Historia naturalis bulgarica, 20: 107-120, 2012

Estimation of the faunistic diversity of the Kresna Gorge

Zdravko HUBENOV

HUBENOV Z. 2012. Estimation of the faunistic diversity of the Kresna Gorge. – Historia naturalis bulgarica, **20**: 107-120.

Abstract. A total of 3199 species has been established in the Kresna Gorge, belonging to 355 families, 75 orders, 16 classes and 5 types. The taxa with Mediterranean type of distribution for some of the investigated groups are over 70%. Three hundred and eighteen species are rare (19.4%), endemics - 83 species (4.6%) and relicts - 16 species (5.3% of the Bulgarian relicts). The number of taxa with conservation significance is about 400 (12.5%), of which 42 species are of the highest category – world importance.

Key words: Fauna, diversity, conservation, Kresna Gorge, Bulgaria

Introduction

Extensive research of the Kresna Gorge and its surroundings allows regarding this region as well studied. The knowledge of many taxonomic groups and the large number of investigations in the gorge are related to the occurrence of a highroad nearby, of natural science centres, popular tourist sites, a migratory corridor for a number of bird species, and good attendance by zoologists. The zoogeographical character of the Kresna Gorge and the Sandanski-Petrich Valley has traditionally attracted the interest of zoologists in this territory. Several dissertations deal with the region as well (TOMOV, 1971; HUBENOV, 1985; SAKALIAN, 1989).

Most literature data concern mainly the mountains in Southwestern Bulgaria or are scattered in articles that are not specifically focused on the Kresna Gorge. The latest investigations of the gorge include a part of Nematoda (MITOV et al., 2004), Branchiobdella (SUBCHEV, 2001), a part of Gastropoda (ANTONOVA & DEDOV, 2001), a part of Isopoda (ANDREEV, 2001), Scorpionida, Solpugida and Acari (BERON, 2001a), Pseudoscorpiones (PETROV, 2001), Opiliones (MITOV, 2001), Araneae (BLAGOEV et al., 2001), Myriapoda (STOEV, 2001), Odonata (MARINOV, 2001), Orthopteroidea (POPOV et al., 2001), Raphidioptera and Neuroptera (POPOV, 2001), Buprestidae (SAKALIAN & LANGOUROV, 2001), a part of Coleoptera (GUÉORGUIEV, 2001), Heteroptera (SIMOV, 2001), Hymenoptera (IVANOV & LJUBOMIROV, 2001), Phoridae (LANGOUROV & SAKALIAN, 2001), Tachinidae (HUBENOV, 2001), Trichoptera (KUMANSKI, 2001), Hesperioidea and Papilionoidea (ABADJIEV, 2001), a part of Macrolepidoptera (BESHKOV, 2001), Pisces (STEFANOV, 2001), Amphibia and Reptilia (PETROV & BESHKOV, 2001), Aves (STOYANOV et al.,

2001), Chiroptera (PETROV, 2001), Insectivora, Lagomorpha and Rodentia (POPOV, 2001), and Macromammalia (SPASSOV & STOEV, 2001). The hydrofauna is scrutinized (UZUNOV & VARADINOVA, 2001) and a general faunistic review has been made (BERON, 2001b). Most systematic are the investigations concerning Orthoptera, Heteroptera, a part of Coleoptera, Lepidoptera, amphibians, reptiles and birds.

Three periods are outlined in the contemporary investigations of the Kresna Gorge. The first stage includes mostly the investigations on Orthoptera, Heteroptera, Hymenoptera, Lepidoptera and Reptilia by A. Drenovski, N. Atanasov, G. Peshev, M. Josifov, A. Slivov, J. Ganev and V. Beshkov and publishing of many articles by these authors, concerning the gorge. The second stage is connected with the faunistic investigations of Blagoevgrad district by the Institute of Zoology, Bulgarian Academy of Sciences and publishing of the scientific volumes Fauna of Southwestern Bulgaria (Part 1 - 1986 and Part 2 - 1988). Twenty-five articles by 29 authors have been included in it, parts of which refer to the gorge. The third stage of the investigations refers to the biodiversity protection of Kresna Gorge. It generalizes investigations, devoted to the gorge particularly and collected in the monograph Biodiversity of Kresna Gorge (2001). This edition fills a significant lack in knowledge of many taxonomic groups. However, it is published in Bulgarian and the work that generalizes the fauna is very concise. Some taxonomic groups, for which data are available in previous works, are not included in the monograph (BERON, 2001b). There are fragmentary data about the gorge in the articles of recent years (RAPUZZI & GEORGIEV, 2007; VAGALINSKI & STOEV, 2007; BEKCHIEV, 2008; BESCHOVSKI, 2008).

The aim of the paper is to present in generalized aspect the faunal investigations of the Kresna Gorge as well as to analyze the taxonomic diversity of the fauna, the level of study and the conservation significance of the investigated groups.

Approach

The articles discussed here are various and can be divided into 5 groups: 1) Information on separate taxa in the Kresna Gorge; 2) Accidentally included literature data; 3) Generalization of the reported data for the corresponding group from the investigated region; 4) Generalized papers, where the literature data are expanded by current investigations; 5) Systematic contemporary investigations.

The lack of a generalized plan followed by the papers, their heterogeneous character and the different level of knowledge of the included groups make the extracting of equivalent information from all papers difficult. The level of study is made on the basis of the families investigated. The data, provided in Table 2, have to be accepted as tentative and the presented information for the separate taxa to be not compared literally. The percentages in the work usually refer to the groups for which the corresponding data are included.

The conservation significance of the species is established according to the part of their population's presence in Bulgaria. For local endemics 100% of their populations are localized in the territory of the country so they have the highest category - world importance (**W**). The regional endemics, because of their restricted distribution, and species from the IUCN Red List, are included to this category as well. The Balkan endemics and subendemics; the species,

protected by Bulgarian legislation and those included in the Bulgarian Red Book, Bern and Bon Conventions, Birds and Habitats Directives, EUROBATS, ESC Red List and CORINE belong to the taxa of European importance (**E**). Relicts, rare taxa and species at the border of the area form the group with national importance (**N**).

Results and discussion

A total of 3199 species, belonging to 355 families, 75 orders, 16 classes and 5 types have been identified in the Kresna Gorge so far (Table 1). That represents 13.7% of the species from the treated orders in Bulgaria and 10.5% of the total species composition in the country. The explored territory includes from 30 to 70% of the Bulgarian fauna for the well-studied groups. The estimated study level of the separate taxa is different. Nematoda, Crustacea and some orders of Arachnida and Insecta are the most poorly investigated. Entire families from these groups remain almost unknown, so the data in this study are accidental. A small number of families from Acariformes, Hymenoptera and Diptera have been regarded (from 12 to 19) whereas in Bulgaria these include from 62 to 180 families and thousands species. Thus, these orders (except for a part of the families included) have to be considered poorly investigated since from 1.1 to 4.4% of the Bulgarian species are known in the Kresna Gorge. Mollusks, of which 6.4% of the known species in Bulgaria have been reported in the investigated region, should be considered poorly investigated as well. Some orders of Annelida, Arachnida, Insecta and Vertebrata are well studied (about 30% of the Bulgarian species).

The richest in species are three of the studied classes: Insecta (2561 species – 12.4% of the Bulgarian entomofauna as a whole), Aves (232 species – 58.0% of the Bulgarian ornithofauna) and Arachnida (189 species – 7.0% of the Bulgarian arachnofauna) and three of the orders – Lepidoptera (942 species – 32.5%), Coleoptera (634 species – 10.6%) and Heteroptera (419 species – 39.9% of the species, established in Bulgaria). With a moderate species richness are the following groups: Araneae (112 species – 11.2%), Hymenoptera (136 species – 3.4%), Diptera (153 species – 4.4%) and Passeriformes (119 species - 74.4%). The rest of the groups have a poor species richness (below 100 species) or are presented with separate reports. For most groups the Kresna Gorge is a region with very rich species composition. This fact especially applies to Amphibia, Reptilia, Ciconoformes, Accipitriformes, Piciformes, Passeriformes, Insectivora, Chiroptera, Rodentia and Carnivora, of which among 50.0 and 80.0% of the Bulgarian species have been found. It is worth noting that the gorge has a high species richness in comparison with the Central Balkan National Park (2570 species) and Rila National Park (3861 species). Recently, an inventory of the parks' fauna was made but their territories are situated above 700-1000 m and the great faunal richness of the Kresna Gorge despite its small territory is related to this. It can be assumed that the gorge has a rich faunal diversity but the total level of study is about 50-60%. This low value is related to the poor investigation of the invertebrate groups with a high species richness (Acariformes, Parasitiformes, Hymenoptera and Diptera). The total taxa number could reach about 4000-5000 after a thorough investigation of the fauna.

Low altitude of the gorge and poor study level of part of the taxa allow no definite conclusions on the vertical distribution of the groups. Often the more widely distributed species reach to above 1000 m whereas those with Mediterranean type of distribution rarely reach over 500-

Table 1
Taxonomic diversity and level of study of the investigated groups in Kresna Gorge

Types	Classes	Orders	Kresna Gorge			Bulgaria	
			number of families	number of species	percentage of Bulgarian species	number of families	number of species
Nematoda (23)	Chromadorea (23)	Araeolaimida	2	7	35.0	2	20
		Rhabditida	4	16	2.5	48	629
Annelida (38)	Oligochaeta (31)	Haplotaxida	1	1	50.0	1	2
		Opistophora	1	1	2.2	2	44
		Lumbriculida	1	3	42.8	1	7
		Tubificida	3	26	27.4	4	95
	Branchiobdellea (3)	Branchiobdellida	1	3	50.0	1	6
	Hirudinea (4)	Arhynchobdellida	2	3	25.0	2	12
		Rhynchobdellida	1	1	11.1	2	9
Arthropoda (2784)	Crustacea (15)	Isopoda	7	12	8.7	28	137
		Amphipoda	1	2	1.6	24	122
		Decapoda	1	1	3.0	13	33
	Arachnida (189)	Scorpiones	1	1	33.3	2	3
		Solifugae	1	1	100.0	1	1
		Pseudoscorpiones	5	12	8.5	9	59
		Opiliones	4	16	26.2	6	61
		Araneae	25	112	11.2	41	1000
		Acariformes	6	14	1.1	180	1228
		Parasitiformes	8	33	9.3	32	355
	Chilopoda (14)	Lithobiomorpha	1	6	8.7	2	69
		Scolopendromorpha	1	2	33.3	1	6
		Geophilomorpha	3	6	31.0	6	29
	Diplopoda (5)	Julida	2	5	8.9	3	56
	Insecta (2561)	Ephemeroptera	7	40	39.2	15	102
		Odonata	6	21	30.9	10	68
		Plecoptera	6	13	12.9	7	101
		Embioptera	1	1	100.0	1	1
		Blattodea	2	5	31.2	4	16
		Mantodea	2	4	100.0	2	4
		Isoptera	1	1	50.0	2	2
		Orthoptera	10	68	30.2	14	225
		Dermaptera	2	2	11.8	4	17
		Heteroptera	26	419	39.9	39	1050
		Coleoptera	34	634	10.6	115	6000
		Raphidioptera	1	3	21.4	2	14
		Neuroptera	9	48	41.4	12	116
		Hymenoptera	19	136	3.4	62	4000
		Trichoptera	16	71	27.5	20	258
		Lepidoptera	23	942	32.5	90	2900
		Diptera	12	153	4.4	104	3500

Table 1
Continued

Types	Classes	Orders	Kresna Gorge			Bulgaria	
			number of families	number of species	percentage of Bulgarian species	number of families	number of species
Mollusca (22)	Gastropoda (20)	Mesogastropoda	1	1	1.6	21	61
		Basommatophora	3	3	8.8	6	34
		Stylommatophora	7	16	6.9	25	233
	Bivalvia (2)	Unionida	1	2	25.0	1	8
Vertebrata (332)	Pisces (13)	Anguilliformes	1	1	100.0	1	1
		Cypriniformes	3	11	21.6	4	51
		Siluriformes	1	1	33.3	2	3
	Amphibia (10)	Caudata	1	2	33.3	1	6
		Anura	5	8	66.6	5	12
	Reptilia (21)	Testudines	2	3	50.0	4	6
		Sauria	3	6	46.1	4	13
		Ophidia	3	12	66.7	4	18
	Aves (232)	Podicipediformes	1	2	40.0	1	5
		Pelecaniformes	2	3	50.0	3	6
		Ciconiiformes	3	10	71.4	4	14
		Anseriformes	1	9	25.0	1	36
		Accipitriformes	2	21	75.0	2	28
		Falconiformes	1	5	55.5	1	9
		Galliformes	1	5	71.4	1	7
		Gruiformes	1	7	63.6	3	11
		Charadriiformes	5	24	36.9	9	65
		Columbiformes	1	5	71.4	2	7
		Cuculiformes	1	2	100.0	1	2
		Caprimulgiformes	1	1	100.0	1	1
		Strigiformes	1	5	45.4	2	11
		Apodiformes	1	2	66.7	1	3
		Coraciiformes	4	4	100.0	4	4
		Piciformes	1	8	80.0	1	10
		Passeriformes	20	119	74.4	20	160
	Mammalia (56)	Insectivora	3	8	80.0	3	10
		Lagomorpha	1	1	50.0	1	2
		Chiroptera	3	17	53.1	4	32
		Rodentia	5	18	54.5	10	33
		Carnivora	4	9	56.2	4	16
		Arctiodactyla	2	3	37.5	3	8
5	**16**	75	355	3199	13.7	1074	23283

Note. The number of species for types and classes is given in brackets.

700 m and usually do not leave the belt of the xerothermic oak forests. For poorly investigated groups the vertical distribution reflects mostly the regions of the material collecting that are localized in the low parts of the gorge.

The percentage of the species with Mediterranean type of distribution is high for some of the investigated groups (Table 2): Opiliones – 100.0%, Sauria – 83.3%, Pseudoscorpiones – 75.0%, Ophidia – 75.0%, Neuroptera – 72.9%, Heteroptera – 62.1%, Buprestidae – 50.9%, Orthopterida – 48.5% and Odonata – 42.8%. Probably this percentage will decrease under better investigation of the part of taxa mentioned above. Only southern species of Pseudoscorpoines and Opiliones have been reported from the gorge till now. This refers also to small orders with southern origins such as Solifugae, Embioptera and Isoptera, represented by single species only. Taxa for which the Kresna Gorge represents the northernmost border of distribution – 16 species of invertebrates belonging to 6 orders, are a matter of interest as well (Table 2).

Rare species. This category comprises taxa with scanty populations or only known from single localities. Usually, such species are connected with definite biotopes and require specific conditions of life. Each negative change of the microclimate, as well as environmental pollution and disturbances of their habitats is related to extinction of species in local or areal aspect. Two hundred and ninety-eight species (9.3%) from 25 of the regarded groups are accepted as rare (Table 2). The richest in rare species are Sauria (50.0%), Ophidia (25.0%), Chiroptera (23.5%), Lepidoptera (23.3%), Trichoptera (18.9%) and Orthopterida (17.6%). This percentage is significantly lower for invertebrates (18.7%) than vertebrates (31.7%). Most numerous rare taxa have been established for Lepidoptera, Trichoptera, Orthoptera and Chiroptera (Table 2). Quite probably, with ongoing research, the list of rare invertebrate species would increase.

Endemics. Taxa not distributed outside the borders of the Balkan Peninsula belong to this category. They are divided into: balkan (occurring in the territory of more than one Balkan countries), bulgarian (found in Bulgaria only), regional (known from more localities in a definite region) and local (found in one restricted locality). Endemics are of high conservation value for the evaluation of any territory and show the uniqueness of the fauna. A total of 83 (4.6%) endemic forms for 11 of the investigated groups have been established (Table 2). The percentage of endemism is very high in the following groups – Stylommatophora (31.2%), Isopoda (25.0%), Opiliones (18.7%), Cipriniformes (18.2%), Orthopterida (17.6%) and Trichoptera (14.1%). Local and regional endemics (5 species – 6.7%) have been found for 3 groups (Acariformes, Orthoptera and Heteroptera). Most numerous endemics have Heteroptera – 3 species (3.6%). Bulgarian endemics (3 species – 3.6%) have been established for Isopoda, Trichoptera and Lepidoptera. Balkan endemics and subendemics are the most numerous (75 species – 4.2%). Endemic vertebrates belong to the last category as well – 5 species (Table 2). The endemism of the invertebrates is higher (4.7%) than vertebrates (3.8%) and is close to the total percentage (4.3%) of the endemic species in Bulgaria (HUBENOV, 2008). The great number of endemics (10 to 30) has been established for Heteroptera, Trichoptera and Lepidoptera.

Relicts. The relict elements of the fauna are the result of palaeoclimatic and palaeogeographical changes from the Tertiary to the present. Relicts significantly contribute to the specificity and uniqueness of the fauna and are of high conservation importance. According to their origin, the relicts are preglacial and glacial (Table 2). The percentage of relicts is the highest for Ophidia (41.7%) and Opiliones (18.7%). The preglacial relicts (13 species – 81.3%), represented by 6 systematic groups, predominate in the Kresna Gorge. They are most numerous for Opiliones and Ophidia (from 3 to 5). Smaller is the number of the glacial relicts (3 species – 18.7%) that

Table 2
Conservation importance of the investigated groups of animals in Kresna Gorge

Taxa	Mediterranean type of distribution	Rare species	Endemics			Relicts			Threatened and protected species											
			local and regional	Bulgarian	Balkan and subendemics	preglacial	glacial	areal borders	protected in Bulgaria	Bulgarian Red Book	IUCN	Bern Convention	Bon Convention	Birds Directive	Habitats Directive	EUROBATS	ESC Red List	CITES	CORINE
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Araeolaimida		1																	
Rhabditida	2 (12.5)	5																	
Rhynchobdellida									1		1	1			1		1		1
Isopoda	1 (9.0)			1	2														
Decapoda											1	1			1		1	1	
Solifugae	1 (100.0)	1						1											
Pseudoscorpiones	9 (75.0)																		
Opiliones	16 (100.0)	2			3	3													
Araneae	21 (18.7)	6			5												1		
Acariformes		3	1																
Odonata	9 (42.8)										1	2			1		1		1
Embioptera	1 (100.0)	1						1											
Blattodea	4 (80.0)	2						2											
Mantodea	3 (75.0)	2						1											
Isoptera	1 (100.0)																		
Orthoptera	33 (48.5)	12	1		7	1		4							1				
Heteroptera	260 (62.1)		3		9														
Coleoptera*	54 (50.9)	7						7	2		2	2			2		1		2

Table 2
Continued

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Raphidioptera	2 (66.7)				1														
Neuroptera	35 (72.9)	5																	
Hymenoptera	15 (11.0)																		
Trichoptera	13 (18.3)	14		1	9														
Lepidoptera		220		1	29	2			1		2	3			1		6		7
Diptera	23 (15.0)	16																	
Basommatophora	1 (25.0)	1																	
Stylommatophora	6 (42.8)				5	1													
Unionida									1		1	1			1			1	
Anguilliformes		1																	
Cypriniformes		2			3						1	2			2				
Siluriformes												1							
Caudata		2							2			2			2				
Anura		3							5	1		8			1				
Testudines	2 (66.7)	1							3		3	3			3			2	
Sauria	5 (83.3)	3				1			2			6			1				
Ophidia	9 (75.0)	3				5			9	5		12			2				
Podicipediformes									2			2							
Pelecaniformes									3	3	1	3	2	2			2	1	
Ciconiiformes									10	4		9	6	7			8	2	
Anseriformes									3	2	1	9	9	4			4	5	
Accipitriformes									21	18		21	21	15			16	21	
Falconiformes									5	4	2	5	5	1			3	5	
Galliformes	1 (20.0)						1		1	1		4	1	3			3		

Table 2
Continued

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gruiformes									6	1	1	7	3	4			4		
Charadriiformes									21	11	1	21	19	9			11		
Columbiformes									2	1		5		2			3	2	
Cuculiformes									2			2							
Caprimulgiformes									1			1		1			1		
Strigiformes									5	1		5					4	5	
Apodiformes									2			2							
Coraciiformes									4		1	4	2	4			3		
Piciformes							2		8	1		8		8			6		
Passeriformes	11 (9.2)				2				111	1	1	110	44	18			67		
Insectivora									1			5							
Lagomorpha												1							
Chiroptera		4							17	1	9	17	17		17	17			
Rodentia									3		7	5			3				
Carnivora		1							6	3	1	8			5			4	
Arctiodactyla												2							
Invertebrata	510 (41.7)	298	5	3	70	7		16	5		8	10			8		11	2	11
VERTEBRATA	28 (19.3)	20			5	6	3		255	58	29	290	129	78	36	17	135	47	
Total	538 (39.3)	318	5	3	75	13	3	16	260	58	37	300	129	78	44	17	146	49	11
Conservation value		N	W	E	E	N	N	N	E	E	W	E	E	E	E	E	E	E	E

Note. Different taxonomic groups are included in the table (if enough data are available) in order to present generalized data. The percentages of the species with Mediterranean type of distribution (in a broader sense) are given in brackets and refer only to taxa for which data are available (1369 species).

*For Coleoptera data for the Mediterranean type of distribution, rare species and areal borders refer only to the family Buprestidae.

are regarded only for the vertebrates. The Kresna Gorge takes a modest place (16 species – 5.3% of the Bulgarian relicts) to the number of relict taxa by comparison with the near mountains Rila and Pirin (HUBENOV, 2008). This percentage is not small, especially considering the cramped area of the gorge and negligible number of examined groups with relict forms, and probably will increase under future investigations.

Protected and threatened species. Five invertebrate species, protected by the Bulgarian legislation, have been found. European Red Lists of the invertebrates relate mostly to Central and West Europe but a lot of species distributed in Bulgaria are included in them as well. Thus a small number of taxa from the Kresna Gorge are included in: IUCN Red List – 8 species of Rhynchobdellida, Decapoda, Odonata, Coleoptera, Lepidoptera and Unionida; Bern Convention – 10 species of the same taxa; Habitats Directive – 7 species of the mentioned orders and 1 species of Orthoptera; ESC Red List – 11 species of Rhynchobdellida, Decapoda, Araneae, Odonata, Coleoptera and Lepidoptera; CORINE – 11 species of Rhynchobdellida, Odonata, Coleoptera and Lepidoptera. The richest in such species (from 2 to 6 species) are Odonata, Coleoptera and Lepidoptera. The number of protected and threatened vertebrates is very high: 255 species are protected by the Bulgarian legislation, 58 species are included in the Bulgarian Red Book, 29 species – in IUCN Red List, 290 species – in Bern Convention, 129 species – in Bon Convention, 78 species – in Birds Directive, 36 species – in Habitats Directive, 17 species – in EUROBATS, 135 species – in ESC Red List and 47 species – in CITES (Table 2).

Taxa with high conservation value. Thirteen invertebrate species considered of world importance have been established (5 local endemics and 8 included in IUCN Red List). For the invertebrates, the Balkan endemics and subendemics (70 species – 17.5%), Bern Convention, ESC Red List and CORINE species (10 – 11 species) are mostly of European importance, whereas the rare species with national importance (298 species – 74.5%) are most numerous. Twenty-nine vertebrate species (7.2%) are considered world important (included in IUCN Red List). From the taxa of European importance predominate those protected in Bulgaria, included in Bern Convention, Bon Convention and ESC Red List (129 – 290 species, 32.2 – 72.5%). Taxa of national importance are defined by the rare species (20 species – 5.0%). The total number of taxa with significant conservation importance exceeds 400 species (12.5%), usually belonging to several categories. Nevertheless, their number is very high and demonstrates cogently the important conservation significance of the Kresna Gorge (Table 2).

References

ABADJIEV S. 2001. The butterflies of Kresna Gorge (SW Bulgaria) (Lepidoptera: Hesperoidea & Papilionoidea). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 237-254. (In Bulgarian with English summary).

ANDREEV S. 2001. Woodlice (Isopoda, Oniscidea) and Amphipod Crustaceans (Amphipoda, Gammaridae) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 45-47. (In Bulgarian with English summary).

ANTONOVA V., DEDOV I. 2001. The land snails (Gastropoda, Pulmonata) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 39-43. (In Bulgarian with English summary).

BEKCHIEV R. 2008. The subfamily Pselaphinae (Coleoptera: Staphylinidae) of Southwestern Bulgaria. I. – Historia naturalis bulgarica, **19**: 51-71.

BERON P. 2001a. Scorpionida, Solpugida and Acari (Arachnida) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 63-67. (In Bulgarian with English summary).

BERON P. 2001b. Faunal diversity, zoogeographical character and conservation value of Kresna Gorge (SW Bulgaria. – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 335-349. (In Bulgarian with English summary).

BESCHOVSKI V. 2008. Aadditional records and corrections on the Oscinellinae fauna (Diptera: Chloropidae) of Bulgaria. – Acta zoologica bulgarica, **60** (1): 51-59.

BESHKOV S. 2001. Nocturnal and Day-flyng Moths (Macrolepidoptera, excluding Hesperoidea & Papilionoidea) of Kresna Gorge, SW Bulgaria. National Museum of Natural History & Institute of Zoology, BAS, Sofia, 255-287. (In Bulgarian with English summary).

BLAGOEV G., LASAROV S., DELCHEV CH. 2001. Spiders (Araneae) in Kresna Gorge (SW Bulgaria. – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 85-102. (In Bulgarian with English summary).

GUÉORGUIEV B. 2001. Beetles (Insecta: Coleoptera) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 163-188. (In Bulgarian with English summary).

HUBENOV Z. 1985. Faunistic, zoogeographical and ecological investigations on the family Tachinidae (Diptera) from Sandanski-Petrich Valley. Sofia, Institute of Zoology, BAS (Dissertation), 163 p.

HUBENOV Z. 2001. Tachinidae (Diptera) from Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 219-224. (In Bulgarian with English summary).

HUBENOV Z. 2008. Recent fauna of Bulgaria – Animalia: Invertebrata. – Acta zoologica bulgarica, **60** (1): 3-21.

IVANOV K., LJUBOMIROV T. 2001. Hymenoptera (Insecta) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 205-215. (In Bulgarian with English summary).

KUMANSKI K. 2001. The Caddisflies (Trichoptera) from Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 225-234. (In Bulgarian with English summary).

LANGOUROV M., SAKALIAN V. 2001. Scuttle flies (Diptera: Phoridae) from Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 217-218. (In Bulgarian with English summary).

MARINOV M. 2001. Dragonflies (Odonata) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 109-113. (In Bulgarian with English summary).

MITOV P. 2001. Harvestmen (Opiliones, Arachnida) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 75-83. (In Bulgarian with English summary).

MITOV M., ILIEVA Z., ILIEV I. 2001. Free-living soil nematodes found in associations of *Juniperus excelsa* M. B. of "Tisata" Reserve (SW Bulgaria). – In: Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 31-37. (In Bulgarian with English summary).

PETROV B. 2001a. False scorpions (Arachnida: Pseudoscorpiones) from Kresna Gorge, SW Bulgaria. – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 69-73. (In Bulgarian with English summary).

PETROV B. 2001b. Bats (Mammalia: Chiroptera) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 325-330. (In Bulgarian with English summary).

PETROV B., BESHKOV V. 2001. Amphibians (Amphibia) and the Reptiles (Reptilia) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 297-303. (In Bulgarian with English summary).

POPOV A. 2001. The snakeflies and the lacewing insects (Insecta: Raphidioptera and Neuroptera) of the Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 131-143. (In Bulgarian with English summary).

POPOV A., CHOBANOV D., LANGOUROV M. 2001. Blattaria, Mantodea, Isoptera, Orthoptera, Dermaptera, Embioptera of the Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 115-130. (In Bulgarian with English summary).

POPOV V. 2001. Small Mammals (Insectivora, Lagomorpha, Rodentia) in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 331-334. (In Bulgarian with English summary).

RAPUZZI P., GEORGIEV G. 2007. Contribution to the knowledge of species composition and regional distribution of Longhorn Beetles (Coleoptera: Cerambycidae) in Bulgaria. – Acta zoologica bulgarica, **59** (3): 253-266.

SAKALIAN V. 1989. Faunistic, ecological and zoogeographical investigations on the family Buprestidae (Coleoptera) from Sandanski-Petrich Valley and Gotse Delchev Valley. Sofia, Institute of Zoology, BAS (Dissertation), 175 p.

SAKALIAN V., LANGOUROV M. 2001. Jewel Beetles (Insecta: Coleoptera: Buprestidae) from Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 145-162. (In Bulgarian with English summary).

SIMOV N. 2001. Heteropterous fauna (Insecta: Heteroptera) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 189-202. (In Bulgarian with English summary).

SPASSOV N., STOEV P. 2001. The Kresna Gorge – an ecological corridor for the large mammals (Macromammalia). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 335-340. (In Bulgarian with English summary).

STEFANOV T. 2001. Ichthyofauna of Struma River in the part between Kocherinovo railway station and the mouth of Strumeshnica River. – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 289-296. (In Bulgarian with English summary).

STOEV P. 2001. Myriapod (Chilopoda, Diplopoda) of Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 103-107. (In Bulgarian with English summary).

STOYANOV G., KOTSAKOV G., TODOROV N., BOJILOV V. 2001. Species composition, occurrence and conservation status of the ornithofauna in Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 305-323. (In Bulgarian with English summary).

SUBCHEV M. 2001. *Astacus torrentium* (Crustacea: Decapoda) and its epibionts of genus *Branchiobdella* (Annelida: Clitellata) from Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 49-52. (In Bulgarian with English summary).

TOMOV V. 1971. Investigations on the Chrysomelidae fauna in Struma Valley. Plovdiv, University of Plovdiv (Dissertation).

UZUNOV Y., VARADINOVA E. 2001. New data on aquatic invertebrate fauna of the Kresna Gorge (SW Bulgaria). – In: Beron P. (ed.). Biodiversity of Kresna Gorge (SW Bulgaria). National Museum of Natural History & Institute of Zoology, BAS, Sofia, 53-61. (In Bulgarian with English summary).

VAGALINSKI B., STOEV P. 2007. An annotated catalogue of the millipede order Julida (Diplopoda) in Bulgaria. – Historia naturalis bulgarica, **18**: 35-63.

Received: 24.06.2009

Author's address:
Zdravko Hubenov, National Museum of Natural History – BAS, Tsar Osvoboditel Blvd. 1, 1000 Sofia, Bulgaria, e-mail: zhubenov@nmnhs.com

Оценка на фаунистичното разнообразие на Кресненския пролом

Здравко ХУБЕНОВ

(Р е з ю м е)

В Кресненския пролом са установени 3199 вида, които принадлежат към 355 семейства, 75 разреда, 16 класа и 5 типа. Това представлява 33.0% от семействата в България, 13.7% от видовия състав на разгледаните разреди и 10.5% от видовия състав на страната. При добре проучените групи разглежданата територия включва от 30 до 70% от българската фауна. Процентът на видовете с медитерански тип на разпространение се колебае при някои от разгледаните групи между 40 и 80%. За редки са приети 298 вида (9.3%) при 25 от разгледаните групи. Процентът на редките видове е най-висок при Sauria (50.0%), Ophidia (25.0%), Chiroptera (23.5%) и Lepidoptera (23.3%). При 11 от разгледаните групи са установени общо 83 (4.6%) ендемични форми. Процентът на ендемизъм е най-висок при Stylommatophora (31.2%), Isopoda (25.0%), Opiliones (18.7%), Cipriniformes (18.2%), Orthopterida (17.6%) и Trichoptera (14.1%). По брой на реликтите (16 вида - 5.3% от българските реликти) Кресненският пролом заема по-скромно място в сравнение с планините Рила и Пирин. Процентът им е най-висок при Ophidia (41.7%) и Opiliones (18.7%). Доминират преглациалните реликти (13 вида – 81.3%), които са застъпени в 6 систематични групи. Броят на застрашените видове е много голям: 260 вида са защитени от българското законодателство, 58 вида са включени в Червената книга на България, 37 вида – в IUCN, 300 вида – в Bern Convention, 129 вида – в Bon Convention, 78 вида – в Birds Directive, 44 вида – в Habitats Directive, 17 вида – в EUROBATS, 146 вида – в ESC Red List и 49 вида – в CITES. Общият брой на консервационно значимите таксони е над 400 (12.5%) като 42 вида са от най-висока категория – световно значение.