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Areographical Structure of the Bulgarian Non-marine Invertebrate Fauna (Metazoa: Invertebrata)

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Abstract: In the Bulgarian fauna, three complexes are presented: Superpalaearctic, Palaearctic and a complex within the boundaries of one Palaearctic subregion. Whenever endemics are difficult to identify within other areographical categories, they are assigned to a separate endemic complex. The distinct taxonomic groups are dominated by species with various geographical ranges. The Superpalaearctic complex is dominated by species with Holarctic distribution. Usually the species with Superpalaearctic ranges are not a decisive factor for the zoogeographical characteristics of the superior taxa. They are determining only in the interzonal coastal habitats and within taxa, when associated with such communities. Within the Palaearctic ranges, there is no a latitudinal disjunction whereas this disjunction is characteristic in taxa with the Eurosiberian ranges. Mediterranean complexes are mostly located in the lower vegetation zones and, according to the specifics of the habitats, include different percentages of the species of a systematic group. The pronouncedly dominance of local endemics is rare and occurs in a small number of taxonomic groups. In the Bulgarian invertebrate non-marine fauna, about 15 faunistic elements are presented.

Keywords: Bulgarian fauna, invertebrates, areography, faunistic elements

Introduction

Most studies on the Bulgarian fauna contain brief areographical characteristics of the relevant taxonomic groups. A zoogeographical analysis is used and based on the literature data for the taxa distribution and information from faunistic research about the complexes of species with different zoogeographical characteristics. The zoogeographical description of the fauna is performed on the basis of the used areographical categories. The variety of these categories depends on the specifics of the studied group, the study area and the tendency of the researchers to specify or generalise the ranges.

The horological complexes contain information about the zoogeographical characteristics of the taxonomic groups, which, combined with data on the origin of the ranges, define the zoogeographical characteristics of the fauna. In many groups of invertebrates, due to the lack of fossils, it is difficult to clarify the formation of the recent ranges. In such cases, centres of taxa differentiation are localised (DE LATTIN 1967), which gives information about the formation of the ranges. This information often is not exact and the zoogeographical characteristics of the taxa can be subject to corrections.

The aim of this work is to present a scheme of the areographical categories used for typification of the ranges, horological classification of species and zoogeographical characteristics of different taxonomic groups of the Bulgarian free-living non-marine fauna as well as to note some trends in the regional areography of Bulgaria.

Material and Methods

Studies on systematic groups that characterise areographically the country were analysed. Taxa with

predominantly cosmopolitan ranges were avoided. Various taxonomic groups were included: primitive and higher in systematic terms, freshwater and terrestrial, phyto- and zoophagous, forms with different mobility associated with herbaceous or woody vegetation, with strongly or weakly demonstrated endemism, as well as groups attached to interzonal (water and coastal) habitats.

The used areographical categories reflect current data on the distribution of taxa and traditional zoogeographical nomenclature. Well studied and representative faunistic groups were scrutinised, for which volumes in the series Fauna of Bulgaria, review articles or dissertations had been are written – Araneae: Linyphiidae (Deltshev 2007); Crustacea: freshwater Harpacticoida (Apostolov 2010) and Oniscoidea (Andreev 1988), Myriapoda (Stoev 2007); Insecta: Odonata (Beschovski 1994, Beschovski & Marinov 2007), Orthopterida (Popov 2007), Plecoptera (Tyufekchieva 2014), Coleoptera: Buprestidae (Sakalian & Langurov 2007) and Cerambycidae (Georgiev & Hubenov 2006), Trichoptera (Kumanski 1985), Lepidoptera: Rhopalocera (Abadjiev 1999, 2001), Diptera: Ephydridae (Beschovski 2009) and Tachinidae (Hubenov 2008); freshwater Mollusca and terrestrial Gastropoda (Hubenov 2006, 2007, Georgiev & Hubenov 2013) and different taxonomic groups from the Bulgarian Black Sea coast (Hubenov, 2014).

The distribution of the taxa within areographical categories (Table 1) is represented as percentages. Thus, regardless of the number of taxonomic groups, the differences among them are clearly outlined.

Results and Discussion

For most areographical characteristics of different taxonomic groups, a scheme of categories was created. It wasis ordered from largest to smaller ranges. Most often in such a scheme, several complexes were outlined: ranges including territories in the Palaearctic and beyond it (Superpalaearctic type), the Palaearctic but in more than one subregion (Palaearctic type) and ranges within the boundaries of one Palaearctic subregion (Eurosiberian and Mediterranean type). Often, an endemic complex was also separated, which was scrutinised individually owing to the fact that it was sometimes difficult to connect the origin of the endemic species with larger areographical categories. This approach was applies especially applied to the older endemic forms, in which the endemism was reaching a generic level. In the scheme delineated above, three (four with the endemics) main areographical complexes were outlined. These complexes were presented differently within the different taxonomic groups (Table 1).

Superpalaearctic ranges. Generally this areographical complex is poorly represented among the taxa distributed in Bulgaria. Usually it is better presented among the forms with more possibility to disperse: about 10-12% of the species composition (Table 1). Often but not always, these are highly mobile taxa. There is an exception to this tendency, demonstrated by the terrestrial Isopoda and Gastropoda, among taxa comprising less mobile forms this complex is presented with 5.9-7.5%, whereas within taxa with more mobile forms it shows low percentages, e.g. Buprestidae (0.5%), Lepidoptera – Rhopalocera (1.9%), Cerambycidae (4.0%) and Trichoptera (4.3%) (Table 1). Additionally, there are taxa (Plecoptera), which do not contain species occurring in Bulgaria that are distributed beyond the Palaearctic. An explanation of these differences is often sought in the origin of the groups and their adaptation to certain conditions (food plants, pure mountain waters, etc.). Among isopods and molluscs, there are ancient genera with wide distribution. Some taxa have anthropogenic areas (originated from the human impact) structured with the development of human civilization (before the beginning of advanced research). It could be speculated that the Superpalaearctic complex is presented better among the more mobile taxa (regardless of whether they are ancient or young), with some exceptions. The taxonomic groups that belong here often include species of nothern type (widely distributed in the Holarctic or Palaearctic) and species of southern type (distributed only in the south parts of the Palaearctic). The last subcomplex is presented within a limited number of groups (Odonata, some families of Diptera, aquatic Mollusca, etc.). It is accepted that the species of the northern type have the widest areas and higher ecological plasticity. Even if the Superpalaearctic complex includes a different number of areographical categories depending on the corresponding taxonomic group, the Holarctic species always prevail. From the other areographical categories the Cosmopolitan, Palaearctic-Afrotropical and Afrotropical-Mediterranean forms are better presented.

Usually the complex of species with superpalaearctic areas is not determinant for the zoogeographical characteristics of the taxonomic groups because of its heterogeneity and low numbers. In many interzonal communities, this complex determines the zoogeography of the fauna (because of its great diversity and significant presence) and can include up to 58% of the taxa in some natural areas. Most often these are sea coasts, which are optimal

Table 1. Areographical characteristics of representative taxonomic groups of invertebrates and interzonal habitats

Zoogeographical scheme of the used categories and main taxa	Araneae: Linyphiidae	Crustacea		Myriapoda	Insecta									Mollusca		Different groups along the Black Sea Coast
								Coleoptera				Diptera				
		Freshwater Harpacticoida	Oniscoidea		Odonata	Orthopterida	Plecoptera	Buprestidae	Cerambycidae	Trichoptera	Lepidoptera: Rhopalocera	Ephydridae	Tachinidae	Freshwater Mollusca	Gastropoda terrestrial	
Species distributed in Palaearctic and out of it	**12.4**	**14.4**	**7.5**	**2.7**	**13.2**	**9.6**		**0.5**	**4.0**	**4.3**	**1.9**	**33.0**	**7.6**	**8.9**	**5.9**	**58.3**
NORTHERN TYPE	**12.4**	**14.4**	**7.5**	**2.7**	**7.3**	**9.6**		**0.5**	**4.0**	**4.3**	**1.9**	**33.0**	**5.6**	**8.2**	**5.9**	**55.5**
Cosmopolitan	0.4	4.1	6.5	1.4		3.7			1.2		0.5		0.2			14.8
Subcosmopolitan	1.8								2.8			3.1				8.1
Holarctic - Paleotropical - Neotropical																1.0
Holarctic - Paleotropical - Australian													0.2			0.4
Holarctic - Paleotropical												1.5				0.6
Holarctic - Neotropical - Oriental - Australian																0.6
Holarctic - Neotropical - Oriental		1.0														1.6
Holarctic - Neotropical - Afrotropical - Australian																0.6
Holarctic - Neotropical - Afrotropical												0.8				1.2
Holarctic - Neotropical - Australian																1.0
Holarctic - Afrotropical - Australian																0.6
Holarctic - Oriental - Australian																0.6
Holarctic - Neotropical		1.0										1.5				1.0
Holarctic - Afrotropical												2.3				1.4
Holarctic - Oriental		1.0											0.5			1.6
Holarctic - Australian		1.0														0.4
Palaearctic - Paleotropical - Australian													0.5			0.6
Palaearctic - Afrotropical - Australian																0.4
Palaearctic - Oriental - Australian																0.4
Palaearctic - Paleotropical						1.5							0.2			0.2
Palaearctic - Afrotropical						3.3						8.5	0.5			1.6
Palaearctic - Oriental										0.9		0.8	0.9			1.8
West Palaearctic - Paleotropical																0.2
Transpalaearctic - Oriental																0.4
West and Central Palaearctic - Oriental																0.2

Table 1. Continued

Zoogeographical scheme of the used categories and main taxa	Araneae: Linyphiidae	Crustacea		Myriapoda	Insecta									Mollusca		Different groups along the Black Sea Coast
		Freshwater Harpacticoida	Oniscoidea		Odonata	Orthopterida	Plecoptera	Coleoptera		Trichoptera	Lepidoptera: Rhopalocera	Diptera		Freshwater Mollusca	Gastropoda terrestrial	
								Buprestidae	Cerambycidae			Ephydridae	Tachinidae			
West Palaearctic - Afrotropical																0.6
West Palaearctic - Oriental																0.4
Holarctic	10.1	6.2	1.1	1.4	7.3	1.1		0.5		3.4	1.4	14.6	2.4	5.5	5.9	13.4
North American - Europaean (introduced)														2.0		
European - Australian																0.2
New Zeland - Europaean (introduced ?)														0.7		
Southern type					**5.9**								**1.9**	**0.7**		**2.8**
South Palaearctic - Paleotropical - Australian													0.2			0.4
South Palaearctic - Paleotropical													0.2			
South Palaearctic - Afrotropical													0.5			
South Palaearctic - Oriental														0.7		
Paleotropical - Mediterranean - Central Asian																0.2
Paleotropical - Mediterranean					1.5											0.4
Afrotropical - Mediterranean					4.4								0.5			0.6
Oriental - Mediterranean - Central Asian - Australian																0.2
Oriental - Mediterranean - Central Asian																0.6
Oriental - Mediterranean													0.5			0.4
Species with Palaearctic distribution	**87.6**	**85.6**	**92.5**	**97.3**	**86.8**	**89.8**	**100.0**	**92.7**	**96.0**	**95.7**	**71.1**	**67.0**	**92.4**	**91.1**	**94.1**	**40.4**
Palaearctic type	**38.5**	**5.1**		**2.2**	**29.4**	**8.2**	**8.3**	**20.2**	**27.1**	**24.9**	**22.6**	**35.3**	**25.2**	**13.0**	**6.3**	**15.6**
Holopalaearctic	21.1				13.2	3.3	8.3		1.6	5.2	2.9	3.8	2.2	6.8		2.0
Transpalaearctic		2.1						5.0	5.2				9.8	0.7	0.8	4.1
West and Central Palaearctic									1.2				5.4	3.4	1.3	2.8
West Palaearctic	16.1			0.9		1.9		7.2	9.6	19.7	3.4	16.1	3.2	2.0	1.7	3.5
Disjunctive Palaearctic									0.4			7.7	2.2			0.4
South Palaearctic								1.1					0.2			
Euro-Siberian - Central Asian		1.0							1.2				0.2			0.2
European - West Asian						3.0										

Table 1. Continued

Zoogeographical scheme of the used categories and main taxa	Araneae: Linyphiidae	Crustacea		Myriapoda	Insecta									Mollusca		Different groups along the Black Sea Coast
		Freshwater Harpacticoida	Oniscoidea		Odonata	Orthopterida	Plecoptera	Coleoptera		Trichoptera	Lepidoptera: Rhopalocera	Diptera		Freshwater Mollusca	Gastropoda terrestrial	
								Buprestidae	Cerambycidae			Ephydridae	Tachinidae			
West Euro-Siberian - Central Asian									0.4							
West Euro-Siberian - Turanian									0.8							
European-Central Asian	0.9			0.4									0.7		0.8	0.6
East European - Central Asian	0.4												0.2			
European - West Central Asian													0.2			0.2
European - Southwest Asian									0.8							
European - Mediterranean - Turanian				0.9												
European - Iran - Turanian		1.0						2.8			3.8					0.2
European - Turanian								3.3	4.8		12.5		0.7		1.7	0.4
European - Mediterranean		1.0			16.2			0.5				7.7				
European - North African									1.2							1.2
Euro-Siberian type	**36.2**	**28.9**	**9.7**	**36.8**	**26.5**	**26.2**	**57.4**	**22.9**	**39.8**	**60.6**	**46.5**	**22.3**	**52.3**	**23.3**	**26.0**	**10.8**
Holoeurosiberian		1.0		1.4	20.6	12.2		4.5	5.2	6.0	22.1		12.9	2.0	1.3	0.4
West and Central Eurosiberian									2.4				4.9	2.7	0.8	1.4
West Euro-Siberian - Anatolian									0.8							0.4
West Euro-Siberian								1.1	3.6				3.4	5.5	1.3	1.2
Dusjunct Euro-Siberian		2.1											9.3	0.7	0.4	
European and South Siberian													4.6			
South European and South Siberian													1.7			
European - Anatolian - Levantian											8.5					
European - Anatolian		1.0		0.4			1.9		12.4					0.7	0.4	0.2
European - Caucasian	2.3	3.1														
European	26.6	12.4	8.6	10.4	5.9	2.2	22.2	16.2	7.6	15.0	7.7	22.3	11.2	6.8	8.0	0.2
Central and South European - Anatolian									0.4						0.8	6.1
Central and Southeast European - Anatolian									0.8						1.3	0.2
East European - Anatolian									0.4					0.7		
West European															0.8	

Table 1. Continued

Zoogeographical scheme of the used categories and main taxa	Araneae: Linyphiidae	Crustacea		Myriapoda	Insecta									Mollusca		Different groups along the Black Sea Coast
		Freshwater Harpacticoida	Oniscoidea		Odonata	Orthopterida	Plecoptera	Coleoptera		Trichoptera	Lepidoptera: Rhopalocera	Diptera		Freshwater Mollusca	Gastropoda terrestrial	
								Buprestidae	Cerambycidae			Ephydridae	Tachinidae			
East European	1.4		1.1	6.4				1.1								
Central and South European	0.4	2.1				10.7	19.4		4.0	10.3			3.9	0.7	1.7	0.2
Central and North European														0.7	0.8	
Central and East European	0.9								0.4					1.4	0.8	
Central and Southeast European	2.7	4.1		10.0		1.1	13.9		2.4	6.4			0.2	1.4	5.0	0.8
Carpathian - Balkan	1.4			8.2						6.9					2.5	
Balkan - Caucasian	0.4	3.1														
Balkan Mountains										16.0	8.2					
MEDITERRANEAN TYPE	**1.8**	**6.2**	**15.0**	**11.3**	**30.9**	**27.5**	**4.7**	**49.7**	**22.3**	**10.2**	**28.8**	**9.3**	**14.9**	**8.2**	**33.6**	**14.0**
Mediterranean and South Siberian													0.5			
Mediterranean and Southwest Siberian													0.2			
Mediterranean - Central Asian													2.4		0.8	1.0
Mediterranean - West Central Asian								7.2					0.5			0.6
Mediterranean - Turanian				0.4		4.1			0.4				0.7			
North Mediterranean - Central Asian													0.2		0.8	
North Mediterranean - West Central Asian																0.2
North Mediterranean - Turanian													0.9		0.4	
North Mediterranean - Southwest Siberian													0.2			
East Mediterranean - Central Asian																0.2
East Mediterranean - Iran - Turanian								10.6								
East Mediterranean - Turanian									0.4				0.2			
Northeast Mediterranean - Iran - Turanian											9.6					0.2
Central and Southeast European - Iran - Turanian										0.8						0.2
Central and South European - North African																0.4
Holomediterranean	2		5.4	4.1	17.6	5.6		5.0	4.4	1.3	4.3	3.8	4.9	0.7	2.1	3.7
Atlantomediterranean			3.2												2.1	0.6
North Mediterranean			2.1					1.7	2.0	1.7		3.8	1.9		2.1	0.8

Table 1. Continued

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		Freshwater Harpacticoida	Oniscoidea		Odonata	Orthopterida	Plecoptera	Coleoptera		Trichoptera	Lepidoptera: Rhopalocera	Diptera		Freshwater Mollusca	Gastropoda terrestrial	
								Buprestidae	Cerambycidae			Ephydridae	Tachinidae			
Atlantic - South European															0.4	0.2
Southeast European - Central Asian												0.8				
Southeast European - West Asian						2.6										
South European	2	1.0		0.9		1.9		8.4	0.8				0.7	0.7	0.8	0.6
Southeast European - Turanian									0.4							
Southeast European - Pontian - Caspian																0.2
Southeast European - Pontian														2.7		0.2
Southeast European - Anatolian									2.0	1.7					0.8	0.2
Southeast European		3.1				2.2			1.2					0.7	6.7	0.2
East Mediterranean			4.3	3.6	5.9	5.9		9.5	4.8	1.3			0.9	0.7	1.7	0.8
West Mediterranean					2.9			1.1								
Northeast Mediterranean		1.0			4.4				1.6			0.8	0.2	0.7	0.4	1.0
Pontomediterranean								6.1	0.4	1.7					3.8	0.6
Pontian - Turanian															0.8	
Pontian - Caspian							0.9							2.0		
Balkan - Anatolian - Caucasian						0.4										
Balkan - Anatolian - Levantian		1.0									4.3					
Balkan - Anatolian				2.3		4.8	3.7		4.0	1.7	6.2				7.6	
Pontian (+ Euxinian)															2.1	
Endemics and subendemics	**11.0**	**45.4**	**67.7**	**46.8**		**27.9**	**29.6**	**3.3**	**6.8**	**16.0**	**12.5**			**46.6**	**28.1**	**2.2**
Balkan subendemics		4.1						1.1						0.7	1.7	
Pontian endemics				1.8												0.6
Balkan endemics	2.7	6.2	17.2	14.1		5.6	20.3	2.2	5.6	9.6	7.7			2.0	11.8	0.4
Bulgarian endemics	8.3	16.5	50.5	4.1		7.2			1.2						3.4	0.2
Regional endemics		13.4		26.8		15.1	5.5			6.4	3.8			7.5	6.7	0.8
Local endemics		5.1					3.7				1.0			36.3	4.6	0.2
Number of species	**218**	**97**	**93**	**220**	**68**	**251**	**108**	**179**	**251**	**234**	**208**	**130**	**409**	**146**	**238**	**508**

for the development of the complex representatives. They are poorly presented inside the country. In certain taxa specific for the coastal fauna (Ephydridae, etc.), the number of species with superpalaearctic ranges exceeds 30%.

Palaearctic ranges. Ranges that include more than one Palaearctic subregion in latitudinal direction belong to this complex. They are well represented in the highly mobile groups where they comprise about 25-35% of the taxa. The Palaearctic ranges are underrepresented in some conservative and less mobile groups – about 2-6% (Harpacticoida, Myriapoda, Gastropoda) or totally lacking (Oniscoidea). The Palaearctic complex includes a different number of areographical categories depending on the respective systematic group as most often the Holopalaearctic and West Palaearctic taxa prevail. In some cases *i.e.* Siberia and Central Asia, there is a longitudinal disjunction of the ranges. The ranges of this complex have not a latitudinal disjunction (Gorodkov 1984, Josifov 1988).

Ranges within the boundaries of one Palaearctic subregion. This complex includes taxa with **Euro-Siberian** and **Mediterranean type** of distribution. The Mediterranean-Central Asian species are also included here according to Kryzhanovsky (1965) and Lopatin (1989) who have combine the Mediterranean and Central Asian subregions. The areas of the Mediterranean type include faunistic elements (Submediterranean, Subiranian and Pontian), which some authors scrutinise separately from the Mediterranean ones (Gruev & Kusmanov 1994, 1999; Gruev 1995, 2000d).

Euro-Siberian ranges are well represented among most of the groups. For taxa related to cold and clean water habitats, as most Plecoptera and Trichoptera are, these areas comprise 50-60% of the species composition. A high percentage of species of some higher-dipteran families belong to this complex as well (: over 52% of Tachinidae). The Euro-Siberian areas are underrepresented (below 30%) among taxa connected with xerothermic habitats and open grass communities (Orthoptera, Buprestidae, some Gastropoda, etc.) where the Mediterranean forms are prevailing. There are few Euro-Siberian areas among taxa rich in endemic forms as well (Oniscoidea) but this also applies to other types of ranges. In the interzonal coastal communities, the ranges of the Euro-Siberian type are also underrepresented (about 10% of the taxa) which is associated with the dominance of Superpalaeartic ranges. The Euro-Siberian Complex comprises a number of areographical categories, which are differently represented in certain taxonomic groups. The European, Central and Southeast European, and Central and South European areas often prevail for most systematic groups. The European species dominate in the spiders of family Lyniphidae whereas in Diptera (*i.e.* family Tachinidae) the European, Holoeurosiberian and Disjunctive Euro-Siberian species are most numerous (Table 1).

A number of disjunctive ranges are presented: longitudinal disjunction for parts of Siberia and Central Asia, and latitudinal disjunction with typical for the Euro-Siberian complex boreomontane, boreoalpine and arctic-alpine ranges (Gorodkov 1984, Josifov 1988). In some taxonomic groups (Heteroptera, Cerambycidae, Tachinidae, etc.), boreomontane forms are established in the lower regions of the country (Josifov 1963, 1976; Hubenov 1996b, 2008b; Georgiev & Hubenov, 2006). It is supposed that the humid mountain valleys characterised with cooler climate have facilitated the migration of the mentioned above forms to lowlands. For the family Cerambycidae, this is due to the large afforestation, with conifers in the first vegetation belt. Probably because of this reason, many boreomontane and montane species of the family, fed on conifers, go down below 600 m a.s.l.

Mediterranean ranges usually are the most diverse. This group is divided into many subgroups with different origin, distribution and ecological peculiarities of the taxa. This complexity contributes to establishing of various zoogeographical classifications for Bulgaria (Josifov 1981, 1986, 1988, 1999, Gruev 1988, 1995, 2000a, 2000b, 2000c, 2000d, 2002, Heiss, Josifov 1990, Gruev, Kusmanov 1994, Hubenov 1996b, Popov 2002). Most often, the Mediterranean species are presented in the first 3 vegetation belts. The montane Mediterranean taxa,: a remnant of the old mountain preglacial fauna, are an exception (Josifov 1976, 1981, 1988). In some groups (Orthoptera, Heteroptera, Buprestidae, Rhopalocera, some terrestrial Gastropoda, etc.), the Mediterranean ranges comprise 25-50% of the taxa range, which is related to specific herbaceous vegetation. In some areas of the country, in the herbaceous communities including a great number of Mediterranean floristic elements, the species with Mediterranean distribution (Orthoptera, Heteroptera and Buprestidae) reach 60-70%. Among Heteroptera, depending on the habitats (water and near water, forest and shrubby or herbaceous), the Mediterranean elements vary from 15-20 to 50-60% (Josifov 1981).

Endemics. This category includes taxa, which are not distributed outside the Balkan Peninsula. The endemics most often are divided into **Balkan** (found in more than one Balkan country) and **Bulgarian**

(found in Bulgaria only). The Bulgarian endemics are divided into **regional** (known from more than one locality of certain region) and **local** (known from one locality only). Endemics are important elements of high conservation value for the evaluation of any territory and reflect the uniqueness of the fauna. They are distributed unevenly among the analysed taxa. The percentage of endemism is very high in some systematic groups (Hydrobiidae – 95.5%, Clausiliidae – 74%, terrestrial Isopoda – 67.7%, Myriapoda – 46.8%, freshwater Mollusca – 46.6% and freshwater Harpacticoida – 45.4%), and average for some other groups (Plecoptera – 29.6%, terrestrial Gastropoda – 28.1%, Orthoptera – 27.9), and low in most large groups; however, strong variations can exist within certain taxa. In some taxonomic groups, endemic forms are not registered (Odonata, Ephydridae, Tachinidae, etc.). According to some authors, the high level of endemism is in connection with the existence of genera, in which intensive processes of speciation are occurring on the territory of the Balkan Peninsula. Most authors consider that this statement is valid only for the young (postglacial, neoendemics) and is unacceptable for the ancient (preglacial, tertiary) endemics, where endemism appears even at the level of genera and they have relict character. Most numerous are the Balkan and Bulgarian endemic forms. In some taxa, the regional endemics are well represented. Typical for the family Hydrobiidae is the highly dominance of local endemics (Georgiev & Hubenov, 2013). Relict character is typical for the local troglobiontic endemics, which are divided into 6 groups according to their origin: Gondwanian, Laurasian, Paleo-, Meso-, South- and North-Aegeidean (Guéorguiev 1977, Beron 2005, 2006). The endemic forms in the interzonal natural habitats are poorly represented. Conditions along the sea coast do not favour the formation of endemic taxa, which usually are newly described forms or rare species with unclear distribution.

Faunistic elements. The varied physicogeographical conditions, historical development of the animals and formation of the recent fauna in Bulgaria that began in Tertiary and continued in Quaternary are the main reasons for the existence of a complicated system of faunistic elements, combined into three complexes (Josifov 1981, 1986, 1988, 1999; Gruev 1988, 1995, 2000a, 2000b, 2000c, 2000d, 2002; Heiss & Josifov 1990; Gruev et Kusmanov 1994, 1999; Hubenov 1996a, 2008a).

Nearctic - Euro-Siberian complex. Taxa belonging to it are often younger, more eyrobiotic and have large ranges. The **Arctic** and **Boreal** elements in the Bulgarian mountains are represented by Euro-Siberian species with extreme requirements to definite ecological factors, arctoalpine or boreomontane distribution and relict character. The **Holarctic** and **Euroasian** Palaearctic elements are represented by Eurosiberian species with an extensive ecological flexibility, wide altitudes in the Bulgarian mountains and Eurosiberian, Palaearctic and Holarctic distribution. These species are a considerable part of the Bulgarian fauna and their number varies for separate taxonomic groups. Usually there are more endemics in the younger, species rich groups, that have good settling possibilities. The **Middle European** element includes species, the ranges and origin of which are localised in Europe. They are accepted as variants of the West Eurosiberian species and have a comparatively wide ecological flexibility and considerable vertical distribution. A great part of the Bulgarian fauna consists of such elements. The **European montane** element includes species, concentrated in the mountains of Middle and South Europe. However, these species do not occur in the northern situated plain territories. They are characterised as stenothermic.

Mediterranean-Central Asian complex. The species, which belong to it, often are older, more stenobiotic and have smaller ranges in comparison with the previous complex. The **Holo-**, **North-** and **East Mediterranean** elements are represented by Mediterranean stenobiotic species (Mediterranean in a narrow sense), concentrated in the warmer parts of the country, often in separate relict localities. The **Iranian-Turanian** element includes taxa with Mediterranean-Middle Asian areas, adapted to dry and cooler biotopes. That enables some of them to inhabit the low and middle parts of the Bulgarian mountains. The **Euxinian** element includes preglacial relict forms, concentrated mainly in Southeast Bulgaria, often close to the Black Sea. The **Pontian, Atlantic** and **Submediterranean** elements are represented by Mediterranean species (Mediterranean in a broad sense). They are more eurybiotic and occur from 0 to 1500 m a.s.l. as part of them inhabits lowlands. Their ranges reach to Middle Europe, south parts of the Scandinavian Peninsula (Atlantomediterranean) or South Russian steppes (Pontian, steppe, Pontomediterranean). The **Montane Mediterranean** element includes a limited number of preglacial relicts, concentrated mainly in the woodless zone of the South European and Middle Asian mountains.

Tropic complex. It includes a small number of species that have been widespread in the Palaetropic kingdom, residual from the Tertiary tropic fauna or have penetrated secondary to Europe.

Conclusion

In the Bulgarian fauna, three complexes are presented: Superpalaearctic, Palaearctic and within the boundaries of one Palaearctic subregion. When endemics are difficult to identify with other areographical categories, an endemic complex is also separated.

The distinct taxonomic groups are often dominated by species with different ranges. The Superpalaearctic complex is dominated by species with Holarctic distribution.

Most often the species with Superpalaearctic ranges are not a decisive factor for the zoogeographical characteristic of taxa. They are determinative only for the interzonal coastal habitats and for taxa associated to such communities.

In the species with Palaearctic ranges, most often a latitudinal disjunction lacks whereas in the Eurosiberian species this disjunction is typical.

The species with Mediterranean ranges (except Montane Mediterranean ones) are kept close to the lower vegetation zones and according to the specifics of habitats include different percentages of the taxa of a systematic group.

The pronounced dominance of local endemics is rare and occurs in a small number of taxonomic groups.

In the Bulgarian non-marine invertebrate fauna, about 15 faunistic elements are presented.

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