedorite (Федорит)	1	Murunskii complex, Yakutia (Russia).
2.3.2.2. Apophyllite group		
- [*Apophyllite*] [*Апофилит*]	62	Parvenets vill., Yambol reg.; Lipata quarry, Vitosha Mt., Sofia reg.; Avren vill., Gruevo vill., Kurdzhali reg. Krumovgrad reg. (Bulgaria). King George isl., South Shetland islands (England). Tyrol (Austria). Labe riv. (Czech Republic). Andreasberg (Germany). Avam riv., Siberia (Russia). Akhaltsikhe (Georgia). Pashan, Poona, Maharashta; Tunnar; Bombay (India). Mt. St.-Hilaire, Quebec (Canada). Fairfax quarry, Centreville, Virginia (USA). Minas Gerais; Rio das Antas, Rio Grande do Sul (Brazil). Basalt quarry, Victoria (Australia).
Fluorapophyllite (Флуорапофилит)	2	Akhaltsikhe (Georgia). Pioneer quarry, Victoria (Australia).

1	2	3
Cavansite (Кавансит)	3	Owyhee Dam, Oregon (USA). Poona (India).
Pentagonite (Пентагонит)	1	Wagholi quarries, Poona (India).
Carletonite (Карлетонит)	1	Mt. St.-Hilaire, Quebec (Canada).
2.3.2.3. Natrosilite group		
Natrosilite (Натросилит)	1	Alluaiv Mt., Lovozero, Kola pen. (Russia).
Makatite (Макатит)	1	Lovozero, Kola pen. (Russia).
Revdite (Ревдит)	1	Lovozero, Kola pen. (Russia).
2.3.2.4. Pyrosmalite group		
Pyrosmalite (Пиросмалит)	1	Nordmark (Sweden).
Bementite (Бементит)	1	Franklin Furnace, New Jersey (USA).
Friedelite (Фриделит)	1	Sterling Hill, New Jersey (USA).
Shafranovskite (Шафрановскит)	1	Rasvumchorr Mt., Khibiny, Kola pen. (Russia).
Akatoreite (Акатореит)	1	Otago (New Zealand).
2.3.2.5. Sanbornite - Gillespite group		
Sanbornite (Санборнит)	6	Big Creek; Fresno Co., California (USA). El Rosario (Mexico).
Walstromite (Уолстромит)	1	Fresno Co., California (USA).
Macdonaldite (Макдоналдит)	1	Fresno Co., California (USA).
Krauskopfite (Краускопфит)	1	Fresno Co., California (USA).
Gillespite (Гилеспит)	3	Big Creek, Fresno Co., California (USA). El Rosario (Mexico). Yukon (Canada).
Verplanckite (Верпланкит)	1	Fresno Co., California (USA).
2.3.3. (Pseudo) - isometric		
2.3.3.1. Ertixiite group		
Pellyite (Пелиит)	2	Fresno Co., California (USA). Yukon (Canada).
2.4. Zn-Cu-Pb(U) assemblages		
2.4.2. Planar		

1	2	3
2.4.2.2. Margarosanite group		
Margarosanite (Маргаросанит)	1	Langban (Sweden).
2.4.2.3. Kinoite group		
Kinoite (Киноит)	1	Gila Co., Arizona (USA).
Ajoite (Ейджоит)	1	Navojoa, Sonora (Mexico).
2.4.2.4. Weeksite group		
Weeksite (Уиксит)	1	Anderson mine, Yavapai Co., Arizona (USA).
2.4.3. Pseudoisometric		
2.4.3.1. Dioptase group		
Dioptase (Диоптаз)	16	Mavoio (Angola). Tsumeb (Namibia). Mindouli, Reneville, Brazzaville; M'Sesa, Shaba (Congo). Copiapo, Atacama (Chile).
Chrysocolla (Хризокола)	15	Vurli bryag mine, Burgas reg.; Tsar Asen mine, Panagyurishte reg.; Talc quarry, Ihtiman reg.; Petlite summit, Rila Mt. (Bulgaria). Altyn - Tyube (Kazakhstan). Erdenet (Mongolia). Gelb Mogreni, Akjoujt reg. (Mauritania). Magma mine, Pinal Co., Arizona; Bingham, New Mexico (USA). Copiapo, Atacama (Chile). Iron Monarch mine (Australia).
Shattuckite (Шатукит)	1	Navojoa, Sonora (Mexico).
Plancheite (Планшеит)	4	Gottesgabe, Herborn, Hessen (Germany). Reneville; Shaba (Congo).
2.4.3.2. Ekanite group		
Ekanite II (Еканит II)	1	Dara-Pioz (Tadzhikistan).
Umbozerite (Умбозерит)	2	Karnasurt Mt., Lovozero, Kola pen. (Russia).
3. Silicates with Si: M^{2+}<1:1		
3.1. Be-Al-Mg assemblages		
3.1.1. Axial		
3.1.1.1. Phenakite group		

1	2	3
Phenakite (Фенакит)	8	Volodarsk-Volynskii (Ukraine). Izumrudnye kop'i, Ural; Klichka, Transbaikalia (Russia).
Euclase (Евклаз)	1	Sargardon (Uzbekistan).
Bertrandite (Бертрандит)	1	Klichka, Transbaikalia (Russia).
3.1.1.2. Andalusite - ' group		
Andalusite (Андалузит)	50	Chepelare, Smolyan reg.; Dyadovtsi vill., Ardino reg.; Urdini Lakes, Rila Mt.;
- *Chiastolite II* (*Хиастолит II*)	3	Markova trapeza, Samokov reg.; Madzharovo reg.; Krushevets vill., Burgas reg. (Bulgaria). Villa di Chiavekkaq, Bregaglia; Val·d Aran, Piemonte. (Italy). (Switzerland). Lisenz in Stubai, Tyrol; Krenzeckgruppe, Karnten (Austria). Dolni Bory, Moravia; Trhove Sviny; Frymburk, Bohemia (Czech Republic). Rohan, Morbihan (France). Keivy, Kola pen. (Russia). Cap de Creus; Bosiost, lerida Provance (Spain). Hauden lake, Colorado (USA). Arkaroola (Australia).
Sillimanite (Силиманит)	7	Chepelare, Smolyan reg.; Dyadovtsi vill., Ardino reg.; Dorkovo vill., Velingrad
- *Fibrolite II* (*Фибролит II*)	5	reg. (Bulgaria). Plonghin, Finestere (France). Cap de Creus (Spain).
Kyanite (Кианит)	66	Chepelare, Smolyan reg.; Prilep; Selechka Mt. (Macedonia). Capelinha (Brazil).
Mullite (Мулит)	2	Montalban (Spain). Monte arci, Oristano (Italy).
Staurolite (Ставролит)	40	Oreshnik vill., Topolovgrad reg. (Bulgaria). Finistere; Alpe. Quimper; Coray (France). Pizzo Formo Tessin; St. Gotthard (Switzerland). Petrov nad Desnou bei Sumperk (Czech Republic). Keivy, Kola pen.; Mata riv., Siberia (Russia). Fernleigh, Clarendon, Township, Ontario (Canada). Capelinha (Brazil). Mica Creek, Mount Isa, Queensland (Australia).
Topaz (Топаз)	39	Volodarsk-Volynskii (Ukraine). Altenberg, Erzgebirge, Zwitterstock;
- *Pycnite* (*Пикнит*)	5	Schneckenstein, Vogtland (Germany). Dobra voda, Moravia (Czech Republic). Skuleboda, Vanersborg (Sweden). Ilimaussaq (Greenland). (Niger). Minas Gerais (Brazil). Etats-Unis (French Guiana). Torrington; Inverell, New South Wales; O'Briens Ceek, near Mt. Surprise, Queensland (Australia).
Sapphirine (Сапфирин)	1	Vohimenaq (Madagascar).
Sursassite (Сюрсасит)	2	Molinello mine, Liguria (Italy). Fallota, Sursass (Switzerland).

1	2	3
3.1.1.3. Epidote - Pumpellyite group		
Zoisite (Цоизит)	17	Petlite summit, Bliznaka Lake, Rila Mt. (Bulgaria). Sintibru, Alba, Carpathians, (Romania). Leksviken, Irodelag, Lom (Norway). Morille, Salamanca. Hoy Las Minas, E. of Huijo, El Progresso, Dept. (Guatemala).
- ***Thulite* (*Тулит*)**	4	
Clinozoisite (Клиноцоизит)	13	Yavuz dere river, Sakar Mt.; Krumovo vill; Krumovgrad reg. Seven Rila Lakes, Rila Mt.; Chepelare, Smolyan reg.; Lukovets river, Asenovgrad reg.; Nova Mahala vill., Batak reg. (Bulgaria). Val Suza (Italy).
Epidote (Епидот)	69	Deveti Septemvri mine, Madan reg.; Dorkovo vill., Velingrad reg. Sandanska Bistritsa riv.; Nova Mahala vill., Batak reg.; Stoikite vill., Varbovo vill., Smolyan reg.; Chernomorets quarry, Burgas reg.; Kamilski Dol vill., Kurdzhali reg.; Madzharovo reg.; Ivaylovgrad Dam, Strandzha mine, M. Turnovo reg.; Seven Rila Lakes, Urdini Lakes, Rila Mt.; Vitosha Mt., Sofia reg. (Bulgaria). Tyrol (Austria). Hannover (Germany). Ukrainka vill., Crimea (Ukraine). Strzegom (Poland). Dunje (Yugoslavia). (Switzerland). Dashkesan (Azerbaidzhan). Tormiq (Pakistan). Dhaulagiri summit, Himalayas. Sierra San Pedro (Mexico). Syockdale qyarry, Victoria (Australia).
Piemontite (Пиемонтит)	5	Praborna mine; Traversella; Piemonte (Italy). Anti - Atlas Mt. (Morocco)
Allanite (Алланит=Ортит)	27	Vacha riv., Krichim reg. Kalkovo vill., Plana Mt., Lipata quarry, Vitosha Mt., Sofia reg. (Bulgaria). Rauris, Salzburg (Austria). Luzenac (France). Amur reg. (Russia). Tiro de Estrella mine, New Mexico (USA).
Pumpellyite (Mn) (Пумпелит(Mn))	1	Ochiai mine, Yamanashi (Japan).
Ilvaite (*Илваит*)	15	Osikovo, Mogilata mines - Madan reg.; Byal Izvor vill., Ardino reg. (Bulgaria). Kikladhes islands (Greece). Rio Marina mine; Torre di Rio; Elba (Italy). Ilimaussaq (Greenland). Dalnegorskoye dep. (Russia).
3.1.2. Planar		
3.1.2.2. Prehnite group		
Prehnite (Пренит)	29	Lozen Mt., Vitosha Mt., Sofia reg. (Bulgaria). Steinperf, Marburg; Harz (Germany). Ukrainka vill., Crimea (Ukraine). Pegueres, Pyrenees (France).

1	2	3
Prehnite (continuation)		Markovice; Horky (Czech Republic). Erachimo riv., Siberia (Russia). Tiro de Estrella mine, New Mexico (USA). Prospect quarry, New Sowth Wales (Australia).
3.1.3.(Pseudo) - isometric		
3.1.3.1. Helvite group		
Danalite (Даналит)	2	Rockport, Massachusetts (USA). Mt. St.-Hilaire, Quebec (Canada).
Helvite (Хелвин)	2	Ilimaussaq (Greenland). Mt. St.-Hilaire, Quebec (Canada).
Genthelvite (Гентхелвин)	1	Mt. St.-Hilaire, Quebec (Canada).
Tugtupite (Тугтупит)	1	Kvanefjeld, Ilimaussaq (Greenland).
Zunyite (Зуниит)	1	
- *Dillnite* (*Диланит*)	1	Azegour (Morocco). Banska Stavnica (Slovakia).
3.1.3.2. Chkalovite - Gadolinite group		
Chkalovite (Чкаловит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Gadolinite (Гадолинит)	2	Finbo (Sweden). Iveland (Norway).
3.1.3.3. Gugianite - Meliphanite group		
Meliphanite (Мелифанит)	1	Langesundfjord (Norway).
Leucophanite (Левкофан)	1	Mt. St.-Hilaire, Quebec (Canada).
Chiavenite (Чиавенит)	1	Tvedalen (Norway).
Lovdarite (Ловдарит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
3.1.3.4. Melilite group		
Melilite (Мелилит)	1	Osa, Rome (Italy).
Åkermanite (Окерманит)	1	Kovdor, Kola pen. (Russia).
Gehlenite (Гелинит)	4	Apuani (Romania). Kushiro, Hiroshima pref.; Fuka mine, Bitchu, Okayama pref. (Japan).
Bicchulite (Бичулит)	1	Fuka mine, Bitchu, Okayama pref. (Japan).
Zunyite (Зуниит)	1	Azegour (Morocco).

1	2	3
3.1.3.5. Garnet group		
- [*Garnet*] [*Гранат*]	31	Dyadovtsi vill., Latinka vill., Ardino reg.; Dolen vill., Zlatograd reg.; Vishteritsa quarry, W. Rhodopi Mts; Chernichevo vill., Krumovgrad reg.; Chepelare, Galabovo vill., Banite vill., Smolyan reg.; Musala summit, Irechek summit; Kalin river, Eleshnitsa river, Pastra vill., Rila Mt.; Gorna Dikanya vill., Verila Mt.; Ihtiman reg.; Breznik reg.; Vitosha Mt., Sofia reg. Gradishte mine, Madan reg.; Burdtse mine, M. Turnovo reg. (Bulgaria). Dognecea, Banat (Romania). Tyrol (Austria). Selechka Mt. (Macedonia). Maikhura (Tadzhikistan). Pribyslavice (Czech Republic). Kalmora, Norberg; Ultevis (Sweden). Neudorf mine, Harz (Germany). San Piero in Campo, Elba; Val di Rabbi, Trento; Valle Ranello; Praborna; Val Passiria (Italy). Chupa, Karelia; Keivy, Kola pen.; Chelyabinsk, Ural; Mir, Yakutia; Dalnegorskoye dep., Slyudyanka, Siberia; Ilmeny, Ural (Russia). Langtang; Gahesh Range; Dhaulagiri summit, Himalayas (Nepal). Fuka mine, Bitchu, Okayama pref. (Japan). Alto Ligonha; Cuamba (Mozambique). Tanco mine (Canada). Capelinha (Brazil). Broken Hill (Australia).
Pyrope (Пироп)	4	Trebnice (Czech Republic).
Almandine (Алмандин)	12	Dolen vill., Zlatograd reg.; Topolovgrad reg. (Bulgaria). Silesia (Poland).
- *Hessonite* (*Хесонит*)	1	Kalvola (Finland). (Norway). Ural; Kitelya, Karelia (Russia). Roxbury, Connecticut; Fort Wrangel, Alaska (USA).
Spessartine (Спесартин)	3	Latinka vill., Ardino reg. (Bulgaria). Grants Canyon, New Mexico (USA). Kintore open cut, Broken Hill (Australia).
Grossular (Гросулар)	51	Seven Rila Lakes, Urdini Lakes, Beliya ulik, Rila monastery, Petlite summit, Rila Mt.; Propada mine, M. Turnovo reg. (Bulgaria). Biudov u Sumperka (Czech Republic). Kukhilal, Pamir (Tadzhikistan). Sauland, Telemark (Norway). Pitigliano, Grosseto prov., Tuscany (Italy). Dalnegorskoye dep.; Vilyui riv., Yakutia; Siberia; Primorye (Russia). Dorogiwa Ontcrop, Fuka mine, Bitchu, Okayama Pref. (Japan).

1	2	3
Andradite (Андрадит)	23	Dolni Okol vill., Sofia reg.; Chepelare, Smolyan reg.; Seven Rila Lakes, Urdini Lakes, Rila Mt.; M. Turnovo reg.; Erma river, Zlatograd reg. (Bulgaria). Ocna de Fier, Banat (Romania). Val Malenco, Lombardy (Italy). Dalnegorskoye dep.; Bobrovka river, Ural (Russia). Himalayas.
- *Melanite* (*Меланит*)	2	
- *Demantoid* (*Демантоид*)	3	
Uvarovite (Уваровит)	5	Outokumpu (Finland). Saranovskoye deposit, Ural (Russia).
Schorlomite (Шорломит)	1	Afrikanda, Kola pen. (Russia).
Vezuvianite (Везувиан+ит)	44	Petlite summit, Mala Urdina river, Rila monastery, Rila Mt.; Eleshnitsa vill., Blagoevgrad reg.; Hrabrino vill., Plovdiv reg.; Dolni Okol vill., Sofia reg. (Bulgaria). Telemark; Myrseter (Norway). Pitigliano, Grosseto prov., Tuscany; Vesuvius (Italy). Morille, Salamanca, Spain. Zuluva (Czech Republic). Potoja cuka (Yugoslavia). Canary Islands, Atlantic Ocean. Ural; Vilyui R. (Russia). Lake Jaco, Chihuahua (Mexico). Jeffrey Mine, Asbestos, Richmond Co, Quebec (Canada). Crestmore, Riverside Co., California (USA).
Wiluite (Вилюит)	1	Vilyui riv., Yakutia (Russia).
- *Achtaragdite* (*Ахтарандит-псевдоморфоза по гросулар*)	1	Vilyui riv., Yakutia (Russia).
3.1.3.6. Olivine group		
- [*Olivine*] [*Оливин*]	19	Butovo vill., V. Turnovo reg. (Bulgaria). Starch, Zelezny Brod; Smrci (Czech Republic). Eifel; Ries; Vogelsberg (Germany). Langban (Sweden). Canary Islands, Atlantic Ocean. Lanzarote (Spain). Salzburg (Austria).
Forsterite (Форстерит)	3	Aldan, Yakutia; Pribaikalskii massif, Kovdor, Kola pen. (Russia).
Fayalite (Фаялит)	1	Pirdop. (Bulgaria). Dannemora (Sweden).
- ***Knebelite* (*Кнебелит*)**	1	
3.1.3.7. Humite group		
Chondrodite (Хондродит)	2	Aker; Kaveltorp (Sweden).
Clinohumite (Клинохумит)	2	Bela reka, N. Pirin Mt. (Bulgaria).
3.2. Zr-Ti-Nb assemblages		
3.2.1. Axial		
3.2.1.1. Wöhlerite group		

1	2	3
Rosenbushite (Розенбушит)	1	Karr, Smaland (Sweden).
Hiortdahlite (Хиортдалит)	1	Cava San Vito, Monte Somma, Vesuvius (Italy).
Niocalite (Ниокалит)	1	Quebec (Canada).
3.2.1.2. Keldyshite group		
Keldyshite (Келдишит)	1	Takhtarvumchorr, Khibiny, Kola pen. (Russia).
Parakeidyshite (Паракелдишит)	2	Alluaiv Mt., Lovozero, Kola pen. (Russia).
3.2.1.3. Aeninigmatite group		
Aeninigmatite (Енигматит)	1	Ilimaussaq (Greenland).
Mosandrite (Мозандрит(Ринкит))	3	Loven, near Brevik, Langesundfjord (Norway).
Chevkinite (Чевкинит)	1	Ilmeny, Ural (Russia).
3.2.2. Planar		
3.2.2.1. Murmanite group		
Natisite (Натисит)	1	Vuonnemijok river, Khibiny, Kola pen. (Russia).
Murmanite (Мурманит)	5	Khibiny; Lovozero, Kola pen. (Russia).
Epistolite (Епистолит)	4	Karnasurt Mt., Lovozero, Kola pen. (Russia). Kvanefjeld, Ilimaussaq (Greenland).
Lomonosovite (Ломоносовит)	3	Kola pen. (Russia). Kvanefjeld, Ilimaussaq (Greenland).
Tundrite (Тундрит)	1	Kangerdluarssuk (Greenland).
3.2.2.2. Batisite - Bafertisite group		
Bafertisite (Бафертисит)	1	Dara - Pioz (Tadzhikistan).
Fresnoite (Фресноит)	1	Big Creek, Fresno Co., California (USA).
Nafertisite (Нафертисит)	1	Nanna pegmatite, Igaliko (Greenland).
3.2.3. Pseudoisometric		
3.2.3.1. **Zircon group**		

1	2	3
Zircon (Циркон)	30	Lozen Mt., Sofia reg.; Antonivanovtsi quarry, Smolyan reg. (Bulgaria). (Ukraine). Bar Houes Sai (Norway). Lovozero; Ilmeny; Vishnevye Gory, Urals; Kovdor, Kola pen. (Russia). (Laos). Jebel Tuwalah (Saudi Arabia). Alto Ligonha (Mozambique). Mount Malosa, Zomba, Malawi (East Africa). Kipawa compl., Quebec (Canada). Anakite, Queensland (Australia).
Zirsinalite (Цирсиналит)	1	Rasvumchorr Mt., Khibiny, Kola pen. (Russia).
3.2.3.2. Titanite group		
Titanite (Титанит)	33	Bliznaka Lake, Rila Mt.; Shipeto, Lipata quarry, Vitosha Mt., Sofia reg.; Antonivanovtsi quarry; Stoikite vill.; Smolyan reg.; Chernomorets quarry, Burgas reg. (Bulgaria). Val di Vizze, Tyrol (Italy). Elbachalm, Amertal (Austria). Val Canaria, Tessin (Switzerland). Slyudyanka, Siberia; Rasvumchorr Mt.; Kukisvumchorr Mt., Khibiny (Russia). Little Rock, Arizona; Tiro de Estrella, Lingoln Co., New Mexico (USA). Capelinha, Minas Gerais (Brazil).
Fersmanite (Ферсманит)	2	Khibiny, Kola pen. (Russia).
3.2.3.3. Shcherbakovite group		
Labuntsovite (Лабунцовит)	1	Khibiny, Kola pen. (Russia).
Korobitsynite (Коробитсинит)	1	Alluaiv Mt., Lovozero, Kola pen. (Russia).
Komarovite (Комаровит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Koashvite (Коашвит)	1	Vuonnemijok river, Khibiny, Kola pen. (Russia).
3.3. Ca(TR)-Mn-Ba assemblages		
3.3.1. Axial		
3.3.1.1. Spurrite - Cuspidine group		
Spurrite (Спърит)	4	Fuka mine, Bitchu, Okayama pref. (Japan).
Scawtite II (Скаутит II)	1	Fuka mine, Bitchu, Okayama pref. (Japan).
Tilleyite (Тилеит)	1	Fuka mine, Bitchu, Okayama pref. (Japan).
Bultfonteinite (Бултфонтейнит)	1	Fuka mine, Bitchu, Okayama pref. (Japan).

1	2	3
Afwillite (Афвилит)	2	Bassejour; Puy de Dome (France).
Thaumasite (Таумасит)	5	Petlite summit, Rila Mt. (Bulgaria). Siberia (Russia). Fairfax quarry, Virginia (USA).
3.3.1.2. Thortveitite group		
Thalenite (Таленит)	1	Askagen, Vermland (Sweden).
Haradaite (Харадаит)	1	Noda - Tamagawa mine, Iwate pref. (Japan).
3.3.1.3. Gageite group		
Saneroite (Санероит)	1	Molinelo mine, Genova (Italy).
3.3.2. Planar		
3.3.2.1. Jasmundite - Macfallite group		
Jennite (Дженит)	1	Commercial quarry, Crestmore, California (USA).
3.3.3. Pseudoisometric		
3.3.3.1. Larnite - Kilchoanite group		
Merwinite (Мервинит)	1	Iglika vill., Yambol reg. (Bulgaria).
Rankinite II (Ранкинит II)	1	Fuka mine, Bitchu, Okayama pref. (Japan).
3.3.3.2. Tephroite - Leucophoenicite group		
Tephroite (Тефроит)	1	Broken Hill (Australia).
Sonolite (Сонолит)	1	Abata mine, Gumma pref. (Japan).
3.3.3.3. Cerite - Iimoriite group		
Cerite (Церит)	1	Bastnaes (Sweden).
3.4. Zn-Cu-Pb(U) assemblages		
3.4.1. Axial		
3.4.1.1. Willemite - Hemimorphite group		
Willemite (Вилемит)	3	Vrancice (Czech Republic). Tsumeb (Namibia).

1	2	3
Hemimorphite (Хемиморфит)	7	Govedarnika mine, Luki reg.; Chepelare, Smolyan reg. (Bulgaria). Santa Eulalia; Mapimi, Durango (Mexico).
3.4.2. Planar		
3.4.2.1. Clinohedrite group		
Stringhamite (Стрингхамит)	1	Christmas mine, Arizona (USA).
3.4.2.3. Uranophane group		
Uranophane (Уранофан)	3	Hagendorf (Germany). Grants, New Mexico (USA).
Sklodowskite (Склодовскит)	1	Kamoto, Shaba (Congo).
Cuprosklodowskite (Купросклодовскит)	2	Musonoi, Kalongwe, Shaba (Congo).
Kasolite (Казолит)	1	Grury, Saone-et-Loire (France).
3.4.3. (Pseudo) - isometric		
Eulytine (Евлитин)	1	Schneeberg, Saxony (Germany).
4. Silicates with boron		
4.1. Axial		
4.1.1. Dumortierite group		
Dumortierite (Дюмортиерит)	4	Ak-Tash (Uzbekistan). Ambatolahindnzhary (Madagascar). Etembe (Namibia). Bokira, Bahia (Brazil).
Kornerupine (Корнерупин)	4	Waldheim, Saxony (Germany). Harts Range, Northern Territory (Australia).
4.1.2. Tourmaline group		
- [*Tourmaline*] [*Турмалин*]	120	Hlyabovo vill., Topolovgrad reg.; Bachkovo vill., Smolyan reg.; Latinka vill.,
- *Indigolite* (*Индиголит*)	2	Ardino reg.; Velingrad reg.; Urdini Lakes, Rila Mt. (Bulgaria). Cyrilov, Pikarec, Dolni Bory; Moravia (Czech Republic). Finistere (France). San Piero, Elba; Val di Vizze, Tyrol (Italy). Hagendorf; Neumule (Germany). Rauris Valley, Salzburg (Austria). Turgenevskoye deposit, Far East; Izumrudnye kopi, Ural; Aldan, Yakutia (Russia). Liaoning (China). Langtang, Himalayas (Nepal). Muiane mine,

1	2	3
Kornerupine and varieties (continuation)		Alto Ligonha (Mozambique). Afghanistan. Betroka (Madagascar). Lazarevskaya station (Antarctida).
Buergerite (Бюргерит)	1	Kovachevtsi vill., Samokov reg. (Bulgaria).
Dravite (Дравит)	7	Stipon quarry, Ihtiman reg. (Bulgaria). Dravograd (Slovenia). Yinnietharra; May Downs, Queensland (Australia).
Elbaite (Елбаит)	7	Rozna; Nova Ves; Dobra Voda, Moravia (Czech Republic). Haapaluoma,
- *Rubellite* (*Рубелит*)	17	(Finland). Kola pen. (Russia). Kalbinskii Range (Kazakhstan). Alto Ligonha,
- *Verdelite* (*Верделит*)	2	(Mozambique). Queen mine, Pala district, San Diego; Mesa Grande, California (USA). Conselheiro Pena district, Minas Gerais (Brazil).
Feruvite (Ферувит)	15	Belite brezi, Marchaevsko kale, Shipeto, Lipata quarry, Vitosha Mt., Sofia reg. (Bulgaria).
Schorl (Шерл)	23	Dolni Okol vill., Vladaya vill, Sofia reg.; Markova trapeza, Dragoshinovo vill., Samokov reg. (Bulgaria). Radanice; Brno, Moravia; Dolni Bory; Pikarec; Nova Ves (Czech Republic). Pakistan. Alto Ligonha (Mozambique). Ynniethara; Tourmaline Hill Arkaroola Station Nth. Funders Ranges (Australia).
Uvite (Увит)	1	Pierrepont, New York (USA).
4.1.4. Titantaramellite group		
Titantaramellite (Титантарамелит)	1	Fresno Co., California (USA).
4.2. Planar		
4.2.1.Howlite group		
Howlite (Хаулит)	1	Windsor, Nova Scotia (Canada).
Oyelite II (Ойелит II)	1	Fuka mine, Bitchu, Okayama pref. (Japan).
4.2.2. Leucosphenite group		
Leucosphenite (Левкосфенит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
4.3. (Pseudo) - isometric		
4.3.1. **Axinite group**		

1	2	3
Ferro - axinite (Фероаксинит)	14	Vitosha Mt., Sofia reg. (Bulgaria). Arbizon, Pyrenees; Grand Pic de Belledonne, Bourg d'Oisans, Ysere (France). Freiberg; Elbingerode, Harz (Germany). Dalnegorskoye dep. (Russia). Obira, Kyushu (Japan). Iron Cap Mine, Grahm Co., Arizona (USA). Lake Cooper quarry, Victoria (Australia).
Manganaxinite (Манганаксинит)	2	Omiya, Kyoto (Japan). Iron Cap Mine, Grahm Co., Arizona (USA)
Tinzenite (Тинценит)	4	Falotta, Tinzen (Switzerland). Molinelomine, Genova (Italy). Ananai mine, Tosayameda (Japan).
Serendibite (Серендибит)	1	Aldan, Yakutia (Russia).
Harkerite II (Харкерит II)	1	Sayak-IV (Kazakhstan).
4.3.2. Danburite - Datolite group		
Danburite (Данбурит)	11	Piz Miez, Graubunden (Switzerland). Dalnegorskoye dep. (Russia). Gaurdak (Turkmenia).
Datolite (Датолит)	10	Bologna (Italy). Avam river, Siberia; Dalnegorskoye dep. (Russia). Lane quarry, Massachusetts (USA).
5. Another silicates with additional anions		
5.1. Silicates with semimetalic		
(AsO_3, AsO_4 et al.) groups		
5.1.1. Ardennite group		
Ardennite (Арденит)	5	Salm-Chateau (Belgium).
Inesite (Инесит)	1	Hodrusa (Slovakia).
5.1.2. Dixenite - Chapmanite group		
Chapmanite Чапманит)	1	Smilkov (Czech Republic).
5.1.3. Welshite group		
Welshite (Уелшит)	1	Vicenza (Italy).
5.2. Silicates with PO_4 - anions		

1	2	3
Vuonnemite (Вуонемит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Bornemanite (Борнеманит)	2	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Phosinaite (Фосинаит)	1	Karnasurt Mt., Lovozero, Kola pen. (Russia).
Yoshimuraite (Йошимураит)	1	Tonohata mine, Iwate pref. (Japan).
Perhamite (Перхамит)	5	Tom's Phosphate Quarry, Kapunda. (Australia).
5.3. Silicates with SO_4 - anions		
Latiumite (Латиумит)	3	Sacrofano, Lazio; Pitigliano, Grosseto, Tuscany (Italy).
Tuscanite (Тусканит)	2	Sacrofano quarry, Roma (Italy).
Delhayelite (Делхаелит)	2	Khibiny, Kola pen. (Russia).
5.4. Silicates with CO_4 - anions		
Fukalite (Фукалит)	1	Fuka mine, Bitchu, Okayama pref. (Japan).

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Каталог на минералните видове в Националния природонаучен музей, София (част 2) Силикати

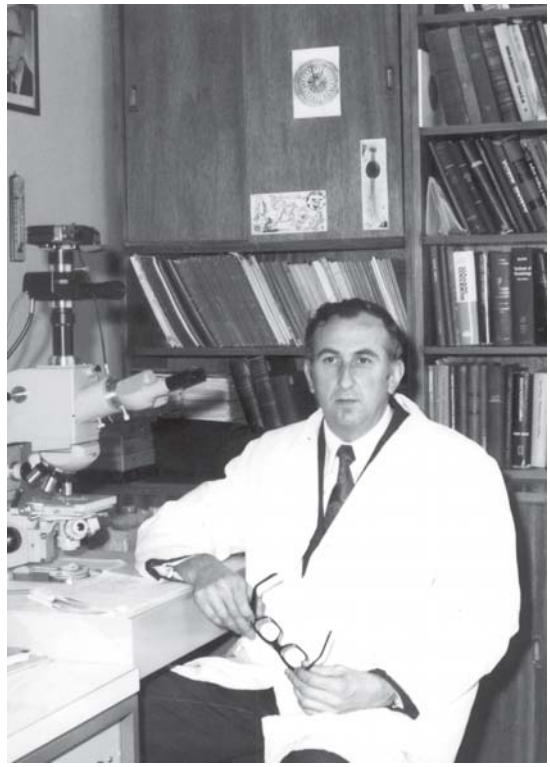
Чавдар КАРОВ, Илия ДИМИТРОВ

(Р е з ю м е)

Каталогът включва образците, инвентирани в основния минераложки фонд на Националния природонаучен музей в София до 2003 г. Втората част представя най-големият и най-разпространен минераложки клас – Силикати. От него в каталога са представени 356 минерални вида, 67 разновидности и 8 групи от недостатъчно добре диагностицирани минерали.

Historia naturalis bulgarica,
16: 46, 2004

Академик Васил Големански на 70 години



На 26 декември 2003 г. член кореспондент Васил Големански навърши 70 години, а на 17 юли 2004 г. беше избран за академик. Колективът на Националния природонаучен музей и редакционната колегия на Historia naturalis bulgarica поздравяват забележителния български зоолог – протистолог със световна известност и му желаят добро здраве за още много нови видове, нови интересни книги и все така да се бори за благото на българската зоология!

Historia naturalis bulgarica,
16: 47-57, 2004

Crustacés des eaux souterraines karstiques des montagnes de Vitocha et de Golo bardo (Bulgarie Occidentale): composition taxonomique, caractéristique générale et répartition spatiale dans le karst

Apostol APOSTOLOV, Ivan PANDOURSKI

APOSTOLOV A., PANDOURSKI I. 2004. Crustacés des eaux souterraines karstiques des montagnes de Vitocha et de Golo bardo (Bulgarie Occidentale): composition taxonomique, caractéristique générale et répartition spatiale dans le karst. – Historia naturalis bulgarica, **16**: 47-57.

Abstract. The current work reports 28 species of crustaceans from the karstic groundwaters of Vitosha and Golo Burdo mountains, including 9 cyclopids, 15 harpacticoids, three amphipods and one syncarid. Their spatial distribution relating to the hydrogeological characteristics of the karst are analyzed. Fourteen species are found in the infiltration zone. The highest species richness is established in the source "Popov izvor" – 9 species, three of which are stygobiontic. This source gives us natural access to the saturated zone of the karst. The differences in the species composition of the studied region with the karstic system of Ponor Mountain (Western Stara Planina Mountain) are analyzed.

Key words: Crustacea, Karst, Groundwaters, Bulgaria, Bosnek

Introduction

Ce travail présente les résultats de recherches stygobiologiques effectuées par l'Institut de zoologie à Sofia dans les masifs karstiques de Vitocha et de Golo bardo pendant les années de 1989 à 1992. En même temps des prospéctions géologiques et hydrogéologiques ont été menées par les spécialistes de l'Institut Géologiques de l'Académie Bulgare des Sciences.

Les crustacés, présentés surtout avec des espèces de sous-classe de Copépodes, constituent la partie principale da la biocoenose de l'écosystème karstiques étudiée. Leur répartition spatiale est discutée dans la lumière de la théorie fonctionnelle en hydrogéologie (MANGIN, 1985) et sur le concept d'écosystème karstique (ROUCH, 1986; CREUZÉ des CHATELLIERS et al., 1991). Les données sur l'ensemble des Copépodes constituent un aspect important de l'analyse pluridisciplinaire dans l'étude de karst (ROUCH, 1980).

Les faits et les conclusions sur les crustacés obtenus des eaux souterraines du karst de Vitocha et de Golo bardo sont comparés avec une étude précédent sur la faune stygobie de la montagne de Ponor en Bulgarie Occidentale (PANDOURSKI & BENDEREV, 1997).

Le massif karstique

La région étudiée couvre 30 km^2 sur le versant sud de la montagne de Vitocha et d'autre part sur le versant est et nord-est de Golo bardo – Bulgarie Occidentale. L'altitude varie entre 800 m et 1400 m. Le plus haut sommet du massif est Aslanov rid (1478 m d'altitude).

La position tectonique et l'étape initiale de la formation du massif de Bosnek était étroitement liée au charriage de Golo bardo (BENDEREV & SHANOV, 1997). Les étapes postérieurs étaient prédominées par l'évolution de la faille de Pernik, ainsi que par le développment de la vallée de la rivière de Strouma (BENDEREV & ANGELOVA, 1999; ANGELOVA et al., 1999; SHANOV et al., 2001). L'évolution récente du système de cavernes, et spécialement des grottes de Douhlata et de Vreloto, est contrôlé par la rivière de Strouma (BENDEREV & ANGELOVA, 1999).

La plus grande partie du massif est constituée des roches d'âge triasique: calcaires et dolomites (Fig. 1). Une zone impérmeable sépare les systèmes des grottes de Vreloto et de Douhlata. La rivière de Strouma joue le rôle majeur dans la formation du réseau hydrographique souterrain: une série de pertes dans le lit de cette rivière donne naissance à plusieurs ruisseaux et petites rivières souterraines. La zone des sources et de la grotte "Zhivata voda" est considérée comme indépendante du reseau souterrain principal: ici les eaux karstiques s'alimentent généralement par l'infiltration des précipitations atmosphériques. Le débit maximal est observé

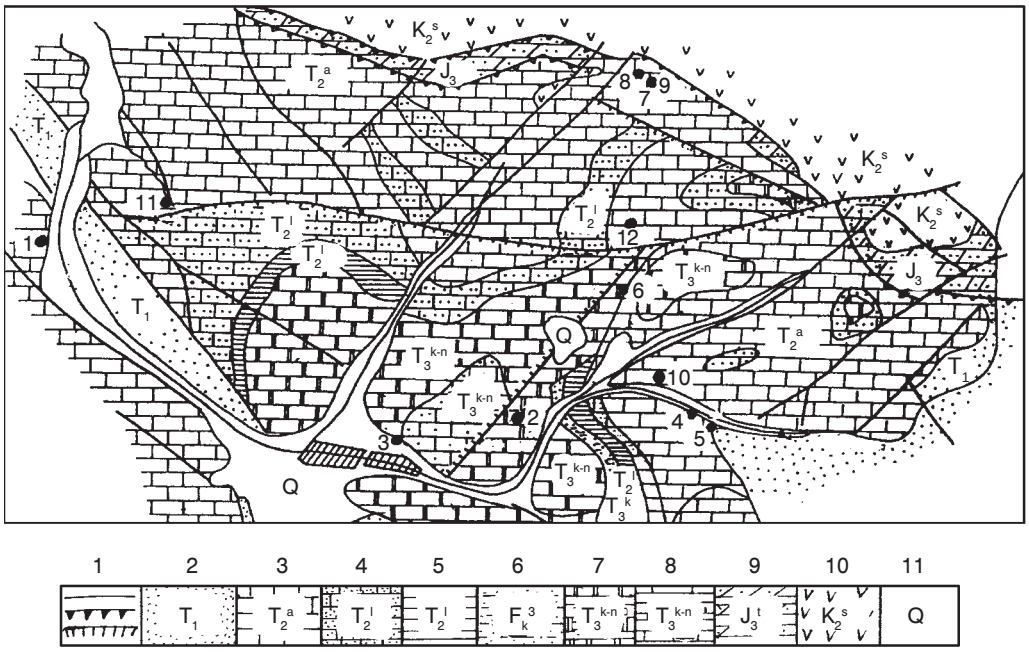


Fig. 1. Schéma géologique du massif kartsique de Bosnek (d'après BENDEREV & VESSELINOV (1999)): 1 – failles téctoniques; 2 – roches sableuneuses; 3 – calcaires; 4 – dolomites; 5 – argilites; 6 – calcaires; 7 – dolomites; 8 – calcaires; 9 – alevrolites et argilites; 10 – roches volcaniqes de Sénonien; 11 - Quaternaire; points noires – stations prospectées

au niveau de la grotte – résurgence de Vreloto: 1140 dm^3/s (débit moyen de 310 dm^3/s). Les eaux de la grotte de Douhlata ont un débit maximal de 720 dm^3/s (débit moyen de 140 dm^3/s). La minéralisation des eaux dans ces deux systèmes dépasse 170 – 190 mg/dm^3 (BENDEREV & SHANOV, 1997), tandis que les valeurs maximales sont mesurées dans la zone d'infiltration: 575 mg/dm^3 (BENDEREV & VESSELINOV, 1999). Les eaux dans le complexe karstifiable du Trias sont caractérisées par des teneurs élevées an HCO_3^-, Ca^{2+} et Mg^{2+}.

Matériel, méthodologie et stations prospectées

Le matériel faunistique était recolté par les méthodes d'échantillorage suivantes:

– filtration des eaux de gours et de flaques dans les grottes et les galeries artificielles par l'aide d'un sac hydrobiologique;

– filtration des eaux des sources et des eaux courantes dans les grottes par le philet phréatobiologiques de CVETKOV (1968);

– filtration d'eau après le rinsage des mousses et des feuilles mortes.

La fréquence d'occurrence (pF) de chaque espèce est donnée en pourcent du nombre total des stations étudiées.

Les crustacés sont déterminés dans 23 échantillons provenant de 15 stations. Plus bas nous donnons une courte caractéristique de chaque station et les dates d'échantillonage.

1. Source karstique "Popov izvor": massif de Golo bardo, draine la zone noyée de karst et probablement s`alimente principalement par les eaux de la rivière de Strouma, ainsi que par des eaux d`infiltration; le bassin versant est mal connu; 12.05.1991, 17.05.1991.

2. Galerie artificielle de Stoudena: massif de Golo bardo, Pernik; zone d'infiltration de karst; gours et flaques d'eau; 08.02.1995, 17.02.1996.

3. Rivière souterraine dans la grotte "Douhlata": massif de Bosnek; le lit de la rivière est couvert par sable fin et gravier; le débit peu depasser plus de 200 dm^3/s; "Douhlata" est la plus longue grotte en Bulgarie (plus de 18000 m); 05.08.1990, 03.11.1991.

4. Gours dans la grotte "Douhlata": 12.01.1991, 03.11.1991.

5. Sources karstiques "Douhlata": drainent le reseau hydrographique souterrain de la grotte "Douhlata"; débit moyen de 140 dm^3/s, débit minimal de 5 dm^3/s, débit maximal de 720 dm^3/s (BENDEREV & SHANOV, 1997); 19.11.1989, 16.05.1991, 06.12.1991.

6. Ruisseau dans la grotte "Academic": fait partie du système de la grotte "Douhlata": 09.09.1990.

7. Ruisseau dans la grotte "Djeranitza": massif de Bosnek; grotte-perte de la rivière de Strouma, souvent inondée; 04.08.1990.

8. Petite source au lieu-dit "Djeranitza": située dans la zone d`infiltration de karst de Bosnek; débit moyen d`environ 2-4 dm^3/s; 04.08.1990.

9. Petite source "Bjalata voda": située dans la zone d`infiltration de karst de Bosnek, s`alimentaent principalement par des précipitations atmosphériques; 03.08.1990.

10. Source karstique "Zhivata voda": draine la grotte de "Zhivata voda", le bassin versant est limité à une petite surface de quelques km^2; zone d`infiltration de karst; le débit dépasse 20 dm^3/s; 15.05.1991, 16.05.1991.

11. Petit ruisseau dans la grotte "Zhivata voda": 12.05.1991; 16.05.1991.

12. Gours dans la grotte "Zhivata voda": 03.08.1990.

13. Gour dans la "Grotte de Bay Boré": galerie artificielle dans le calcaire; altitude 1000 m; la gour est située à 5 m de l`entrée de la galerie; zone d`infiltration; 16.10.1988.

14. Résurgence de la grotte "Vreloto": l`eau provienne de la rivière de Strouma; l`afflux d`eau d`infiltration joue un rôle secondaire; débit moyen de 310 dm^3/s, débit maximal de 1140 dm^3/s et minimal de 83 dm^3/s (BENDEREV & CHANOV, 1997); 10.12.1989.

15. Mousses et feuilles mortes sur le travertin d'un ruisseau au lieu-dit "Metcha mogila": 01.12.1991.

L'ensemble des Crustacés

Composition taxonomique et remarques faunistiques

En résultat de recherches sur les crustacés effectuées dans le karst des massifs karstiques de Bosnek et de Golo bardo nous avons établi 28 espèces, dont 9 copépodes, 15 harpacticoïdes, 3 amphipodes et une syncaride:

COPEPODA
Cyclopoida

***Eucyclops graeteri graeteri* (Chappuis)**
8; pF = 6.6%

***Paracyclops fimbriatus fimbriatus* (Fischer)**
1, 9, 10, 11, 12; pF = 33.3%
***Megacyclops viridis* (Jurine)**
1; pF = 6.6%

***Acanthocyclops vernalis vernalis* (Fischer)**
12; pF = 6.6%

***Acanthocyclops propinquus* (Plesa)**
1, 5, 7, 10, 11, 12, 13, 15; pF = 53.3%

***Acanthocyclops chappuisi* (Naidenow & Pandourski)**
1, 3; pF = 13.3%

***Acanthocyclops strimonis* (Pandourski)**
1, 2, 3, 5, 7, 10, 11, 15; pF = 53.3%

***Acanthocyclops* sp. ("*kieferi*" gr.)**
7; pF = 6.6%

***Diacyclops languidoides* (Lilljeborg) (s. lat.)**
1; pF = 6.6%

Harpacticoida

***Bryocamptus* (*Br.*) *minutus* (Claus)**
5; pF = 6.6%

***Bryocamptus* (*Rh.*) *zschokkei zschokkei* (Schmeil)**
5, 7, 11, 14; pF = 26.6%

***Bryocamptus* (*Rh.*) *pygmaeus* (Sars)**
5, 12, 15; pF = 20%

***Bryocamptus* (*Rh.*) *typhlops* (Mrazek)**
3, 4, 5, 11; pF = 26.6%

***Bryocamptus* (*Rh.*) *echinatus* (Mrazek)**
9; pF = 6.6%

***Bryocamptus* (*L.*) *dacicus* (Chappuis)**
1; pF = 6.6%

***Maraenobiotus brucei carpaticus* Chappuis**
4; pF = 6.6%

***Attheyella* (s. str.) *crassa* (Sars)**
1, 11, 12; pF = 20%

***Elaphoidella phreatica* (Chappuis)**
11; pF = 6.6%

***Elaphoidella iskrecensis* Apostolov**
3; pF = 6.6%

***Elaphoidella pandurskyi* Apostolov**
6; pF = 6.6%

***Moraria* (s. str.) *poppei* (Mrazek)**
9; pF = 6.6%

***Epactophanes richardi* Mrazek**
7, 15; pF = 13.3%

***Parastenocaris jeanneli* Chappuis**
3; pF = 6.6%

***Nitocrella hirta* Chappuis**
2; pF = 6.6%

AMPHIPODA

***Gammarus balcanicus* Schäfferna**
1, 5; pF = 13.3%

***Niphargus* sp.**
5; pF = 6.6%

***Niphargus pancici vlkanovi* Stanko et Gordan Karaman**
7, 11; pF = 13.3%

Syncarida: gen. sp.
3; pF = 6.6%

Les espèces des genres *Acanthocyclops* (5 espèces) et *Bryocamptus* (6 espèces) sont plus nombreuses. Elles se rencontrent dans 93.3% des stations prospectées et caractérisent les eaux karstique de la région étudiée. *Acanthocyclops propinquus* et *A. strimonis* sont les plus fréquents et habitent 53.3% des stations. Les espèces stygobies du genre *Elaphoidella* se rencontrent dans 3 stations (20%). Nous pouvons considérer 18 espèces comme très rare et qui ne se rencontrent que dans une seule station.

Les espèces, formant le peuplement de crustacés dans les eaux souterraines de la région étudiée, se trouvent dans différents stades de processus de colonisation active du milieu souterrain. Les cyclopides *Eucyclops graeteri*, *Acanthocyclops propinquus*, *A. strimonis* et *A. chappuisi*, les harpacticides *Bryocamptus* (R*h*.) *typhlops*, *Maraenobiotus brucei carpaticus*, *Elaphoidella phreatica, E. iskrecensis, E. pandurskyi* et *Parastenocaris jeanneli*, les deux espèces de *Niphargus* et la Syncaride de la grotte de "Douhlata" sont des formes stygobies. Parmis les copépodes certains cyclopides considérés comme hypogés on peut trouver dans des biotopes de la surface. PANDOURSKI (1994) trouve *Acanthocyclops strimonis* et *A. propinquus* dans de tels habitats. *Eucyclops graeteri* a été établi parmis des mousses humides de la montagne de Rila (PANDOURSKI, 2000).

D'autre part, espèces stygofiles comme *Paracyclops fimbriatus, Acanthocyclops vernalis, Bryocamptus* (*Br.*) *minutus, Br.* (R*h*.) *zschokkei, Br.* (R*h*.) *pygmaeus, Br.* (R*h*.) *echinatus, Br.* (*L.*) *dacicus* et *Moraria* (s. str.) *poppei* peuvent être considérées comme des espèces en voix de colonisation des biotopes souterraines. Ce sont aussi des élements fréquents dans les eaux montagneuses de Bulgarie (CHICHKOV, 1909; APOSTOLOV, 2001)

Le troisième groupe inclus des formes épigées, accidentellement pénetrées dans le milieu souterrain. Ce sont *Megacyclops viridis, Epactophanes richardi* et *Gammarus balcanicus*.

De point de vue zoogéographique, les espèces endémiques sont très bien représentées dans les eaux souterraines de Bosnek et de Golo bardo. *Elaphoidella pandurskyi* est une espèce endémique locale avec une seule station connue: la grotte "Academic". *Acanthocyclops strimonis, A. chappuisi* et *Elaphoidella iskrecensis* sont des espèces endémique pour la Bulgarie, dont les aires de distribution sont très limitées et morcelées. *Maraenobiotus brucei carpaticus, Elaphoidella*

phreatica, Parastenocaris jeanneli, Nitocrella hirta et *Niphargus pancici vlkanovi* sont des formes endémiques pour la péninsule Balkanique. Malheureusement, un représentant de genre *Niphargus* et la seul syncaride connue ne sont pas déterminés au niveau d`espèce.

Les autres espèces ont une distribution plus vaste dans des biotopes épigées et hypogées.

Origine des crustacés stygobie

Une seule espèce est d'origine marine: c'est la syncaride habitante la rivière souterraine de "Douhlata". Sa présence est liée aux plus anciennes étapes géologiques de la formation du système hydrogéologique.

Les autres espèces ont une origine dulçaquicole et nous pouvons les répartir en trois groupes (PANDOURSKI, 1994; 1997):

– espèces néoendémiques pour lesquelles les eaux souterraines ont vraisemblablement constitué un milieu conservateur pour des populations issues des ancêtres cryophiles épigés durant le retrait du climat froid vers le nord de l'Europe. Ce sont les espèces stygobie de genre *Bryocamptus, Maraenobiotus brucei carpaticus* et *Diacyclops languidoides* (s. lat.);

– espèces paléoendémiques, restes de l'ancienne faune boréale de Paléarctique de temps de l'Oligocène et de Miocène, dont populations épigées disparaissent au cours de refroidissement du climat à la fin du Pliocène et au début du Quaternaire. Ce sont les trois espèces du groupe *"kieferi"* du genre *Acanthocyclops: A. propinquus, A. strimonis* et *A. chappuisi*;

– espèces paléoendémiques de la première moitié du Tértiaire, quand le territoire de Bulgarie a été soumis à un climat subtropical humide à moussons. Dans ce groupe rentrent les trois espèces d'*Elaphoidella* (*E. phreatica, E. iskrecensis* et *E. pandurskyi*) et *Parastenocaris jeanneli*.

L'origine des représentants du genre *Niphargus* est encore discutable (NOTENBOOM, 1991).

Répartition spatiale dans le karst

1. Les crustacés de la zone d'infiltration

Dans cette zone nous avons prospecté 13 stations. Ce sont des gours dans les grottes et les galeries artificielles, des ruisseaux souterrains et petite sources karstiques, s'alimentant principalement par des précipitations atmosphériques. La grande hétérogénéité spatiale caractérise la répartition des crustacés: 14 espèces ne se rencontrent que dans une seule station chacune et quatre dans deux stations chacune.

Les gours dans la grotte "Douhlata" sont peuplées exclusivement par *Bryocamptus typhlops*, qui forme une dense population. *Maraenobiotus brucei carpaticus* est une espèce plus rare, habitant aussi les gours de "Douhlata". Le peuplement de crustacés dans les sédiments (sable et gravier) de la rivière souterraine de la même grotte est très différent: ici nous trouvons *Parastenocaris jeanneli, Acanthocyclops chappuisi, A. strimonis* et le représentant de Syncarida. La seule espèce trouvée dans le ruisseau souterrain de la grotte "Academic" est *Elaphoidella pandurskyi*. Le système de la grotte "Zhivata voda" est caractérisé par la présence de *Acanthocyclops strimonis, A. propinquus* et quelques espèces de genre *Bryocamptus*. Pour la zone d`infiltration du massif de Golo bardo nous devons ajouter *Nitocrella hirta*.

2. Les crustacés dans la zone noyée

La source "Popov izvor" nous donne le seul accés naturel pour prélévement de la zone noyée de karst. Ici nous avons constaté la plus grande richesse spécifique (9 espèces). Trois sont des formes stygobies. Le fait que le nombre d`espèce augmente des parties supérieures du réseau hydrographique souterrain est souligné aussi par GIBERT (1986); CREUSÉ des CHATELLIERS et al. (1991) et PANDOURSKI & BENDEREV (1997).

Discussion

Dans une étude précédente (PANDOURSKI & BENDEREV, 1997) une analyse de l'ensemble stygobie et la répartition spatiale de la faune dans les eaux souterraines karstiques de la montagne de Ponor est faite. Ce massif est situé à 70 km au nord du karst de Bosnek et fait partie de la chaine montagneuse balkanique. Bien que les deux systèmes karstiques sont situés très proche (Fig. 2), nous devons remarquer certaines différences importantes dans la composition et la structure spatiale de la faune stygobie:

– seulement deux espèces sont commune pour les deux écosystèmes karstiques: *Acanthocyclops propinquus* et *Diacyclops languidoides* (s. lat.);

– les espèces qui caractérisent la zone d'infiltration de karst de Ponor sont *Speocyclops lindbergi* Damian, *Stygoelaphoidella elegans* Apostolov et *Acanthocyclops iskrecensis* Pandourski. Les genres *Speocyclops* et *Stygoelaphoidella* sont très fréquents dans les eaux karstiques de la Stara Planina Occidentale et Centrale et de Prébalkan, tandis qu'ils sont absents dans les eaux karstiques en Bulgarie Sud (la zone tectonique de Srédnogorié, Vitocha et Golo bardo y compris);

– l'absence d'isopodes hypogées et plus spécialement de *Sphaeromides bureschi* dans le karst de Vitocha et de Golo bardo. La répartition en Bulgarie de cette isopode de grande taille est

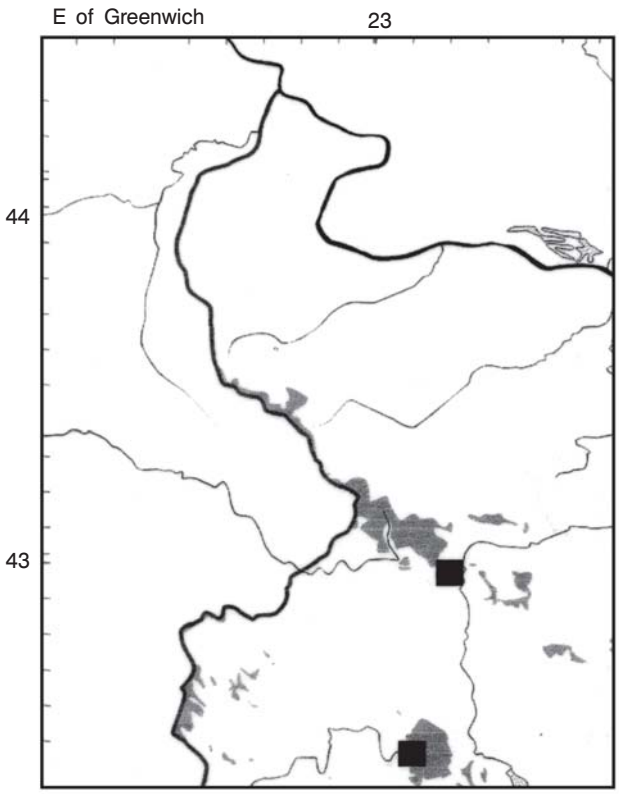


Fig. 2. Situation des régions prospectées: 1 – le masif karstique de Ponor; 2 – le massif karstique de Bosnek

discutée chez PANDOURSKI & BRESKOVSKI (1995). Les auteurs proposent l'hypothèse de leur origine marine dès le Crétacé supérieur;

– les espèces du groupe *"kieferi"* de genre *Acanthocyclops* sont très fréquentes dans les eaux de deux écosystèmes karstiques, mais la composition taxonomique dans les deux cas est différente.

Nous pouvons expliquer ces différences par l'évolution géologique particulière de chaqun des deux systèmes karstiques. Durant le Paléogène la region étudiée a été couverte par des sédiments d'âge d'Oligocène moyen et de Miocène inférieur (le paléobassin de Pernik). Au cours de Miocène moyen les sédiments d'âge jurassique et triasique ont chevauché les roches du pluton de Vitocha. Des conditions pour développement d'un karst allogène sous l'influence des facteurs de surface s'établissent (BENDEREV & ANGELOVA, 1999). La paléorivière de Strouma avait eu un rôle majeur dans le processus de karstification. L'activation de l'orogenèse au cours de Pliocène-Pléistocène a conduit à la différenciation des blocks de Vitocha et de Golo bardo (MATOVA & ANGELOVA, 1994).

La présence du représentant des syncarides dans les eaux souterraines de Vitocha est liée probablement à l'existence du paléobassin de Pernik. Le rôle des bassins néogènes pour la formation de l'ensemble des syncarides dans la Bulgarie de sud a été souligné par PANDOURSKI & OGNJANOVA (2001). Par contre, l'origine des crustacés thalassophréatiques de genre *Sphaeromides* est beaucoup plus ancienne et date de la dernière transgression marine de Crétacé (PANDOURSKI & BRESKOVSKI, 1995).

L'absence d'espèces reliques de début de Tértiaire des genres *Speocyclops* et *Stygoelaphoidella* est liée au bassin de Pernik, quand les roches carbonatés triasiques et jurassiques ont été couverts par des sédiments de ce bassin. En ce temps le système karstiques de Ponor est bien devéloppé et offre des conditions très favorables pour une colonisation active du milieu souterrain.

Au Néogène les eaux souterraines karstiques des massifs de Bosnek et de Golo bardo sont déjà formées et les espèces du groupe *"kieferi"* de genre *Acanthocyclops* pénètrent et colonisent l`écosystème karstique. L`isolation géographique conséquante est la cause principale pour la vicariance et différenciation des espèces connues des eaux souterraines de Vitocha, de Golo bardo et de Ponor.

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Ракообразните от подземните карстови води на планините Витоша и Голо бърдо (Западна България): таксономичен състав, обща характеристика и пространствено разпределение в карста

Апостол АПОСТОЛОВ, Иван ПАНДУРСКИ

(Р е з ю м е)

Съобщават се 28 вида ракообразни от карстовите подземни води на Витоша и Голо бърдо, в това число 9 циклопоиди, 15 харпактикоиди, три амфиподи и една синкарида. Анализирано е тяхното пространствено разпределение във връзка с хидрогеоложките особености на карста. Най-голямо видово богатство е установено в Попов извор, който ни дава естествен достъп до водонаситената зона. Зоната на аерация се характеризира с подчертана пространствена хетерогенност: 14 вида се срещат само в по едно находище, а четири вида са установени само в по две от изследваните станции. Произходът на ракообразния комплекс е дискутиран въз основа на геоложкото развитие на изследвания район от средния миоцен до неогена. Направен е сравнителен анализ на видовия състав и разпределението на ракообразните в Боснешкия карстов район и карстовата система на Понор планина (Западна Стара планина). Установените различия са обяснени на основата на сравнителен палеогеографски анализ на тези територии.

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Втора книга за совите

Златозар БОЕВ

НЯГОЛОВ К. 2003. Совите в България – наши спътници в нощта. Борина, София, 1-104.

Изминаха само 15 години от издаването на първата българска книга за совите (СИМЕОНОВ, С., 1988. Совите – наши тайнствени приятели. БАН, С., 1-152.) и ето, че вече в ръцете си държим една нова, великолепно оформена и прекрасно илюстрирана книга за "летящите котки". Повишеното внимание към совоподобните птици (Strigiformes) се дължи, както на интересната им външност (големи глава и очи, надочни кичурчета от пера, силни и остри нокти на краката, меко оперенеие), начина им на живот (нощна и привечерна активност, издаване на приглушени или пискливи, но малко зловещи за човека звуци, безшумен полет, инфрачервено зрение), природозащитния им статус (застрашени и редки видове, всички включени във Вашингтонската конвенция CITES), а също и на важното им практическо значение (системни унищожители на масовите мишевидни гризачи и много насекоми, които са изявени вредители на селскостопанската продукция). Совите са и символ на мъдростта и с тайнствената си прикритост неоснователно са дали повод някъде да ги смятат за предвестник на нещастие. Книгата е създадена от двама изявени природозащитници и отлични познавачи на птиците. Константин Няголов е автор на текста, а прекрасните цветни и черно-бели рисунки (99 на брой) са дело на все по-популярния млад анималист – биолога Асен Игнатов. Рисунките на Игнатов, представящи всевъзможни пози, които илюстрират поведението на нашенските сови са допълнени и от 19 майсторски цветни снимки на чухъл, горска ушата сова, кукумявка, бухал, забулена сова и др. Изтъкнатият наш зоолог, ст.н.с. д-р Петър Берон, е автор на предговора. "Совите в България" е научно-популярна книга за 12 вида сови, 10 от които са разпространени и у нас. За всеки вид К. Няголов представя богата информация, разпределена в следните рубрики (за някои видове те са назовани различно): латински названия, синоними и народни названия, общо разпространение, разпространение в България, описание, издавани звуци, местообитания, размножаване, възраст и размножаване на затворено, хранене, особености и поведение, легенди и поверия, стопанско значение, природозащитен статус. За всеки вид е представена и карта, показваща разпространението му в България. Тук авторът се е престарал, като е показал разпространението и на полярната сова и ястребовата сова, които още никой у нас не е наблюдавал. За блатната сова пък е "уточнено", че у нас "Може да се наблюдава ... до 800 м надм. в.". Въпреки изобилната и в нашата научна литература информация, прави впечатление, че не са ползвани много сведения, които съществено биха допълнили данните, често заимствани от чуждестранни източници. Това личи и от сравнително краткия списък на ползваната литература. В книгата са допуснати множество грешки от коректорски характер, най-честите от които са пропуснатите препинателни знаци или неправилното членуване в мъжки род ед. ч. Непонятно защо един вид, *Glaucidium passerinum*, в книгата е споменат с две имена – врабчова сова и врабчева кукумявка. Подвида "*gutatta*" на забулената сова и изписан "*gutata*". Допуснати са и някои стилови и фактически грешки. Те биха могли да се избегнат, ако книгата беше представена на рецензент и научен редактор, каквито очевидно няма. "Совите в България" е издадена едновременно на два езика. Половината от тиража е на английски и ще се разпространява в чужбина. Появяването на поредната книга за птиците у нас, разпространяваща знания и призоваваща за тяхното опазване е факт, който безспорно заслужава да бъде приветстван.

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Paralaophonte livingstoni n.sp. (Crustacea: Copepoda: Harpacticoida) – un nouveau représentant de l'île de Livingstone, Antarctique

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Abstract. One new marine harpacticoid copepod, *Paralaophonte livingstoni* n.sp., is described. It has been collected only in the coastal zooplankton of the Marine Lion bay and north of the South Bay of the Livingston Island, Antarctic. The new species is characterized by the armament of P2 – P5 and furca. The affinities and systematic position of the new species are discussed.

Key words: Copepoda, Harpacticoida, *Paralaophonte*, New species, Antarctic

Introduction

La présente note est la suite de nos recherches sur la faune de l'île de Livingstone qui doit être considérée comme la quatrième d'une série de publications faunistiques concernent les copépodes harpacticoides de l'Antarctique.

Le matériel dont l'étude est l'objet ici, a été récolté par M. Ivan Pandourski, de l'Institut de zoologie de Sofia lors d'un séjour en Antarctique pendant la sixième (1998) expédition bulgare. Il a eu occasion d'effectuer de nombreux prélèvements dans la région des îles du groupe de Shetland du sud, près de la base bulgare 62°38' Sud et 60°22' Ouest.

Nos prospections taxonomiques de la zone littorale de la région de l'île de Livingstone, ont permis la découverte d'une abondante collection de copépodes harpacticoides (APOSTOLOV & PANDOURSKI, 1999, 2000, 2002).

L'examen des prélèvements réalisés en quelques stations a révélé l'existence d'une faunule harpacticoidienne bien diversifiée, dont représentants appartiennent aux genres *Ameira* Boeck et *Paralaophonte* Lang. Parmi les espèces trouvées de ces deux genres, une était inédite et encore inconnue dans la faune antarctique. Dans la présente note, nous décrirons, dans des premières fois, une espèce – *Paralaophonte livingstoni* sp.n. présentant des caractères originaux. Dans la seconde partie de la description, nous donnerons quelques renseignements sur la répartition et l'écologie de l'espèce nouvelle.

Matériel et méthode

Le matériel décrit dans le présent travail provient de prélèvements effectués à l'île Livingstone dans le cadre des recherches scientifiquee de l'Institut Antarctique Bulgare et de l'Académie bulgare des sciences pendant la sixième expédition bulgare (1998/99).

Les prélèvements des littorales ont été effectués à l'aide d'un filet à la main avec vide maille de 0.120 mm. Le tri de cette microfaune, a été réalisé au laboratoire, selon les méthodes classiques. La nomenclature employée au cours des descriptions est celle qui est utilisée par LANG (1948, 1965) et des auteurs contemporains. Les dessins de l'espèce nouvelle été exécutés à l'aide d'un appareil à dessin et à main levée. La longueur totale est mesurée du rostre à l'extrémité distale des branches furcales (éxeptée soies apicales). La présente description est fondée sur la dissection des exemplaires, dont les caractères originaux sont conservés dans la collection zoologique de l'auteur à l'Université de Bourgas.

LAOPHONTIDAE

Paralaophonte livingstoni sp. n.

(Fig. 1-3)

Matériel examiné: Quatre femelles adultes, 21.12.1998.

Localité-type: Zooplancton du golfe Marin Lion; Zooplancton, au Nord de la Baie du Sud, cape Ereby, île Livingstone.

Holotype: une femelle adulte.

Paratypee: deux femelles.

Faune associée: Ostracoda, Calanoida, Isopoda, Amphipoda; Acari.

Diagnose. Femelle. Antennule à sept articles. Exopodite de l'antenne uniarticulé, portant quatre soies. Maxille avec un syncoxa présentant trois endites cylindriques portant 2, 2 et 1 soie. Endopodite représenté par un article avec deux soies. Maxillule avec arthrite du precoxa armé de sept épines; exopodite plus long de l'endopodite, avec deux soies inégales; endopodite réduit, portant trois soies apicales. Exopodite P1-P4 triarticulé, endopodite P1-P4 biarticulé, article basale de l'endopodite P2-P4 sans soie interne; article apical porte respectivement 4, 4 et 3 soies. L'exopodite de P5 a cinq soies, basoendopodite porte quatre soies. Branches furcales deux fois plus longues que larges. Un sac ovigère. Opercule anal bien développé, glabre.

Description. Femelle. Bord postérieur des somites du corps avec une rangée ininterrompue d'épines dorsalement, ventralement et latéralement (Fig. 1.1, 1.2, 1.3). Dernier somite avec, sur la face ventrale, une rangée de cinq spinules à la base de chaque branche furcale (Fig. 2.1) Bord libre de l'opercule anal glabre (Fig. 1.3)

Les branches furcales sont deux fois plus longues que larges, avec deux soies apicales médian bien développé, une soie apicale interne et deux soies subapicales externe avec quelques-unes spinules à leur base. Sur la face dorsale une soie géniculée à sa base, insérée distalement non loin de la base des branches furcales. (Fig. 1.3).

Antennule (Fig. 2.2): composé de sept articles. Le bord interne de deux premiers articles avec quelques-unes spinules. L'aesthète à d'aspect d'une longue soie. Deuxième article porte un éperon à sa partie externe.

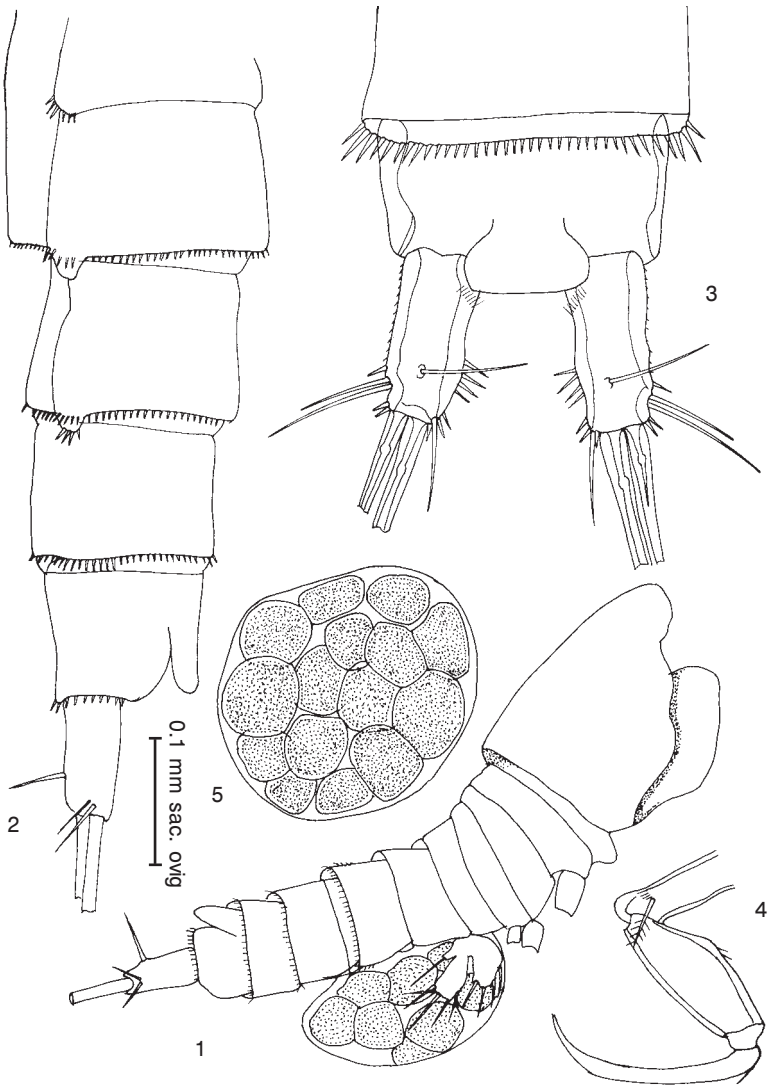

Fig. 1. *Paralaophonte livingstoni* n. sp., ♀: 1 - habitus; 2 - somites et furca vue latérale; 3 - somite anal et furca vue dorsale; 4 - maxillipède; 5 - sac ovigère

Antenne (Fig. 2.3): allobasis avec soie barbelée au bord interne. Exopodite uniarticulé avec quatre soies, dont trois barbelées. Endopdite avec deux épines et quelques-unes de spinules au bord interne et cinq épines apicales.

Mandibule: n'a pu être observée.

Maxillule (Fig. 2.4): avec un arthrite du praecoxa armé de sept épines, dont les trois internes sont très fortes ; exopodite plus long de l'endopodite, avec deux soies ; endopodite réduit, portant trois soies apicales.

Maxille (Fig. 2.5): syncoxa présentant trois endites, dont les deux premières avec deux soies et le proximal avec une soie. Basis avec une épine robuste et deux soies inégales. Endopodite présenté par un article portent deux soies.

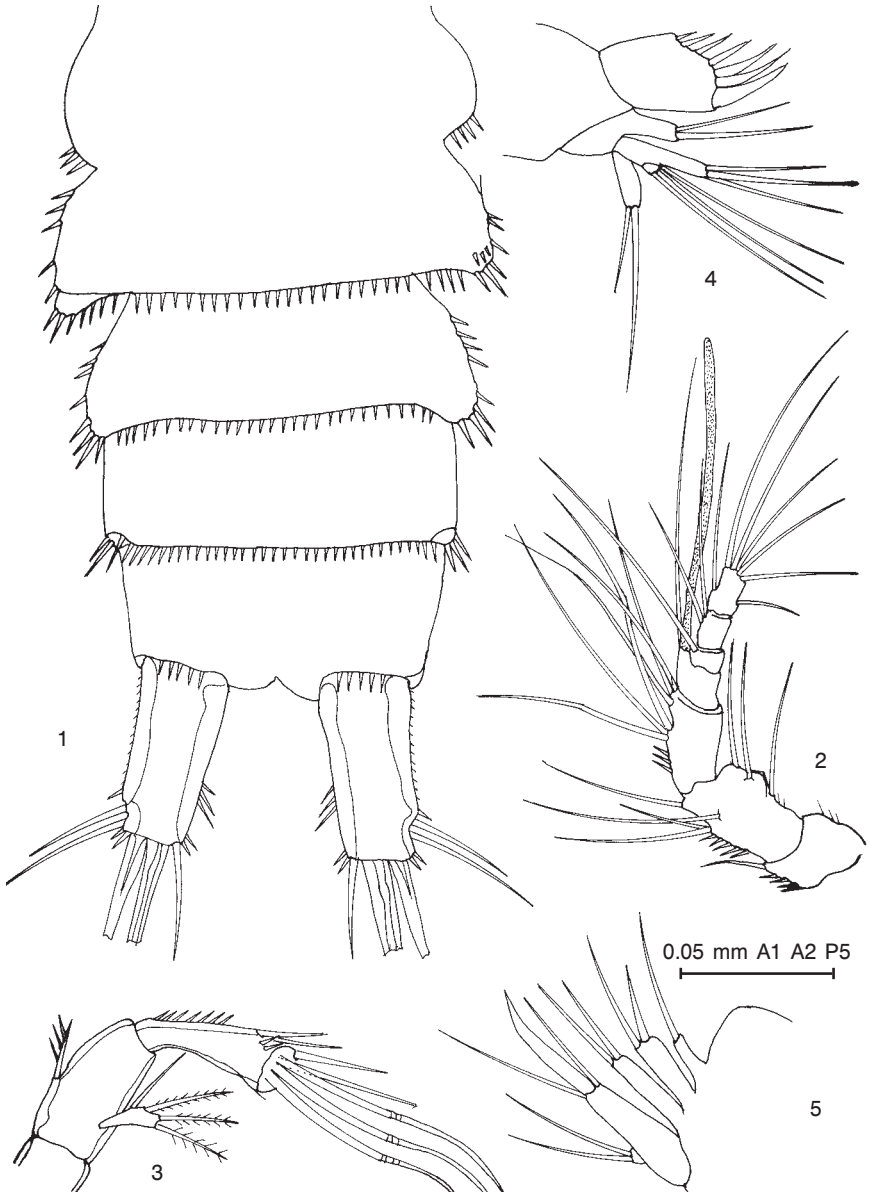

Fig. 2. *Paralaophonte livingstoni* n. sp., ♀: 1 - somites abdominaux et furca vue ventrale; 2 - antennule; 3 - antenne; 4 - maxillule; 5 - maxille

Les péréiopodes 1 à 4 avec un exopodite triarticulé et un endopodite biarticulé.

P1 (Fig. 3.2): typique du genre : basipodite avec deux épines, l'une externe, l'autre interne. Une rangée de quelques épines implantées sur le basipodite au-dessus de l'endopodite. La soie interne du basipodite est plus longue que le premier article de l'exopodite ; la soie externe est très longue et barbelée sur sa moitié distale. Le premier et le troisième article de l'exopodite sont d'égale longueur, tandis que l'article médian est plus long. Exopodite plus court de l'endopodite. L'article médian de l'exopodite ne porte pas de soie interne, le distal porte quatre épines. Endopodite biarticulé, l'article basal très allongé et sans soie ; l'article distal portant à son apex un fort crochet.

P2 (Fig. 3.3): basipodite avec une soie externe longue et barbelée. Endopodite biarticulé, atteignant le milieu du deuxième article de l'exopodite. Article basal sans soie interne, second article avec deux soies au bord interne, et deux soies apicales. L'article basal de l'exopodite porte une forte épine et quelques-unes spinules à l'angle distal et externe ; deuxième article avec une soie interne, une épine externe et une rangée de trois spinules externes ; article distal porte cinq soies et épines et trois spinules.

P3 (Fig. 3.4): basipodite avec une soie au coin externe, barbelée sur sa moitié distale. L'article basal de l'exopodite peu allongé, avec une longue épine et une rangée de spinules sur le bord externe ; deuxième article avec une soie interne courte, l'article distal avec une soie interne, une soie apicale et quatre fortes épines.

P4 (Fig. 3.5): basipodite avec une épine externe. L'endopodite atteignant la partie apicale de l'article basal de l'exopodite; premier article sans soie interne, article apical porte trois soies inégales et barbelées. Premier article de l'exopodite sans soie interne, deuxième article avec une soie interne; article apical porte une soie interne, une soie apicale et quatre épines.

La chétotaxie de P2-P4 peut se résumer ainsi:

	Exopodite					Endopodite			
P2	0	1	1	2	3	0	2	2	0
P3	0	1	1	2	3	0	2	2	0
P4	0	1	1	2	3	0	1	1	1

P5 (Fig. 3.6): avec basoendopodite bien développé. Lobe interne dépasse le milieu de l'exopodite, armé de quatre soies barbelées: les deux internes courtes, la médiane longue et l'externe courte. Lobe externe muni d'une rangée de spinules. Exopodite oblong, il présente cinq soies, dont deux internes plumeuses. La soie apicale la plus interne est courte; la deuxième soie apicale d'interne est la plus longue, les autres trois soies externes, inégales, dont la médian est très court et fine.

Longueur de la femelle: 0.52 mm.

Répartition. Antarctique, au nord de la Baie du Sud, près du cap Ereby, l'île de Livingstone.

Étymologie. L'espèce est nommée d'après le nom de l'île de Livingstone.

Position systématique

Nous avons classé la nouvelle espèce décrite ci-dessus, dans le genre *Paralaophonte* Lang d'après l'ensemble des caractères notamment d'après la structure de deuxième article de

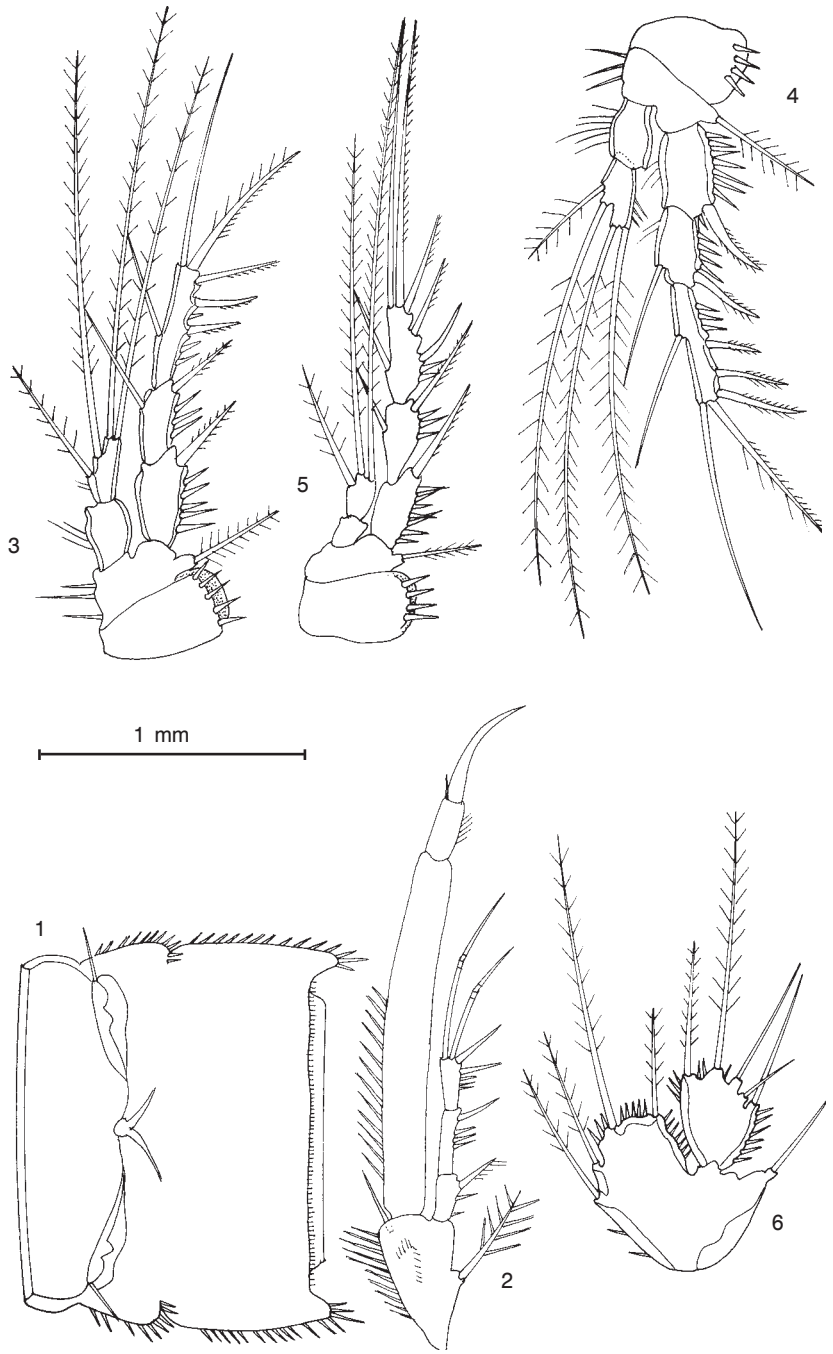

Fig. 3. *Paralaophonte livingstoni* n. sp., ♀: 1 - aire genital; 2 - P1; 3 - P2; 4 - P3; 5 - P4; 6 - P5

l'antennule qui possède un petit éperon, le nombre des articles de l'antennule, l'exopodite P1 triarticulé, la structure et la morphologie de la P5 et des branches furcales. Il faut noter ces caractères pour la diagnose de l'espèce et pour la composition d'une clé pour la détermination des espèces du genre *Paralaophonte*. Pour cette raison, en nous servant de la monographie de LANG (1948, 1965), nous n'avons pas été eus mesure de déterminer le genre auquel il faut rapporter nos exemplaires femelles. Cela n'a été possible qu'après que le Dr. F. Fiers, de Brusselle, ait eu l'amabilité de voir nos dessins et de nous donner son avis. Selon lui, nos femelles de l'île de Livingstone sont très proches des espèces du groupe *karmensis* du genre *Paralaophonte*. A l'intérieur de ce groupe, les espèces les plus proches de *Paralaophonte livingstoni* sp.n. sont: *Paralaophonte longipes* T. Scott, *P. karmensis* Sars, *P. zimmeri* Douwe, *P. lunata* Willey.

Les plus importants caractères de ce groupe sont les antennules composées de 6 à 7 articles; l'exopodite P1 bi- ou triarticulé; l'article distal de l'exopodite P4 avec une soie interne. Comme la souligne LANG (1948), le nombre des soies sur les pattes natatoires est très variable. Basoendopodite de P5 porte de 2 à 5 soies et exopodite de 4 à 5 soies. Il serait très difficile de comparer et d'individualiser la nouvelle espèce à chacune des espèces du genre. Les descriptions sont souvent incomplètes et ne permettent pas une comparaison suffisamment minutieuse. Mais on peut faire cela parmi les espèces du groupe *karmensis*.

Après comparé la nouvelle espèce aux espèces de ce groupe, nous avons pu constater les différences suivantes:

– La présence, sur deuxième article de l'antennule d'un petit éperon.
– L'exopodite P1 triarticulé.
– Sur l'article distal de l'endopodite de P2-P3 quatre soies.
– La présence de trois soies sur l'article distal de l'endopodite P4, au lieu de quatre.
– Branches furcales deux fois plus longues que larges.
– L'opercule anal grand, arrondi et glabre.
– La nouvelle espèce atteint 0.52 mm, alors que la plus part des espèces du groupe atteignent de 0.35 à 0.68 mm.

Comme on le voit, toute l'originalité de la nouvelle espèce réside dans l'armature de l'article distal des endopodite des péréiopodes 2 et 4; la morphologie et longueur des branches furcales, l'antennule et l'opercule anal. D'après ses caractères *P. livingstoni* sp.n. prend une place particulière parmi des espèces connues de ce genre. Parmi toutes les espèces connues du genre *Paralaophonte*, aucune n'a les endopodites P2 et P3 portant un nombre égale des soies (excepté *P. quaterspinata*) et les endopodites P4 avec trois soies, comme c'est le cas ici.

Paralaophonte livingstoni sp.n. se distingue également de *P. longipes*, en ce qui concerne le nombre d'articles de l'exopodite P1 qui est biarticulé, au lieu de trois articles chez la nouvelle espèce. D'autre parte l'espèce *P. longipes* se diffère de l'espèce antarctique par la longueur et la structure de basoendopodite P5 qui ne porte que trois soies, au lieu de quatre soies chez *P. livingstoni* sp.n. Une différence valable pour les deux espèces à la fois, est la présence sur la deuxième article de l'antennule chez la nouvelle espèce d'un petit éperon, tandis que dans *P. longipes* il manque. Il faut aussi attirer l'attention sur la différence des branches furcales chez la femelle des deux espèces: les branches furcales de *P.livingstoni* sp.n. sont deux fois plus longues que larges, chez *P. longipes* trois fois.

S'il faut chercher quelque ressemblance (en se basant sur les femelles) entre les espèces connues jusqu'à présent du groupe *karmensis* et la notre, nous devrions mettre celle-ci plus près de l'espèce *P. karmensis*. La ressemblance porte avent tout sur le nombre et la disposition des soies sur les péréiopodes P2, exopodite P3 et P4. L'unique différence consiste ici en la présence de quatre, au lieu de six soies sur le deuxième article de l'endopodite P3. En deuxième lieu il faut noter que chez la nouvelle espèce l'endopodite de P4 porte trois soies, au lieu de quatre. La morphologie et la structure de P5 est très différente dans les deux espèces. *P. karmensis* a un exopodite de P5 avec quatre soies, au lieu de cinq chez la nouvelle espèce. D'autre part *P.livingstoni* sp.n. a une furca deux fois plus longue que large (chez *P. karmensis* 1.5 fois)

Paralaophonte livingstoni sp.n. est très proche de *P. tenera*, dont elle partage la chétotaxie de P2, P5, le nombre d'articles à l'antennule, la longueur des branches furcales. Elle s'en distingue cependant par la morphologie et la chétotaxie de l'endopodite P3 et P4. Chez *P. tenera* l'article distal de l'endopodite P3 porte trois soies internes, chez *P. livingstoni* sp.n. elles sont deux. Enfin, le nombre des soies de l'endopodite P4 est très différente dans les deux espèces, quatre chez *tenera* et trois chez *livingstoni*.

La chétotaxie des péréiopodes P1, P2 et P5 est pratiquement identique à celle de *P. zimmeri*. Mais la dernière espèce possède une antennule composé de six articles, au lieu de sept chez *P. livingstoni* sp.n.

En comparaison avec l'espèce *P. lunata*, la nouvelle espèce se distingue cependant aisément par la structure du deuxième article de l'antennule qui ne porte pas un éperon; par la structure de l'article distal de l'endopodite P3 avec trois soies internes, par l'endopodite P4 dont l'article terminal port quatre soies, par la morphologie des branches furcales; par longueur d'opercule anal et l'ornementation des somites abdominaux.

Les différences entre notre espèce de l'île de Livingstone et les espèces du genre *Paralaophonte*, sont assez notables et elles nous donnent le droit de traiter cette espèce comme nouvelle.

Remerciements

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Notre reconnaissance va à l'ensemble du personnel de l'expédition bulgare antarctique et plus particulièrement à M. Ivan Pandourski, dont la collaboration nous fut très précieuse. L'auteur tient donc à exprimer ici toute sa gratitude à l'égard de F. Fiers de Brusselle, qui a eu l'amabilité de voir nos dessins de l'espèce *Paralaophonte livingstoni* et de nous donner son avis.

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Paralaophonte livingstoni n. sp. (Crustacea: Copepoda: Harpacticoida) – един нов представител от остров Ливингстън, Антарктида

Апостол АПОСТОЛОВ

(Р е з ю м е)

Описва се един нов вид за науката – *Paralaophonte livingstoni* n.sp., намерен в зоопланктона от литоралната зона, северно от Южния залив при нос Ereby, Антарктика. Материалите са събирани от д-р Иван Пандурски по време на неговото участие в Шестата антарктическа експедиция на остров Ливингстън през 1998-1999 *г.* В систематично отношение новият вид стои много близко до някои известни видове от този род. Различията се изразяват в наличието на 4 четинки на дисталното членече на ендоподит P2–P3 и 3 четинки на същото членче при ендоподит P4, дължината на фуркалните членчета, наличието на малък шип на второто членче на антенулата, силно развито оперкулумно капаче. След описанието на вида е направена дискусия относно неговото систематично положение. Подробно са разгледани приликите и разликите с видовете от група *karmensis* на род *Paralaophonte*, към която се отнася новият антарктически вид.

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Експедиция "Памир - 2003" – зоологични наблюдения и сборове

Боян П. ПЕТРОВ

Памир е най-високата планинска система в бившия Съветски съюз, чиято най-висока точка е връх Гармо (7495 m). Границата между Киргизия и Таджикистан минава по главното било на мощния Заалайски хребет (дължина около 240 km), чийто най-висок връх е Ленин (7134 m). В периода 16.07-12.08.2003 *г.* имах възможността да участвам като алпинист-зоолог в лагер-сбора на Федерацията на българските алпийски клубове за изкачването на вр. Ленин. Приблизително 95% от територията на републиката (199 945 km^2) се намира над 1000 m. Климатът е типично континентален, силно аридeн с ясно изразени пространствени различия. Известни са над 2000 езера (най-голямото е Иссык-Кул, 6236 km^2), заледявания покриват над 8100 km^2. Установени са над 4000 вида висши растения, а видовете от гръбначната фауна надхвърлят 500. Предвид разнообразието от хабитати и височинната зоналност, безгръбначната фауна на републиката, също е богата. По време на експедицията събирах материал от безгръбначни животни от всички възможни места, започвайки от базовия лагер на 3820 m до щурмовия лагер на 6100 m. Както и очаквах, най-богата фауна събрах в района на базовия лагер до около 4200 m. Най-многочислени и разнообразно представени са паяците (ок. 20 вида), бръмбарите-бегачи (ок. 10 вида) и хилоподите (ок. 5 вида). С навлизане в зоната на ледовете над 4300 m видовото разнообразие рязко намаля успоредно с намаляването на малките по площ "оазиси" от мъхове и цветни растения. За компенсация, разнообразието от вкаменелости се увеличи и на лагерната морена около палатките намерихме множество добре запазени образци. В района на предния базов лагер (4300 m) ми трябваха няколко часа, за да събера 4 паяка от 2 вида. С голям интерес наблюдавах, че в околностите на щурмовия лагер, разположен в най-ниската точка на хребета между вр. Разделни (6200 m) и вр. Ленин, летят дяволски пеперуди (*Vanessa cardui*). Те летяха дори в условията на силен вятър, характерен за този превал и за около час прелитаха ок. 5-6 екземпляра. Съдейки по поведението, този мигрантен вид се чувстваше добре и на тази височина, а в зоната между 4400 m и 4600 m наблюдавах по леда десетки умрели екземпляри. В района на предния базов лагер до около 4500 m наблюдавах множество бързо летящи гълъбови опашки (*Macroglossum stellatarum*), които кацаха по места, където се стичаха капчици разтопен лед. В малко по-ниска численост, до около 5000 m наблюдавах бързо летящите едри водни кончета (*Pantala flavescens*), които изглеждаха неприсъщи на тази сурова среда, поне 1000 m над последното ледниково езеро или поток. Гръбначната фауна, която успях да наблюдавам, не беше особено разнообразна. От птиците най-голямо впечатление на всички правеше брадатият лешояд (*Gypaetus barbatus*), който често прелиташе на 20 m над базовите ни палатки на Лукова поляна (3820 m). Значително по-висока беше числеността му под 3500 m, където пасяха стотици овце, крави и коне. Хайдушки гарги (*Pyrrhocorax graculus*) виждах сравнително рядко. Доста по-често попадаха в полезрението добре познатите ми гарвани-гробари (*Corvus corax*). Тези едри птици са неизменени спътници на височинните лагери на алпинистите, където разравят торбите с боклуци и разпръскват по склоновете остатъци от храна и вещи. По време на изкачването си до върха на 1 август 2003 *г.* не наблюдавах летящи птици и други животни над 6200 m. От бозайниците най-забележимо беше присъствието на дългоопашатия мармот (*Marmota caudata*). Числеността му по безкрайните пасища под Лукова поляна беше много висока. Най-високо го наблюдавах до около 4000 m, почти където изчезваше тревистата растителност. Макар и скромно, музейните колекции се обогатиха и с представители на памирската високопланинска безгръбначна фауна. Научното обработване на сборовете предстои.

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Harpacticoida (Crustacea: Copepoda) des eaux souterraines de l'Albanie

Apostol APOSTOLOV

APOSTOLOV A. 2004. Harpacticoida (Crustacea: Copepoda) des eaux souterraines de l'Albanie. – Historia naturalis bulgarica, **16**: 69-72.

Abstract. *Nitocra hibernica* (Brady), *Bryocamptus* (*Br.*) *minutus* (Claus), *Bryocamptus* (*Rh.*) *spinulosus* Borutzky, *Parastenocaris* sp. are reported for the first time from Albania. Some ecological and morphological data supplement the study.

Key words: Crustacea, Harpacticoida, Faunistics, Albania

Introduction

Le présent travail donne les résultats de nos recherches stygobiologiques sur la faune harpacticoidienne de l'Albanie. Nous avons étudié une collection de Copépodes Harpacticoides qui a été réalisée par Dr Ivan Pandourski au cours d'un séjour de cinq jours en Albanie du nord, pendant l'été 1994. Ce matériel provient de quatre stations des eaux interstitielles, hyporhéiques et des gours d'une niche pariétale au bord de la route Tirana – Bourel, grâce à l'aide d'organisation et financière de la Fédération Bulgarie de la Spéléologie.

Comme d'souligne PANDOURSKI (1997), nous ne connaissons pas le informations scientifiques sur les copépodes des eaux souterraines de l'Albanie. Maintenant dans la littérature scientifique manquent les travaux sur la composition et la répartition des copépodes harpacticoides des eaux souterraines de ce pays, groupe auquel nous nous sommes particulièrement intéressés. Seul PANDOURSKI (1997) publie une liste des Cyclopoides récoltées de l'Albanie, contenant huit espèces.

Dans cette première note sur la faune harpacticoidienne d'Albanie, nous nous sommes efforcés de mettre en évidence l'existence de peuplements caractéristiques d'harpacticoides souterraines. La collection est beaucoup trop fragmentaire pour pouvoir servir de base à des considérations biogéographiques.

Matériel et méthodes

Le matériel utilisé dans cette note provient de quatre stations. Il appartient à quatre espèces, nouvelles pour la hydrofaune de l'Albanie. Parmis les quatre stations deux sont localisées dans le milieu hyporhéique de la rivière Mati près de la ville de Milot, à quelques km sous le

barrage. Un autre prélèvement on a été effectué dans les gour d'une niche pariétale au bord de la route Tirana – Bourel, à 110 km de Tirana. La quatrième station est localisée dans la côte d'ouest du lac Shkodra de la plage de sable et de gravier, à deux km de la frontière avec Monténégro.

L'examen de ces échantillons nous a montré que la faune harpacticoidienne n'était composée que de quatre espèces: deux du genre *Bryocamptus*, un du genre *Nitocra* et un de *Parastenocaris*. Les propotions des quatre espèces étaient les suivantes: 58% pour le *Nitocra hibernica*, 8.3% pour *Bryocamptus* (*Rh.*) *spinulosus*, 25.4% pour *Bryocamptus* (*Br.*) *minutus* et 8.3% pou *Parastenocaris* sp. Les espèces étaient représentées par des individus à tous les stades de développement.

Les prélèvements ont été réalisés à l'aide d'une filtration des eaux des gours et par la méthode Karaman – Chappuis pour la faune hyporhéique. Chaque prélèvement est fixé séparément pour la détermination au formol neutre à 4%.

Au laboratoire les harpacticoides sont séparés des détritus et des autres espèces d'animaux contenants dans chaque prélèvement sous la loupe binoculaire, au grossissement 16 X.

Pour la détermination taxonomique les exemplaires étaient disséqués et montés entre lame et lamelle dans glycérine.

Pour les déterminations systématiques on a suivi les travaux de LANG (1948), de DUSSART (1967) et de JANETZKY et al. (1996), aussi que des travaux plus récents qui traitent les espèces étudiées (APOSTOLOV, 2003).

Remarques taxonomiques et écologiques

AMEITIDAE

***Nitocra hibernica* (Brady, 1880)**

Matériel examiné: Eaux interstitielles de la plage de sable et de gravier la côte d'ouest du lac Shkodra à deux km de la frontière avec Monténégro, 1 ♀, 2 ♂♂, 15.05.1994; Milieu hyporhéique de la rivière Mati, près de la ville de Milot, à quelques km sous le barrage, 4 ♀♀, 18.05.1994.

Faune associée: Nématodes, Oligochètes, Colembolla, Chironomides, Ostracodes, Cyclopoides (dét. I. Pandourski): *Eucyclops serrulatus* (Fischer), *Paracyclops fimbriatus* (Fischer), *Diacyclops antrincola* Kiefer, *Diacyclops clandenstinus* (Kiefer), *Diacyclops paolae* Pesce & Galassi, *Diacyclops bisetosus* (Rehberg), *Diacyclops longuidoides* (Lilljeborg); Harpacticoides: *Bryocamptus* (*Br.*) *minutus* (Claaus).

Discussion. Il s'agit d'une espèce vivant en lacs comme en mares à toutes profondeurs. L'espèce euryhaline, vit de préférence dans les eaux chaudes et alcalins riches en végétations.

Les exemplaires que nous avons examinés sont parfaitement coïncident avec la description de l'espèce.

Répartition. Cette forme est connue dans toute l'Europe (Allemagne, Autriche, France, Pologne, Roumanie, Pays-Bas, Hongrie, Rép. Cheh, ex-Yougoslavie, Bulgarie, Danemark, Suède), Sibérie, Palestine.

CANTHOCAMPTIDAE

***Bryocamptus* (*Br.*) *minutus* (Claus, 1863)**

Matériel examiné: Eaux interstitielles de la plage de sable et de gravier, la côte d'ouest du lac Shkodra, à deux km de la frontière avec Monténégro, 2 ♀♀, 15.05.1994; Milieu hyporhéique de la rivière Mati, après la ville de Milot, 1 ♀, 18.05.1994.

Faune associée: Cyclopoides (dét. I. Pandourski): *Eucyclops serrulatus* (Fischer), *Diacyclops antrincola* Kiefer, *D. clandenstinus* (Fischer); Harpacticoides: *Nitokra hibernica*, *Parastenocaris* sp.

Discussion. L'espèce semble sujette à d'assez nombreuses variations taxonomiques au sein d'une même espèce et montre une considérable plasticité écologique. Les exemplaires que nous avons examinés montrent une remarquable variabilité en position des soies apicales des branches furcales. La soie interne chez les exemplaires de l'Albanie n'insère pas au-dessus de l'externe. D'autre part, l'article distal de l'exopodite de P4 porte deux épines externes au lieu de trois chez les exopodites de P2-P3.

Bryocamptus (*Br.*) *minutus* est une espèce très eurytope vivant dans la zone littorale et la zone profonde des lacs (DUSSART, 1967). Elle est répandue en étagnes, mares, fontaines et en montagne jusqu'à 3000 m d'altitude. D'après nombreux auteurs elle est pérenne et polycyclique.

Répartition. Il s'agit d'une espèce très répandue soit dans des eaux de surface, que dans les eaux souterraines de l'Europe; de la Scandinavie à la Grèce, de l'Espagne à la Russie et de l'Afrique du Nord, Amérique du Nord et Centrale, Asie (DUSSART, 1967). On peut considérer *Bryocampus* (*Br.*) *minutus* comme une espèce pratiquement cosmopolite (APOSTOLOV & PESCE, 1969).

***Bryocamptus* (*Rh.*) *spinulosus* Borutzky, 1931**

Matériel examiné: Gour dans une niche pariétale au bord de la route Tirana-Bourel, à 110 km de Tirana, 2 ♀♀, 18.05.1994.

Faune associée: Nématodes, Oligochètes, Ostracodes, Cyclopoides: *Paracyclops fimbriatus* (Fischer).

Discussion. Nos spécimens sont apparemment semblables à ceux trouvés par BOROUTZKY (1952). L'espèce est une forme stygophile trouvée dans les fontaines, les sources et les eaux souterraines.

Répartition. Trouvée jusqu'à présent en Caucase et en Bulgarie.

PARASTENOCARIDIDAE

***Parastenocaris* sp.**

Matériel examiné: Milieu hyporhéique de la rivière Mati, après la ville Milot, 1 ♀, 18.05.1994.

Faune associée: Nématodes, Oligochètes, Chironomides, Ostracodes, Cyclopoides, *Eucyclops serrulatus* (Fischer), *Diacyclops antrincola* Kiefer, *D.clandenstinus* (Kiefer); Harpacticoides: *Nitocra hibernica* (Brady), *Bryocamptus* (*Br.*) *minutus* (Claus).

Discussion. L'exemplaire étudié a été recueilli mort c'est pourquoi il présente un mauvais état, dont la détermination exacte était impossible. On doit aussi souligner que le genre *Parastenocaris* n'était pas encore connu de l'hydrofaune de l'Albanie.

Remerciements

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Харпактикоиди (Crustacea: Copepoda) от подземните води на Албания

Апостол АПОСТОЛОВ

(Р е з ю м е)

Съобщават се 4 вида харпактикоиди нови за подземната хидрофауна на Албания - *Nitocra hibernica* (Brady), *Bryocamptus* (*Br.*) *minutus* (Claus), *Bryocamptus* (*Rh.*) *spinulosus* Borutzky, *Parastenocaris* sp., събирани през май 1994. Материалът е събран около река Мати, интерстициалните води на плажа в западната част на езеро Шкодра и синтрови езерца в скална ниша до град Бурел. За всеки от намерените видове е дадена екологична характеристика, а за *Bryocamptus* (*Br.*) *minutus* и някои морфологични отклонения от типичния вид.

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Contribution à l'étude des Isopodes terrestres de Grèce. 5. *Alistratia beroni* n. gen. n. sp. (Isopoda: Oniscidea: Trichoniscidae)

Stoïtze ANDREEV

ANDREEV S. 2004. Contribution à l'étude des Isopodes terrestres de Grèce. 5. *Alistratia beroni* n. gen. n. sp. (Isopoda: Oniscidea: Trichoniscidae). – Historia naturalis bulgarica, **16**: 73-80.

Abstract. A new genus and species, *Alistratia beroni* n. gen. n. sp., is described from the cave Alistrati, North Greece. The new genus differs from all remaining genera of subfamily Haplophtalminae by the presence of a pair of paramedian tubercles on the first pleonal segment and an endopodit of the first pleopode formed by 3 articles. On the ground of these differences a new (fourth) group within the classification of VANDEL (1967) with one representative, genus *Alistratia*, was initiated. The characteristics of the new genus confirm his views concerning the presence of numerous independent phyletic lines, which are subordinate to more or less parallel evolution trends.

Key words: Isopoda, Trichoniscidae, *Alistratia beroni* n. gen. n. sp., Greece

Introduction

Au cours d'une prospection biospéléologique, effectuée en 1983 dans le cadre du projet bulgaro-hellénique d'étude de la faune cavernicole de la Grèce, Dr P. Beron et Dr V. Beshkov ont recueillis une Trichoniscide troglobie appartenant à un nouveau genre de la sous-famille Haplophthalminae.

Actuellement de la sous-famille Haplophthalminae en Grèce sont connus 6 genres et 13 espèces et sous-espèces. La plupart des espèces sont connues seulement de locus typicus ou des régions limitées de la Grèce insulaire et continentale.

VERHOEFF (1908) annonce les premiers renseignements sur la sous-famille en Grèce. Plus tard paraissent plusieures reprises d'ARCANGELI (1923), STROUHAL (1929, 1936, 1940, 1961, 1966), VANDEL (1955, 1958, 1964, 1968), SCHMALFUSS (1972, 1979, 1981), ANDREEV (1986), qui enrichissent considérablement les connaissances sur la répartition de la sous-famille en Grèce.

Le plus caractéristique des représentants de la sous-famille Haplophthalminae en Grèce c'est qu'ils appartiennent aux formes relativement plus évoluées. On y observe une diminution du nombre des tubercules sur le céphalon qui eux mêmes agrandissent considérablement. On constate en même temps un phénomène pareil dans l'ornementation du corps où il y a aussi une certaine réduction des tubercules et des côtes et une augmentation de leurs tailles. Dans la

classification de VANDEL (1967) du groupement rationnel des genres de la sous-famille Haplophthalminae (sans le genre *Haplophthalmus*) ils trouvent leur place dans le deuxième et troisième sous-groupes du troisième groupe. C'est le genre *Monocyphoniscus* qui fait une exception et se rattache au deuxième groupe.

Alistratia n. gen.

Caractères du genre

Appareil oculaire: absent. Coloration: parfaitement blanche. Ornementation: Céphalon garni de six rangées de tubercules; Péréion: quatre paires de côtes sur les tergites I–VII à peu près subégales. La côte *a* sur le péréionite VII est peu visible. Pléon: Pléonite I porte une paire des tubercules paramédianes. Pléonites III, IV et V sont pourvus de deux tubercules paramédianes. Pléopode I mâle: exopodite réctangulaire; endopodite formé de trois articles.

Affinités. De la sous-famille Haplophthalminae sont connus 34 genres répartis de la péninsule Ibérique jusqu'au Caucase. Parmi eux, uniquement le genre *Haplophthalmus* est présenté par plus de 45 espèces et sous-espèces. Tous les autres genres sont monospécifiques ou possédent un nombre limité d'espèces. Une particularité caractèristique des espèces de la sous-famille Haplophthalminae, en comparaison de celles de la sous-famille Trichoniscinae, c'est l'ornementation tergale bien développé chez les premiers et surtout néopleurons 3-5 qui

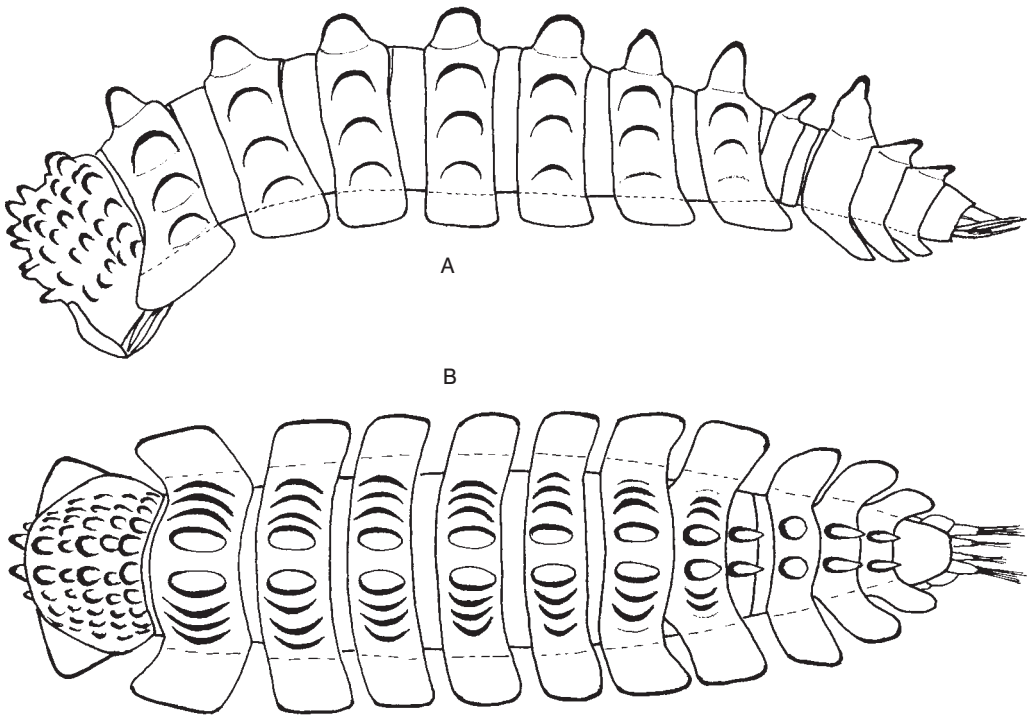

Fig. 1. *Alistratia beroni* n. gen. n. sp., holotype ♂: A - vue de profil: B - vue dorsale

représentent un prolongation du péréiontergites. La deuxième particularité qui différencie la sous-famille Haplophthalminae c'est une constante et une conservatisme extraordinaires des appareils sexuels. Ils gardent une structure commune des différents genres et espèces et se distinguent par de minimes détails, tandis que dans la sous-famille Trichoniscinae on observe une variabilité exceptionelle et des différences essentielles dans les appendices sexuels des différents genres. Ces particularités des représentants de la sous-famille Haplophthalminae déterminent l'attention de certains spécialistes de la systématique et taxonomie de la sous-famille Haplophthalminae vers l'importance de l'ornementation du corps pour éclercir la classification des différents genres. Les tableaux de détermination de genres de la famille Haplophthalminae ainsi proposés par les auteurs VERHOEFF (1936), STROUHAL (1940), VANDEL (1960), SCHMÖLZER (1965), BORUTZKI (1974) sont basés essentiellement aux différences de la sculpture du céphalon et du corps.

Le nouveau genre *Alistratia* conserve la structure générale des appendices sexuels spécifiques pour les représentants de la sous-famille Haplophthalminae, mais on y constate une différence importante dans la formation de l'endopodite du pléopode I ayant un caractère distinctif. L'endopodite est formé de trois articles, résultat de la subdivision de l'article distal. Dans tous les autres genres de la sous-famille l'endopodite est formé de deux articles. Une pareille subdivision de l'article distal de l'endopodite constate VANDEL (1960) chez l'espèce *Buddelundiella cataracte*. Avec l'ornementation comparément primitive du céphalon ayant de nombreux tubercules de petite taille et existance de quatre paires de côtes sur les péréiontergites, le nouveau genre pourraît être rattaché au deuxième groupe de la classification rationnelle de VANDEL (1967) qui inclue des espèces caractérisées des tubercules céphaliques nombreux, portant trois, deux ou une paire de côtes ou de tubercules sur les tergites péréiaux. Mais la présence d'une paire de tubercules paramédians sur le premier segment pléonale du nouveau genre, le différencie de tous les autres genres. Ayant en vue et les particularités de l'endopodite du pléopode I on propose la création d'un nouveau groupe (le quatrième) à la classification de Vandel avec un genre *Alistratia* n. gen.

Type du genre: *Alistratia beroni* n. sp.

Alistratia beroni n. sp.

Station: Grotte d' Alistrati, v. Alistrati, distr. Sérés, Grèce, 02.10.1983, 7 ♂♂, 8 ♀♀, 2 juv., leg. P. Beron et V. Beshkov.

Materiel étudié: La description du nouveau genre et l'espèce se fondent sur l'examen de 17 exemplaires mâles et femelles. Holotype: un mâle ayant 2.6 mm de longueur provenant de la grotte Alistrati. Paratypes: 6 exemplaires mâles, 8 exemplaires femelles et 2 juveniles. L'holotype et les paratypes sont déposés dans les colléctions du Muséum National d'Histoire Naturelle à Sofia.

Qualification écologique: Troglobie.

Caractères somatiques: Taille: Le corps des mâles atteiynt une longueur de 2 à 2.2 mm; les femelles atteignent de 2 à 3.5 mm. Coloration: parfaitement blanche, sans aucune trace de pigment. Appareil oculaire: absent. Le corps: en forme convex, et les côtés du corps tombent à peu près verticalement. Tegument: réseau hexagonal manque. Appendices: Antennules (Fig. 3, B) constitués de trois articles, dont le premier est très robuste et plus large que le deuxième

Fig. 2. *Alistratia beroni* n. gen. n. sp., holotype ♂: A – mandibule gauche; B – mandibule droite; C – maxillule, endit externe; D – maxillipède; E – péréiopode VII, face interne; F - péréiopode VII, face externe; G – pléopode II; H – soie écaille. I – pléopode I; J – pléopode I à un grossissement plus fort

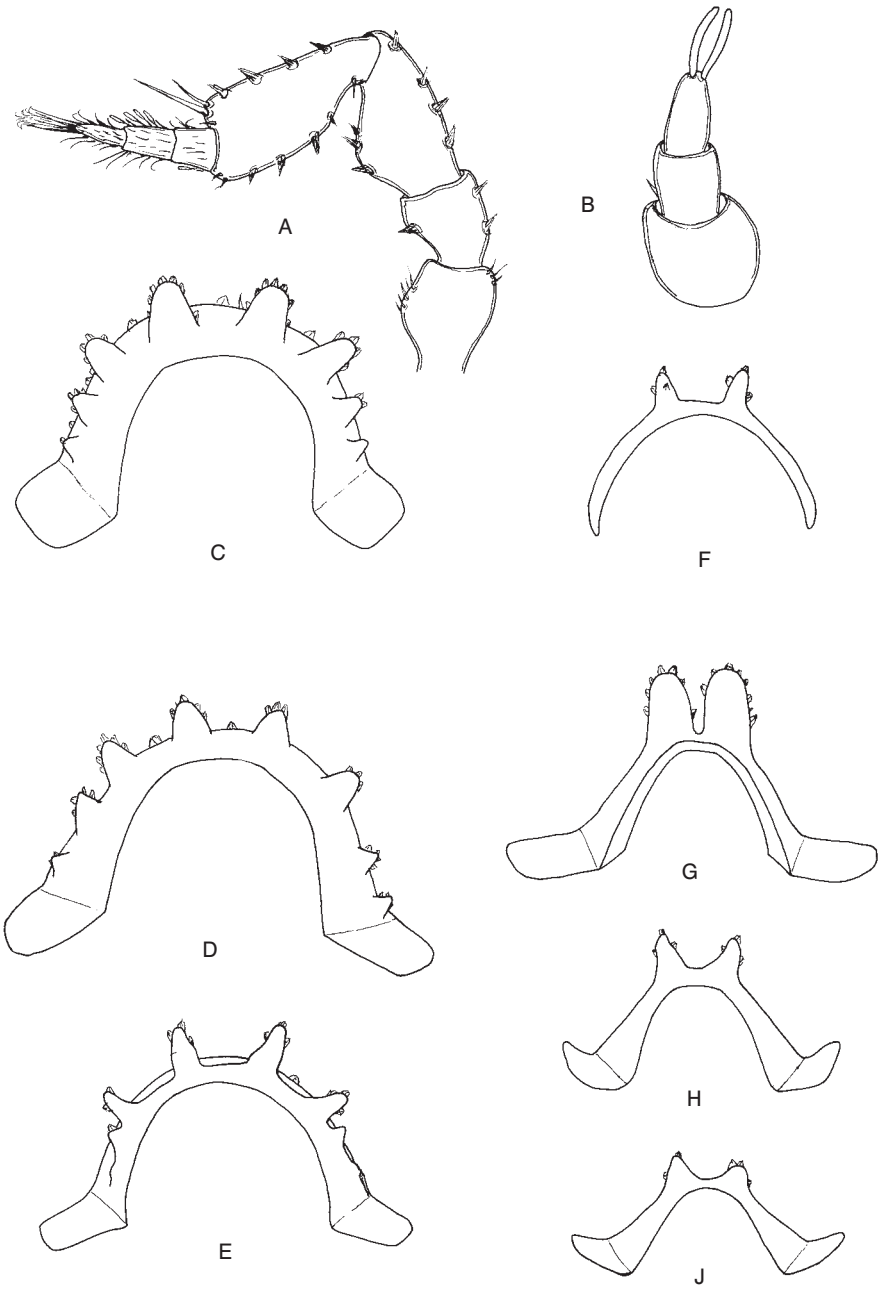

Fig. 3. *Alistratia beroni* n. gen. n. sp., holotype ♂. A – antenne; B – antennule; C – I péréiontergite; D – IV péréiontergite; E – VII péréiontergite; F – I pléonite; G – III pléonite; H – IV pléonite; I – V pléonite

et le troisième. Le troisième article garni distalement de deux aesthetascs. Antennes (Fig. 3, A): Le pédoncule de l'antenne formé de cinq articles. Les trois derniers articles ornés de tubercules écailleux. Le cinquième article pourvu dans sa partie distale d'une forte tige. Flagelle de trois articles peu distincts, dont le premier porte un aesthetasc; deuxième article garni de quatre aesthetascs. Pièces buccales: Mandibules: mandibule gauche (Fig. 2, A) porte un long pénicille; le processus molaire bien développé. Mandibule droite (Fig. 2, B) avec deux pénicilles et fort processus molaire. Maxillules: L'endite interne porte trois pénicilles; L'endite externe (Fig. 2, C) termine par une rangée de 10 ou 11 dents. Maxillipèdes (Fig. 2, D): le palpe porte distalement quelques longues tiges; l'endite armé des soies et de trois fortes épines. Ornementation: Céphalon (Fig. 1): orné de nombreuses tubercules coniques, disposés en six rangées transversales. Les dernières deux rangées des tubercules sur le segment maxillipédale sont plus fortes. Péréion (Fig. 1, 3): Les tergites péréiaux garnis de quatre paires de côtes, bien saillantes, corespondant aux côtes *a, b, c* et *d*. Les côtes sont bien développées, arrondies en vue de profil. Les côtes *a* et *b* sur les tergites VI sont très peu saillantes et la côte *a* du tergite VII à pein visibles.

Pléon: Néuropleurons (Fig. 1, 3) de pléonites 3, 4, et 5 bien développés; Le premier pléonite (Fig. 1; 3, F) pourvu d'une paire de tubercules paramédianes, légèrement recourbés vers l'arrière. C'est un caractère remarquable, qui n'existe chez aucun genre et l'espèce de la sous-famille Haplophthalminae. Le pléonite III garni d'une paire des fortes protuberances paramédianne. Les pléonites III et IV portent des tubercules paramédianes, dirigées vers l'arrière et qui diminuent de l'avant à l'arrière. Les tubercules et les côtes sur le céphalon et le corps sont ornés de grandes soies écailles (Fig. 2, H). Telson: dépourvu de reliefs particuliers.

Caractères sexuels mâles: Péréiopode VII (Fig. 2, E, F): différencié. Le lobe carpien est bien développé et prend la forme d'une concavité en forme de gorgeret; les trois tiges a^1, a^2 et a^3 sont disposées en éventail; Tige a^1 du carpos est dirigée en direction du propodos; Tige a^2 est la plus longue et legerement inclinée vers la base de l'article; Tige a^3 très courte est orientée vers la base de l'article, tandis que la tige du méros est orientée en sens inverse; Tige β est disposée transversalement par rapport au méros; la tige *st* est à peu près égale à la tige *a* et dirigée dans la même direction.

Premier pléopode (Fig. 2, I, J): L'exopodite triangulaire à bord externe concave, avec des angles arrondis. L'endopodite très robuste, constitué de trois articles. L'article distale de l'endopodite élargi distalement et finement strié. Deuxième article beaucoup plus court que le premier et le troisième, portant sur son bord interne, distalement des soies fines.

Second pléopode (Fig. 2, G): L'exopodite réctangulaire à pointe interne allongée. L'endopodite biarticulé. L'article distale très allongé, se prologeant par une longue tige fine et grêle.

Derivatio nominis: l'espèce nouvelle est dédiée à mon Collegue Dr Petar Beron de Sofia et le genre au village Alistrati.

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Принос към изучаването на сухоземните изоподи на Гърция. 5.
***Alistratia beroni* n. gen. n. sp. (Isopoda: Oniscidea: Trichoniscidae)**

Стоице АНДРЕЕВ

(Резюме)

Представено е описанието на един нов род и вид сухоземни изоподи – *Alistratia beroni* n. gen. n. sp., описани от пещерата Алистрати в Северна Гърция. Новият род несъмнено се различава от всички познати родове на подсемейство Haplophthalminae с наличието на един чифт парамедианни туберкули върху първи плеонален сегмент и оформеният от три членчета ендоподит на първи плеопод при мъжките екземпляри, докато при останалите родове и видове ендоподитът е изграден от две членчета. Тези различия дават основание да бъде създадена нова група (четвърта) към рационалната класификация на родовете в подсемейство Haplophthalminae на VANDEL (1967) с един представител – род *Alistratia* n.gen. Особеностите на новият род потвърждават схващането на същия автор за наличието на многобройни независими филетични линии, подчинени на повече или по-малко паралелни еволюционни тенденции.

Historia naturalis bulgarica,
16: 81-88, 2004

Centipedes (Chilopoda) from Greece in the collection of the National Museum of Natural History, Sofia

Pavel STOEV

STOEV P. 2004. Centipedes (Chilopoda) from Greece in the collection of the National Museum of Natural History, Sofia. - Historia naturalis bulgarica, **16**: 81-88.

Abstract. The paper is devoted to the treatment of the centipedes in the National Museum of Natural History, Sofia collected by Bulgarian zoologists in Greece. It deals with material gathered in the provinces of Macedonia and Thrace, and the islands of Tassos, Thasopulo, Samothraki, Kythira, Syros, Amorgos, Santorini, Kalymnos and Karpathos. A total of 22 species were identified, three of them, *Lithobius ferganensis* Trotzina, 1880, *L. vizicae* (Ribarov, 1987) and *Henia* (*Turkophilus*) *porosa* (Verhoeff, 1941), are new to the fauna of the country. An examination of the holotype of *Lithobius seresensis* Matic et Stavropoulos, 1990 showed that it is a junior synonym of *Lithobius schuleri* Verhoeff, 1925, not of *L. erythrocephalus* C.L. Koch, 1847 as thought previously. *Lithobius vizicae* (Ribarov, 1987) is briefly re-described and its taxonomic position discussed.

Key words: Centipedes, Chilopoda, Faunistcs, Taxonomy, Greece

Introduction

The Greek centipede fauna is among the richest in species in Europe and is undoubtedly very attractive for biogeographical analysis. Even though it has been an object of intensive investigation almost since the beginning of the nineteenth century, yet very little is known about some regions of mainland Greece and most of the islands. The ecology of certain species and the species communities are also insufficiently known. Many taxa are imprecisely diagnosed or known only from their original description. All the information concerning the taxonomic status, general and country distribution, phenology and ecology of the Greek centipedes was reviewed in detail by ZAPPAROLI (2002).

Among the hundreds of unidentified specimens in the collection of Chilopoda of the National Museum of Natural History in Sofia (NMNHS) a considerable number come from the neighbouring country of Greece. Different generations of Bulgarian zoologists have been collecting invertebrates from the region, most extensively from Macedonia, Thrace, Chalkidiki and the islands Thassos and Samothraki. Since the 1970s Dr. Petar Beron and his colleagues Dr. Vladimir Beshkov, Dr. Stoitse Andreev, Dr. A. Bartsiokas have implemented a broad inventorising campaign, emphasizing the cave and high mountain faunae. This resulted in collecting a large number of soil arthropods, among which also a huge number of myriapods.

A substantial part of this collection has already been studied by MATIC (1980), MATIC & STAVROPOULOS (1988, 1990, 1993) and STAVROPOULOS & MATIC (1990).

In the autumn of 2000, Boyan Petrov, Dr. Stoyan Beshkov and I (all from the NMNHS) carried out a scientific expedition to northern Greece, including the Rhodopi, Olympos, Menikio and Falakro mountains and the Chalkidiki Peninsula. Different soil arthropods were gathered using various sampling methods, but mostly through hand collecting and sifting leaf litter. Special attention was paid to the fauna of the caves in the vicinities of the villages of Zigos, Maronia, Alistrati and Pachni, and along the river of Nestos.

The present work records only a part of the Greek collection in the NMNHS. It deals mostly with materials collected during the trip of Petrov, Stoev and Beshkov and those collected at the beginning of the last century by I. Buresch, N. Stoyanov, N. Karnozhitski, I. Tsonkov, D. Papazov, A. Petrov, V. Petrov and K. Tuleshkov in Thrace, Olympos and Thassos. A total of 22 species were identified, three of them, *Lithobius ferganensis* Trotzina, 1880, *L. vizicae* (Ribarov, 1987) and *Henia* (*Turkophilus*) *porosa* (Verhoeff, 1941), appeared to be new to the country's fauna.

Material and methods

Species identification was made with the aid of an MBC-10 stereoscope, made in Russia. All centipedes are preserved in 70% ethanol. The whole collection is preserved in the Department of Non-Insect Invertebrates of the NMNHS. The general distribution is given only for the new species. Species localities are transliterated into English.

List of species

Lithobiomorpha

***Eupolybothrus litoralis* (L. Koch, 1867)**

Material examined: Rhodopi Mts.: subad., village of M. Evmiro, alt. ca. 300 m, oak litter, 26.09.2000, Petrov, Stoev, Beshkov leg.; Thassos Is.: 2 ad. ♂♂, 2 ad. ♀♀, near St. Athanasos Monastery above Limena, 26.06.1942, I. Tsonkov leg.; several ♂♂, ♀♀, near Limena, 24.10.1942, collector unknown; ad. ♂, same locality, 24.04.1943, N. Karnozhitski leg.; ad. ♀, Limena, below Prophet Iliya Peak, 27.04.1943, N. Karnozhitski leg.; ad. ♀, Limena - Rahoni, 21.06.1942, I. Tsonkov leg.; ad. ♀, village of Rahoni, Kazaviti Rock, 27.10.1942, collector unknown; ♂, ♀, village of Marios, 08.06.1943, I. Tsonkov leg.; Samothraki Is.: ad. ♀, 25.04.1943, A. Petrov leg.; several ♂♂, ♀♀, 24.05.1988, G. Ribarov leg.; Amorgos Is.: ad. ♂, ad. ♀, Katapola, 13.09.1981, P. Beron, A. Bartsiokas leg.; Syros Is.: ad. ♂, 2 ad. ♀♀, 3 subad., Ano Syros - Mytakas, 30.12.2002, P. Beron leg.

Note. These are the first records of *E. litoralis* for the islands of Samothraki, Amorgos and Syros.

***Eupolybothrus transsylvanicus transsylvanicus* (Latzel, 1882)**

Material examined: Menikio Mts.: ad. ♂, subad. ♂, Timios Prodromous Monastery, 11 km from Seres, Piladele Cave, alt. ca. 500 m, under stones, guano, 19.09.2000, Petrov, Stoev, Beshkov leg.; Rhodopi Mts.: ad. ♂, Xanthi District, village of Pachni, a small nameless cave

below Doupkata Cave, alt. ca. 600 m, under stones, 25.09.2000, Petrov, Stoev, Beshkov leg.; ad. ♂, Didimoticho District, village of Koufovouno, Koufovouno Cave, under stones, guano, 29.09.2000, Petrov, Stoev, Beshkov leg.

Note. The examined specimens belong to the nominate form characterized by projections on the 6th, 7th, 9th, 11th and 13th tergites.

***Eupolybothrus werneri* (Attems, 1903)**

Material examined: Olympos (Ólimbos) Mts.: ad. ♂, near a cave, alt. ca. 1300 m, 07.07.1936, K. Tuleshkov leg.; ad. ♂, subad. ♀, 10 km above village of Kalivia, alt. ca. 1500 m, under stones, 16.09.2000, Petrov, Stoev, Beshkov leg.

Notes. This species is restricted to the mountains of mainland Greece (Olympos, Parnassos, Vermio, Timfristos, Giona, Erimanthos, Aroania, Killini, Lambia) and the Llogorase Pass in Albania. It occurs in the zone between 700 and 2240 m altitude (ZAPPAROLI, 2002). A morphologically similar species to *werneri*, *E. dolops*, was described from near Stournaraiika and Kataras Pass in Pindos Mts. (ZAPPAROLI, 1998).

***Lithobius* (s. str.) *forficatus* (Linnaeus, 1758)**

Material examined: Falakro Mts.: 2 ad. ♂♂, above the ski-center, alt. ca. 2000 m, 21.09.2000, Petrov, Stoev, Beshkov leg.; 2 ad. ♀♀, a pass between the mountains Menikio and Vrondou (Vrontous), alt. ca. 900 m, beech litter, 29.09.2000, Petrov, Stoev, Beshkov leg.; Rhodopi Mts.: ad. ♀, 11 km from Leptokaria, alt. ca. 920 m, *Pinetum*, under logs, 27.09.2000, Petrov, Stoev, Beshkov leg.

Note. It is worth mentioning that though very common in other parts of Europe, *L. forficatus* has so far been recorded in Greece only in the Falakro, Vrondou, Menikio and Rhodopi mountains, and the island of Samothraki (ZAPPAROLI, 2002; present study).

***Lithobius* (s. str.) *mutabilis* L. Koch, 1862**

Material examined: Rhodopi Mts.: subad. ♂, ad. ♀, Drama District, between Elatjas Forestry Enterprise and Thermi, alt. ca. 1100 m, broad-leaved forest, leaf litter and under stones, 24.09.2000, Petrov, Stoev, Beshkov leg.

Note. This is the first record of *L. mutabilis* in northeastern Greece (Thráki province).

***Lithobius* (s. str.) *nigripalpis* L. Koch, 1867**

Material examined: ad. ♂, ad. ♀, a pass between the mountains Menikio and Vrondou, alt. ca. 900 m, beech litter, 29.09.2000, Petrov, Stoev, Beshkov leg.; Syros Is.: 2 ad. ♂♂, 2 ad. ♀♀, 1 subad., Ano Syros - Mytakas, 30.12.2002, P. Beron leg.

Note. This is the first record of *L. nigripalpis* in Syros Island.

***Lithobius* (*Monotarsobius*) *ferganensis* Trotzina, 1880**

Material examined: Rhodopi Mts.: ad. ♂, 2 subad. ♂♂, 3 ♀♀, 11 km from Leptokaria, alt. ca. 920 m, *Pinetum*, under logs, 27.09.2000, Petrov, Stoev, Beshkov leg.

General distribution. Karakoram, Central Asia, Caucasus, Crimea, Greece.

Notes. This species is widespread in Central Asia, Caucasus and Crimea reaching Chinese Karakoram in the east (EASON, 1997). Until recently, it was known from Turkey as *Monotarsobius curtipes turkestanicus* Attems, 1904 and *Monotarsobius nodonotatus* Verhoeff, 1943, both taxa included

in the list of synonyms of *ferganensis* (EASON, 1997; ZAPPAROLI, 1999). The new record forms the westernmost border of species distribution. It is a new species for the Greek fauna.

***Lithobius* (*Sigibius*) *microps* Meinert, 1868**

Material examined: Rhodopi Mts.: 2 ad. ♀♀, Drama District, between Elatjas Forestry Enterprise and Thermi, alt. ca. 1100 m, broad-leaved forest, leaf litter and under stones, 24.09.2000, Petrov, Stoev, Beshkov leg.; ad. ♂, 2 ad. ♀♀, Drama District, village of Skaloti, near Elatjas Forestry Enterprise, Chakalos Peak, beech litter, alt. ca. 1800 m, 24.09.2000, Petrov, Stoev, Beshkov leg.; ad. ♂, Falakro Mts.: Volakas, alt. ca. 970 m, *Fagetum*, leaf litter and under stones, 20.09.2000, Petrov, Stoev, Beshkov leg.; ad. ♂, a pass between the mountains Menikio and Vrondou, alt. ca. 900 m, beech litter, 29.09.2000, Petrov, Stoev, Beshkov leg. Samothraki Is.: ad. ♀, village of Chora, 200-1000 m, 25.05.1984, P. Beron leg.

***Lithobius* (*Sigibius*) *vizicae* (Ribarov, 1987)**

Material examined: Rhodopi Mts.: 2 ad. ♂♂, ad. ♀, village of Dadja, Dadja Monastery, oak forest, dry, under stones, leaf litter, 28.09.2000, Petrov, Stoev, Beshkov leg.

General distribution. Southeastern Bulgaria, Northeastern Greece.

Description: Color: pale brown - yellowish. Head: longer rather than broad; posterior marginal ridge with medial thickening. Antennae: as long as the posterior edge of third tergite; composed of 28-29 articles; ultimate article about 1.2-1.5 times longer than penultimate one. Ocelli: 3, black, in a single row. Tömösváry's organ: equal in size to ocella. Prosternum: with 2+2 broadly separated teeth and very short and stout porodonts, emerging laterally to the lateral teeth. Medial concavity, deep and evenly rounded. Coxal pores: 2, 2, 2, 2; circular, well separated from each other. Tergites: smooth, without posterior projections; 10th and 12th tergites cover 11th and 13th, respectively. Posterior pair of legs: thickened femur and tibia; accessory apical claw present; internal pores are large and cover the whole surface of the legs. Female gonopods: with 2+2 long spurs and bipartite terminal article; lateral tooth emerges at the base of the principle claw as figured by RIBAROV (1987).

Notes. This species was described by RIBAROV (1987) from the Strandzha Mts., southeastern Bulgaria. Its closest relative in the Balkans is *L. trebinjanus* Verhoeff, 1900 from Albania, Montenegro and Bosnia and Herzegovina (re-description in EASON, 1983). Both species can be distinguished from each other by the number of antennal articles (26-29 vs. 42-43 in *trebinjanus*), shape of the terminal claw of the female gonopods (with basal protuberance vs. tripartite, with well-developed medial and smaller lateral denticle) and the shape of the 15th male tibia (hairless vs. distal third densely setose). The only character in common, making them a single group is the form of the prosternum, bearing 2+2 small teeth and very stout porodonts. Another Bulgarian congener having this peculiar character is *L. strandzanicus* (Ribarov, 1987), a species of uncertain taxonomic position. *Lithobius vizicae* is a new species to the fauna of Greece.

A note on the status of *Lithobius seresensis* Matic et Stavropoulos, 1990

L. seresensis Matic et Stavropoulos, 1990 has been described on the basis of a single female specimen collected in the region of Seres (North Greece). ZAPPAROLI (1994) assumed it to be a synonym of *Lithobius erythrocephalus* C.L. Koch, 1847, although he never studied the type. After a re-examination of the holotype kept in the NMNHS, it became clear that this species is based on an aberrant specimen of *Lithobius schuleri* Verhoeff, 1925. Hence, it should be removed from the list of synonyms of *erythrocephalus* and put in that of *schuleri*.

Scolopendromorpha

***Scolopendra cingulata* Latreille, 1829**

Material examined: Thrace (Thráki): subad., Sketscha (Xanthi), 26.04.1914, I. Buresch leg.; 4 subadults, Kavala, 24.04.1942, V. Petrov leg.; 5 specimens, same locality, 18.04.1943, N. Karnozhitski leg.; Thassos Is.: subad., 23.02.1942, N. Stoyanov leg.; subad., October, 1942, collector unknown; 4 specimens, May, 1943, N. Karnozhitski leg.; ad., Limenaria, 28.04.1942, V. Petrov leg.; one specimen, same locality, 01.05.1943, collector unknown; one specimen, same locality, 10.06.1943, I. Tsonkov leg.; 9 adults, 3 juv., Limena, 20-28.04.1943, N. Karnozhitski leg.; one subad., same locality, 24.10.1942, collector unknown; one ad., above Limena, near St. Athanasos Monastery, 24.06.1942, I. Tsonkov leg.; one specimen, village of Marius, 08.06.1943, I. Tsonkov leg.; one adult, one subad., near village of Potamya, 24.06.1942, I. Tsonkov leg.; 3 adults, 3 juv., village of Rahoni, Kazaviti Rock, 24-27.10.1942, collector unknown; Thasopulo Is.: one juv., 26.06.1942, I. Tsonkov leg.; Samothraki Is.: one adult, one juv., 25.04.1943, A. Petrov leg.; one specimen, 24.05.1988, G. Ribarov leg.; Kalymnos Is.: one subad., village of Skalia, alt. 0-100 m, 04.05.1987, P. Beron leg.

Note. This is the first record of *S. cingulata* in the island of Kalymnos.

***Cryptops anomalans* Newport, 1844**

Material examined: Thassos Is.: 2 adults, October, 1942, collector unknown; 2 adults, one subad., Limena, 02.05.1942, V. Petrov leg.; one ad., same locality, 0-200 m, 24.10.1942, collector unknown; 4 adults, same locality, 20.04-01.05.1943, N. Karnozhitski leg.

Note. These are the first records of *C. anomalans* in Thassos.

***Cryptops croaticus* Verhoeff, 1931**

Material examined: Menikio Mts.: one adult, Seres District, Timios Prodromus Monastery, Lakosh, ruins, near a stream, alt. ca. 500 m, *Platanus* forest, under stones, 20.09.2000, Petrov, Stoev, Beshkov leg.

Notes. The only recent and reliable record of this species in Greece is that of MATIC (1976) from Lefkada (Lefkáda) Isle. The new record verifies its presence in Greece and considerably extends the species range in a northeast direction. This find is not surprising since *C. croaticus* has already been reported from the Bulgarian part of the Slavyanka (Orvilos) Mts. (STOEV, 2002), which is situated close to Menikio.

***Cryptops hortensis* (Donovan, 1810)**

Material examined: Rhodopi Mts.: several specimens, Drama District, between Elatjas Forestry Enterprise and Thermi, alt. ca. 1100 m, broad-leaved forest, leaf litter and under stones, 24.09.2000, Petrov, Stoev, Beshkov leg.; several specimens, a pass between the mountains Menikio and Vrondou, alt. ca. 900 m, beech litter, 29.09.2000, Petrov, Stoev, Beshkov leg.; 1 specimen, Alexandropouli District, Leptokaria, beech litter, alt. ca. 740 m, 27.09.2000, Petrov, Stoev, Beshkov leg.; Thassos Is.: one specimen, Kazaviti Rock, 28.10.1942, collector unknown.

***Cryptops parisi* Brolemann, 1920**

Material examined: Falakro Mts.: one specimen, Volakas, alt. ca. 970 m, *Fagetum*, leaf litter and under stones, 20.09.2000, Petrov, Stoev, Beshkov leg.; several specimens, a pass between the mountains Menikio and Vrondou, alt. ca. 900 m, beech litter, 20.09.2000, Petrov, Stoev, Beshkov leg.; Rhodopi Mts.: 2 specimens, Xanthi District, village of Pachni, alt. ca. 600 m,

beech litter, 25.09.2000, Petrov, Stoev, Beshkov leg.; one specimen, Alexandropouli District, Leptokaria, beech litter, alt. ca. 740 m, 27.09.2000, Petrov, Stoev, Beshkov leg.; Santorini (= Thíra) Is.: 5 specimens, under stones, 03.10.1974, P. Beron, V. Beshkov leg.

Notes. Until now *C. parisi* has been known only from the mainland part of Greece and the Ionian Islands (ZAPPAROLI, 2002). The new record from Santorini Island extends its range in a southeast direction, including the Aegean Islands.

Geophilomorpha

***Clinopodes flavidus* C.L. Koch, 1847**

Material examined: 2 ad. ♀♀, Alexandropouli District, village of Essimi, 18.05.1981, P. Beron leg.; Thassos Is.: one ad. specimen, Acropolis above Limena, 25.06.1942, I. Tsonkov leg.; ad. ♂, ad. ♀, Limena, 24.04.1943, N. Karnozhitski leg.; Thasopulo Is.: ad. ♀, 01.05.1942, V. Petrov leg.; Samothraki Is.: ad. ♂, 24.05.1988, G. Ribarov leg.

***Pachymerium ferrugineum* (C.L. Koch, 1835)**

Material examined: Lekani Mts.: ♀, Kavala District, village of Drimia, *Quercetum*, alt. ca. 200 m, leaf litter and under stones, 25.09.2000, Petrov, Stoev, Beshkov leg.; Thassos Is.: several specimens, Kazaviti Rock, 28.10.1942, collector unknown; Kythira Is.: ad. ♀ with 59 pairs of legs, village of Mylopotamos, 28.04.1987, P. Beron leg.; Santorini Is.: 4 ads., one of which with 61 pairs of legs, village of Akrotiri, 05.10.1974, P. Beron, V. Beshkov leg.; Syros Is.: one ad., one subad., Ano Syros - Mytakas, 30.12.2002, P. Beron leg.

Note. These are the first records of *P. ferrugineum* from the islands Thassos and Kythira.

***Dignathodon microcephalus* (Lucas, 1846)**

Material examined: Lekani Mts.: ♂, Kavala District, village of Drimia, *Quercetum*, alt. ca. 200 m, leaf litter and under stones, 25.09.2000, Petrov, Stoev, Beshkov leg.

Note. This is the first record of *D. microcephalus* in the province of Macedonia.

***Henia illyrica* (Meinert, 1870)**

Material examined: Chalkidiki Peninsula: one subad. ♂ with 85 pairs of legs, Athon, 27.06.1936, D. Papazov leg.; Drama Distr.: ad. ♂, ad. ♀, Prossotsani Region, village of Angitis, under stones, 28.09.2002, P. Beron leg.; Thrace: ad. ♂, Kavala, 24.04.1942, V. Petrov leg.; Rhodopi Mts.: 2 ad. ♀♀, Xanthi District, village of Pachni, alt. ca. 600 m, beech litter, 25.09.2000, Petrov, Stoev, Beshkov leg.; Thassos Is.: one ad. ♀, Acropolis above Limena, 25.06.1942, I. Tsonkov leg.; ad. ♂ with 85 pairs of legs, ad. ♀ with 91 pairs of legs, near Limena, 24.10.1942, collector unknown.

Note. These are the first records of *H. illyrica* in the Rhodopi Mts., Chalkidiki Peninsula and Thassos Island.

***Henia* (*Turkophilus*) *porosa* (Verhoeff, 1941)**

Material examined: Rhodopi Mts., ad. ♀, village of Dadja, Dadja Monastery, oak forest, dry, under stones, leaf litter, 28.09.2000, Petrov, Stoev, Beshkov leg.

General distribution. Northwest Turkey, Southeast Bulgaria, Northeast Greece.

Notes. *Henia porosa* is widespread in southeast Bulgaria (sub *H. angelovi* Ribarov, 1987) and the regions of Marmara and West Pontus in Turkey (ZAPPAROLI, 1999). It is the first record from Greece.

***Strigamia transsilvanica* (Verhoeff, 1928)**

Material examined: Rhodopi Mts.: ♂ with 47 pairs of legs, Drama District, between Elatjas Forestry Enterprise and Thermi, alt. ca. 1100 m, broad-leaved forest, leaf litter and under stones, 24.09.2000, Petrov, Stoev, Beshkov leg.

***Himantarium gabrielis* (Linnaeus, 1767)**

Material examined: Thrace: several specimens, Kavala, 18.04.1943, N. Karnozhitski leg.; Thassos Is.: ad. ♀, Limena, 02.05.1942, V. Petrov leg.; 3 ad. ♀♀, same locality, 24-27.04.1943, N. Karnozhitski leg.; 2 ad. ♀♀, Limena, below Prophet Iliya Peak, *Pinetum*, 26.04.1943, N. Karnozhitski leg.; Karpathos Is.: ad. ♀, Arch. Michail, alt. 800-1000 m, 04.05.1984, P. Beron leg.

Note. These are the first records of *H. gabrielis* from the islands of Thassos and Karpathos.

***Bothriogaster signata* (Kessler, 1874)**

Material examined: Thrace: 3 specimens, Kavala, 24.04.1942, V. Petrov leg.; one specimen, same locality, 18.04.1943, N. Karnozhitski leg.; ♂, Komotini District, 10 km E of village of Maronia, alt. ca. 100 m, *Olea europaea* forest mixed with *Quercus coccifera*, 27.09.2000, Petrov, Stoev, Beshkov leg.; Samothraki Is.: 3 specimens, 25.04.1943, A. Petrov leg.; Karpathos Is.: one specimen, village of Karpathos (Pighadia), 02.05.1984, P. Beron leg.; Santorini Is.: ad. ♂, "*Stigmatogaster gracilis* Z. Matic det.", 05.10.1974, P. Beron, V. Beshkov leg.

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Хилоподи (Chilopoda) от Гърция в колекцията на Националния природонаучен музей, София

Павел СТОЕВ

(Р е з ю м е)

Съобщават се 22 вида хилоподи от колекцията на Националния природонаучен музей в София, събрани в Северна Гърция (Македония, Тракия) и островите Тасос, Тасопуло, Самотраки, Китира, Сирос, Аморгос, Санторин, Калимнос, и Карпатос. *Lithobius ferganensis* Trotzina, 1880, *L. vizicae* (Ribarov, 1987) и *Henia* (*Turkophilus*) *porosa* (Verhoeff, 1941) са нови за фауната на Гърция. Нови за фауната на Тасос са *Cryptops anomalans*, *Pachymerium ferrugineum*, *Henia illyrica* и *Himantarium gabrielis*; за Самотраки и Аморгос – *Eupolybothrus litoralis*; за Китира – *P. ferrugineum*; за Сирос – *E. litoralis* и *Lithobius nigripalpis*; за Санторин – *Cryptops parisi*; за Калимнос – *Scolopendra cingulata*; за Карпатос – *H. gabrielis*; за провинция Тракия – *Lithobius mutabilis*; за провинция Македония – *Cryptops croaticus* и *Dignathodon microcephalus*. След преразглеждане на холотипа, *Lithobius seresensis* Matic et Stavropoulos, 1990 е обявен за синоним на *Lithobius schuleri* Verhoeff, 1925, а не както се смяташе досега на *L. erythrocephalus* C.L. Koch, 1847. *Lithobius vizicae* е преописан по материали от района на манастира Дадя в Североизточна Гърция.

Historia naturalis bulgarica,
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Contribution to the Bulgarian fauna of Heteroptera

Nikolay SIMOV, Michail JOSIFOV

SIMOV N., JOSIFOV M. 2004. Contribution to the Bulgarian fauna of Heteroptera. – Historia naturalis bulgarica, **16**: 89-94.

Abstract. Among the announced 16 Heteroptera species 7 are new for the Bulgarian fauna. The presence of another three species on the territory of the country is confirmed. New localities for 6 species collected until now only from single ones are represented as well. The discovery of *Phytocoris minor* and *Atractotomus marcoi* on *Pinus nigra* is the first data about the biology of these dendrobiont species in Bulgaria.

Key words: Faunistics, Heteroptera, Bulgaria

Introduction

The following Heteroptera species are subjects of this work: new ones for the Bulgarian fauna (in the text they are marked with *) or species announced until now only from a single locality in Bulgaria or the data on their presence need confirmation.

The position of the localities is given in UTM code (UTM Zones 34, 35). The feeding plant or the habitat, where the insect was collected, is represented as well if there are enough data available. The method of collection is mentioned only if it differs from mowing with an entomological net or beating the tree branches with a net for dendrobiont species. The material is deposited in the authors' collections in the National Museum of Natural History and in the Institute of Zoology.

Species account

CERATOCOMBIDAE

***Ceratocombus* (s. str.) *coleoptratus* (Zetterstedt, 1819)**

Material examined: Bulgaria NG 45, Strandzha Mts. 80 m alt., near Veleka River, Kachul Site, wet meadow, pitfall traps, 01.10-16.11.2000, 3 ♂♂, leg. N. Kodzhabashev & M. Langourov; Bulgaria GL 09, Southern Pirin Mt., 450 m alt., SE slope of Sveti Iliya Hill, near v. Kalimantsi, communities of *Quercus coccifera*, pitfall traps, 01.06-22.06.2002, 1 ♀, leg. M. Langourov.

Notes: Until now this species has been announced for Bulgaria without any data on its locality (STICHEL, 1960). This West Euro-Siberian one is found on the Balkan Peninsula in Bosnia and Herzegovina, Greece and Macedonia as well (KERZHNER, 1995).

CORIXIDAE

**** Micronecta* (*s. str.*) *carpatica* Wróblewski, 1958**

Material examined: Bulgaria LF 78, Eastern Rhodopes Mts. 450m alt., v. Ribino, a Karst spring in Talashman Dere Protected Site, 18.06.2000, 17 ♂♂ & ♀♀, leg. N. Simov.

Notes: An European species. For the territory of the Balkan Peninsula it is known from Greece as well (POLHEMUS et al., 1995).

***Micronecta* (s. str.) *poweri poweri* (Douglas et Scott, 1869)**

Material examined: Bulgaria FP 51, Western Balkan Mts. 500 m alt., Prevalska River near v. Prevala, 18.07.2000, 11 ♂♂, 15 ♀♀, leg. N. Simov.

Note: A West Euro-Siberian species announced for Bulgaria without locality (STICHEL, 1956).

SALDIDAE

***Saldula c-album* (Fieber, 1859)**

Material examined: Bulgaria FN 81, Vitosha Mt. 1900 m alt., Reserve Torfen Rezervat, Gorno Blato Site, 13.07.1984, 2 ♂ & ♀, leg. M. Josifov.

Note: A Boreo-Montane species announced for Bulgaria without locality (STICHEL, 1960).

**** Salda muelleri* (Gmelin, 1790)**

Material examined: Bulgaria FN 91, Vitosha Mt. 1800 m alt., near the Fizkulturnik hut, 13.07.1984, 5 ♂♂ & ♀♀, leg. M. Josifov.

Note: A Boreo-Montane species announced for Bulgaria on the basis of an incorrectly determined material from Rila Mt. (JOAKIMOV, 1922).

MICROPHYSIDAE

**** Myrmedobia jakovlevi* Péricart, 1969**

Material examined: Bulgaria FM 71, Strouma River Valley, 170-240 m alt., 2 km SE of v. Kamenitsa, communities of *Quercus coccifera*, pitfall traps, 27.09-02.11.2002, 1 ♀, leg. M. Langourov.

Notes: The species is new for the fauna of the Balkan Peninsula. Up to now it has been known from Crimea and Georgia (PÉRICART, 1972, 1996a). Probably the species is Ponto-Mediterranean.

**** Myrmedobia exilis* (Fallén, 1807)**

Material examined: Bulgaria FN 81, Vitosha Mt. 1800 m alt., Platoto, on *Picea abies*, 08.08.1999, 1 ♀, leg. N. Simov.

Notes: An Euro-Siberian species. Until now it has been announced for the territory of the Balkan Peninsula from Bosnia and Herzegovina and Croatia (PÉRICART, 1972, 1996a).

MIRIDAE

***Phytocoris* (*Exophytocoris*) *minor* Kirschbaum, 1856**

Material examined: Bulgaria GM 03, Pirin Mt. 1160 m alt., Chalin Valog Site, on *Pinus nigra*, 10.08.2002, 6 ♂♂, 5 ♀♀, leg. N. Simov; Bulgaria GM 03, Pirin Mt. 1040 m, Ravno Bore Site, on *Pinus nigra*, 23.08.2002, 1 ♂, 2 ♀♀, leg. N. Simov.

Notes: For the first time in Bulgaria this species was collected in Kresna Gorge on UV light (JOSIFOV, 1986b). Its discovery on *Pinus nigra* is the first data about the biology of this North-Mediterranean species in the country.

***Brachycoleus steini* Reuter, 1877**

Material examined: Bulgaria NG 75, Black Sea Coast, v. Sinemoretz, near the outflow of Veleka River, 22.06.1991, 2 ♂ & ♀, leg. M. Josifov.

Notes: The announcements for Bulgaria of this Ponto-Mediterranean species are from Sliven (HORVÁTH, 1890) and from Slavyanka Mt. (DRENOWSKI, 1937), but the material is lost and the determination is doubtful.

**** Pinalitus viscicola* (Puton, 1888)**

Material examined: Bulgaria NG 58, Black Sea Coast, 7 km N of Primorsko, Arkutino Protected Site, on *Viscum album* on *Acer* sp., 12.09.2002, 29 ♂♂, 21 ♀♀, leg. N. Simov.

Note: A West-Palaearctic species known for the Balkan Peninsula from Macedonia, Slovenia and Croatia (KERZHNER & JOSIFOV, 1999).

***Cremnocephalus albolineatus* Reuter, 1875**

Material examined: Bulgaria FM 82, Kresna Gorge 450 m alt.,v. Stara Kresna, Hladkata Banya thermal spring, on *Pinus nigra*, 27.05.2001, 1 ♂, 2 ♀♀, leg. N. Simov.

Notes: The species is announced for Bulgaria from the Rhodopes Mts. on *Pinus sylvestris* (JOSIFOV, 1980). Its relation to the genus *Pinus*, as well as its discovery at so low altitude on the Mediterranean species *Pinus nigra,* makes us to consider its origin as Mediterranean and the concept of its affiliation to the Boreo-Montane group (JOSIFOV, 1986a; BRÄNDLE & RIEGER, 1999) as incorrect.

***Atractotomus marcoi* Carapezza, 1982**

Material examined: Bulgaria GM 03, Pirin Mt. 1160 m alt., Chalin Valog Site, on *Pinus nigra*, 10.08.2002, 1 ♂, 3 ♀♀, leg. N. Simov; Bulgaria KG 21, Western Rhodopes Mts. 1200m alt., Reserve Kastrakli, on *Pinus nigra*, 12.08.2002, 1 ♂, leg. N. Simov; Bulgaria GM 03, Pirin Mt. 1040 m alt., Ravno Bore Site, on *Pinus nigra*, 23.08.2002, 1 ♀, leg. N. Simov.

Notes: For the first time the species is collected in Bulgaria in Kresna Gorge on UV light (JOSIFOV, 1993). It is found on *Pinus laricio* in its locus typicus (CARAPEZZA, 1982). Its discovery on *Pinus nigra* is the first data about the biology of this Ponto-Mediterranean dendrobiont species in Bulgaria.

ANTHOCORIDAE

***Tetraphleps bicuspis* (Herrich-Schäffer, 1835)**

Material examined: Bulgaria FN 82, Vitosha Mt. 1800 m alt., Dolno blato Site near Planinarska pesen hut, on *Larix decidua*, 22.09.1999, 1 ♂, 2 ♀♀, leg. N. Simov.

Note: This Boreo-Montane species is known for the Balkan Peninsula also from Slovenia and Croatia (PÉRICART, 1972, 1996b).

***Cardiastethus nazarenus* Reuter, 1884**

Material examined: Bulgaria NG 76, Black Sea Coast, v. Lozenetz, on strobiles of *Cupresus sempervirens*, 06.09.2002, 3 ♂♂, 2 ♀♀, leg. N. Simov; Bulgaria NG 58, Black Sea Coast, 7 km N of Primorsko, Arkutino Protected Site, on *Viscum album* on *Acer sp.*, 12.09.2002, 2 ♂♂, leg. N. Simov.

Note: A Holomediterranean species collected in Bulgaria on *Tamarix sp.* in Sandanski-Petrich Kettle (GÖLLNER-SCHEIDING & ARNOLD, 1988).

REDUVIIDAE

***Stenolemus novaki* Horváth, 1888**

Material examined: Bulgaria LG 24, Central Rhodopes Mts. 550 m alt., Asenova Krepost Site, 04.06.1989, 1 ♂, leg E. Heiss.

Note: Up to now the species was known for the Balkan Peninsula from only from its terra typica in Dalmatia (PUTSHKOV & PUTSHKOV, 1996).

***Rhynocoris punctiventris* (Herrich-Schäffer, 1846)**

Material examined: Bulgaria KH 18, Pre-Balkan Area, v. Reselets, 01.07-12.07.1996, 15 ♂♂, 10 ♀♀, leg. M. Josifov.

Note: A Ponto-Mediterranean species. Its locality in Reselets is on the extreme north of its distribution in the Balkan Peninsula (JOSIFOV, 1986a; PROTIĆ 1998), considerably far from the other known localities in Bulgaria (JOSIFOV, 1964). Apparently the microclimatic conditions in this karst region are favorable for this isolated population.

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Принос към хетероптерната фауна на България (Insecta: Heteroptera)

Николай СИМОВ, Михаил ЙОСИФОВ

(Р е з ю м е)

От съобщените 16 вида хетероптери, 7 са нови за българската фауна. Други три вида са потвърдени за страната. За шест вида, известни досега само от едно находище, са посочени нови такива. Дендробионтните хетероптери *Phytocoris minor* и *Atractotomus marcoi* са установени по *Pinus nigra*, което представлява първи опит за изследване на биологията на тези видове в България.

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Revised checklist of Histeridae (Coleoptera) in the collection of the National Museum of Natural History, Sofia

Eugeni CHEHLAROV

CHEHLAROV E. 2004. Revised checklist of Histeridae (Coleoptera) in the collection of the National Museum of Natural History, Sofia. – Historia naturalis bulgarica, **16**: 95-107.

Abstract. The present work is devoted to the treatment of the histerid beetles (Histeridae) preserved in the National Museum of Natural History, Sofia. The collection comprises 59 species belonging to 26 genera. The studied material is collected from Bulgaria, Greece, Turkey, Slovakia and Macedonia. New for the Bulgarian fauna are 5 species and 2 genera. Another 10 species are confirmed for the fauna of the country. New distributional data are provided for 32 species.

Key words: Coleoptera, Histeridae, Faunistics, Collection, Europe

Introduction

The insect collections of the National Museum of Natural History, Sofia (NMNHS) (which are the largest on the Balkans) are still not entirely studied. It is especially true for the representatives of the family Histeridae, which are the subjects of this study. Part of the histerid material has already been identified and published by IOAKIMOV (1904), MARKOVICH (1904, 1909), NEDELKOV (1909a, b), ANGELOV (1988), and GUÉORGUIEV (1990). Nevertheless, there are also a lot of unpublished materials kept in the museum.

Nikolai Karnoschitzky has collected the main part of the material (more than 450 specimens), mainly from the Bulgarian Black Sea Coast, and Boryana Zaharieva, chiefly from north-western Bulgaria, the Rhodopes and the region of Bourgas. A few specimens from the first collection were published (KARNOSCHITZKY, 1949, 1959). Except for a few specimens cited by GUÉORGUIEV (1990), the major part of the material of Zacharieva remains untreated. In fact, most of the museum collection of Histeridae is unpublished, as almost half of it has remained unidentified, too.

Material and methods

This study is based on all the available material of Histeridae from the collections of the NMNHS. In total, 1266 specimens were examined and identified. In the groups the information

is ordered according to geographical regions. In the cases when there are more finds from a single locality the repetitions are omitted, using "/" for separation. Additional notes for several species are presented.

Abbreviations: m. – male exemplar/s; s. – specimen/s; sp./ spp. – species (and subspecies); A.P. – Aleksi Petrov; A.V. – Aleksandar Valkanov; B.G. – Borislav Guéorguiev; B.P. – Bruno Pittioni; B.U. – Blaga Urumova; B.Z. – Boyana Zaharieva; D.I. – Dimitar Ioakimov; G.P. – Georgi Paspalev; I.B. – Ivan Buresch; Il. – Ilchev; J.G. – Julius Ganev; J.M – Julius Milde; Kr. – Krupka; M.I. – Mihail Iosifov; N.A. – Neno Atanasov; N.K. – Nikolai Karnoschitzky; N.N. – Nikola Nedelkov; N.V. – N. Vihodtzevskij; P.T. – Petar Tschorbadjiev; P.D. – Pencho Drenski; S.L. – Stoyan Lazarov; S.M. – Sofia Kantarjieva-Minkova; T.I. – Teodora Ivanova; T.L. – Toshko Ljubomirov; T.P. – Tsolo Peschev; Ts. – Tsvetkov; V.G. - Vassil Guéorguiev; V.D. – Vanya Dimova; V.Dr. – V. Dramchev; V.K. – Vera Krasteva.

List of species

***Onthophilus affinis* Redtenbacher, 1849**

Bulgaria: Malashevska planina Mtn., E of Igralishte Village, 730 m, 15.03-16.04.2003, 1 s., 16.04-04.05.2003, 1 s., leg. S.L., T.L.; Lake near Varna, 24.11.1951, 1 s. in leaf litter leg. N.K.; **Greece:** Burun-Gyol, 12.11.1942, 2 s., leg. N.V. (KARNOSCHITZKY, 1959).

Note: First record for the Malashevska planina Mtn.

***Epierus comptus* (Erichson, 1834)**

Bulgaria: Varna, 13.04.1958, 1 s. in a rotten stump, leg. N.K.; **Greece:** Mesta River, 07.11.1942, leg. N.V., 9 s. (KARNOSCHITZKY, 1959, sub *Epiurus* (sic!) *comptus* Er.).

Note: New for the Bulgarian fauna.

***Pseudepierus italicus* (Paykull, 1811)**

Bulgaria: Varna, 06.04.1958, 4 s. in a rotten stump/ 13.04.1958, 2 s. in a rotten stump/ 20.04.1958, 1 s. in a rotten stump, leg. N.K.

Note: This is the second record for the fauna of Bulgaria.

***Tribalus minimus* (Rossi, 1790)**

Bulgaria: Louda Kamchiya River, 02.05.1958, 1 s., leg. N.K. (GUEORGIEV, 1990); Nessebar, 23.06.1954, 1 s., leg. A.V.; Malashevska planina Mtn., E of Gorna Breznitsa Village, 300-400 m, 03.05.2003, 2 s. in leaf litter of *Platanus orientalis*, leg. B.G.

Note: This is the first record for the Malashevska planina Mtn.

***Hololepta plana* (Sulzer, 1776)**

Bulgaria: Botanical Garden in Sofia, 21.04.1933, 45 s., leg. N.A.; Longosa, 24.09.1949, 1 s., leg. S.M.; Petrich, April 1954, 1 s., leg. T.P.; Rupite, 01.03.1982, 5 s., leg. J.G. (GUÉORGUIEV, 1990).

Note: This is the first record for the Sofia region.

***Platysoma compressum* (Herbst, 1783) {= *depressum* Fabricius, 1787}**

Bulgaria: Touria, 07.08.1898, 1 s., leg. D.I. (IOAKIMOV, 1904, sub *Platysoma depressum* F.); Sredna Gora Mtn., 18.08.1905, 7 s.; Tundzha Valley, 08.08.1909, 1 s.; **Slovakia:** N. Baňa, June 1953, 1 s., leg. Kr.

Note: This is the first record for the regions of Sakar and Tundzha valley.

***Eblisia minor* (Rossi, 1792)**

New records: Lakatnik, 11.06.1943, 2 s.; **Slovakia:** Vysok Tatry, July 1954, 1 s., leg. Kr.

***Margarinotus brunneus* (Fabricius, 1775) {= *cadaverinus* (Hoffmann, 1803)}**

Bulgaria: Razgrad, sub *Hister cadaverinus* Hoffm. (MARKOVICH, 1909); Suhodol, 02.04.1901, 1 s., leg. D.I. (IOAKOMOV, 1904); Kuru-Baglar (Sofia), May 1903, 2 s., leg. N.N. (NEDELKOV, 1909a)/ 10.05.1904, 1 s.; Sofia, 20.03.1905, 1 s., leg. D.I./ October1905, 6 s., leg. N.N. (NEDELKOV, 1909a)/ 25.04.1912, 1 s., leg. B.U./ 1925, 1 s., leg. P.T.; Vitosha Mtn., 19.07.1961, 1 s., leg. S.M.; Plovdiv, 4 s., leg. N.N. (NEDELKOV, 1909a, sub *Hister* (= *Margarinotus) terricola* Germ., misidentified)/ 2 s. leg. N.N.; Stara Zagora, 05-06.1906, 3 s., leg. N.N. (NEDELKOV, 1909a)/ May 1907, 1 s., leg. N.N. (NEDELKOV, 1909a)/ 1 s. leg. N.N.; Krichim, 07.06.1942, 1 s., leg. I.B.; Malashevska planina Mtn., Gorna Breznitsa Village, 600-1000 m, 09.07.2002, 1 s., leg. B.G.; Varna, 29.03.1947, 3 s./ 30.03.1947, 2 s./ 20.04.1947, 5 s. in dung of *Equus*/ 24.04.1947, 1 s. 30.04.1947, 4 s. on a dead hedgehog (*Erinaceus*)/ 19.05.1947, 2 s. on dead *Talpa*/ 23.04.1949, 1 s./ 03.04.1955, 9 s. on a dead dog, leg. N.K.; Zvezditsa near Varna, 02.05.1949, 16 s. on a carcass, leg. N.K.; Iovkovo near Varna, 20.07.1947, 2 s. on dead *Pica pica*, leg. N.K.; Pomorie, 02.05.1948, 1 s. on the west coast of the salt lake, leg. N.K.

Note: First records for the West Rhodopes (Krichim), Vitosha and Malashevska planina mountains, and the Back Sea Coast.

***Margarinotus bipustulatus* (Schrank, 1781) {= *fimetarius* Herbst, 1792}**

Bulgaria: Svishtov, 04-05.1950, 1 s., leg. N.A.; Varna, 01.04.1943, 8 s./ 07.04.1943, 3 s./ 23.04.1949, 1 s., leg. N.K.; Beloslav near Varna, 03.05.1955, 1 s., leg. N.K.; Zvezditsa near Varna, 02.05.1949, 1 s., leg. N.K.; Vladislavovo near Varna, 28.04.1957, 1 s., leg. N.K.

Note: First records for the Central Danubian Plane and the North Black Sea Coast.

***Margarinotus obscurus* (Kugelann, 1792) {= *stercorarius* (Hoffmann, 1803)}**

Bulgaria: Svishtov, July 1900, 1 s., leg. D.I.; Murgasch, 24.05.1958, 1 s., leg. A.P.; Sofia, 07.04.1913, 1 s./ 3 s. leg. N.N.; Vitosha Mtn., 700 m, 21.05.1939, 1 s., leg. B.P.; Stara Zagora, 05-06.1906, 1 s., leg. N.N. (NEDELKOV, 1909a)/ 1908, 1 s., leg. N.N. (NEDELKOV, 1909a)/ 2 s., leg. N.N.; Malashevska planina Mtn., W of Gorna Breznitsa Village, 600-1000 m, 01.05.2003, 1 s., leg. B.G.; Malashevska planina Mtn., W of Gorna Breznitsa Monastery, 600-1000 m, 02.05.2003, 1 s., leg. B.G.; Malashevska planina Mtn., E of Igralishte Village, 730 m, 16.04-04.05.2003, 1 s., leg. S.L., T.L.; Rhodopes Mtn., Belovo, 1 s. leg. J.M.; **Turkey:** Takir-Dagh, near Ganos, 800 m, 06.05.1918, 1 s., leg. I.B.

Note: First records for the Central Danubian Plane, and the West Stara Planina, Vitosha, Malashevska planina and West Rhodopes mountains.

Margarinotus carbonarius **(Hoffman, 1803)**
Bulgaria: Parschevitsa near Vratsa, 13.07.1966, 1 s., leg. B.Z.

Margarinotus neglectus **(Germar, 1813)**
Bulgaria: Sofia, 30.09.1903, 1 s., leg. D.I. (IOAKIMOV, 1904); Vitosha, Knyazhevo, 1 s., leg. N.N.
Note: This is the first record for the Vitosha Mtn.

Margarinotus purpurascens **(Herbst, 1792)**
Bulgaria: Gorni Lozen, May 1958, 1 s.; Stara Zagora, 6 s., leg. N.N. (NEDELKOV, 1909a); Haskovo, 16.05.1905, 1 s., leg. D.I.; Beloslav, 15.05.1952, 1 s., leg. N.K.; Varna, 01.04.1943, 2 s./ 23.04.1949 2 s./ 02.05.1949, 1 s./ 08.05.1949, 1 s./ 29.03.1953, 1 s., leg. N.K.; Zvezditsa, 02.05.1949, 1 s., leg. N.K.
Note: This is the first record for the Eastern Rhodopes.

Margarinotus ventralis **(Marseul, 1854)**
Bulgaria: Kom Peak near Berkovitsa, 11.07.1966, 1 s., leg. B.Z.; Parschevitsa near Vratsa, 13.07.1966, 3 s., leg. B.Z.; Brestnishka Laka near Teteven, 14.08.1969, 1 s., leg. B.Z.; Sofia, 18.05.1902, 1 s., leg. D.I. (IOAKOMOV, 1904); Sliven, 20.05.1969, 2 s., leg. B.Z.; Varnicata near Pazardzhik, 26.07.1969, 2 s., leg. B.Z.; Yazovir Vasil Kolarov, 26.07.1967, 2 s., leg. B.Z. (GUÉORGUIEV, 1990); Chudnite Mostove near Smolyan, 29.07.1965, 1 s., leg. B.Z.; Danoto near Peshtera, 21.07.1967, 4 s., leg. B.Z.; Beglika, 27.07.1969, 2 s., leg. B.Z.
Note: First records for the Central Stara Planina Mtn. and Thracean Lowland.

Pactolinus major **(Linnaeus, 1767)**
Bulgaria: Sliven, April 1915, 1 s., leg. P.T.; Burgas, 27.09.1909, 1 s., leg. P.T.; **Turkey:** Tekir-Dagh near Sahar Kjol, 05.05.1913, 1 s., leg. I.B.; **Greece:** Korfu (Kerkira) Is., Paleokastritsa, 22.06.1902, 1 s.
Note: First records for the Central Stara Planina Mtn. and the South Black Sea Coast.

Pachylister inequalis **(Olivier, 1789)**
Bulgaria: Svishtov, July 1899, 1 s., leg. D.I.; Razgrad, 1 s.; Aleksandrovo near Schumen, 13.10.1963, 1 s., leg. B.Z.; Granitovo near Belogradchik, 24.05.1966, 2 s., leg. B.Z.; Belogradchik, 04.07.1963, 2 s./ 06.07.1963, 5 s./ 22.05.1966, 1 s., leg. B.Z./ 19.09.1964, 1 s., leg. V.K.; Vedrenika near Belogradchik, 17.09.1963, 1 s./ 18.06.1964, 1 s., leg. B.Z.; Lom River near Belogradchik, 20.09.1964, 1 s., leg. V.K.; Karmiatitsa near Belogradchik, 18.09.1964, 1 s., leg. V.K.; Vraschka Chuka near Kula, 16.06.1964, 1 s., leg. B.Z.; Rakovischki Monastery, near Belogradchik, 17.09.1964, 2 s./ 14.09.1965, 1 s., leg. V.K.; Chuprene Village near Belogradchik, 19.09.1965, 1s./ 22.05.1966, 1 s., leg. B.Z.; Berkovitsa, 09.07.1963, 14 s./ 10.07.1963, 5 s./ 12.07.1963, 5 s./ 22.09.1963, 1 s. / 9.09.1965, 1 s., leg. V.K./ 27.06.1965, 1 s., leg. V.Dr.; Klisurski Monastery near Berkovitsa, 10.07.1963, 2 s./ 25.09.1963, 1 s./ 19.06.1964, 1 s., leg. B.Z.; Varschets (= Zanozhene) near Berkovitza, 22.06.1964, 8 s., leg. B.Z.; Begova Livada area near Berkovitsa, 19.09.1965, 1 s., leg. V.K.; Begovitza area near Berkovitsa, 19.05.1966, 2 s., leg. B.Z.; Parschevitza near Vratza, 14.09.1964, 1 s., leg. V.K.; Bulchino Prohod near Godech, 29.06.1965, 1 s., leg. V.Dr.; Iskarsko defile, 26.05.1966, 1 s., leg. B.Z.; Vitinya,

19.09.1964, 1 s., leg. V.K.; Bresdnischka Laka near Teteven, 14.08.1969, 1 s., leg. B.Z.; Gara Anton, 26.07.1972, 1 s., leg. B.Z.; Troyan, 15.05.1972, 1 s., leg. B.Z.; Panicite near Kalofer, 17.08.1969, 1 s./ 03.09.1970, 1 s./ 09.11.1971, 1 s., leg. B.Z.; Karandila near Sliven, 20.05.1964, 1 s., leg. B.Z.; Geravna Village near Sliven, 24.08.1969, 1 s., leg. B.Z.; Kotel, 22.07.1972, 2 s., leg. B.Z.; Bania Village near Burgas, 24.07.1972, 15 s., leg. B.Z.; Sofia, 2 s., leg. N.N./ 07.06.1909, 1 s., leg. Markovich; Vitosha Mtn., 700 m, 21.05.1939, 1 s., leg. B.P.; Karnare, 19.07.1972, 1 s., leg. V.K.; Turia Village near Kazanlak, 1923, 1 s., leg. D.I.; Tsrancha near Pazardzhik, 21.05.1963, 1 s., leg. B.Z.; Debrastitsa Village near Pazardzhik, 21.05.1963, 2 s., leg. B.Z.; Plovdiv, 1 s., leg. N.N.; Asenovgrad, 16.05.1963, 3 s., leg. B.Z.; Stara Zagora, 05.1907, 1 s., leg. D.I./ 2 s. leg. N.N.; Svilengrad, 19.06.1963, 4 s./ 20.06.1963, 2 s./ 19.06.1963, 4 s./ 20.06.1963, 2 s., leg. B.Z.; Belila Village near Grudovo, 22.06.1966, 3 s., leg. B.Z.; Grudovo, 15.08.1967, 4 s./ 12.07.1967, 4 s./ 11.07.1967, 2 s., leg. B.Z.; Malashevska planina Mtn., Tsaparevo Village, 480 m, 02-30.07.2002, 1 s., leg. S.L., T.L./ W of Gorna Breznitsa Village, 600-1000 m, 18-20.06.2003, 3 s., leg. B.G.; Petrich, 15.05.1973, 1 s./ 19.05.1973, 1 s./ 21.05.1973, 1 s./ 20.07.1973, 1 s., leg. B.Z.; Satovcha near Blagoevgrad, 23.07.1965, 1 s., leg. B.Z.; Dospat, 24.07.1965, 3 s./ 26.08.1965, 1 s., leg. B.Z.; Trigrad, 29.06.1964, 7 s., leg. B.Z.; Smolyan, 24.07.1964, 1 s./ 26.07.1965, 2 s., leg. B.Z.; Kurdzhali, 25.05.1964, 2 s./ 30.05.1965, 1 s., leg. B.Z.; Zarevez near Kurdzhali, 23.07.1964, 7 s., leg. B.Z.; Protigerovo near Kurdzhali, 23.07.1964, 3 s., leg. B.Z.; Momchilgrad, 31.05.1965, 4 s., leg. V.K.; Izgrev Village near Momchilgrad, 09.08.1967, 5 s., leg. B.Z.; Meden Buk Village near Krumovgrad, 20.07.1964, 1 s./ 16.07.1967, 6 s., leg. B.Z.; Topolka near Krumovgrad, 01.06.1965, 2 s., leg. V.K.; Snyagodin near Krumovgrad 02.06.1965, 1 s., leg. V.K.; Ivailovgrad, 21.05.1964, 1 s./ 26.07.1964, 4 s./ 18.06.1969, 2 s., leg. B.Z.; Mandritza Village near Ivailovgrad, 22.04.1964, 3 s./ 18.07.1964, 2 s./ 19.06.1969, 1 s., leg. B.Z.; Varna, 06.06.1954, 2 s. in the dung of *Equus*/ 30.05.1955, 1 s., leg. N.K.; Kaliakra, 05.06.1941, 1 s., leg. P.D.; Karnobat, 01.05.1948, 1 s., leg. N.K.; Arkutino near Burgas, 26.06.1966, 1 s., leg. B.Z.; Lesen Village, near Burgas, 13.07.1967, 2 s., leg. B.Z.; Primorsko, 13.08.1967, 2 s., leg. B.Z.; Primorsko, 17.06.1965, 4 s., leg. B.Z.; Losenets near Burgas, 28.06.1966, 1 s., leg. B.Z.; Tsarevo, 11.08.1967, 1 s., leg. B.Z.; Sozopol-Ahtopol, 12-15.07.1920, 1 s., leg. Il.; Ahtopol, near Burgas, 16.06.1967, 2 s./ 17.06.1968, 1 s., leg. B.Z.; Sinemoretz, near Burgas, 10.08.1967, 1 s., leg. B.Z.; Resovo Village, 10.08.1967, 1 s., leg. B.Z.

Note: First records for the Western and Central Danubian Plane, the Central Stara planina Mtn., Vitosha Mtn., Podbalkan, Bakadzhik-Burgas Region and Sandanski-Petrich Valley.

***Hister illigeri* Duftschmid, 1805 {= *sinuatus* Illiger, 1798}**

Bulgaria: Mezdra, 10.06.1906, 1 s., leg. N.N.; Sofia, 3 s., leg. N.N./ 04.04.1909, 1 s./ August 1929, 1 s.; Vitosha, 800 m, 30.05.1939, 1 s., leg. B.P.; Longosa, 22.05.1949, 1 s., leg. N.K.; Pazardzhik, 5 s., leg. N.N.; Malashevska planina Mtn., W of Gorna Breznitsa Village, 600-1000 m, 18-20.06.2003, 2 s., leg. B.G.; Momchilgrad, 04.04.1905, 1 s.; Varna, 02.05.1954, 1 s., leg. N.K./ 09.06.1957, 1 s., leg. N.K.; Vladimirovo near Varna, 28.04.1957, 1 s./ 12.05.1957, 1 s., leg. N.K.

Note: This is the first record for the Sofia region and the Vitosha Mtn.

***Hister quadrimaculatus* Linnaeus, 1758 {= *sinuatus* Herbst, 1792}**

Bulgaria: Razgrad, 1 s., sub *Hister sinuatus* F. (misidentified) = *Margarinotus bipustulatus* (Schrank) (MARKOVICH, 1904; 1909); The collection comprises altogether 115 identified

specimens from the following localities and areas: Razgrad (1 s.), Tervel (2 s.), Shumen (2 s.), Lukovit (2 s.), Sliven (3 s.), Kazanlak (3 s.), Lyulin Mtn. (4 s.), Dragoman (1 s.), Sofia (15 s.), Vitosha Mtn. (8 s.), Thrace (23 s.), West Rhodopes (3 s.), East Rhodopes (5 s.), Malashevska planina Mtn. (1 s.) Slavyanka Mtn. (2 s.), Sakar Mtn. (2 s.), Strandzha Mtn. (9 s.), North Black Sea Coast (11 s.), South Black Sea Coast (20 s.), **Greece:** (Xanthi, 1 s., Saros, 1 s.), **Macedonia:** (Kavadarsko 1 s.), that have been collected between May and September.

Note: First record for the Central Predbalkan, Podbalkan region, Sofia region, Sakar-Tundzha region, Bakadzhishki Heights-Burgas region, Vitosha, Malashevska planina and Slavyanka Mts.

***Hister quadrinotatus* Scriba, 1790**

Bulgaria: Chirpan, 1 s., leg. N.N. (NEDELKOV, 1909; 1909a sub *Hister quadrimaculatus* Linnaeus misidentified); Varna, 07.04.1943 1 s./ 20.04.1947, 2 s./ 30.04.1950, 1 s./ 02.05.1950, 2 s./ 29.03.1953, 1 s./ 26.04.1953, 1 s./ 17.05.1953, 3 s., leg. N.K.

Note: First record for the North Black Sea Coast.

***Hister sepulchralis* Erichson, 1854**

Bulgaria: Svishtov, July 1900, 1 s., leg. D.I.; Sofia, 1 s., leg. N.N.; Kurilo, 01.04.1900, 1 s.; Gorna Banya, 16.04.1913, 1 s.; Gorno Malovo, 17.04.1951, 2 s., leg. P.D.; Malashevska planina Mtn., W of Gorna Breznitsa Monastery, 600-1000 m, 02.05.2003, 1 s., leg. B.G.; Beloslav, 02.05.1949, 1 s./ 30.05.1955, 2 s., leg. N.K.; Varna, 20.04.1947, 1 s./ 27.04.1947, 2 s./ 23.04.1949, 3 s./ 30.04.1950, 1 s./ 04.05.1952/ 26.04.1953, 3 s., leg. N.K.; Varna, 12.05.1955, 1 s., leg. N.K.; Zvezditsa near Varna, 02.05.1949, 2 s., leg. N.K.

Note: First record for the Central Danubian Plane.

***Hister teter* Truqui, 1852**

Bulgaria: Mandritsa Village near Ivailovgrad, 19.07.1964, 1 s., leg. B.Z.

Note: This is the second record for the fauna of Bulgaria.

***Hister unicolor* Linnaeus, 1758**

Bulgaria: Vraschka Chuka near Kula, 16.05.1964, 1 s., leg. B.Z.; Chuprene near Belogradchik, 08.07.1966, 3 s., leg. B.Z.; Kom Peak near Berkovitsa, 11.07.1966, 1 s., leg. B.Z.; Klisurski Monastery near Berkovitsa, 10.07.1963, 8 s., leg. B.Z.; Golyama Reka near Berkovitsa, 22.04.1964, 1 s., leg., V.K.; Varschets (= Zanozhene) near Berkovitsa, 22.06.1964, 4 s., leg. B.Z.; Parschevitsa near Vratsa, 13.07.1966, 3 s., leg. B.Z.; Petrevene Village near Lovech, 14.05.1972, 1 s., leg. B.Z.; Brestnischka Laka area near Teteven, 14.08.1965, 1 s., leg. B.Z.; Kusch-Bunar, near Sliven, 20.05.1969, 3 s., leg. B.Z.; Zelenik area near Kotel, 25.08.1969, 5 s., leg. B.Z.; Kotel, 22.07.1972, 4 s., leg., V.D.; Pobit Kamak area near Pazardzhik, 27.07.1969, 1 s., leg. B.Z.; Rhodopes, Yundola, 23.08.1965, 1 s., leg. V.K./ 23.07.1967, 7 s., leg. B.Z.; Beglica area near Velingrad, 27.07.1967, 9 s., leg. B.Z.; Yasovir Vasil Kolarov, 26.07.1967, 5 s., leg. B.Z.; Danoto near Peshtera, 21.07.1967, 4 s., leg. B.Z.; Satovcha near Blagoevgrad, 23.07.1965, 4 s., leg. B.Z.; Trigrad, 29.06.1967, 3 s., leg. B.Z.; Progled near Smolyan, 27.07.1965, 3 s., leg. B.Z.; Smolyan Lakes, 24.07.1964, 1 s., leg. B.Z.; Pelevun near Ivailovgrad, 05.06.1965, 4 s., leg. V.K.; Ivailovgrad, 26.07.1964, 1 s., leg. B.Z.; Burschama near Primorsko, 17.06.1965, 1 s., leg. B.Z.

Note: First records for the West Danubian Plane, Thracean Lowland, and the Rhodopes.

Atholus bimaculatus **(Linnaeus, 1758)**

Bulgaria: Lyulin, 800 m, 15.02.1938, 1 s., leg. B.P.; Stara Zagora, 1 s. leg. N.N.; Varna, 3 s., leg. N.N. (NEDELKOV, 1909b); **Greece:** Kavala, 18.04.1943, 1 s., leg. N.K. (KARNOSCHITZKY, 1959).

Atholus corvinus **(Germar, 1817)**

Bulgaria: Luda Kamchiya River, 02.05.1958, 1 s., leg. N.K., det. Kryzhanovskij; Dragoman, 02.04.1904, 1 s., leg. D.I.; Sredna Gora Mtn., Panagyuriste, 02.06.1996, 1 s., leg. S.L.; Sofia, April 1906, 5 s., leg. N.N. (NEDELKOV, 1909a); Stara Zagora, 1 s., leg. N.N. (NEDELKOV, 1909a); Vinitsa near Varna, 07.04.1957, 1 s. in dung of *Equus*, leg. N.K.

Note: This is the first record for the Sredna Gora Mtn.

Atholus duodecimstriatus duodecimstriatus **(Schrank, 1781)**

New records: Bulgaria: Parschevitsa near Vratsa, 13.07.1966, 1 s., leg. B.Z.; Panicite near Kalofer, 18.08.1969, 2 s., leg. B.Z.; Banya Village near Burgas, 24.07.1972, 1 s., leg. B.Z.; Isgrev Village near Momchilgrad, 09.08.1967, 1 s., leg. B.Z.; Meden Buk Village near Krumovgrad, 16.07.1967, 2 s., leg. B.Z.; Resovo Village near Burgas, 10.08.1967, 1 s., leg. B.Z.

Note: This is the first record for the South Black Sea Coast.

Atholus duodecistriatus quatuordecimstriatus **Kryzhanovskij, 1976**

New records: Bulgaria: Panicite near Kalofer, 18.08.1969, 1 s., leg. B.Z.; Sofia, 15.05.1912, 1 s.; Gorni Lozen, May1958, 1 s.; Sinemorets Village near Burgas, 10.08.1967, 1 s., leg. B.Z.; Resovo Village near Burgas, 10.08.1967, 2 s., leg. B.Z.

Note: This is the first record for the South Black Sea Coast.

Dendrophilus punctatus championi **Lewis, 1886**

New records: Bulgaria: Malashevska Planina Mtn., W of Gorna Breznitsa Village, 600-1000 m, 01.05.2003, 1 s., leg. B.G.

Note: This is the first record for the Malashevska Planina Mtn.

Platylomalus complanatus **(Panzer, 1792)**

Bulgaria: Dalgopol, 24.11.1947, 6 s., leg. N.K.; Longoza, 23.09.1949, 1 s., leg. N.K.; **Greece:** Mesta River, 07.11.1942, 1 s., leg. N.V.

Note: This is the second record for the fauna of Bulgaria.

Paromalus flavicornis **(Herbst, 1792)**

Bulgaria: Kocherinovo, 30.06.1943, 1 s.

Note: This is the first record for the region of Boboschevo-Simitli.

Chaetabraeus convexus **(Reitter, 1884)**

Bulgaria: Varna, 22.10.1944, 2 s. under a stone/ 25.02.1950, 17 s. under a stone/ 13.02.1951, 1 s./ 14.02.1951, 2 s. in leaf litter/ 17.10.1954, 1 s., leg. N.K.

Note: This is the second record for the fauna of Bulgaria.

***Abraeus perpusillus* (Marsham, 1802)**
New records: Varna, 20.04.1958, 1 s. in a rotten stump, leg. N.K.
Note: This is the second record for the fauna of Bulgaria.

***Acritus minutus* (Herbst, 1792)**
Bulgaria: Bilka Village (= Chiflik), 22.11.1953, 1 s. under the bark of an old oak stump, leg. N.K.; **Greece:** Mesta River, 07.11.1942, 2 s. leg. N.V. (KARNOSCHITZKY, 1959, sub *Acritus punctum* Aubé, misidentified).
Note: This is the first record for the East Stara Planina Mtn.

***Acritus nigricornis* (Hoffmann, 1803)**
Bulgaria: Varna, 27.02.1949, 3 s./ 02.09.1950, 3 s./ 10.09.1950, 1 s./ 17.10.1954, 2 s. in leaf litter, leg. N.K./ 28.05 1954, 1 s./ 30.03.1958, 1 s. in the dry dung of *Bos*, leg. N.K.
Note: This is the second record for the fauna of Bulgaria.

***Teretrius fabricii* Mazur, 1972**
Bulgaria: Eastern Danubian plane, Harsovo Village near Isperih (= Kemanlar), 28.08.1934, 3 s. in the beams of the houses/ 12.01.1935, 1 s. in "woods of oak"/ 02.10.1936, 4 s. in an oak beam/ 08.1936, 1 s. in an oak beam, leg. P.T., det. Bryant.
Note: This species is new to the Bulgarian fauna.

***Gnathoncus nannetensis* (Marseul, 1862)**
Bulgaria: Yantra Valley, near Tarnovo, cave Prilepnata, 24.04.1995, 1 s., leg. T. I.; Varna, 24.04.1947, 1 s., leg. N.K.
Note: Second record from Bulgaria.

***Gnathoncus rotundatus* (Kugelann, 1792) {= *nannus* (Scriba, 1790)}**
Bulgaria: Knyazhevo, 23.07.1902, 1 s., leg. D.I. (IOAKIMOV, 1904); Sofia, 01.05.1902, 1 s. leg. D.I. (IOAKIMOV, 1904); Varna, 14.06.1953, 1 s., leg. N.K.
Note: First record for the North Black Sea Coast.

***Saprinus aegialius* Reitter, 1884**
Bulgaria: Varna, 23.09.1950, 2 m., leg. Ts.

***Saprinus aeneus* (Fabricius, 1775)**
Bulgaria: Sofia, 02.05.1901, 1 m., leg. D.I. (IOAKIMOV, 1904); Varna, 18.08.1944, 1 m., leg. N.K.; Iovkovo near Varna, 20.07.1947, 1 m., leg. N.K.
Note: First record for the North Black Sea Coast.

***Saprinus furvus* Erichson, 1834**
Bulgaria: Svishtov, July 1900, 2 s., leg. D.I.; Varna, 18.08.1944, 12 s./ 18.08.1944, 1 s., leg. N.K./ 30.04.1950, 1 s., leg. Ts./ 23.09.1950, 1 s., leg. Ts./ 30.05.1955, 1 s., leg. N.K.
Note: First record for the Central Danube Plane.

***Saprinus georgicus* Marseul, 1862**
Bulgaria: Varna, 18.08.1944, 1 m., leg. N.K.

***Saprinus maculatus* (Rossi, 1790)**
Bulgaria: Svishtov, July 1900, 1 s., leg. D.I.; Stara Zagora, 1 s., leg. N.N. (NEDELKOV, 1909); Burgas, 06.06.1910, 1 s.
Note: First record for the South Black Sea Coast.

***Saprinus planiusculus* Motschulsky, 1849**
Bulgaria: Varna, 18.08.1944, 1 m. on dead *Testudo*, leg. N.K.; Zvezditsa, 02.05.1949, 1 m., leg. N.K.; Varna, 02.05.1950, 1 m., leg. N.K.
Note: First record for the North Black Sea Coast.

***Saprinus politus* (Brahm, 1790)**
Bulgaria: Varna, 23.09.1950, 1 m. leg. Ts. / 09.08.1953, 1 m., leg. N.K.
Note: This species is new to the Bulgarian fauna.

***Saprinus semipunctatus* (Fabricius, 1792)**
Bulgaria: Svishtov, July 1900, leg. D.I.; Sofia, 09.07.1927, 1 m., leg. D.I.; Varna, 26.06.1946, 1 m., leg. N.K./ 23.09.1950, 4 m. on dead crayfishes, leg. Ts./ 09.08.1953, 10 m. on dead *Sus*, leg. N.K.; Nessebar, 23.06.1954, 2 m., leg. A.V.; Sozopol, on the seacoast, 02.07.1958, 1 m. on a carcass, leg. N.K.

***Saprinus semistratus* (Scriba, 1790)**
Bulgaria: Sofia, 1 m., leg. N.N. (NEDELKOV, 1909a, sub *Saprinus subnitidus* Marseul, misidentified); Plovdiv, 1 m., leg. N.N. (NEDELKOV, 1909a); Varna, 08.1941, 1 m., leg. A.V./ 19.08.1946, 1 m. on a dead shrew, / 19.05.1947 1 m. on dead *Talpa*/ 02.05.1950, 1 m./ 02.05.1950, 1 m./ 09.08.1953, 2 m. on dead *Sus*, leg. N.K.; Iovkovo near Varna, 20.07.1947, 1 m. on dead *Pica pica*/ 20.07.1947, 1 m. on dead *Pica pica*, leg. N.K.
Note: First record for the North Black Sea Coast.

***Saprinus subnitescens* Bickhardt, 1909**
Bulgaria: Sofia, 1 m., leg. N.N.; Plovdiv, 2 m., leg. N.N.; Varna, 15.07.1939, Sv. Konstantin, 7 m., leg. P.D.; Varna, 12.08.1941, 2 m. leg. A.V./ 13.08.1944, 1 m. on dead *Felis*, leg. N.V. / 18.08.1944, 1 m. on dead *Testudo*/ 18.08.1944, 5 m. on dead *Testudo*, leg. N.K./ 19.08.1946, 2 m. on dead shrew, leg. N.K./ 24.04.1947, 1 m., leg. N.K./ 30.04.1947, 1 m. on dead *Talpa*, leg. N.K./ 19.05.1947, 5 m. on dead *Talpa*, leg. N.K./ 19.05.1947, 2 m. on dead *Talpa*, leg. N.K./ 03.04.1950, 1 m. on dead *Anser*, leg. N.K./ 02.05.1950, 1 m., leg. N.K./ 02.05.1950, 1 m., leg. N.K./ 23.09.1950, 2 m. on dead crayfishes, leg. Ts./ 23.09.1950, 2 m. on dead crayfishes, leg. Ts.; 09.08.1953, 12 m. on dead *Sus*, leg. N.K.; Beloslav (= Gebedzhe), 20.07.1947, 1 m. on the coast of the lake, leg. N.K.; Iovkovo near Varna, 20.07.1947, 3 m. on dead *Pica pica*, leg. N.K.; Zvezditsa near Varna, 02.05.1949, 1 m., leg. N.K.

***Saprinus tenuistrius sparsutus* Solsky, 1876**
Bulgaria: Stara Zagora, 1 m., leg. N.N.
Note: Second record for Bulgaria.

***Saprinus vermiculatus* Reichardt, 1923**
Bulgaria: Varna, 29.03.1947, 1 m., leg. N.K.
Note: This species is new to the Bulgarian fauna.

***Saprinus virescens* (Paykull, 1798)**
Bulgaria: Sofia, 2 s., leg. N.N.; Varna, 24.09.1947, 1 s., leg. N.K.; Beloslav near Varna, 15.05.1952, 1 s., leg. Ts.

***Euspilotus perrisi* (Marseul, 1872)**
Bulgaria: Marten Village near Rouse, 28.07.1958, 2 s. in the nest of *Merops apiaster*, leg. V.G, det. Krizhanovskij (GUEORGIEV, 1990); Sofia, 03.07.1934, 2 s., leg. P.D.
Note: First record for the Sofia region.

***Chalcionellus amoenus* (Erichson, 1834)**
Bulgaria: Pobiti Kamani near Varna, 13.08.1950, 2 s. in the dung of *Bos*, leg. N.K. (MAZUR, 1970).

***Chalcionellus decemstriatus* (Rossi, 1792)**
Bulgaria: Louda Kamchiya River, 02.05.1958, 1 s., leg. & det. N.K.; Vitosha Mt., 800 m, 30.06.1939, 1 s., leg. B.P.; Malashevska planina Mtn., W of Gorna Breznitsa Village, 600-1000 m, 18-20.06.2003, 1 s., leg. B.G.; Varna, 24.04.1947, 1 s. in the dung of *Equus*/ 17.05.1953, 9 s. in the dung of *Equus*, leg. N.K.;
Note: First record for the Vitosha Mtn.

***Pholioxenus schatzmayri* (J. Müller, 1910)**
Bulgaria: Beloslav-Esero, 01.08.1951, 2 s. in the nest of *Glis*, leg. N.K.
Note: This species is new to the Bulgarian fauna.

***Hypocacculus rubripes* (Erichson, 1834)**
Bulgaria: Louda Kamchiya River, 02.05.1958, 1 s., leg. N.K., det. Krizhanovskij; Shabla, 08.05.1949, 7 s., leg. N.K.; Karaman, 09.05.1943, 1 s., leg. Karnoschitsky; Varna, Sv. Konstantin, 15.07.1939, 1 s., leg. P.D.; Varna, 18.07. 1944, 1 s. on dead dolphin/ 18.08.1944, 3 s. on dead *Testudo*/ 31.05.1947, 1 s., leg. N.K./ 19.09.1945, 1 s., leg. M.I.; Zvezditsa, 02.05.1949, 1 s., leg. N.K.; Nessebar, 15.08.1948, 1 s., leg. M.I./ 23.06.1953, 11 s., leg. N.K./ 23.06.1954, 4 s., leg. A.V; Sozopol, 11.10.1948, 2 s., leg. M.I.; **Greece:** Kum-Burun, 10.05.1943, 2 s. leg. A.V. (KARNOSCHITZKY, 1959, sub *Saprinus* (*Hypocaccus*) *rubripes* Er.)/ 10.05.1943, 1 s. leg. A.V. (KARNOSCHITZKY, 1959, sub *Hypocacculus metallicus* (Hbst.), misidentified)/ 10-11.05.1953, leg. A.V.; Keramoti, May 1943, leg. A.V. (KARNOSCHITZKY, 1959).
Note: First record for the East Stara Planina Mtn.

***Hypocacculus rufipes* (Kugelann, 1792)**
Bulgaria: Shabla, 25.05.1958, 1 s., leg. N.K. Varna, 13.03.1944, 1 s. in leaf litter, leg. N.K.
Note: Second record for Bulgaria.

***Hypocaccus crassipes* (Erichson, 1834)**
Bulgaria: Nessebar, 23.06.1953, 1 s., leg. N.K.
Note: Second record for Bulgaria.

***Hypocaccus rugifrons subtilis* (Schmidt, 1884)**
Bulgaria: Kamchiya River, 30.07.1945, 5 s./ 30.07.1947, 6 s. leg. M.I.; Shabla, 23.05.1948, 1 s., leg. A.V.; Beloslav, 02.05.194?, 1 s. on carcass, leg. N.K.; Pobiti kamani, 08.09.1945, 1 s., leg. M.I.; Varna, 15.07.1939, Sv. Konstantin, 5 s., leg. P.D. (DRENSKI, 1942, sub *Saprinus virescens* Paykull, misidentified)/ 01.06.1944, 5 s. on a dead gull/ 18.07.1944, 52 s. on a dead dolphin (KARNOSCHITZKY, 1949)/ 18.08.1944, 60 s. on dead *Testudo*, leg. N.K./ 26.07.1948, 14 s., leg. G.P./ 06.09.1948, 2 s., leg. M.I.; Byala, 05.05.1957, 8 s. on the seacoast, leg. A.V.; Nessebar, 01.06.1920, 1 s., leg. D.I./ 23.06.1954, 11 s., leg. A.V; Pomorie, 02.05.1948, 3 s., leg. N.K.; Sozopol, 02.07.1958, 29 s. seacoast, on carcass, leg. N.K.

***Hypocaccus dimidiatus* (Illiger, 1807)**
Bulgaria: Aladzha Monastery near Varna, 13.09.1942, 6 s., leg. N.V.; Varna, Sv. Konstantin, July 1939, 1 s., leg. P.D.; Varna, 15.07.1939, 16 s., leg. P.D. (DRENSKI, 1942, sub *Saprinus virescens* Paykull, misidentified); Varna, 15.07.1939, 1 s., leg. P.D. (DRENSKI, 1942, sub *Saprinus semipunctatus* Fabricius, misidentified); Varna, 01.06.1944, 1 s. on dead gull, leg. N.K. (KARNOSCHITZKY, 1949); Varna, 18.08.1944, 1 s. on dead *Testudo*, leg. N.K./ 26.07.1948, 9 s. on the seacoast leg. G.P. (KARNOSCHITZKY, 1949)/ 06.09.1945, 11 s. (KARNOSCHITZKY, 1949)/ 09.09.1945, 10 s., leg. M.I.; **Greece:** Kum-Burun, 10.05.1943, 1 s. leg. A.V. (KARNOSCHITZKY, 1959).

***Exaesiopus grossipes* (Marseul, 1855)**
Bulgaria: Luda Kamchiya River, 02.05.1958, 1 s., leg. N.K., det. Kryzhanovskij (GUEORGUIEV, 1990).

Results

A total of 1266 specimens found in the collection of the NMNHS were examined and identified. Out of this number, another 41 females of the genus *Saprinus* Erichson, which cannot be reliably determined, were reviewed but were not included in the list below. Altogether, 59 species and subspecies from 26 genera were identified, as 5 species were new to the Bulgarian fauna. Two of the genera (*Teretrius* Erichson and *Pholioxenus* Reichardt) are also new entries to the country's list. Another 10 species were recorded for the second time from Bulgaria. For another 32 species new data for their regional distribution were added.

It has been found out that some already published specimens of *Margarinotus terricola* Germ. (sub *Hister*) in the regions of Sofia and the Thracian Lowland (NEDELKOV, 1909a) are actually *Margarinotus brunneus*. DRENSKY (1942) recorded *Saprinus semistriatus* and *Saprinus*

virescens from the North Black Sea Coast. After a re-examination of that material the author established that it had been wrongly identified and that it actually refers to *Hypocaccus rugifrons subtilis* (Schmidt) and *Hypocaccus dimidiatus* (Illiger). The study of the material of KARNOSCHITZKY (1959) led to the inference that part of it was incorrectly determined also. As a result of this the following corrections have been done: 1/ the halophilous *Halacritus punctum* Aubé (sub *Acritus*) is in fact the dendrophilous *Acritus minutus* (Hbst.); 2/ *Hypocacculus* (= *Hypocaccus) metallicus* (Hbst.) has to be referred as to *Hypocacculus rubripes* (Er.). One of the specimens from Razgrad (MARKOVICH, 1904), identified as *Hister sinuatus* Fabricius (= *Margarinotus bipustulatus* (Schrank), is in fact *Hister quadrimaculatus* Linnaeus (= *Hister sinuatus* Herbst).

Except from Bulgaria (59 spp.), material from the following countries: Greece – 9 species; Turkey – 2 species; Slovakia – 2 species and Macedonia – 1 species, is recorded.

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Ревизиран списък на брумбарите от семейство Histeridae (Coleoptera) в колекцията на Националния природонаучен музей, София

Евгени ЧЕХЛАРОВ

(Р е з ю м е)

Настоящото изследване се основава изцяло на материал от колекциите на Националния природонаучен музей в София. Бяха открити и определени общо 1266 екземпляра от 59 вида и 26 рода. Нови за България са 5 вида и 2 рода. Други 10 вида се съобщават за втори път за страната. За 32 от видовете се дават нови данни за тяхното разпространение. При ревизирането на колекцията беше открит погрешно определен материал, на базата на който са съставени научни публикации. Във връзка с това са направени съответните корекции. Установените видове са от следните държави: България - 59 вида, Гърция - 9 вида, Турция - 2 вида, Словакия - 2 вида и Македония - 1 вид.

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Първо находище на *Nemoptera sinuata* Olivier (Nemopteridae) в Средна Стара планина

Димитър ДИМИТРОВ

При изследване флората и растителността на резерват „Каменщица" и природна забележителност „Енинско ждрело" на 15.07.2003 *г.* попаднахме на един индивид от лентокрилка *Nemoptera sinuata* Olivier. Локалитетът се намира западно от връх Чиличето, над левия бряг на р. Енинска и ВЕЦ „Енина", по открит скалист склон на 650 m надморска височина. Склонът е с южно изложение и наклон от 20 °. Тревистата растителност е съставена от житните видове: *Festuca valesiaca* Schleich. ex Gaudin, *Poa bulbosa* L., *Cleistogenes serotina* (L.) Keng., *Dichantium ischaemum* (L.) Roberti, *Dactylis glomerata* L., *Agrostis capillaris* L., *Stipa capillata* L., *Bromus arvensis* L., *Bromus sterilis* L., *Elymus hispidus* (Opiz) Meld. и разнотревие: *Convolvulus cantabrica* L., *Galium album* Miller, *Satureja montana* L., *Calamintha sylvatica* Bromf., *Dianthus campestris* MB., *Petrorhagia prolifera* (L.) P. W. Ball et Heywood, *Helianthemum nummularium* (L.) Miller, *Clinopodium vulgare* L., *Sideritis montana* L., *Teucrium polium* L., *Teucrium chamaedrys* L., *Astragalus onobrychis* L., *Sedum acre* L., *Sedum album* L., *Hieracium pilosella* L., *Linaria genistifolia* (L.) Miller, *Stachys recta* L., *Euphorbia myrsinites* L., *Alyssum saxatile* L., *Silene frivaldskyana* Hampe, *Carlina vulgaris* L., *Anthemis tinctoria* L., *Hypericum umbellatum* A. Kerner. Дървесната и храстовата растителност е изградена от *Quercus polycarpa* Schur, *Q. cerris* L., *Carpinus orientalis* Miller., *Pinus nigra* Arnold, *Ostrya carpinifolia* Scop., *Fraxinus ornus* L., *Sambucus nigra* L., *Prunus cerasifera* Ehrh., *Cornus mas* L., *Crataegus monogyna* Jacq., *Rosa canina* L., *Prunus spinosa* L., *Pyrus communis* L., *Juniperus oxycedrus* L., *Euonymus europaeus* L., *Syringa vulgaris* L. Този източносредиземноморски вид е известен от Южна България, Македония, Северна Гърция, Малоазийските острови, Мала Азия, Сирия, Кюрдистан, Северозападен Иран, Грузия, Азербайджан и Армения (ПОПОВ, 1970 – Известия на Зоологическия институт с музей, 32: 5-31). В Източна Стара планина *Nemoptera sinuata* е известна от Природния парк „Сините камъни" при връх Кутелка, Карандила и Дюлев дол. Новото находище се намира на около 70 km от находището в Източна Стара планина. Имайки предвид сходните екологични условия по южните склонове на Шипченско-Тревненска, Елено-Твърдишка и Сливенска планина, допускаме намирането на лентокрилката по долините на някои от левите притоци на река Тунджа, водещи началото си от тези дялове на Стара планина.

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Amphotis orientalis Reiche, 1861 in Bulgaria (Coleoptera: Nitidulidae)

Borislav GUÉORGUIEV

GUÉORGUIEV B. 2004. *Amphotis orientalis* Reiche, 1861 in Bulgaria (Coleoptera: Nitidulidae). – Historia naturalis bulgarica, **16**: 109-112.

Abstract. *Amphotis orientalis* Reiche, 1861 is recorded for the first time from Bulgaria. Short taxonomic notes, useful in the differentiation of the species from another Balkan representative of the genus – *A. marginata* (Fabricius, 1781), are added also.

Key words: Coleoptera, Nitidulidae, *Amphotis orientalis*, first record, Bulgaria

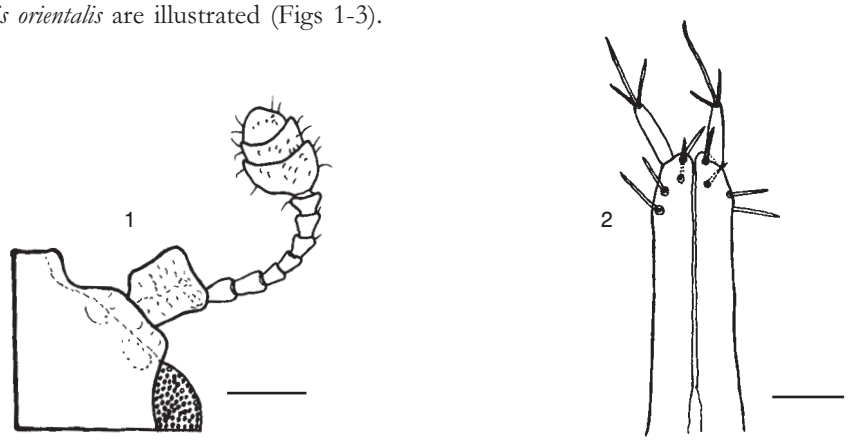
Only two species of the genus *Amphotis* Erichson, 1843, *A. marginata* (Fabricius, 1781) and *A. orientalis* Reiche, 1861, have been known in the Balkans (APFELBECK, 1916; NOVAK, 1952; JELÍNEK, 1965; AUDISIO, 1993). Interestingly, later one of these authors omitted *orientalis* in his renovated list of the beetles from the Adriatic islands of former Yugoslavia (NOVAK, 1970). IOAKIMOV (1904), ANONYMOUS (1907), and JELÍNEK (1965) reported *marginata* for Bulgaria, the latter two without exact localities.

As a result of a project funded by the Bulgarian Ministry of Education and Science, in 2002 an arachno-entomological research of the Maleshevska planina Mtn. began, a mountain area with almost unknown invertebrate fauna. One of the first more interesting finds was *Amphotis orientalis* Reiche, 1861, a new species for the Bulgarian fauna. The exact data are: south of village Tsaparevo, 550 m, 2-31.07.2002, pitfall traps in open habitat with single *Quercus* spp., 2 female specimens, S. Lazarov & T. Ljubomirov leg. The specimens are preserved in the collection of the National Museum of Natural History, Sofia. At present the known distribution of this East-Mediterranean species includes Spain (probably introduced), Italy (probably introduced), Dalmatia, SW Bulgaria, Greece, Anatolia, Syria, Lebanon, Israel, North Africa (introduced) (AUDISIO, 1993; AUDISIO et al., 1999). *A. orientalis* is rarely found in the Balkans, as three or four localities are cited from there. The genus is known as the only myrmecophile among the other nitidulid beetles in the European-Mediterranean Region (COIFFAIT, 1958). Thus, *A. marginata* is known as a permanent visitor of the nests of *Lasius fuliginosus* (Latreille) (GRZIMEK & FONTAINE, 1975). NOVAK (1952) mentioned *orientalis* under the bark of a dry trunk in an immediate proximity to *Crematogaster scutellaris* (Olivier).

Beside his faunistic contribution, APFELBECK (1916) noted also several diagnostic characters of *orientalis*, comparing it with *marginata*.

Our observations on the two specimens from Maleshevska planina could be added to Apfelbeck's comments, thus making easier the differentiation of *orientalis* from *marginata* (Table 1). The total length of the body in the two individuals studied is 5.4-5.8 mm, and their

maximum width – 2.9-3.1 mm. The antennae of both species and the apex of ovipositor of *Amphotis orientalis* are illustrated (Figs 1-3).



Figs 1-2. *Amphotis orientalis*: 1 - right half of head with antenna, dorsal view (after AUDISIO, 1993: 114, fig. 29c-d). Scale line = 0.1 mm; 2 - apex of ovipositor. Scale line = 0.25 mm

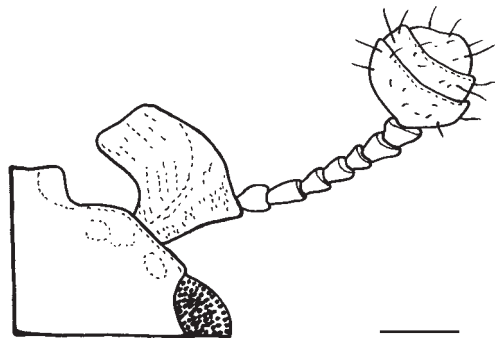


Fig. 3. *A. marginata*: right half of head with antenna, dorsal view (after AUDISIO, 1993: 114, fig. 29c-d). Scale line = 0.1 mm

Table 1

States of some external characters useful in the differentiation of *A. orientalis* from *A. marginata*

Characters	*A. marginata*	*A. orientalis*
Magnitude and shape of 1st antennomere	Larger and transversal, auriculate	Lesser and sub-rounded
7th and 8th antennomeres	Almost as long as wide	Wider than long
Colour of pronotum	Sharply two-colored	One-colored (rusty yellow)
Colour of elytra	Sharply two-colored	Dimly one-colored (disc somewhat darkened)

Acknowledgements

I am grateful to Prof. Dr. P. Audisio (University "La Sapienza", Roma) and Dr. J. Jelínek (Národní muzeum, Praha), for the useful comments on the manuscript. For the collecting of material I thank Dr. S. Lazarov and Dr. T. Ljubomirov (Institute of Zoology, Sofia). The Bulgarian Ministry of Education and Science supported the fieldwork.

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Amphotis orientalis Reiche, 1861 в България (Coleoptera: Nitidulidae)

Борислав ГЕОРГИЕВ

(Р е з ю м е)

Amphotis orientalis Reiche се съобщава за пръв път за фауната на България. Материалът е събран над с. Цапарево в Малешевската планина, на 550 m надморска височина. Представени са кратки таксономични бележки, полезни за различаването на този източномедитерански вид от другия балкански представител на рода - *A. marginata* (Fabricius). Според типа на хабитата, *A. orientalis* може да бъде класифициран като мирмекофил. Изследването е резултат от работата по проект "Б-МУ-1101/01", финансиран от Министерството на Образованието и науката (МОН).

Historia naturalis bulgarica,
16: 113-117, 2004

Eucinetidae – a new family to the fauna of Bulgaria (Coleoptera: Scirtoidea)

Borislav GUÉORGUIEV

GUÉORGUIEV B. 2004. Eucinetidae – a new family to the fauna of Bulgaria (Coleoptera: Scirtoidea). – Historia naturalis bulgarica, **16**: 113-117.

Abstract. The presence of the family Eucinetidae Lacordaire, 1857, the genera *Eucinetus* Germar, 1818 and *Nycteus* Latreille, 1829, and the species *Eucinetus haemorrhoidalis* (Germar, 1818) and *Nycteus hopffgarteni* (Reitter, 1885) is recorded for the first time in the Bulgarian fauna.

Key-words: Coleoptera, Eucinetidae, *Eucinetus haemorrhoidalis*, *Nycteus hopffgarteni*, first records, Bulgaria

Introduction

The superfamily Scirtoidea (former Fossipedes) includes four families: Clambidae (incl. Calyptomeridae), Decliniidae, Eucinetidae, and Scirtidae (= Cyphonidae; Helodidae; Elodidae) (LAWRENCE & NEWTON, 1995). Except for Decliniidae, the other families are represented in the fauna of Europe, but so far only Clambidae and Scirtidae were noted to inhabit Bulgaria.

The aim of the present report is to formalize the finding of a new family of the order Coleoptera to the fauna of the country (Fig. 1).

Material

As a result of the examination of beetles collected for a research project financed by the Bulgarian Ministry of Education and Science, the presence of the family Eucinetidae hitherto not found in Bulgaria was ascertained. The find is kept in the collection of the National Museum of Natural History, Sofia. A single specimen, collected by Mr. S. Vit during his recent visit to Bulgaria, is added to the aforementioned material.

Results

The family Eucinetidae Lacordaire, 1857 comprises 8 genera and more than 40 valid species (VIT, 1999; 2000). A character, which easily discriminates the adults of

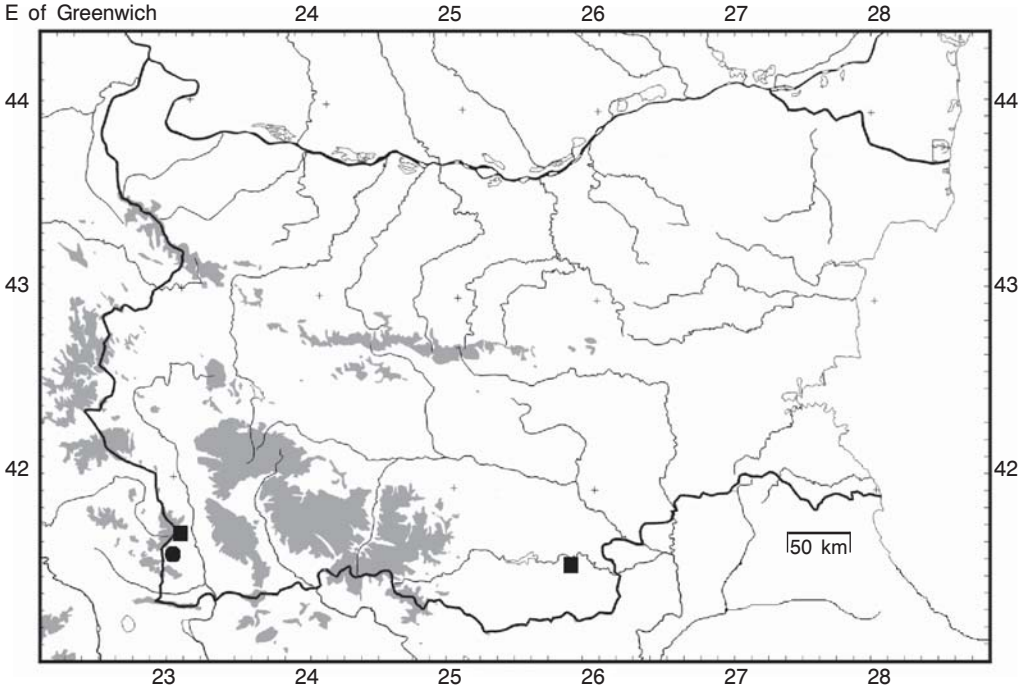


Fig. 1. Localities of *Eucinetus haemorrhoidalis* (Germar) (circle) and *Nycteus hopffgarteni* (Reitter) (squares) in Bulgaria

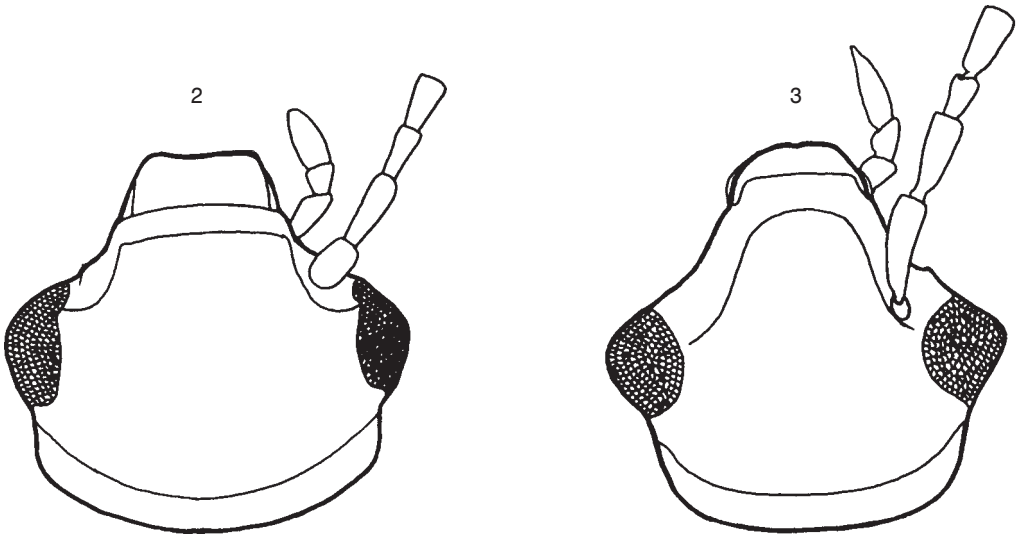
Eucinetidae from the other Scirtoidea, is the tarsal formula 5-5-5 (KRYZHANOVSKIJ, 1989). Because of the peculiar shape of the metacoxae, these beetles are usually called "plate-thigh beetles". The development of the two stages, the adults and the larvae, is strongly connected with the mould fungi, as the adults could be found also under barks or in woods of decayed trees (NIKITSKY, 1989; VIT, 2000). Judging from the scant material kept in several European collections (VIT, 1985), the beetles appear to be rare in their habitats.

Eucinetus Germar, 1818

Eucinetus haemorrhoidalis (Germar, 1818)

Locality: Maleshevska Planina Mt., 660 m, 3 km E Nikudin, 04.05.-04.07.2003, 1 ex. in soil trap in Submediterranean deciduous forest (*Quercus* spp., *Fagus sylvatica*, *Juglans regia*, ect.), S. Lazarov & T. Ljubomirov leg., B. Guéorguiev det. Distribution: Holarctic.

Notes: In the Balkan Peninsula *Eucinetus haemorrhoidalis* has hitherto been cited only from North Serbia and Romanian part of Dobrogea (HORION, 1955). It is widely distributed in Europe, being also found in Turkey (VIT, 1985).



Figs 2-3. Head of *Eucinetus haemorrhoidalis* (Germar) (Fig. 2) and *Nycteus* sp. (Fig. 3), re-drawn from VIT (1985), with modifications

***Nycteus* Latreille, 1829**

***Nycteus hopffgarteni* (Reitter, 1885)**

Localities: Eastern Rhodopes Mts., vicinities of Madzharovo, 22.04.2000, one male digging in the base of *Populus* sp., S. Vit leg. & det. Maleshevska Planina Mt., 750-770 m, 4 km W Gorna Breznitsa, 01.05.-20.06.2003, 1 ex., soil traps in Submediterranean dense forest of *Platanus orientalis*, B. Guéorguiev leg. & det. Distribution: Slovakia, Hungary, Romania, Bosnia and Herzegovina, Bulgaria (nominotypical subspecies), Italy (ssp. *prospector* Vit).

Notes: At present the genus *Nycteus* includes 12 species, limited to the warm temperate and subtropical belts of the Holarctic region (VIT, 1999). Two species, *hopffgarteni* (type locality "Banat: Franzdorf") and *oertzeni* Reitter, 1887 (type locality "Morea, Olympia") are known from the Balkan Peninsula (KLAUSNITZER, 1975: 35; VIT, 1985: 449, 455). According to VIT (op. cit.) the first species forms two distinct subspecies. The nominotypical one has a Southeastern European range, and on the Balkans, it has been hitherto cited only from Bosnia and Herzegovina. The subspecies *prospector* Vit, 1985, described from the Sila Mountain in Calabria, is distributed in both the northern and the southern parts of Italy (ANGELINI & POGGI, 1995). *N. oertzeni* is known from Peloponnesos (Greece) only. Both Balkan species are most probably vicariant in relation to each other.

The two genera could be distinguished easily by three main characters. The first two are the shape of clypeus and the size and shape of antennomere I (Figs. 2-3). The third distinguishing mark is the number of metatibial spurs - one in *Eucinetus* and two in *Nycteus*. There are also two more or less variable characters: the color of pronotum and elytra, which in *E.*

haemorrhoidalis are bi-colored. Conversely, *N. hopffgarteni* usually has a uniform rusty-yellowish pronotum and elytra (with a somewhat darkened disc).

Acknowledgements

I am obliged to Mr. S. Vit (Geneva, Switzerland), for his comments on the manuscript, as well as for the faunal data and literature provided. For the field collecting I thank Dr. S. Lazarov and Dr. T. Ljubomirov (Institute of Zoology, Sofia). The Bulgarian Ministry of Education and Science supported financially the fieldwork.

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Eucinetidae – едно ново семейство за фауната на България (Coleoptera: Scirtoidea)

Борислав ГЕОРГИЕВ

(Р е з ю м е)

Семейство Eucinetidae, родовете *Eucinetus* и *Nycteus*, както и видовете *E. haemorrhoidalis* (Germar) and *N. hopffgarteni* (Reitter) са съобщени за първи път от България. Представени са морфологични белези, позволяващи ефикасното различаване на таксоните. Изследването е резултат от работа по проект "Б-МУ-1101/01" финансиран от Министерството на образованието и науката (МОН).

Historia naturalis bulgarica,
16: 118, 2004

First record of *Trechoblemus micros* (Herbst, 1784) in Bulgaria (Coleoptera: Carabidae: Trechini)

Borislav GUÉORGUIEV

A trip to the Rushovata peshtera Cave realised on 7th of May 2004 by Dr. Petar Beron yielded three cave-dwelling trechid species: *Trechoblemus micros* (Herbst, 1784) (2 males, 1 female), *Trechus* (*Trechus*) *austriacus* Dejean, 1831 (6 males, 10 females), and *Trechus* (*Trechus*) *irenis* Csiki, 1912 (2 males). The cave is situated in Triassic limestone (Vasilyovski Karst Region), lying close to village of Gradeshnitsa, Central Predbalkan. The beetles were found near the riverbank, in moist habitat, among a mixture of debris and remnants of plants. The genus *Trechoblemus* Ganglbauer, 1892 with *T. micros* have so far unknown on the territory of Bulgaria that is why a short diagnosis is provided here. It could be distinguished from the other representatives of the tribe Trechini in Bulgaria by the following set of characters: penultimate labial palpomere with 4 setae, eyes present, entire upper surface of body finely punctate and pubescent, and the apical stria of elytron joining stria 3. Median lobe: as illustrated on Fig. 1. APFELBECK (1904, Familienreihe Caraboidea, Berlin, R. Friedländer & Sohn), having at disposal material collected from Bosnia, first recorded *Trechoblemus micros* in the Balkan Peninsula. Later MATITS (1922, Spomenik srpske kraljevske akademje, **57**) announced it from Serbia. A review of the species distribution in the west part of Balkans, including Slovenia, Bosnia and Herzegovina, and Serbia can be found in DROVENIK & PEKS (1999, Schwanfelder Coleopterologische Mitteilungen, Neuauflage Sonderheft, **1**). The species is widespread in the whole Euro-Siberean region. Along with the other records from Asturia (Spain), Bosnia, Turkey and Adzharia (Georgia), the Bulgarian locality forms the southern border of species areal. According to CASALE & LANEYRIE (1983, Mémoires de Biospéologie, **9**) the genus *Trechoblemus* includes six species: one in the Nearctics, four in East Asia, and the Euro-Siberian *T. micros*. The genus belongs to one of the oldest phyletic lineages of tribe Trechini in the Northern Hemisphere (JEANNEL, 1928, L'Abeille, **35**), showing excessively disjunctive Holarctic distribution. This lineage has its highest diversity of genera and species in East Asia and eastern part of the USA. Besides, one genus with six species, as well as two genera with three species are known from the Carpathians and the Tian Shan Range, respectively. Worth species mention is the present distribution of genus *Pseudanophthalmus* Jeannel, 1920 (= *Duvaliopsis* Jeannel, 1928), which representatives occur in two regions – the southeastern part of North America and the Carpathian Range in Europe. This type of distribution is probably a result of Eocene-Oligocene land (faunal) connections between North America and Europe (NOONAN, 1988, Memoirs of the Entomological Society of Canada, **144**).

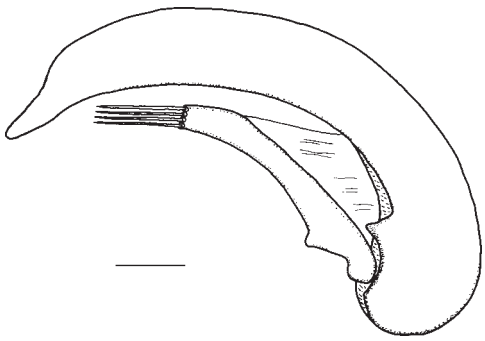

Fig. 1. *Trechoblemus micros*, lateral aspect of median lobe. Scale line = 0.1 mm

Historia naturalis bulgarica,
16: 119-121, 2004

New record of *Vipera ursinii* (Bonaparte, 1835) in Bulgaria

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Vladimir BESHKOV

HRISTOV K., RUSSEV G., WESTERSTRÖM A, BESHKOV V. 2004. New record of *Vipera ursinii* (Bonaparte, 1835) in Bulgaria. – Historia naturalis bulgarica, **16**: 119-121.

Abstract. The paper reports the re-discovery of the Meadow viper (*Vipera ursinii*) in Bulgaria. A single female specimen, 54 cm long, was found in Ludogorsko Plateau, NE Bulgaria on June 18, 2003.

Key words: Meadow viper, *Vipera ursinii*, New record, Bulgaria

The Meadow viper, *Vipera ursinii* (Bonaparte, 1835), is among the rarest snakes in Bulgaria. KOVACHEV (1906), having on disposal a single specimen (21 cm long), found in 1905 in the forested area above the town of Shumen, NE Bulgaria, is the first to record it for the Bulgarian fauna. At the beginning of 20th century, a second specimen (34 cm long) was found in the same area – "above Kyoshkovete" (BURESCH & ZONKOW, 1934). Other two specimens have been caught in the Lyulin Mt., one (20.6 cm long) near the village of Verdikal in 1927, and second (44 cm long) near the Sveti Kral Monastery above Knyazhevo in 1934. All four specimens are preserved in the National Museum of Natural History in Sofia (BURESCH & ZONKOW, 1934; BESHKOV, 1973).

Since then, despite the efforts of many Bulgarian and foreign herpetologists, Meadow viper has not been encountered in Bulgaria anymore. This circumstance, along with the progressing decline of the species populations and its disappearance in many places in Central and South Europe (GASC et al., 1997) was the main reason for including it as a "vanished species" in the "Red Data Book of Bulgaria" (BESHKOV, 1985).

In the spring of 2003 several field trips in search of the Meadow viper were carried out in NE Bulgaria. During one of them on April 25, 2003 on the southern slope of the Ludogorsko Plateau a well-preserved skin of the head and the front part belonging to a specimen probably 45-50 cm long was found. The skin is preserved in the NMNH, Sofia. On June 18, 2003 around 13.00 h several hundred meters apart from the place where the skin was found, near a big boulder, Georgi Russev noticed a live specimen of Meadow viper, which he caught. This female specimen was 54 cm long. The neck scales were in 21 rows and around the middle part of the body – 19 rows. The locality is a stony slope with bushes and sparse grass. *Vipera ammodytes meridionalis* and *Natrix natrix natrix* inhabit the same area, too.

The snake was photographed; samples of its poison were taken, and on June 25, 2003 it was released exactly on the same place. The parameters of the population and the subspecific status will be studied in the future.

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Нова находка на *Vipera ursinii* (Bonaparte, 1835) в България

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Владимир БЕШКОВ

(Р е з ю м е)

До сега от територията на България бяха известни само 4 екземпляра от степната усойница *Vipera ursinii* (Bonaparte, 1835) – два, намерени в началото на XX век в околностите на гр. Шумен (ок. 100 km западно от Варна) и други два, уловени през 1927 и 1934 *г.* в Люлин планина, западно от София. В продължение на 69 *г.* след намирането на последния споменат екземпляр видът не бе установен в България и това дава основание той да бъде включен като "изчезнал вид" в Червената книга на НР България (1985). През пролетта на 2003 *г.* бяха проведени няколко експедиции за търсене на степни усойници в Североизточна България. При една от тях, на 25 април 2003 *г.*, по южния склон на Лудогорското плато бе намерено добре запазено съблекло от главата и предната половина на тялото на усойница, която вероятно е била с дължина от около 45-50 cm. Съблеклото е запазено като сух препарат в НПМ в София. При следващата експедиция, на 18 юни 2003 *г.*, на няколкостотин метра от мястото на намирането на съблеклото бе уловен жив екземпляр – женски, дълъг 54 cm. Люспите на тялото в шийната област са 21 реда, а около средата на тялото – 19 реда. Мястото на улавяне представлява склон с много камъни, обрасъл с храсти и редки треви. Уловената змия е многократно фотографирана, а на 25 юни същата година бе освободена точно на мястото на намирането и.

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Нова монография за паяците на Сърбия

Петър БЕРОН

DELTSCHEV CH. C., ĆURĆIĆ B. M., BLAGOEV G. A. 2003. The Spiders of Serbia. – Monographs, Vol. VII, Institute of Zoology, Belgrade-Sofia, 832 p.

Неотдавна проф. Божидар Чурчич беше избран за чуждестранен член на БАН. Ето, че се появи и поредната българо-сръбска творба, която потвърди доброто сътрудничество между двете съседни държави с близки фауни. Българските специалисти по паяците д-р Христо Делчев и Гергин Благоев, в сътрудничество с видния сръбски арахнолог проф. Чурчич, сътвориха един обемист труд, прекрасно отпечатан от "Геокарта" – Белград. Монографията за разпространението на 618 вида паяци от 36 семейства е илюстрирана с карти на находищата на всички видове. Има общ географски обзор на Сърбия, а за всеки вид се изреждат синонимите, под които е публикуван за тази страна. Съобщават се височинният интервал, в който се среща и зоогеографската принадлежност. Работата е добър модел, по който могат да се направят подобни каталози и за останалите балкански страни.

В тази книга – паметник на често поставяната под въпрос българо-сръбска дружба – намираме и някои невиждани другаде неща. Оказва се, че пари за издаването ѝ са дали най-различни организации, от някои сръбски общини до българското посолство в Белград. Затова и виждаме нашия национален герб, изобразен в една сръбска книга – чудо невиждано! Още по-непривична гледка е цветният портрет на Негово Светейшество Патриарх Павле – книгата е благословена от него.

Във всеки случай, като се абстрахираме от тези външни, макар и интересни особености, важното е да се прецени научното съдържание на книгата. А то е без съмнение, важна основа за опознаването на тази важна група у съседите. Чест е за българската зоология, че е зачетен високият професионализъм на авторите от Института по зоология при БАН. Без съмнение, те ще ни поднесат скоро и други такива солидни изследвания върху паяците на Македония, Албания, а и на България. В балканската арахнология книгата на тримата ни колеги е истинско събитие.

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Средно- и късноholоценски птици от находища в източната част на Горнотракийската низина (Южна България)

Златозар БОЕВ

БОЕВ З. 2004. Средно- и късноholоценски птици от находища в източната част на Горнотракийската низина (Южна България). – Historia naturalis bulgarica, **16**: 123-132.

Abstract. Avian bone finds (330; MNI 65) from seven archaeological sites in CS Bulgaria, dated Eneolithic to 12 century A. D. have been examined. They belong to at least 13 species of 7 orders, some of them (*Aquila chrysaetos*, *Aquila* cf. *pomarina*, *Otis tarda*, *Phasianus colchicus* and *Corvus corax*) rarities at present. The Eneolithic to the Bronze Age finds of *Gallus gallus* (the site of Galabovo) much predate the former oldest record (Kabile, 7th century B. C.) of the Domestic Chicken in Bulgaria. This supports the hypothesis of the more ancient appearance of *Gallus gallus domestica*, or its native origin possibly through domestication of a local native subspecies of the Red Junglefowl in SE Europe.

Key words: Subfossil birds, Holocene avifauna, Domestication of birds, *Gallus gallus*, Bulgaria

Увод

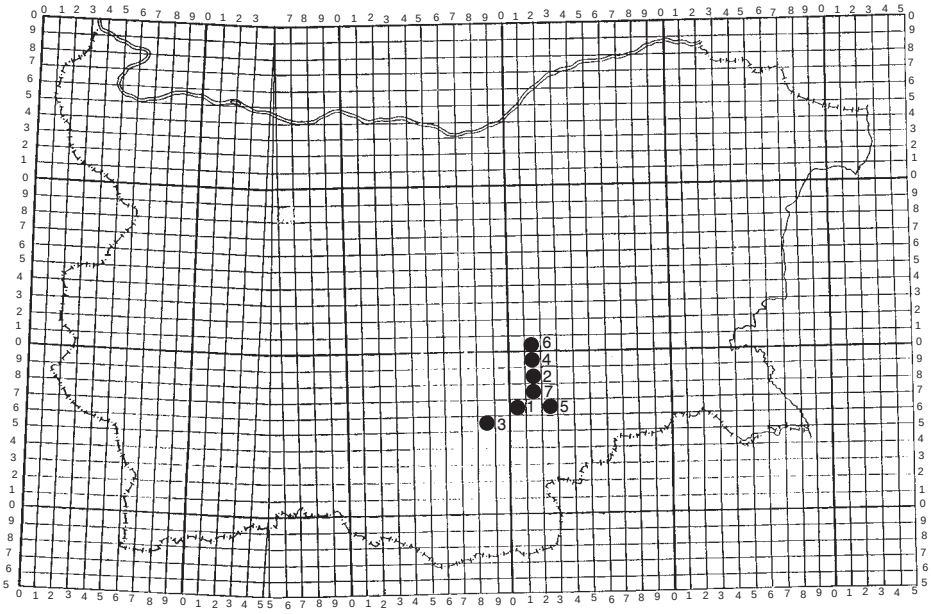
Източната част на Горнотракийската низина като обособена единица във физико-географското районiране на България обхваща т. н. Пловдивско-Загорско-Хасковски район (ВАПЦАРОВ и др., 1997). Сведенията за холоценските птици в България са оскъдни и се отнасят главно за някои антични и средновековни селища (БОЕВ, 1995), но потъналите селища при Созопол и Китен предоставят богата информация за ловната фауна през енеолита и ранно-бронзовата епоха (БОЕВ, 1999, BOEV, 1993, 1996a, b).

Настоящото съобщение е докладвано на Юбилейната научна сесия, посветена на 10-годишнината от учредяването на Археологическия музей в гр. Раднево (05.-07.06.2002).

Материал и методи

За периодизацията и абсолютната хронология на холоцена е възприета ползваната от BOZILOVA (1982) и НЕЙЩАДТ & СТЕКЛОВ (1982) схема: 1) древен (субарктичен) – преди 12000-10000 *г.*; 2) ранен (бореален) – преди 10000-8000 *г.*; 3) среден – с два подпериода: 3а) атлантически – преди 8000-5000 *г.* и 3б) суббореален – преди 5000-2500 *г.* и 4) късен (субатлантически) – преди 2500-1000 *г.* За общата археологична хронология в България е следвана схемата на ВЕЛКОВ (1979). Така само едно от изследваните находища (Гълъбово) е със средно-холоценска възраст, а останалите 6 се отнасят към късния холоцен (вж. по-долу).

Настоящото проучване се основава на 330 броя костни находки (цели кости и костни фрагменти) от 65 екземпляра. Материалът е събран през 1984-1996 г., инвентиран е и се съхранява във фонда на отдел "Фосилни и рецентни птици" на Националния природонаучен музей (НПМ) при БАН в София. Определянето е извършено чрез морфологични сравнения на находките с образци от еталонните сравнителни сбирки от рецентни птици на НПМ. След имената на находищата е посочен техният код от мрежата UTM (фиг. 1).



Фиг. 1. Местоположение на изследваните археологически обекти в източната част на Горнотракийската низина: 1 – Гълъбово, 2 – Раднево, 3 – Воден, 4 – Дядово, 5 – Искрица, 6 – Караново, 7 – Гледачево

Кратко описание на находищата

1. Гълъбово MG 06. Селищна могила (енеолит – среден бронз). 350 m н. м. в. Разкопки 1989 г. Материалът е предоставен от н. с. Георги Рибаров. Съпътстваща фауна : енеолит - *Unio* sp., Bivalvia indet., Gastropoda terrestria indet., *Testudo* sp., *Cervus elaphus*, *C. dama*, *Capreolus capreolus*, *Bos primigenius*, *Vulpes vulpes*, *Felis silvestris*, *Castor fiber*, *Lepus capensis*, *Bos taurus*, *Sus scrofa*, *S. s. domestica*, *Canis familiaris*, Ovicaprinae indet.; бронз - *Helix pomatia*, *Cepaea vindobonensis*, *Unio* sp., Bivalvia indet., *Cervus elaphus*, *Bos primigenius*, *Cervus dama*, *Capreolus capreolus*, *Vulpes vulpes*, *Canis lupus*, *Ursus arctos*, *Felis silvestris*, *Martes* sp., *Meles meles*, *Erinaceus concolor*, *Lepus capensis*, *Castor fiber*, *Equus caballus*, *Sus scrofa*, *S. s. domestica*, *Ovis aries*, *Capra hircus*, *C. familiaris* (Г. Рибаров – непубл. данни). В находището е установена и следната културна флора: *Triticum monococcum*, *T. dicoccum*, *T.* cf. *spelta*, *T.* cf. *compactum*, *Hordeum* sp., *Hordeum* v. *vulgare*, *H.* v. *nudum*, *Vicia ervilia*, *Lens culinaris*, *Fucus carica*, cf. *Secale cereale*, *Rumex acetosa*, *R. acetosella*, *Bromus secalinus*. От дивата флора по

палеоботанични останки са установени *Carpinus betulus*, *Cornus mas* и *Lathyrus* sp. (POPOVA, 1995). Материал: 1217-1220; 1481; 6328-6352.

2. Раднево MG 18. Селище от късножелязната епоха. 150 m н. м. в. Материалът е събран през 1994 *г.* и предоставен от Г. Рибаров. Материал: 2945.

3. Воден LG 85. Пещера до с. Воден край гр. Болярово (Хасковска област). 400 m н. м. в. Раннохристиянски и средновековен комплекс. Материалът е датиран на 10-14 в. от ръководителя на разкопките – арх. н. с. Георги Илиев и е предоставен от Г. Рибаров Материал: 1567-1569. Съставът на находките от птици е публикуван от БОЕВ (1995) и BOEV (1996b).

4. Дядово MG 19. Средновековно селище и некропол до с. Дядово (Новозагорско). 250 m н. м. в. Края на 11-12 в. Селищна могила. Разкопки 1984 *г.* Материалът е предоставен от Г. Рибаров. Материал: (кат. № 216-221); (2444-2446). Съставът на находките от птици е публикуван от БОЕВ (1995) и BOEV (1996b).

5. Искрица MG 26. Средновековно селище до с. Искрица (Старозагорско). 350 m н. м. в. 11-12 в. Разкопки 1991-1992 *г.* Дълб. 0,5-0,9 m. Квадрати L17-K17, M15-N15. Материалът е предоставен през 1993 *г.* от Г. Рибаров. Съпътстваща фауна: *Testudo* sp., Pisces indet., *Bos primigenius*, *Cervus elaphus*, *Capreolus capreolus*, *Sus scrofa*, *Lepus capensis*, *Spermophilus citellus*, *Ursus arctos*, *Equus caballus* f. *ferrus*, *Equus asinus*, *Ovis/Capra*, *Sus scrofa domestica*, *Canis familiaris*, *Felis catus* (Г. Рибаров – непубл. данни). Материал: 486; 1195-1215; 1221-1283; 1344-1365; 1487-1525; (кат. № 4952-5095); (кат. № 5582-5632). Съставът на находките от птици е публикуван от БОЕВ (1995) и BOEV (1996b).

6. Карановo MH 10. Късноантично (2-6 в.) и средновековно (11-12 в.) селище с крепостна стена до неолитна могила до Нова Загора. 350 m н. м. в. Разкопки и датировка: арх. Веселин Игнатов. Материалът е предоставен от Г. Рибаров. Съпътстваща фауна: късна античност - *Testudo* sp., *Bos primigenius*, *Cervus elaphus*, *Capreolus capreolus*, *Sus scrofa*, *Lepus europaeus*, *Erinaceus concolor*, *Canis lupus*, *Equus caballus*, *Equus asinus*, *Ovis/Capra*, *Sus scrofa domestica*, *Canis familiaris*; средновековие - *Testudo* sp., *B. primigenius*, *C. elaphus*, *S. scrofa*, *Sp. citellus*, *Er. concolor*, *Ovis/Capra*, *E. caballus*, *E. asinus*, *F. catus*, *S. s. domestica*, *C. familiaris* (Г. Рибаров – непубл. данни). Материал: 1216; 1303; 1478-1479; (кат. № 2997-3128). Съставът на находките от птици е публикуван от БОЕВ (1995) и BOEV (1996b).

7. Гледачево MG 17. Средновековно селище (последната четвърт на 12 в.) до с. Гледачево (Радневска община). 150 m н. м. в. Разкопки на арх. н. с. Милена Тонкова от 1994-1996 *г.* Общ брой на костните останки - 564. Птичите находки са събрани през м. август 1996 *г.* от хоризонт 0,5-0,4 m и са предоставени от Г. Рибаров. Съпътстваща фауна: *Unio sp.*, *Cervus elaphus*, *Capreolus capreolus*, *Bos primigenius*, *Sus scrofa*, *Lepus capensis*, *Equus cabalus* f. *ferrus*, *Equus asinus*, *Sus scofa domestica*, *Ovis aries*, *Capra hircus*, *Canis familiaris* (Г. Рибаров – непубл. данни). Материал: 1595-1607.

Резултати и обсъждане

Домашни птици

Домашната авифауна е представена от 3 форми: домашна кокошка (*Gallus gallus domestica*), домашна гъска (*Anser anser domestica*) и домашен гълъб (*Columba livia domestica*). С древната си възраст (енеолит – бронз) останките на домашна кокошка и домашна гъска от Гълъбово

представляват значителен интерес не само от национален мащаб. Те са важни въобще за проследяване на древното разпространение на домашните птици в Европа.

Домашна кокошка (*Gallus gallus domestica*)

Най-ранната поява на *Gallus gallus* на Балканите и в България, както и къснотретичните и кватернерните находки от *Gallus* spp. в Европа са разгледани подробно от BOEV (1995).

Утвърдено в литературата становище (основаващо се на произхода от дивата форма от Югоизточна Азия) е, че *G. g. domestica* е достигнала до Балканския полуостров по два пътя: 1) северен – през Китай, Средна Азия, южно-руските степи, Украйна и Добруджа, и 2) южен – през Индия, Персия, Мала Азия и Тракия. Така, в двата случая се възприема тезата, че на запад от Черно море, Балканите са били първите европейски земи, в които *G. gallus* се е появила на континента. Възможни са обаче и други два варианта – (1) Домашната кокошка да е достигнала Балканския полуостров почти едновременно и по двата пътя; (2) домашната кокошка е била пренесена на Балканите по трети път – по море от Закавказието. Макар да е малко вероятно, не бива да се изключва и възможността за пряко пренасяне на кокошката в древността от Китай в Европа. На подобна мисъл ни навежда едно съобщение на БАРАХТА (1989) за удивителни паралели в анималистичния жанр на паметници от 3 в. н.е. от Елада и Китай.

Макар и недостатъчно обосновани, предположенията за най-ранната поява на домашната кокошка в българските земи се отнасят за бронзовата епоха (1200 в. пр.н.е.; ПЕТРОВ, 1986). Трябва да се отбележи, че BOCHENSKI (1982) намира една furcula от *Gallus gallus* в палеолитната пещера "Бачо Киро", но самият автор се съмнява в достоверното датиране на находката. Две находки от България (фигуриран килик от Созопол от трета четвърт на 6 в. пр.н.е., декориран с изображения на петли, и кости на кокошки от тракийско светилище до с. Кабиле, Ямболско, датирани 7 в. пр.н.е.) представляват най-древните досега индикации за разпространението на вида в страната (BOEV, 1995). Споменатите костни находки представляваха и най-старите останки от домашни птици въобще, намерени досега в България. Те маркираха първата половина на първото хилядолетие пр. н.е. като периода, в който домашната кокошка вече е била пренесена от Азия на Балканския полуостров. От друга страна така се доказва, че възникването на птицевъдството като отрасъл у нас трябва да се отнесе не по-късно от 7 в. пр.н.е. (BOEV, 1995). Останките от домашни птици от всички останали археологически обекти в страната имат значително по-късен произход.

Находките от домашна кокошка, най-многобройните в проучваните селища от източната част на Горнотракийската низина, са от изключителен интерес. Намерените останки от кокошки от селището при Гълъбово са най-древните находки на род *Gallus* в България, доказващи древния автохтонен произход на кокошката на Балканите или поне те са указание за една много по-древна доместикация, отколкото се смяташе досега. С категоричност не можем да твърдим дали находките от Гълъбово принадлежат на дива или на одомашнена форма. Както е известно, първоначално декоративните, а не алиментерните (месно-яйчни и особено – месни), белези са били водещи в процеса на доместикацията. По тази причина търсенето на остеологични (вкл. и остеометрични) различия в най-ранните находки от диви или домашни кокошки е спекулативно. Затова категоричен отговор не може да се даде и на още един въпрос: Дали кокошките от Гълъбово

са били елемент на локалната авифауна или са били пренесени от другаде като одомашнени птици. От представения в друга статия (BOEV, 1995) преглед се вижда, че неолитните кокошки в някои места в Европа съвсем не са сензационни.

Очевидно е налице едно непрекъснатото съществуване на *Gallus gallus* в българските земи през последните около 5000 години. Находките от Гълъбово от енеолит-ранен-бронз отместват още по-назад във времето най-ранната поява на кокошки в тази част от Балканския полуостров. Те са почти едновъзрастови с някои от гореспоменатите находки от Индостан и Индокитай (WEST & BEN-XIONG, 1988) и потвърждават (наред с енеолитните останки от Португалия (GOURICHON & CARDOSO, 1995) много по-древния (или множествен) произход на домашната кокошка.

Домашна гъска (*Anser anser domestica*)

През римската епоха в Европа видът е отглеждан масово за хранителни нужди (CRAWFORD, 1984). По тази причина елементите на скелета на *A. a. domestica* са със сравнително по-големи размери от тези на дивата изходна европейска форма. Отделни единични кости от дребни екземпляри или от дребни примитивни породи трудно могат да бъдат надеждно разграничени от тези на дивите *A. anser*. Затова често дивата и домашната форма във фаунистичните списъци на археоорнитологичните изследвания се представят заедно или са обозначени като *"Anser anser"*. По тези съображения само част от находките на *Anser anser* от България (БОЕВ, 1999) могат да бъдат смятани като принадлежащи на одомашнени гъски. От одомашняването й до днес, *A. a. domestica* повсеместно е била отглеждана в много по-ограничено количество в сравнение с домашната кокошка, патица и пуйка. Смята се, че има полифилетичен произход. В Европа е бил одомашнен западният подвид на сивата гъска (*A. anser anser*), а в Югоизточна Азия – лебедовата гъска (*A. cygnoides*) (CRAWFORD, 1984). В Европа гъски се отглеждали още през неолита (3000 *г.* пр.н.е.), а в Китай – 1000 *г.* пр.н.е. Предполага се, че доместикацията първоначално е протекла в Югоизточна Европа (Гърция; CRAWFORD, 1984).

Находките от домашна гъска в Европа са твърде малобройни. Тя е известна от 2-10 в. във Wijnaldum, от 450-750 в. в Oosterbeintum и от 17 в. във Harlingen в Холандия (PRUMMEL, 1993). В античния град Кабиле домашната гъска е представена с 13 кости, принадлежащи на 3 екз. (14% от домашните птици) (БОЕВ & РИБАРОВ, 1993). Находките от Гълъбово са сред най-древните на континента и потвърждават твърде ранната (вероятно автохтонна) доместикация на домашната гъска.

Домашен гълъб (*Columba livia domestica*)

Дивата и домашната форма на *C. livia* се отличават слабо по метрични и морфологични показатели. В археоорнитологичната литература обикновено двете форми се представят заедно като "*Columba livia*". Сходството с хралупара (*C. oenas*) също е голямо.

По археозоологични данни домашният гълъб в България е имал твърде ограничено разпространение в античността и средновековието. Според ДАРВИН (1987) "... най-ранното указание за гълъбите е от V-та египетска династия, около 3000 *г.* пр.н.е. ... гълъбите били ценени много ... в Индия около 1600 *г.* пр.н.е. ..." (с. 787). В Ирак *C. livia* е одомашнен около 4500

г. пр.н.е., а в Гърция – преди 500 г. пр.н.е. Приема се, че скалният гълъб е опитомен в Египет преди около 5000 г., където първоначално са го използвали за пощенски цели. Около 1600 г. пр.н.е. той вече е бил използван и в Гърция. В Рим са запазени сведения за одомашнени гълъби от времето на император Нерон (54-68 г. н.е.) (ТОНЧЕВ, 1969; HAWES, 1984). Плиний Старши (23-79 г. н.е.) дава описания за няколко различни породи гълъби, отглеждани в Древния Рим. В някои части от Западна Европа като домашна птица се появява твърде късно. В Англия прониква от Франция едва в средата на 13 в. (HAWES, 1984). В Западна Европа за пренасяне на съобщения най-масово са го използвали през 11-13 в. (ТОНЧЕВ, 1969; HAWES, 1984). Има данни за отглеждане на *C. livia* в Палестина от 200-220 г. н.е.

Като одомашнена птица в Европа прониква от Персия. Според някои предположения (НАНКИНОВ, 1996) възникването на древното земеделие в Месопотамия преди около 8000 г. съдействало за одомашняването на вида. Главното направление на неговото разселване през следващите хилядолетия било на северозапад. Интересна връзка този автор установява по отношение на миграцията на опръстените домашни (полудиви) гълъби в България, които очертават тенденцията за преместване в югоизточно направление (т.е. към тяхната прародина). "В процеса на миграциите гълъбите (от България – б.а.) се придържат към трасето на разселване на техните предци от древната им родина ..." (с. 32).

Домашни гълъби са установени в 3 находища в Холандия: от 2-10 в. във Wijnaldum, 450-750 г. в Oosterbeintum, и от 17 в. във Harlingen (Prummel, 1993). В изследвания материал находката от с. Искрица не може категорично да бъде отнесена към одомашнената форма на скалния гълъб, въпреки че показва някои белези (по-едри размери), характерни за домашния гълъб.

Ловни птици

Сред установените видове са и някои от най-ценните до последното столетие ловни обекти като *Anser anser*, *Anas platyrhynchos*, *Phasianus colchicus*, *Streptopelia turtur*, *Perdix perdix*, *Columba livia* и *Otis tarda*.

Останките от колхидския фазан представляват по-особен интерес поради дискусионния, съвсем до скоро, произход на този вид у нас и на Балканите. Предположенията за неговия чуждоземен произход и древната му интродукция и натурализация на Балканите, извършени през елинистичната или римската епоха или дори в средновековието (с кръстоносните походи) категорично се отхвърлят от енеолитните му костни останки. Впрочем, *Ph. colchicus* в България е известен и чрез костните си късно-плейстоценски останки от няколко пещери (БОЕВ, 1999). Почти повсеместно разпространените днес ловни фазани са чисти или хибридни потомци на пренесени от Азия чуждоземни подвидове – монголски (*Ph. c. mongolicus*) и пръстенчат (*Ph. c. torquatus*).

Птици с неустановено значение за човека

В тази категория попадат 6 вида: *Aquila chrysaetos*, *A.* cf. *pomarina*, *Athene noctua*, *Pica pica*, *Corvus corax* и *Corvus frugilegus*. Скалният и малкият креслив орел е твърде възможно да са били предмет на лов заради техните махови и кормилни пера, от които в древността масово се изготвяли ветрилата на стабилизаторите на ловните стрели. Не е изключено

останките да принадлежат и на обучени за лов на дребен дивеч птици. У нас тази практика е била широко разпространена от най-дълбока древност (БОЕВ, 1997).

Като мършоядни птици врановите са чести посетители на сметищата край селищата и е възможно наличието на останки от гарван и посевна врана да се обясни с тази тяхна биологична особеност. От друга страна до средновековието врановите птици в България

Таблица 1

Таксономичен състав, брой на останките и минимален брой на екземплярите

Находище	Таксон	Брой на останките	Минимален брой екземпляри
Гълъбово	*Anser anser*	1	1
	Anser anser domestica	2	1
	Anas platyrhynchos	1	1
	Aquila chrysaetos	1	1
	Gallus gallus domestica	22	4
	Phasianus colchicus	3	1
Раднево	*Galllus gallus domestica*	1	1
Воден	*Phasianus colchicus*	2	1
	Pica pica	1	1
Дядово	*Phasianus colchicus*	2	2
	Galllus gallus domestica	6	2
	Streptopelia turtur	1	1
Искрица	*Anser anser*	7	2
	Perdix perdix	2	1
	Phasianus colchicus	1	1
	Gallus gallus domestica	132	16
	Otis tarda	1	1
	Columba livia	1	1
	Columba cf. *livia*	1	1
	Athene noctua	1	1
Карапово	*Anser anser* cf. *domestica*	2	1
	Gallus gallus domestica	124	17
	Aquila cf. *pomarina*	1	1
	Corvus corax	3	2
Гледачево	*Gallus gallus domestica*	3	1
	Corvus frugilegus	10	2
Общо:		330	65

се използвали за храна от човека, т. е. вероятността да са били уловени като дивеч също не бива да се изключва.

Обикновената кукумявка вероятно дължи присъствието си като изявен синантропен вид (BOEV, 1993). Останките ѝ от средновековното селище при с. Искрица вероятно са косвена индикация за наличието на трайни масивни постройки, в кухините на чиито зидове обикновено се заселва.

Заключение

Разкритата холоценска авифауна е съставена от най-малко 13 вида от 7 разреда: Anseriformes, Falconiformes, Galliformes, Gruiformes, Columbiformes, Strigiformes и Passeriformes. Това показва значително разнообразие не само относно разностранното утилитарно значение на птиците, но и по отношение на разнообразието на природните местообитания край проучваните селища. Данните от табл. 1 показват, че средно от един екземпляр в археологическия контекст са съхранени по около 5 костни находки – едно сравнително добро представяне, ако се има предвид използваната несъвършена методика на събиране на материала без промиване.

Домашната авифауна е представена от 2 (3) форми – кокошка, гъска и (?) гълъб. Появата на домашната кокошка на Балканите е станало значително по-рано, отколкото се смяташе досега. Гълъбово предоставя най-старите останки от домашни кокошки в България, предхождащи тези от Кабиле с най-малко 2 хилядолетия. Находките от Гълъбово показват, че в средния холоцен (енеолит – среден бронз), както в югозападна, така и в югоизточна (въпреки хронологичната разлика от 1000-1500 години) Европа кокошката е била разпространена. Тук са открити и едни от най-древните находки на домашната гъска. Напредналото птицевъдство е указание за един по-висш етап в развитието на икономиката на населението - факт, доказан и от многобройните други паметници на материалната му култура (керамика, метал и камък).

С това проучените археологическите обекти в източната част на Горнотракийската низина предоставят нови сведения за птиците от последните 5000 години и разкриват слабо познати страни от бита на древното население като птицевъдството и лова.

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Middle and Late Holocene birds from the Eastern Upper Thracian Plane (S Bulgaria)

Zlatozar BOEV

(S u m m a r y)

A total of 330 avian bone finds of MNI 65 of seven archaeological sites in CS Bulgaria, dated Eneolithic to 12 century A.D. have been examined. They belong to at least 13 species of 7 orders: Anseriformes, Falconiformes, Galliformes, Gruiformes, Columbiformes, Strigiformes and Passeriformes. Besides the records of such rare birds, as *Aquila chrysaetos*, *Aquila* cf. *pomarina*, *Otis tarda*, *Phasianus colchicus* and *Corvus corax*, the examined material proved ones of the earliest domestication of *Gallus gallus* and *Anser anser*, occurred in the Eneolithic to the Bronze Age (the site of Galabovo). The appearance of the Domestic Chicken on the Balkans (or in Bulgaria at least) occurred much earlier. It predates the oldest until now record of Kabile (7th century B. C.) by 2000 years at least. This supports the hypothesis of the more ancient appearance of *Gallus gallus domestica*, or its native origin possibly through domestication of a local native subspecies of the Red Junglefowl in SE Europe.

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New data on the Holocene distribution of the Southern Birch Mouse (*Sicista subtilis* (Pallas, 1773)) in Bulgaria

Ivan MITEV

MITEV I. 2004. New data on the Holocene distribution of the Southern Birch Mouse (*Sicista subtilis* (Pallas, 1773)) in Bulgaria. – Historia naturalis bulgarica, **16**: 133-138.

Abstract. Ten semi-mandibles and one maxille of at least 8 individuals, collected in 1993-2002 in four new localities of *Sicista subtilis* - the vicinities of the villages Madara (Shoumen Region), Shirokovo, Petrolna Basa to Rouse (Rouse Region) and Strelkovo (Silistra Region) in the NE Bulgaria, considerably widen the species range throughout the country.

Key words: *Sicista subtilis*, Mammalia, Holocene fauna, Bulgaria

Introduction

The Southern birch mouse – *Sicista subtilis* (Pallas, 1773) from fam. Zapodidae is a rare species, spread in the steppe areas of the temperate latitudes. The species has limited distribution in Europe. It is established in the steppe regions of the central and eastern parts of the continent: in Austria, Czech Republic, Slovakia, Croatia, Romania, Bulgaria, Moldova, Ukraine and Russia. Its range reaches Baykal Lake in Siberia to the East (GORNER & HACKETAL, 1987).

According to the published data there are two records of the species in Bulgaria, both from Dobrudzha (NE Bulgaria). For the first time the species is established by PETROV (1954) in the vicinities of the town of General Toshevo, Dobrich Region. As a rare species it is included in the "Red Book of People's Republic of Bulgaria" (Peshev, 1985). The second record comes from pellets of the Eagle owl (*Bubo bubo* (L.)), found in a rock niche in the Bulgarian Black Sea coast in the neighborhood of the Cape Kaliakra (POPOV, pers. comm.).

The four new localities

We present here four new records of *S. subtilis* in Northeast Bulgaria, where it was established by bone remains only:

1. Madara. A rock niche, 1 km northwards from the Madarski Skali Park near the Madara village, Shumen region. The niche is situated in a 60 m high rock cliff of western exposition, 20 m above the rock base and about 100 m above the level of the river near the find. The niche is 1 m wide, 1.5 m high and 3 m deep. It contained a layer of 50 cm, rich in accumulations, which were screened from 1994 to 1995. The material originates from the food remains of

Bubo bubo. There are two remains of two specimens of birch mouse, established in the obtained material: one subfossil semi-mandible, and one recent semi-mandible. Associated fauna: *Ochotona pussila*, *Spermophillus citellus*, *Mus* sp., *Sylvaemus* sp., *Ratus* sp., *Glis glis*, *Dryomis nitedula*, *Cricetus cricetus*, *Mesocricetus newtoni*, *Microtus arvalis/agrestis*, *Arvicola terrestris*, *Lagurus lagurus*, *Eulagurus luteus*, *Nannospalax leucodon*. The materials of this locality are different in age – from the Early Holocene to the recent time. This locality testifies about the contemporary distribution of the species in the Provadiysko Plateau, part of which is the "Madarski skali" park. Up till now favorable habitats for *S. subtilis* have existed in the plateau. The measurments of the materials are not given in the table, because we could not rely on them at the moment of publishing of the present work.

2. Shirokovo. A cave in the canyon of the Tsherni Lom River, 3 km northwards of the Shirokovo village, Rouse region. The cave is situated in a 30-m high rock, of western exposition, 7 m above the rock base and 60 m above the river level. It is 1 m wide, 1 m high and 3 m deep. The cave contained a 30 cm thick layer of accumulations, which were screened in October 2000. The accumulations contained plentiful food remains of *Bubo bubo*. There are four remains of at least two specimens of birch mouse: one right semi-mandible - partly broken with M/1; one right semi-mandible – fragmentary, with well preserved alveoles, without teeth; and two left semi-mandibles without teeth. Two of the semi-mandibles look recent, although they were obtained from 20-30 cm deep accumulations. We observed that the overlays in this find were really transposed, because of the burrowing activity of predators. Associated fauna: *Sciurus vulgaris*, *Spermophilus citellus*, *Mus* sp., *Sylvaemus* sp, *Ratus norvegicus*, *Micromys minutus*, *Cricetus cricetus*, *Mesocricetus*

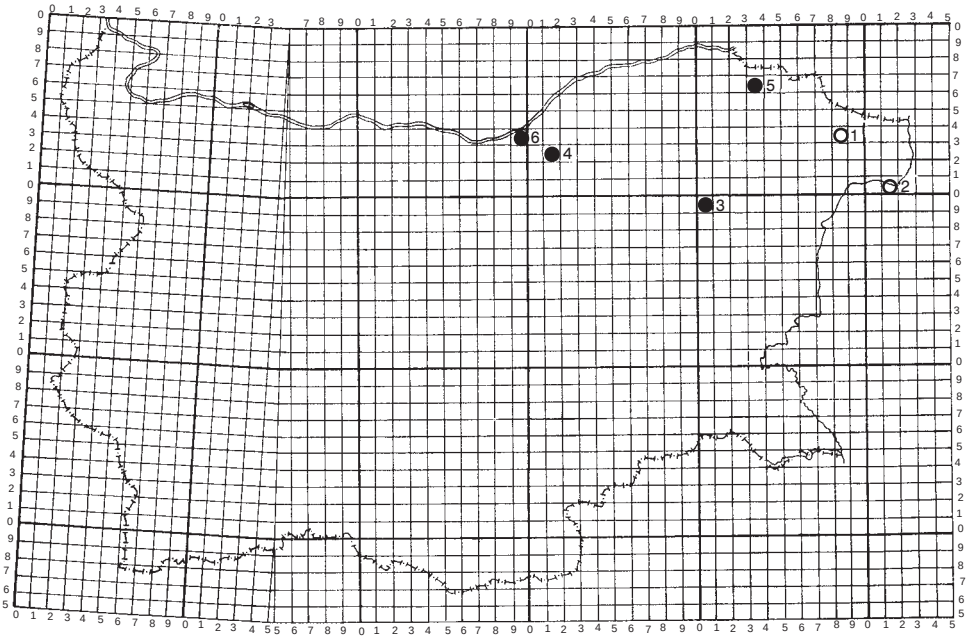

Fig. 1. Distribution of *S. subtilis* in northeastern Bulgaria. Empty circles – literature records; filled circles – new records. 1 – General Toshevo; 2 – Kaliakra Cape; 3 – Madara; 4 – Shirokovo; 5 – Strelkovo; 6 – Petrolna Basa – Rouse

newtoni, *Microtus arvalis/agrestis*, *M. subterraneus*, *M. nivalis*, *Arvicola terrestris*, *Nannospalax leucodon*. This species composition indicates prevailing Late Holocene origin of the osteological material but the presence of *M. nivalis* testifies that the most inferior layer contains Upper Pleistocene and Early Holocene animal remains. The locality of Shirokovo is in the vicinity of the karst area of Pepelina village, where there are large steppe habitats suitable for *S. subtilis*.

3. Strelkovo. A rock niche in a dry valley, 3 km southwards of Strelkovo village, Silistra region. The site is situated in a 15-m high rock of southern exposition, 4 m above the rock base and 12 m above the valley level. The niche is 0.5 m wide, 2 m high and 2 m deep. The niche contains a 20-cm deep layer of accumulations. In May 2002 a part of the accumulations was screened, and remains of three specimens of *S. subtilis* were found – three right semi-mandibles, two of them with M/1. The material originates from the food remains of *Bubo bubo* and probably other owl species. Associated fauna: *Mus* sp., *Sylvaemus* sp., *Mesocricetus newtoni*, *Arvicola terrestris*, *Microtus arvalis/agrestis*, *Muscardinus avellanarius*, *Nannospalax leycodon*. All the materials are dated as recent. There are large steppe areas in the surroundings of the site favorable to *S. subtilis*.

4. Petrolna Basa – Rouse. A karst hole near Danube River, 10 km SW of Rouse. The hole is situated in a 10 m high rock of western exposition, 5 m above the rock base and 15 m above the river level. It is 0.5 m wide, 0.5 m high and 1.0 deep. It contained a 20-cm layer of accumulations, which were screened in 1993. Two remains of at least one specimen were found: one right semi-mandible without teeth and a left maxille, also without teeth. The remains look fresh (i.e. recent). The material comes from the remains of the feeding place of *Bubo bubo* and other owl species (probably *Athene noctua*). Associated fauna: *Spermphilus citellus*, *Mus*

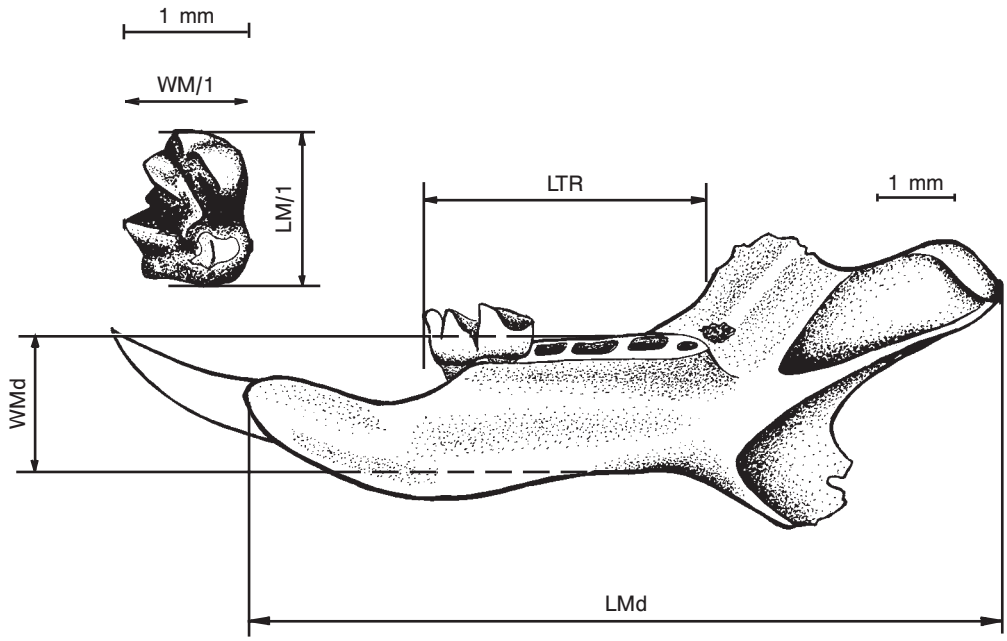

Fig. 2. *S. subtilis* – mandible dextra and molar (for the abbreviations of the measurements see Table 1)

sp., *Sylvaemus sp.*, *Cricetus cricetus*, *Mesocricetus newtoni*, *Microtus sp.*, *Arvicola terrestris*, *Glis glis*, *Nannospalax leucodon*. The age of this vicinity is determined as Late Holocene. There are steppe areas in the vicinity of this site favorable to *S. subtilis*.

The measurements of the collected mandibles of S. *subtilis* are given in Table 1.

Table 1
Measurements (in mm) of the mandibles of *S. subtilis*

Site	Anatomical element	LMd	LTR	WMd	LM/1	WM/1	Notes
Shirokovo	Mandible dextra	-	-	2.30	-	-	fragmentary
Shirokovo	Mandible sinistra	11.05	3.40	2.30	-	-	complete
Shirokovo	Mandible dextra	-	3.30	2.15	1.15	0.90	partly broken
Shirokovo	Mandible sinistra	-	3.65	2.30	-	-	partly broken
Strelkovo	Mandible dextra	10.45	3.40	2.20	1.20	0.90	almost complete
Strelkovo	Mandible dextra	-	3.50	2.25	1.20	0.90	partly broken
Strelkovo	Mandible dextra	10.60	3.40	2.40	-	-	partly broken
Petrolna Basa	Mandible dextra	-	3.45	2.20	-	-	partly broken

Abbreviations: LMd – length of the mandibule; WMd – weight of the mandibule; LTR – length of the tooth rows; LM/1 – length of the lower M1; WM/1 – weight of the lower M1 (Fig. 1).

Discussion

Available data show that *S. subtilis* was a species of large distribution in Northern Bulgaria during the Middle and Upper Pleistocene (POPOV, 1984, 1989, 1994, 2000). The size of M1 of the semi-mandibles from Strelkovo and Shirokovo corresponds to the Pleistocene series from Cave 16 (LM/1: min. 1.12 mm – max. 1.32 mm, mean 1.22 mm; WM/1: min. 0.82 mm – max. 1.22 mm, mean 0.94 mm) rather than to the recent series from Romania (LM/1: min. 1.08 mm – max. 1.18 mm, mean 1.13 mm; WM/1: min. 0.80 mm – max. 0.94 mm, mean 0.89 mm) (POPOV, 2000). This relation indicates a possible Pleistocene origin of these finds, because in the mammal populations, inhabiting colder climatic conditions, the individuals have bigger corporal sizes than those which live in a warmer climate – a well studied tendency, determined as the Rule of Bergman. However, this is not a sufficient evidence of the Pleistocene origin of these finds because we do not rely on the measurment data on recent Bulgarian population of *S. subtilis*, necessary for the comparison with the obtained material.

During the Pleistocene in Northen Bulgaria mainly steppe associations developed, suitable as habitats for *S. subtilis* and other rodent species from the steppe ecological complex. At the beginning of the Holocene when the climate became warmer and dampier, the steppe vegetation was dried

out by the mesophilous woods, which reduced the areals of the typical steppe species, including *S. subtilis*. For this reason the populations of these species have been preserved in some particular localities – refugia: karst areas, favorable to the development of steppe associations. For *S. subtilis* some regions of Dobrudzha, like the Black Sea coast and the vicinities of General Toshevo and Strelkovo, the Provadiysko Plateau and the karst area near Shirokovo - Pepelina and Petrolna Basa – Rouse played the role of suitable refugia. The last three localities prove that the species range spreads much more westwards than considered so far. This makes more realistic the possibilities of records of *S. subtilis* in other regions of Northern Bulgaria.

Acknowledgements

We would like to express our gratitude to Mr. Ilcho Kolev from Rouse for his assistance in the fieldwork on the site of Shirokovo.

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Нови данни за холоценското разпространение на степната скачаща мишка (*Sicista subtilis* (Pallas, 1773)) в България

Иван МИТЕВ

(Р е з ю м е)

Съобщават се четири нови находища на *Sicista subtilis* от Североизточна България. Видът е установен по материали от погадки на бухал (*Bubo bubo*), събрани от 1993 до 2002 г. в находищата до с. Мадара (Шуменско), с. Широково и Петролна база (Русенско), както и с. Стрелково (Силистренско). Събрани са общо 10 полумандибули и една максила от общо 8 индивида. Тези находки свидетелстват за по-широкото холоценско разпространение на вида в България отколкото беше известно досега.

Historia naturalis bulgarica,
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The fossil proboscideans of Bulgaria and the importance of some Bulgarian finds – a brief review

Georgi N. MARKOV

MARKOV G. 2004. The fossil proboscideans of Bulgaria and the importance of some Bulgarian finds – a brief review. – Historia naturalis bulgarica, **16**: 139-150.

Abstract. The paper summarizes briefly the current data on Bulgarian fossil proboscideans, revised by the author. Finds of special interest and importance for different problems of proboscideanology are discussed, with some paleozoogeographical notes.

Key words: Proboscidea, Neogene, Bulgaria, Systematics

Introduction

The following text is a brief summary of the results obtained during a PhD research (2000-2003; thesis in preparation) on the fossil proboscideans of Bulgaria. Various Bulgarian collections stock several hundred specimens of fossil proboscideans from more than a hundred localities in the country. BAKALOV & NIKOLOV (1962; 1964) summarized most of the finds collected from the beginning of the 20th century to the 1960s, the first of the cited papers dealing with deinotheres, mammutids and gomphotheres *sensu lato*, the second – with elephantids. Sporadic publications from the 1970s have added more material.

During the 1980s and the 1990s there were practically no studies by Bulgarian authors describing new material or revising the proboscidean fossils already published. Bulgarian material has been discussed by TASSY (1983; 1999), TOBIEN (1976; 1978; 1986; 1988), METZ-MULLER (1995; 1996a,b; 2000), and more recently by MARKOV et al. (2002), HUTTUNEN (2002a,b), HUTTUNEN & GÖHLICH (2002), LISTER & van ESSEN (2003), and MARKOV & SPASSOV (2003a,b).

During the last two decades, a large amount of unpublished material was gathered, and many of the previously published finds needed a serious revision. A study of Bulgarian fossil proboscideans by the author has yielded the following results:

Four families (three of them elephantoids *sensu* TASSY, 1988) are represented in the fossil record of the country: Deinotheriidae, Mammutidae, Gomphotheriidae *sensu lato* and Elephantidae. (Here Gomphotheriidae is used for convenience as = "bunodont mastodons", i.e. including choerolophodons, amebelodons and "tetralophodont gomphotheres" *sensu* Tassy, although this approach of mine certainly makes the family paraphyletic).

Family Deinotheriidae Bonaparte, 1845

Both *Prodeinotherium* Ehik, 1930 and *Deinotherium* Kaup, 1829 are present in Bulgarian fossil fauna. In older Bulgarian literature, "*Deinotherium giganteum* race minor" has been used for prodeinotheres, and "*Deinotherium giganteum* race maior" for deinotheres proper. Since the very first paper on Bulgarian deinotheres by BAKALOW (1914, Taf. I-VI), however, finds from Nessebar have been erroneously referred to "race minor", i.e. *Prodeinotherium bavaricum* (von Meyer, 1833). Instead, these are juvenile remains of the largest and latest European deinothere, *Deinotherium gigantissimum* Stefanescu, 1892 (MARKOV, in prep.).

Originally described from Romania, this latter species has long been considered a synonym of *Deinotherium giganteum* Kaup, 1829 (e.g. HARRIS, 1978; SHOSHANI et al., 1996), although some European authors believed it to be a separate species or have at least accepted such a possibility (GRÄF, 1957; TOBIEN, 1988; TARABUKIN, 1974). A skeleton from Ezerovo, South Bulgaria, still unpublished (photo in TOBIEN, 1986; some dental measurements in TOBIEN, 1988) shows cranial differences from the Eppelsheim skull and provides good evidence for the separate status of *D. gigantissimum* (MARKOV et al., 2002)[1].

The juvenile remains from Nessebar, mentioned above, the Ezerovo skeleton, as well as other separate dental finds largely increase our knowledge of *D. gigantissimum* – up till now no data was available on some loci, including the deciduous teeth. The skull of this species was unknown too.

Family Mammutidae Hay, 1922

According to earlier authors, two mammutid species are known from Bulgaria: "*Zygolophodon tapiroides*" (i.e. *Z. turicensis*) and *Z. borsoni*. Two of the three finds referred to "*Z. tapiroides*" by BAKALOV & NIKOLOV (1962, Pl. LX, LXI) have been revised by me as belonging to "*Mammut*" *borsoni* (Hays, 1834). *Zygolophodon turicensis* (Schinz, 1824) is represented in the Bulgarian fossil fauna by a single find, if at all – a hemimandible from Butan, North Bulgaria.

Known for decades under the binomen *Zygolophodon borsoni*, Borson's mastodon is usually referred to as *Mammut borsoni* in more recent literature. This seems to be strongly influenced by the works of TOBIEN (1976, etc.) who, nevertheless, assumed an independent origin for *M. borsoni* from Eurasian zygolophodons and for *M. americanum* (type species of the genus) from American Miocene mammutids, objecting to the hypothesis of SCHLESINGER (1922) who suggested a European ancestor for *M. americanum*. Such an approach makes the genus *Mammut* obviously polyphyletic. If *M. borsoni* and *M. americanum* are regarded indeed as belonging to the same genus, this implies a second mammutid migration to North America – a fair enough option. If, however, *M. americanum* is believed to be the ultimate representative of an autochthonous American lineage starting with so-called *Miomastodon* (i.e. *Zygolophodon proavus*), as for example by SAUNDERS & TASSY (1989) and SAUNDERS (1996), then using the generic name *Mammut* for Borson's mastodon is not justified.

[1] Eichwald's names *D. proavum*, *D. podolicum* and *D. uralense* seem to refer to the same East European Turolian species. Although they all precede *D. gigantissimum* and thus should have priority, there are some problems around them concerning types and synonymy with each other. *D. gigantissimum* on the other hand is a well established name, and I agree with Martin Pickford (in lit.) that it would be better to keep it in use: a case for the ICZN.

I personally tend to support the idea that Borson's mastodon evolved in the Old World in parallel with *M. americanum*, and agree with authors who separate it from *Zygolophodon*. Unfortunately, too little is known about this animal apart from its dentition, which makes the description of yet another genus with *Mastodon borsoni* as its type species undesirable in the present state of our knowledge. For this reason, and following the recent trend to some extent, I do not use the binomen *Zygolophodon borsoni*, but "*Mammut*" *borsoni* (with the generic name in quotation marks) as a provisional solution to its taxonomy.

As pointed out by ALEXEEVA (1965), probably under the name "*Mammut*" *borsoni* more than one species is mixed – brevirostrine "*M*". *borsoni* proper from the Pliocene and a closely related longirostrine form from the Late Miocene. There is Bulgarian material from localities of both Late Miocene and Pliocene age, and – as expected – no obvious dental features help to separate the two forms. I provisionally refer all the material to "*M*". *borsoni*, with one exception: a mandible from Ahmatovo, South Bulgaria, published by NIKOLOV & KOVACEV (1966) as *Zygolophodon borsoni*. The mandible has a long rostrum, slightly curving downwards, with alveoli for lower tusks obviously larger than those in the Pliocene form. The age of Ahmatovo is believed to be Turolian (SPASSOV, 2002). A proper name for this find would be "*Mammut*" cf. *borsoni*, as used by TASSY (1985) for finds from Pikermi (Greece), a locality of similar age and in the same geographic region. It is very possible that a senior synonym for the longirostrine form called here "*Mammut*" cf. *borsoni* is "*M*". *praetypicum* – further research is needed to clarify this, and the Ahmatovo mandible is of importance for the understanding of European Late Miocene mammutids.

Family Gomphotheriidae Hay, 1922

As said above, I use the name Gomphotheriidae in its broadest sense for convenience, including here all so-called "bunodont mastodons".

Choerolophodon pentelici (Gaudry & Lartet, 1856)

The species is really well represented in the fossil fauna of Bulgaria, including a skull and several mandibles of adult individuals, which are rare in the fossil record. All finds referred to "*Trilophodon*" *angustidens* by BAKALOV & NIKOLOV (1962) are in fact choerolophodons, as has been pointed out by TASSY (1983). According to our present views, a single species is present in the Late Miocene of Southeastern Europe (TASSY, 1994). This seems indeed to be the best taxonomic solution for the time being. Most of the Bulgarian material comes from localities of assumed MN12 age. A dp3 from Kocherinovo, Southwest Bulgaria, however, shows strong affinities to a deciduous tooth from the lower level (KTD) of Kemiklitepe, Turkey, described by TASSY (1994), thus suggesting an earlier, MN11 age.

Platybelodon cf. *Platybelodon danovi* Borissiak, 1928

This taxon is rare in Bulgaria. A catalogue by NIKOLOV (1985) lists *Platybelodon* sp. from Varna, on the Black Sea coast, but without any details. According to Spassov (pers. comm.), a mandible of platybelodont affinities was indeed pictured in a newspaper in the 1970s and was apparently brought to Nikolov for determination. No description of such a specimen has ever been published though, and the present location of the mandible is unknown. However, there is another find from Varna, originally described by BAKALOW (1911, Pl. VIII, Fig. 2)[1]

as a second molar of *Tetralophodon longirostris* and revised by me as a third lower molar of *Platybelodon* cf. *danovi*.

"*Mastodon*" *grandincisivus* Schlesinger, 1917

I follow TASSY (1985) in regarding this obscure species as an amebelodont, standing quite apart from both *Tetralophodon* and *Stegotetrabelodon*, two genera to which it has been referred by OSBORN (1936) and TOBIEN (1976), respectively.

"*Mastodon*" *grandincisivus* is extremely poorly known (see TASSY, 1999 for specimens belonging to this species). Bulgarian material is probably the most abundant. BAKALOV & NIKOLOV (1962) have described from Orjachovo, North Bulgaria, a mandible with both m3s and lower tusks, two upper tusks and an upper M3. According to TOBIEN (1976), this is the best preserved "*M*". *grandincivus* mandible (note, however, that parts of it are reconstructed).

An unpublished juvenile mandible from Hadjidimovo, Southwest Bulgaria, has been determined by me as probably belonging to "*M*". *grandincisivus*. If so, this is the sole juvenile mandible of this species known so far. It visibly differs from another juvenile mandible of tetralophodont grade from the same locality, referred by me to *Tetralophodon atticus* (see below). The age of Hadjidimovo is believed to be around the MN11/MN12 boundary (SPASSOV, 2002), an age quite in accordance with our knowledge on the distribution of "*M*". *grandincisivus*.

An unpublished "*M*". *grandincisivus* adult skull from South Bulgaria (preliminary determination by D. Kovachev and N. Spassov, kindly confirmed by P. Tassy) is a unique find.

Gomphotherium angustidens (Cuvier, 1817)

As already said, the finds referred to this species in the older Bulgarian literature are actually choerolophodons. Nevertheless, *G. angustidens* is indeed present in the fossil fauna of the country with a single find – an m2 dext labeled Seltzi (South Bulgaria). Seltzi and nearby localities have yielded only Turolian fauna up till now, but to claim that *G. angustidens*, known to range between MN5 and MN9 (TASSY, 1996) survived to a later age in the region would be too far-fetched. The precise place where this specimen was found is not known, so it could come from layers of different age near Seltzi – or from a different locality.

Tetralophodon longirostris (Kaup, 1832) and *Tetralophodon atticus* (Wagner, 1857)

Numerous finds from the country have been referred to *Tetralophodon longirostris* by previous Bulgarian authors. However, the revision of the material showed that most of the finds have been erroneously determined. Many show characters typical of *Anancus*, and one is actually a *Platybelodon* as pointed out above. Part of the Bulgarian material does indeed belong to the genus *Tetralophodon*, but it is another species of the genus, *T. atticus*, that is present in the country (previously unpublished material, see below). Juvenile *Tetralophodon* remains from Bulgaria (a mandible from Hadjidimovo with a broken symphysis, some upper deciduous teeth from the same locality, and a skull from Kalimantsi) are of special interest.

According to TASSY (1986) and METZ-MULLER (1996a), juvenile tetralophodons are known in Europe from Eppelsheim and Laaerberg, Pikermi, Taraklia and Novaya Emetovka

[1] Published again by BAKALOV & NIKOLOV (1962, Pl. LXIV, Fig.2)

(details and references in the two cited works). There is more juvenile material however, published in the literature but gone unnoticed for various reasons. A photo of a DP2-4 tooth row from Pikermi, the type locality of *T. atticus*, has been published without any comments by MARINOS & SYMEONIDIS (1974), erroneously determined as "*M. pentelicus*" (i.e. *Choerolophodon pentelici*), although the four lophs of DP4 indicate a tetralophodont gomphothere. More than ten other specimens (upper and lower milk teeth, mandibular and maxillary fragments) are known from roughly contemporaneous localities (MN11-12) near the northern coast of the Black Sea on the two banks of the Dniester. Today the localities are in Moldova and Ukraine, but the finds have been described by Romanian, Ukrainian and Russian authors – due to the complicated history of the region (for details see Markov in prep.). Bearing in mind the age of these localities, their geographic position and opinions about the similarity between the material from at least two of them and *T. atticus* from Pikermi (TASSY, 1985; BURCHAK-ABRAMOVICH, 1940) it seems logical to assume that all the material from the Turolian of Southeastern Europe (plus Turolian material from Austria and Hungary described by SCHLESINGER, 1917; 1922) represents one species, *T. atticus*.

It seems reasonable to add the roughly contemporaneous juvenile material from Hadjidimovo and Kalimantsi to the rest of the finds from the Turolian of the region and refer it to *T. atticus*. Too little is known about this species, and the finds from Bulgaria, together with those from the localities at the North- Black Sea coast, could play a key role. Whatever its specific status, the Kalimantsi specimen is the only complete juvenile tetralophodont skull known so far.

Anancus arvernensis (Croizet & Jobert, 1828)

Bulgarian finds of *A. arvernensis* also have some importance beyond the regional level. It seems that Bulgarian *Anancus* finds are among the earliest in Europe (METZ-MULLER, 2000; note however that not all Bulgarian localities cited there as MN12/13 are indeed that early). The locality of Dorkovo (MN14) has yielded one of the most abundant samples of this species (now at the MNHN-Paris), superbly treated by METZ-MULLER (1995; 1996b; 2000). One of Metz-Muller's important results was demonstrating that m2's of *A. arvernensis* may reach pentalophodonty – a condition previously unknown from European material (METZ-MULLER, 1996b).

As found out during my research, some finds from Bulgaria of supposed Late Miocene age do show characters typical for *Anancus*, but not *A. arvernensis*. Further research is needed on their specific status (see METZ-MULLER, 2000 on early *Anancus* from Western Europe and Asia).

Gomphotheriidae gen. et sp. indet.

Two finds published by previous authors deserve special attention in my opinion. One is a hemimandible with m3 from Vidin, Northwest Bulgaria, referred by BAKALOW (1911, Pl. V, Fig. 1)[1] to *Tetralophodon longirostris*. It is apparently brevirostrine, and (contrary to the original description) there are no traces of a tusk alveolus. The other is a brevirostrine hemimandible with m3 from Lozenets, Sofia, referred by NIKOLOV (1962, Pl. X) to *A. arvernensis* but – in my opinion – differing markedly from this taxon. The age and the precise locality of the Vidin specimen is unknown, the age of Lozenets is estimated as the beginning of MN14 (SPASSOV, in press). The brevirostrine gomphotheriid genus *Sinomastodon* (described from the Late Miocene

to Pleistocene of China by TOBIEN et al., 1986) has never been found in Europe, although such a find wouldn't be entirely absurd from a palaeozoogeographical viewpoint: SPASSOV (2003) described from Bulgaria finds belonging to a *Nyctereutes* species previously unknown outside China (and a locality in Greece), and none of the other proboscidean genera known from China is restricted only to this area. However, according to Haruo Saegusa (pers. comm. 2004), each of the two specimens has dental characters different from those observed in typical *Sinomastodon*. It is not clear if the two specimens belong to the same taxon or not, and in the absence of m2 in both cases (i.e. no data on tri- or tetralophodont condition) I regard both as Gomphotheriidae gen. et sp. indet.

Family Elephantidae Gray, 1821

Most of the elephantid remains from Bulgaria are stored at the Museum of Russe Region (Russe is a town on the Danube, Northeast Bulgaria) and have not been published yet. Elephantids published by BAKALOV & NIKOLOV (1964) have been partly revised by MARKOV & SPASSOV (2003b) and by me during my PhD research. There are five elephantid species in the Bulgarian fossil fauna: *Elephas antiquus*, *Mammuthus rumanus*, *M. meridionalis*, *M. trogontherii* and *M. primigenius*.

Elephas antiquus Falconer & Cautley, 1845

Until recently, this species was known in Bulgaria only from three finds, published by BAKALOV & NIKOLOV (1964). My research added several specimens from the bottom of the Danube. Unfortunately, the original three specimens are isolated finds, and the rest, as said, come from the bottom of the Danube, so nothing can be said about their precise age.

Mammuthus rumanus (Stefanescu, 1924)

Regarded for decades as a junior synonym of *M. meridionalis* (e.g. MAGLIO, 1973), recent research strongly supports a separate specific status for the most ancient European mammoths (LISTER & van ESSEN, 2003; MARKOV & SPASSOV, 2003a). The first of these two papers provides evidence for the independent status of the species, revising Pliocene mammoth material from Europe and proposing a neotype. The second, describing Bulgarian material that can be referred to *M. rumanus*, suggests a migration path for *Mammuthus* via the Levant and not Gibraltar, *contra* MAGLIO (1973), and discusses probable affinities with African material. A mandible from Bossilkovtsi, near Russe, referred by us to *M. rumanus* is probably the only mandible of this species known so far and thus the most important elephantid fossil from Bulgaria.

Mammuthus meridionalis (Nesti, 1825)

The species is relatively well represented in the country. Material from Northwest Bulgaria described by BAKALOV & NIKOLOV (1964) as "*Elephas* (*Archidiscodon* [sic]) *planifrons*" has been referred by MARKOV & SPASSOV (2003b) to Maglio's "Laiatico Stage" of *M. meridionalis*. This paper was submitted in 2001 (before the two above mentioned papers on *M. rumanus* appeared) and as, according to LISTER & van ESSEN (2003), the Laiatico Stage itself needs

[1] See also BAKALOV & NIKOLOV (1962, Pl. LXII).

revision, this material, or part of it, could turn out to belong to *M. rumanus* (MARKOV & SPASSOV, 2003a). Unfortunately, it is too scarce and without known stratigraphy.

Mammuthus trogontherii (Pohlig, 1881)

This species has not previously been reported from Bulgaria. Part of the remains described by BAKALOV & NIKOLOV (1964) as *M. primigenius* are referred by me to *M. trogontherii* instead; and new unpublished material from the Russe region belongs to this species too. Again, the precise age of the finds is unknown.

Mammuthus primigenius (Blumenbach, 1799)

Separate teeth and a few mandibles, mainly from North Bulgaria, demonstrate the presence of the species in the country. Again, these are isolated finds without other fauna, and the interesting problem of the last occurrence of this species in Bulgaria remains unresolved.

To summarize:
The following proboscidean species are known from Bulgaria:

Family Deinotheriidae:
Prodeinotherium bavaricum
Deinotherium giganteum
Deinotherium gigantissimum

Superfamily Elephantoidea:

Family Mammutidae:
Zygolophodon turicensis
"*Mammut*" *borsoni*
"*Mammut*" cf. *borsoni* (?= "*M*". *praetypicum*)

Family Gomphotheriidae s.l.
Choerolophodon pentelici
Platybelodon cf. *danovi*
"*Mastodon*" *grandincisivus*
Gomphotherium angustidens
Tetralophodon atticus
Anancus arvernensis
Anancus sp. (primitive form of probable Late Miocene age)

Family Elephantidae
Elephas antiquus
Mammuthus rumanus
Mammuthus meridionalis
Mammuthus trogontherii
Mammuthus primigenius

Some of the Bulgarian proboscidean finds add to our knowledge on different problems of proboscideanology as a whole. These are:

– A maxilla and two mandibles, juvenile, of *Deinotherium gigantissimum* – the only ones known so far; a skeleton with both skull and mandible of the same species, providing strong evidence for its separate taxonomic status.
– A longirostrine Late Miocene mandible of "*Mammut*" cf. *borsoni*.
– Adult mandibles and skull of *Choerolophodon pentelici*.
– An adult mandible of the obscure species "*Mastodon*" *grandincisivus*, a unique adult skull, and a juvenile mandible of the same species which is the only one known so far.
– Juvenile *Tetralophodon* material (mandible, skull and upper tooth rows).
– One of the largest samples of *Anancus arvernensis* (currently at the MNHN-Paris), showing that pentalophodonty occurs in European *Anancus* (METZ-MULLER, 1996b).
– Primitive *Anancus* of probable Late Miocene age, differing from typical *A. arvernensis*.
– A mandible of *Mammuthus rumanus*, the only one known so far.

Bulgarian material permits the following observation of palaeozoogeographical interest: in the Turolian, there is an association of five proboscidean species (so-called "Pikermian proboscidean fauna": Markov, in prep.) – *Deinotherium gigantissimum*, "*Mammut*" cf. *borsoni* (?= "*M*". *praetypicum*), *Choerolophodon pentelici*, "*Mastodon*" *grandincisivus* and *Tetralophodon atticus*. The "PPF" is represented in a vast area from Eastern Austria and Hungary through former Yugoslavia, Bulgaria, Romania, the northern Black Sea coast, Greece and Turkey, to Iran and Afghanistan. Not all the taxa have been reported from all mentioned countries, due, I believe, to lack of finds or imprecise taxonomical interpretations. There is one notable exception: *Choerolophodon pentelici* is unknown from the northwest part of this area (former Yugoslavia except Macedonia; Hungary and Austria), which most probably reflects its actual absence from this territory. The "PPF" area corresponds more or less to the "East" block of FORTELIUS et al. (1996)[1]; while the border between the two "subareas" defined by the presence or absence of *Choerolophodon pentelici* corresponds to the border between the so-called "Central Paratethys Bioprovince" and the territories east and south of it (see BERNOR et al., 2003).

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[1] Thus extending the Southeast European – Southwest Asian "superprovince" (see BERNOR et al., 1996) to the northwest.

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Фосилните хоботни на България и значението на някои находки – кратък обзор

Георги Н. МАРКОВ

(Резюме)

Статията представлява кратък синтез на съвременните данни върху фосилните хоботни на България. Тя обобщава резултатите от ревизията на материала от Proboscidea в различни колекции на страната, направена от автора през 2000-2003 г. Някои български находки представляват особен интерес от гледна точка на значението им за решаването на различни проблеми на разреда Proboscidea, като съществено разширяват знанията за слабо познати в световен мащаб таксони или спомагат за изясняването на статута на видове със спорно таксономично положение. Отбелязано е съществуването на асоциация от пет вида хоботни в турола на България. Накратко е дискутирано присъствието ѝ в Югоизточна Европа и Предна Азия и потенциалният интерес от палеозоогеографска гледна точка.

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The dromedary domestication problem: 3000 BC rock art evidence for the existence of wild One-humped camel in Central Arabia

Nikolai SPASSOV, Todor STOYTCHEV

SPASSOV N., STOYTCHEV T. 2004. The dromedary domestication problem: 3000 BC rock art evidence for the existence of wild One-humped camel in Central Arabia. – Historia naturalis bulgarica, **16**: 151-158.

Abstract. The paper discusses a rock depiction - probably the earliest - of a one-humped camel (Sha'ib Musamma open-air site, Saudi Arabia, ca. 3000 BC) in the context of the still unclear problem of dromedary's domestication, and the time and place of this. The enigmatic wild ancestor is discussed too. According to our analysis, the depiction shows a scene of hunting a wild one-humped camel - the latest known evidence for the existence of the wild form.

Key words: Rock art, Paleozoology, Wild One-humped camel, *Camelus dromedarius*, Domestication

Introduction

Interdisciplinary research in the field of rock art could provide interesting results for archaeology as well as archeozoology and domestication. This paper is a small part of the results of our common project 'Prehistoric Mammals in the Rock Art of Palaearctic Region' and an attempt to contribute to the studies on the domestication of the dromedary and its wild ancestor. A composition, which has not been interpreted from this viewpoint until now provides new interesting data on the matter.

For comparative purposes we have used a typology classifying depictions into pictograms/ mythograms, ideograms and psychograms; in the illustrations captions we used area codes suggested by E. Anati and commissioned by the UNESCO – International Council on Monuments and Sites (ANATI, 1993).

Location and description of the depiction

The earliest preserved depiction of a dromedary, or one-humped camel (*Camelus dromedarius*) seems to be the one at Sha'ib Musamma open-air site, Saudi Arabia, ca. 3000 BC (ANATI, 1997). The technique used is plane rock engraving. According to the contemporary (STOYTCHEV, 2001), it is a part of a profile frieze composition representing a hunting scene (Fig. 1). The animal is standing motionless, and seems to have been wounded by four

spears - one stuck deep into the back of the hump and another into the groin; two others are stuck into the thoracic part of the vertebral column but they don't seem to have penetrated deep beneath the skin and hang laterally. Two hunters with bows are aiming at the base of the neck and the left thigh of the animal. A dog on its hind legs is trying to immobilize the camel biting into the upper part of its right forelimb. In the left there is an anthropomorphic figure with a weapon at its waist, making encouraging gestures with its arms. The camel itself looks a large (tall) animal with long limbs, resembling the riding camels of the Sahel desert. Quite realistic, the depiction gives an idea of the exterior of the wild one-humped camel.

Other early (though not that early) depictions of one-humped camels are present, e.g. at Nahal Odem open-air site, Southern Negev, Israel. They are depicted in profile ray-symmetric composition representing a fine nursing scene, which makes us suggest this is an early depiction of already domesticated camel (Fig. 2). The two animals are executed in plane rock engraving technique; they are expressive, finely stylized and dated back between 1900-1350 BP (ANATI, 1997). The stylization of the animals has no significant influence on the precise presentation of their exterior morphology. The female zoomorphic image even has the exact number of tits on its udder.

Fig. 1. Sha'ib Musamma open-air site, Central Arabia. Rock engraving of one-humped camel (*Camelus dromedarius*), part of a hunting scene, ca 3000 BC. *Source:* Redrawn from E. Anati, 1997, p. 99, fig. 69. *Area code:* B-IV

Analysis and discussion

A potential matter of dispute could be the interpretation of the scene from Sha'ib Musamma as a hunt of a wild one-humped camel. Undoubtedly, this is a hunting scene, but is the animal wild or domesticated? From the viewpoint of formal logic, the latter possibility is not to be neglected and has to be particularly analyzed. In the Neolithic rock art of Egypt there's an interesting precedent: at Jebel Uwenat open-air site a chaotic profile composition of rock engravings is preserved, showing an obvious attempt to kill a domestic long-horned female

cattle (ANATI, 1997). This is not just a cattle-raid, the animal is going to be killed for its meat (Fig. 3). We think this is a story-telling scene, not narrative, as classified by E. Anati. Our interpretation is different too: in the right, two men with the same hair-dresses or hats, one bearing a bow and an arrow and the other a spear, attack the two owners of the cattle depicted in the left, each of them with a feather on his head. The upper left human figure is already wounded with a spear in the thigh and continues fighting, the other protects a long-horned cow and its calf with a bow and an arrow, while the second attacker is throwing his spear to the cow's neck, the trajectory of the spear is represented by the small lines. The importance of the event is emphasized by the identification ideograms for possession (two pairs of triangles) on the cow's body. This depiction is probably the oldest evidence for deprivation of property in the world.

Fig. 2. Nahal Odem open-air site, Southern Negev, Israel. Rock engraving, nursing scene: one-humped camel (*Camelus dromedarius*) with its young, 1900-1350 BP. *Source:* Redrawn from E. Anati, 1993, p. 113, fig. 74. *Area code:* B-III

What makes the two scenes completely different is that one of them is hunting and the other story-telling, one has a dog taking part in the hunt, the other does not. To assume that a dog is used for hunting domestic animals is against Ocam's principle, because dogs are usually used to drive the game to the hunters, and domestic cattle is used to the presence of people and dogs are needed to cut the distance - one could just come near a domestic animal because it does not instinctively expect to be threaten or killed by those taking care of it. For these reasons, we believe that the Sha'ib Musamma scene undoubtedly represents a hunting of a wild one-humped camel.

On the origin of dromedary and the problem of its wild ancestor

The origin of many domestic animals has long been debatable. This holds especially true for the one-humped camel. Supposedly ancestral to the Bactrian camel is the wild two-humped camel, today surviving in the Gobi desert. Despite assumptions that it is secondarily feral or

contaminated by cross-breeding with domestic Bactrian camel, craniometrical research has shown some differences with the latter (BOGOLIUBSKY, 1959). According to some authors, wild (or maybe feral?) two-humped camels were present in the 17th century or even later in Turkmenistan and Tian-Shan (BOGOLIUBSKY, 1959). EPSTEIN (1971) thought that two-humped camel might have been domesticated as early as the fourth millennium BC, but this suggestion is not based on any concrete evidence. As for the dromedary's ancestor, the problem is even less clear. There is no wild one-humped camel in our days. Historical data (see below) could refer to feral animals, and most of the data on earliest domestication are based on no certain evidence. For this reason it has been suggested (some authors still support this view) that dromedary and Bactrian camel have a common origin (from the same species, or mostly two different subspecies) basing upon some embryological peculiarities of the development of the hump and the hybrids fertility (HILZHEIMER, 1926 cited in EPSTEIN, 1971; KÖHLER, 1981). The presence of one or two humps however is a difference of probable important social behavioral demonstrative meaning and indicates a taxonomical differentiation (SPASSOV, 1992). Except for the number of humps, there are other important differences between the two camels: differences in the skull and skeleton, in the soft tissues morphology, the exterior (proportions, development of horny pads on the body, coats), physiology and behavior. Hybrids do have some limits to their fertility (BOGOLIUBSKY, 1959; BASKIN, 1976; EPSTEIN, 1971). All that clearly demonstrates that they originate from different wild species, and not from one ancestral species.

Ancient Greek historians mention the presence of wild one-humped camels in the Arabian Peninsula (EPSTEIN, 1971). We cannot be sure, however, if these were indeed wild camels or feral dromedaries, like recent camels introduced in Australia which are now feral.

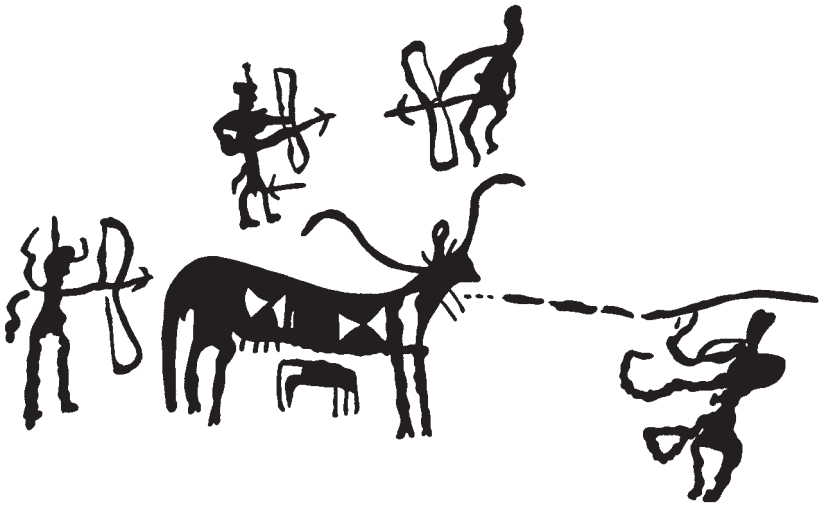

Fig. 3. Jebel Uwenat open-air site, Egypt. Neolithic rock engraving, story-telling scene: killing long-horned female domestic cattle with a spear, Neolithic. *Source:* Redrawn from E. Anati, 1997, p. 155, fig. 122. *Area code:* C-II

Natural distribution area of the domestic one-humped camel is northern Africa and Arabia, Iran, Turkmenistan, Asia Minor to southern Kazakhstan and southern Uzbekistan (BOGOLIUBSKY, 1959). There are no two-humped camels in the prehistoric rock art of the Arabian Peninsula and northern Africa, as well as there are no one-humped camels in the rock art of Central Asia. From the Ternifine site, Algeria, after a maxilla, the fossil camel *Camelus thomasi* Pomel, 1893 has been described. Remains assumed to belong to *C. thomasi* from Northern Africa are known from the Middle and Late Pleistocene from Morocco to Egypt; in the south camel remains are known from the Plio-Pleistocene of Ethiopia (Omo), from Northern Kenya and the Middle Pleistocene levels of Olduvai (Tanzania) (GRIGSON, 1983); it seems they are also known from the Holocene (Neolithic) of Algeria and Mauritania (EPSTEIN, 1971). It's not clear if *C. thomasi* survived in northern Africa. It seems more probable that here the wild camel didn't survive until the penetration of the domestic one, the latter probably coming from the east (EPSTEIN, 1971; BOGOLIUBSKY, 1959). Fossils of Late Pleistocene age assumed to belong to *C. thomasi* have also been found east of Africa, in the Negev desert (GRIGSON, 1983).

A rather controversial problem is how close to the dromedary indeed is *C. thomasi*, as noted in the original description, and if it could be regarded as its wild ancestor. As far as this is practically the only identified wild camel occurring in Northern Africa until Holocene times, *Camelus thomasi* is thought by some authors to be the possible wild ancestor of the dromedary (BARYSHNIKOV, 1981). However, comparative research shows that *C. thomasi* is closer to the Bactrian camel in its bone proportions and size, and maybe some cranial features as well (GAUTIER, 1966; GRIGSON, 1983).

HAVESSON (1954) described after a mandible a separate wild camel subspecies - *Camelus dromedarius dahli* from a locality near the lake Sevan, Armenia, dated ca 3000 BC. Remains are insufficient for a serious analysis of this camel's relationships, but it could be a possible 'candidate' for dromedary's direct wild ancestor. Scarcity of palaeontological data, the presence of a Bactrian-like (according to the data available) wild camel in the end of the Pleistocene of Northern Africa and Negev, and the lack of reliable data on the existence of wild one-humped camels, makes the problem of the dromedary's wild ancestor very uncertain.

Time and supposed centre of domestication of the one-humped camel

Ideas of a very early domestication have recently been criticized. A stated presence of a Neolithic clay figurine of a dromedary on the island of Crete (BOGOLIUBSKY, 1959) has been revised. This figurine is probably from the middle of the second millennium BC (EPSTEIN, 1971), and it is not certain that it represents a camel at all. EPSTEIN (1971) supposed that the dromedary's domestication began during the fourth millennium BC. However, there are no facts to support this opinion.

Animal pottery figurines from Egypt dating from the Predynastic/ Early Dynastic period have been used as evidence for a very early domestication. The hypothesis of the presence of domestic one-humped camel in Egypt in the end of the fourth and the beginning of the third millennium BC is based on these finds. Among the more serious evidence is a terracotta tablet from the Predynastic Period (after EPSTEIN, 1971) necropolis north of Gurna – with a depiction interpreted as a domestic camel led by a rope. From Abusir-el-Meleq site (ca. 3000

BC) is known a camel figurine "carrying a load"; the same figurine is thought to represent a lioness by other authors. In northern Fayum a rope of camel hair has been found, dated at ca. 2600 BC. Strangely enough, camels are almost absent from Egypt depictions until the Ptolemaic Period and begin being widely used only in the Greek-Roman Period. A logical explanation would be that wild camel didn't survive here until the time of domestication or inhabited regions bordering Predynastic Egypt. The oldest evidence for camels presence could be explained as being sporadic and related to foreign cultural influence (EPSTEIN, 1971). In Mesopotamia (Iran) at Uruk another very old figurine has been identified as a dromedary (age – ca. 3000 BC after EPSTEIN, 1971).

There is no unequivocal evidence for the presence of domestic camels of this age. For this reason, it is assumed nowadays that the dromedary was domesticated mostly 3000 years ago (DAVIS, 1987), and certain evidence is even later. Bone remains cannot show if these are wild or domesticated animals. Camel dung and hairs dating 2600 BC have been found in Iran at Shar-i Sokhta. This is accepted by some authors as the earliest evidence for the camel's domestication, but it could be a two-humped camel (CLUTTON-BROCK, 1981). Of interest are archaeological data on the presence of camels (unidentified at the species level, but maybe dromedaries) from Mohenjo-Daro, India, 2300 BC (DAVIS, 1987).

Indirect evidence shows that the most possible initial centre of dromedary's domestication is the Arabian Peninsula (EPSTEIN, 1971; KÖHLER, 1981; DAVIS, 1987). This is also supported by the here discussed rock art images of wild camels from the second millennium BC at Nahal Odem open-air site and the wild camel depiction from 3000 BC at Sha'ib Musamma open-air site.

It remains unclear if the latter could represent *C. thomasi*. It is known that this animal was very large, especially the remains found at Negev (GRIGSON, 1983). If we assume that in this hunting scene the artist tried to keep the proportions between the size of the camel and the men, then maybe the gigantic stature of the animal is not accidental? On the other hand, could we expect that *C. thomasi* is indeed a one-humped camel, if it's skeleton is closer to that of C. *bactrianus*, as usually assumed?

General conclusions

Discussed rock art images support the suggestion that the centre of one-humped camel domestication was the Arabian Peninsula. The depiction at Sha'ib Musamma in Saudi Arabia is of particular interest because it seems to show the dromedary's direct wild ancestor, an animal practically unknown. Still unknown remains the taxonomic status of this wild ancestor as well as the question if the depicted animal could be *C. thomasi,* or the enigmatic *Camelus dromedarius dahli*.

The depiction is an indirect testimony that the purpose of camel's domestication was initially its meat (contrary to other opinions, see KÖHLER, 1982) as is the case with most other domesticated ungulates. There are two possibilities:

1.The depiction dates from the very beginning of domestication. At the time of the earliest domestication of the one-humped camel – ca. 3000 BC, at the most probable centre of domestication (or close to it) wild camels were still hunted for their meat. In such case,

most probably the hunters were not the same people who domesticated the one-humped camel. Similar examples could be given with horse, sheep and goat. Supporting this is a conclusion by ANATI (1997), according to whom both hunting nomad tribes and herdsmen tribes created rock depictions in Sinai and Arabia by the time of the Sha'ib Musamma hunting scene.

2. The depiction dates from the period immediately before domestication.

It's quite possible that authors recently claiming that domestication began in Arabia about 3000 BC or even later are right. One should bear in mind that reports on the presence of domestic dromedaries 3200 – 3000 BC in Egypt and Mesopotamia, and 2600 BC in Libya (periphery of the domestication centre?) are not based on any certain on direct evidence. Assuming that the relative style dating by ANATI (1997) of the hunting scene at Sha'ib Musamma is correct, than the scene should be related to the end of the hunting period, immediately before the beginning of domestication (at least in the central part of Arabian Peninsula). Such a suggestion seems quite probable: domestication is usually related to (at least partially) settled way of life (on camel in particular see also KÖHLER, 1981). Such a mode of life creates the conditions needed for animal husbandry, while the people who created the discussed hunting scene were probably still hunters-nomads.

In both cases, this depiction is probably the latest of preserved evidence for the existence of wild one-humped camel in the region related to the centre of its domestication.

Acknowledgments

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Свидетелства от скалното изкуство (3000 години пр. н. е.) за съществуването на дивата едногърба камила в Централна Арабия и въпросът за времето на одомашняването на дромедара

Николай СПАСОВ, Тодор СТОЙЧЕВ

(Р е з ю м е)

В изследването се привеждат нови данни, чрез анализ и интерпретации на праисторическо скално изкуство, за едни от най-късните свидетелства за съществуването и външния вид на дивата едногърба камила. Те аргументират присъствието на дива едногърба камила в Саудитска Арабия през III хилядолетие пр. н. е. Направен е и анализ на хипотезите и аргументите за одомашняването на едногърбата камила, причините, времето и мястото на този процес според археологически и остеологични материали.

Historia naturalis bulgarica,
16: 159-166, 2004

The presence of cave hyaena (*Crocuta crocuta spelaea*) in the Upper Palaeolithic rock art of Europe

Nikolai SPASSOV, Todor STOYTCHEV

SPASSOV N., STOYTCHEV T. 2004. The presence of cave hyaena (*Crocuta crocuta spelaea*) in the Upper Palaeolithic rock art of Europe. – Historia naturalis bulgarica, **16**: 159-166.

Abstract. The very few images of cave hyaena, from the Upper Palaeolithic rock art of Europe are analyzed in the paper. The images show a very close exterior appearance (coloration pattern) with the African spotted hyaena. The causes for the extremely low number of preserved cave hyaena pictograms as well as the lack of "fantastic" zoomorphic images in the Upper Palaeolithic rock art of Europe are discussed.

Key words: Rock art, Paleozoology, Europe, Pleistocene, Cave hyaena, *Crocuta crocuta spelaea*

Introduction

After looking through thousands of large mammal depictions in the rock art of Europe's Upper Palaeolithic published during the last century, our interest was raised by the inexplicably low number of Cave Hyaena zoomorphic pictograms. It is in discrepancy with the numerous fossil finds and the large area (KAHLKE, 1999) of Late Pleistocene *Crocuta crocuta spelaea*. During the Late Pleistocene this species inhabited all of Europe except the northern part of the continent. Many caves (so called hyaena caves) are known for the large number of cave hyaena remains: Kent's Cavern, Tornewton Cave (England), Teufelslucken (Austria), Lindental Hyaena Cave (Germany), Sveduv Stul (Czech Republic), etc. (WERDELIN & SOLOUNIAS, 1991; KAHLKE, 1999). France also has numerous remains and localities from this time (BALLESIO, 1979; CLOT, 1980). In fact, France has the only European examples of Palaeolithic art representing the cave hyaena, which we shall discuss later.

Before the 90s, when an undoubted cave hyaena depiction from the Chauvet cave was published (CHAUVET et al., 1995) the positive presence of the species in Europe's prehistoric art was limited to a small ivory sculpture from La Madlaine, France (KURTEN, 1986 after WERDELIN & SOLOUNIAS, 1991). WERDELIN & SOLOUNIAS (1991) explain the scarcity of this carnivore in European Palaeolithic art with the scarcity of depictions of carnivores as a whole (WERDELIN & SOLOUNIAS, 1991). This is true, indeed, for small carnivores. As for the large ones, however, (where the cave hyaena rather belongs), they are represented well enough, and cave bear and cave lion have been portrayed numerous times.

Location and description

For comparative purposes we use a typology classifying depictions as pictograms/ mythograms, ideograms and psychograms; in the illustrations captions we used area codes suggested by E. Anati and commissioned by the UNESCO – International Council on Monuments and Sites (E. ANATI, 1993, 39-4).

J-M. Chauvet, E. Deschamps and C. Hillaire discovered in December 1994 one of the five largest sanctuaries with Palaeolithic rock art in Western Europe – Ch0•uvet Cave, the plateau of Bas Vivarais near Ardéche river, Valon-Pont d'Arc, Ardéche, South France. Among the numerous zoomorphic images on the cave walls there is a pictogram of a cave hyaena (CHAUVET et al., 1995, p. 26, fig. 23). The rock painting is in red, the animal is outlined and represented in profile, with two legs, with its head and front part with well distinguishable spotted coloration pattern (Fig. 1). Judging from the published photo, one could suggest that the image is probably unfinished, yet this could be confirmed only *in situ*. It's also possible that initially the spots took the whole outlined surface. The zoomorphic image is referred to Magdalenian, Upper Palaeolithic.

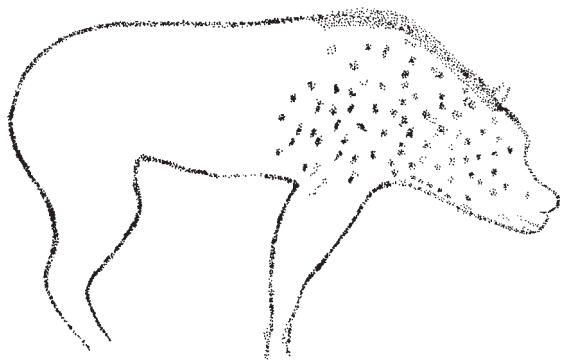

Fig. 1. Chauvet Cave, Valon-Pont d'Arc, Ardéche, France. Upper Palaeolithic /Magdalenian/ rock painting in red of a cave hyaena (*Crocuta spelaea spelaea*); the only undoubted image of this animal up till now, with punctuated skin pattern, artistic style IV after A. Leroi-Gourhan. *Source:* Drawn from a photograph by J-M. Chauvet et al., 1995, p. 26, fig. 23. *Area code:* E-I. [44]

Another image we believe to represent a cave hyaena is in the famous Lascaux Cave, Dordogne, France. The cave's pictograms are among the best studied in the world, bearing in mind that research on them was started as early as 21 September 1940 by Abbot H. Breuil, Abbot J. Bouyssonie, A. Sheynier and D. Peyrony (BREUIL, 1985, p. 107). Lascaux Cave is too one of the five largest sanctuaries with Palaeolithic rock art in Western Europe, having 600 rock paintings and 1500 rock engravings. The discussed zoomorphic depiction (fig. 2) is a rock painting in red and black (DELLUC & DELLUC**,** 1989, p. 47, fig. 42). It is in profile, with four limbs, showing an animal with a steep back. The body and the long neck have spots, including the flanks. This obviously shows that the fur has a spotted coloration pattern on the whole body. The image is depicted in the part of the

cave known as Diverticule axial and belongs to Late Solutrenian or Early Magdalenian, Upper Palaeolithic (LEROI-GOURHAN, 1971, p. 453). As far as the depiction is more schematic than other zoomorphic pictograms at Diverticule axial, which suggests an earlier relative dating, and should probably rather be referred to the Late Solutrenian.

A depiction which hasn't been taxonomically determined until now, is known from the Le Portel Cave, Ariège, France (MÜLLER-KARPE, 1966, Taf. 114-45). It was discovered on 6 March 1908 by Dr R. Geannel, who (together with G. Fauveau) explored the rock paintings, and during the same year rock engravings were studied by H. Beuil. The zoomorphic pictogram is incompletely outlined and deeply engraved, representing a part of an elongated neck, smoothly passing into part of the animal's forelimb on the proximal side. Its head is in profile (Fig. 3). The year is rounded, with a shape typical for C*rocuta*, the muzzle is probably re-engraved, yet there is no possibility that the image shows a horse.

The rock art in Le Gabillou Cave, Sourzac, Dordogne, France was discovered in 1941 by Sharmarty and Truffier: pictograms of horses, bovids, bisons, deer, a mammoth, two hares and a portrait in profile. First to study them was Dr. Gaussen, who also undertook their protection. Among the animal depictions is a deeply engraved zoomorphic image with a head in frontal view and an elongated neck with part of the forelimb in profile (Fig. 4). It has large round eyes, ears short, rounded and set far from each other, and a line-like mouth that is largely broadened (larger than the outer distance between the eyes) and reminds a "smile".

Discussion

First of all, we have to note that only the cave hyaena in Chauvet Cave has been determined as such by the authors of the first publication (CHAUVET, 1995, p. 26, fig. 23). This painting, which recently became known to zoologists and palaeontologists, raised a large interest, because it definitely shows the spotted coloration pattern of this carnivore. The outline and the coloration

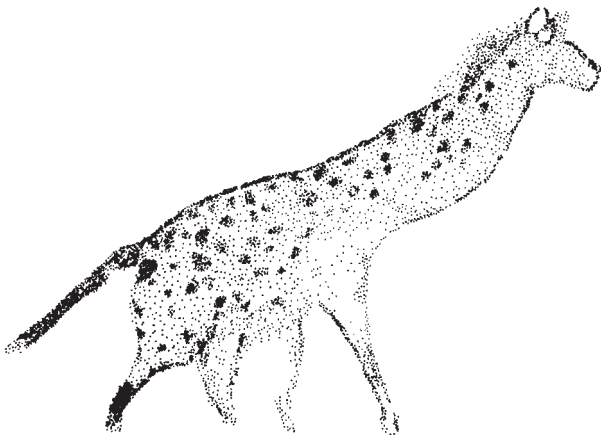

Fig. 2. Lascaux Cave, Dordogne, France. Upper Palaeolithic /Late Solutrenian/ rock painting in black of a cave hyaena (*Crocuta spelaea spelaea*), artistic style III after A. Leroi-Gourhan. *Source:* Drawn from a photograph by B. Delluc, G. Delluc**,** 1989, p. 47, fig. 42. *Area code:* E-I. [402]

indeed leave no doubt that a cave hyaena is portrayed. The angle between the muzzle and the forehead seems to be a little bit too strained and the head doesn't differ too much from some cave bear profiles from Western European Palaeolithic rock art. We believe it's possible that the initial intent was to depict a cave bear, later finishing the painting as a hyaena. Such cases of changing the initial intent are not too rare in Paleolithic art of Europe.

Despite the popularity of the paintings in the Lascaux Cave (Fig. 2), the image of a hyaena seems to be unnoticed by zoologists and most rock art specialists, and is not published or discussed in the more important classical works (BATAILLE, 1955, 65-90; BREUIL, 1985, 107-152; LEROI-GOURHAN, 1971, 362-365). A photograph is available in one of the French special editions on the cave, but the authors regard it as a pictogram of a horse (DELLUC & DELLUC**,** 1989, p. 47, fig. 42). There are indeed spotted horse images in the Late Palaeolithic art of Western Europe. The peculiar characters of this depiction, however, eliminate the horse, despite the presence of a mane. At the same time, typical hyaena features are present: steep back, elongated neck with a curving opposite to the horse (rather concave than convex), irregular spots. The tail of the animal resembles *Crocuta*, and the presence of a mane is also a character of this genus. One of the very characteristic (yet harder to notice) character of this genus' exterior is the long neck of a scavenger. It often looks even longer in alert posture – something the Palaeolithic artist didn't miss.

In both cave hyaena depictions it's clearly seen that their fur preserved the spotted coloration pattern. Judging from the colour and position of the spots on the body, the mane and the outline, the similarity between the recent and fossil forms is obvious. The Chauvet pictogram

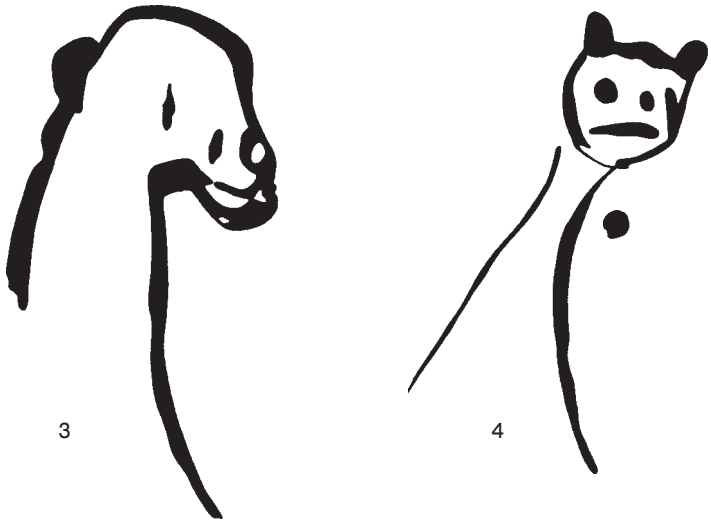

Fig. 3. Le Portel Cave, Ariège, France. Upper Palaeolithic /Solutrenian/ rock engraving of a possible cave hyaena (*Crocuta crocuta spelaea*), artistic style III after A. Leroi-Gourhan. *Source:* Redrawn from H. Müller-Karpe, 1966, Taf. 114-45. *Area code:* E-I. [563]

Fig. 4. Le Gabillou Cave, Dordogne, France. Upper Palaeolithic /Solutrenian/ rock engraving of a possible cave hyaena (*Crocuta crocuta spelaea*), artistic style III after A. Leroi-Gourhan. *Source:* Redrawn from a photograph by A. Leroi-Gourhan, 1971, p. 367, fig. 351. *Area code:* E-I. [412]

shows the posterior part of the body without spots. It is rather improbable that this was the real pattern, i.e. an indication for the disappearance of the spots in the posterior part of the body. As already noted, this is rather due to an unfinished painting. It's well known that populations inhabiting harsher northern latitudes decrease the contrast of their coloration (GUTHRIE, 2000). The distribution of the spots in the Lascaux depiction - probably the only finished one - prevents us from making the conclusion that the Würm Palaearctic *Crocuta crocuta spelaea* had less spots on its body. As this image shows, the cave hyaena didn't lose its spots in the harsh climatic conditions of Europe's Ice Age and probably kept the same spot frequency as the Recent African form. In fact, this is also true for the coloration pattern of Recent Palaearctic leopards. The other two rock engravings are of interest from the viewpoint of their possible interpretation as cave hyenas. The elongated neck we already discussed, together with the rounded ear and dome-shaped skull permit the possibility that the Le Portel engraving represents a cave hyaena. The image in the Le Gabillou Cave has been interpreted by A. Leroi-Gourhan as a feline-like "fantastic animal" (LEROI-GOURHAN, 1971, p. 436). In the European Upper Paleolithic rock art, zoomorphic pictograms are rather not fantastic, but taxonomically determinable or not. Fantastic animals should be referred to zoomorphic-hybrid pictograms, meaning that the image consists of parts of different animal species (STOYTCHEV, 2000, 45-46), something absent in this particular depiction. More than that - in European Upper Palaeolithic rock art there are no known images of "fantastic" animals. In some extremely rare cases there are anthropomorphic figures masked with zoomorphic-hybrid elements and interpreted as shamans or else, which are determined from the viewpoint of modern classification as anthropo-zoomorphic or zoo-anthropomorphic pictograms: e.g. painting-engraving of the Sorcerer and the rock engraving of a bison-like human figure with music-bow in Trois-Frères Cave, Ariège; similar image engraved in the Le Gabillou Cave, Dordogne; zoo-anthropomorphic pictograms of a rhinoceros or cave lions with human features in Chauvet Cave, Ardéche (TIMULA, 1995, 211-248, figs. 13, 15, 20; CHAUVET et al., 1995, p. 58, fig. 50, p. 104, fig. 84).

There are other combinations too, resulting from accumulations with partial imposition or accumulations with superimposition. They belong to accumulations on one rock surface, when two or more images impose partially or are executed on each other (STOYTCHEV, 2000, 39-40). This was done by different artists, and could have happened after a period of 2 months, 2, 20, 200 or 2000 years. In all those cases the later images changed the initial concept and semantic of the earlier ones. For these reasons it's impossible to accept S. Timula's interpretation of these images as being "composite" (TIMULA, 1995, p.234, fig. 14) or "fantastic", as is the case with an engraved realistic human portrait overlapping a bison depiction, which is an earlier addition in Trois-Frères Cave, Ariège. Typical examples in this relation are: a polychrome rock painting of a woolly mammoth (*Mammuthus primigenius*), the zoomorphic pictogram is part of a composition with a mammoth herd, later partially re-painted and representing a bison (*Bison priscus mediator*) in Font-de Gaume Cave, Dordogne; in another case a rock engraving of a woolly mammoth (*Mammuthus primigenius*) is overlapping an earlier woolly rhinoceros (*Coelodonta antiquitatis*) in La Mouthe Cave, Dordogne (BREUIL, 1985, p. 301, fig. 345).

Going back to the zoomorphic image in Le Gabillou Cave, Dordogne, which can't be "fantastic", "composite" or zoomorphic-hybrid, it most probably represents a carnivore. This could be a felid or more probably a mustelid, but the long neck and the broad muzzle create mostly the impression of the typical behavior characters of a "curious" and alarmed hyaena: we can imagine its stretched neck and typical mimics, resembling a broad "smile".

Conclusions

Until recently, it was assumed that cave hyaena was practically absent from European Palaeolithic rock art. The only exception seemed to be recently found in the Chauvet depiction. The extremely low number of preserved cave hyaena (*Crocuta crocuta spelaea*) pictograms seems to show indeed it was not depicted proportionally to the large area of distribution. Such an absence could be explained by social-psychological reasons, a taboo related to the hyaena's scavenging mode of life, etc. As we are trying to show, hyaenas are present in rock art, if scarce, and this presence makes us reject the possibility of a "taboo". It seems more probable that its lower rank in the "animal worship" hierarchy in the imaginations and beliefs of the Ice Age hunters and artists was caused by entirely mundane, everyday reasons: the species has the unpleasant exterior of a scavenger, it's not a typical and looked-for prey as artiodactyls, it's not a serious enemy or rival like cave lions and bears, and it lacks the impressiveness of the mammoth or wooly rhino. In addition, we could add that cave hyaena bones bearing traces of human activity are not among often finds from Palaeolithic sites.

Depictions from Chauvet and Lascaux provide interesting zoological data on the exterior of the species. Although today the prevailing opinion is that Late Pleistocene European cave hyaena is only a subspecies of *Crocuta crocuta* (WERDELIN & SOLOUNIAS, 1991*)*, some authors (THENIUS, 1966) still consider the fossil form a species distinct from Recent African *Crocuta crocuta* (BARYSHNIKOV, 1995). Up to now, the problem is not clarified also by the DNA investigations (Nagel et al., 2004). Whatever the taxonomical decision, it's obvious, judging from the coloration pattern and the exterior, that the two forms are very close. A morphological, and probably taxonomical closeness between the cave hyaena and Recent African *Crocuta crocuta* suggests a significant similarity in the biology of the two forms.

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Върху присъствието на пещерната хиена (*Crocuta crocuta spelaea*) в къснопалеолитното скално изкуство на Европа

Николай СПАСОВ, Тодор СТОЙЧЕВ

(Р е з ю м е)

Установени и изследвани са няколко изображения на пещерна хиена (*Crocuta crocuta spelaea*) от скалното изкуство на късния палеолит в Европа. Три, от тези четири изображения, са посочени за пръв път като сигурни (от пещерата Ласко) или вероятни (от Ле Габилу и Ле Портел) изображения на пещерна хиена. Последните две скални гравюри носят редица външни белези и поведенчески особености на хиените. Две рисунки (от пещерите Шовет и Ласко) показват не само екстериора на хиените от род *Crocuta*, но и доказват наличието на петниста окраска на козината – белег на близко родство с африканската петниста хиена (*Crocuta crocuta crocuta*). Обръща се специално внимание на липсата на зооморфно-хибридни или "фантастични" изображения през късния палеолит и се търси причината за твърде слабото представяне на пещерната хиена в скалното изкуство, независимо от широкото разпространение на вида по остеологични материали.

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Изложбата "Русенски природоизпитатели" в Националния природонаучен музей

Мая ВАСИЛЕВА

На 20 април 2004 г. специалисти от отдел "Природа" към Регионалния исторически музей в Русе подредиха документална изложба във фоайето на Националния природонаучен музей, посветена на русенските учители и естественици Васил Ковачев и Михаил Халваджиев. Изложбата е организирана във връзка с честването на 100-годишнината от създаването на Русенския музей. Изложените снимки, оригинали и копия от научни трудове, научно-популярни статии, факсимилета, както и формалинови препарати и хербарий от 1902 г., представят живота и научната работа на двамата природоизпитатели. Те са тясно обвързани с историята на музея и по специално на отдела "Природа" към него. През 1904 г. в Държавната мъжка гимназия "Княз Борис" в Русе се създават археологическа и природонаучна сбирка, събрани и организирани от братята Карел и Хермингилд Шкорпил, както и от учителя по естествознание Васил Ковачев. Това поставя начало на съществуването на Исторически музей в Русе.

Васил Ковачев е роден на 1 януари 1866 г. в гр. Русе. Основно и гимназиално образование получава в тукашната Мъжка гимназия, като основен тласък за развитието му като природоизпитател дава учителят по естествознание чехът Вацлав Колар. Пак под негово влияние Ковачев записва естествени науки в Новоросийския университет в Одеса. През 1889 г. се завръща в България, където учителства 2 години във Велико Търново, а след това в Държавната мъжка гимназия в родния си град. Там посвещава 20 години от живота си на преподаване, събиране на материали от растителния и животински свят, занимавайки се активно и с обществена дейност. Положените усилия и изявеният ентусиазъм му позволяват да създаде богата колекция от растителни и животински материали. В резултат на събирателската си дейност Ковачев успява да публикува голям брой научни трудове в областта на ботаниката и зоологията, както и някои научно-популярни статии. Сред най-значимите му работи са: "Принос за изучаване на ентомологическата фауна на България", "Херпетологична фауна на България", "Сладководната ихтиологична фауна на България" и "Бозайната фауна на България". След 1912 г. заема различни длъжности - инспектор, директор, учител - в градовете София, Пловдив, Хасково и Кюстендил. В края на живота си се връща в Русе, сломен от тежка наследствена болест и умира на 60-годишна възраст. Неговите колекции постъпват в отдел "Природа" на Русенския музей, като по този начин създават

основата на бъдещия фонд. Днес хербария на Васил Ковачев, съдържащ около 900 листа със 781 вида, и част от зоологическите препарати се съхранява във фондовете на отдела.

Вдъхновен от намерените материали на Васил Ковачев (включително кости и зъби на фосилни бозайници), **Михаил Халваджиев** (1914–1988) продължава неговата работа. Роден в с. Самоводене (Великотърновско), той допринася съществено за развитието на палеонтологията в България. Михаил Халваджиев е заемал различни длъжности – от учител в Русенската мъжка гимназия, до директор на Техникума по зърносъхранение и зърнопреработка "Асен Златаров" в Русе (1964–1977). Бил е също така и директор на Вечерната гимназия (1952–1954), секретар на Природонаучното дружество – секция Русе (1959–1977), директор на 5-то единно средно училище в гр. Русе (1957–1962) и инспектор по биология и химия към Окръжен отдел "Просвета" (1962–1964). През 1954 г. се създава отдел "Природа" към Русенския музей и Михаил Халваджиев е негов пръв уредник. Като научен работник се посвещава на събиране и изследване на останки от фосилни бозайници. В пясъчните кариери в селата около Русе открива много фосили на различни животни, между които и такива на мастодонти и мамути, които систематизира и изследва. Плод на няколкогодишен труд е работата му: "Терциерна бозайна фауна от Русенско". Днес тези вкаменелости са експонирани в Русенския исторически музей. Палеонтологичната колекция от фосилни бозайници е причина изложбата "Бозайници на 6 000 000 години" да се радва на голям интерес от страна на русенската общественост.

Работата на двамата природоизпитатели е пионерна, имайки предвид трудността в намирането на материали, средства за работа и оскъдната литература. Постиженията им в науката оставят трайна следа в историята на естествознанието в България. Вдъхновени от тяхната работа, днешните биолози продължават делото им в научното поприще.

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