

Andrzej LEŚNIAK

Zoogeographical analysis of the *Carabidae* (Coleoptera) of Poland

(With one map in the text)

Abstract. Presented paper is a proposal of a classification of the carabid beetles occurring in Poland to the following zoogeographical elements: Holarctic, Palaearctic, Euroarctic, Euro-Siberian, Euro-Central Asiatic, Euro-Mediterranean and element of the European Forest Province.

Biogeography as a science dealing with the problem of distribution of organism communities has developed over last three decades. It is an integration of both animal and plant geography into a unified special branch. This junction seems to be especially reasonable since, so far, any consideration about particular distribution of animals resulted with an observation of their dependence on the specific vegetation.

Recently biogeography has been developing in many countries, particularly in the Soviet Union and the USA with both theoretical and utilitarian aspects. The following ends were put to be fulfilled by this knowledge (Teoret. i prikl. aspekty biogeografii, 1982):

- explanation of performance and energy balances of ecosystems,
- bioindication of elements of landscape (among others for the classification purposes),
- forecasting of trends in community transformations influenced by natural and anthropogenic factors.

According to OBMIŃSKI (1974) zoocenosis is a formation which does not exist independently. It is only a "formal unit" built up by researchers, being in fact an integrated part of biocenosis. This opinion had been supported, independently from OBMIŃSKI, by STUGREN (1975), who established much closer con-

nections between for instance, the plant and its phytophagic insects than between two plants.

It looks, however, reasonable to retain some of those "formal units" at the present phase of the development of biogeography. They should serve the purpose of classification of zoogeographical units. They should be easy in application and simultaneously not isolated from the present natural environment of animal world, i.e. to some degree biogeographical.

The aim of this paper is a new proposal for such a classification as well as an exemplary classification of species of the family *Carabidae* (*Coleoptera*) in Poland.

Proposal of the simplified division of Polish fauna into zoogeographical elements

Analysis of the Polish strictly zoogeographical references as well as the zoological one which deals partially with zoogeographical subjects¹ has proved its paucity, especially as far as the number of theories and syntheses is concerned. Classifications applied in those references also are extremely different. This differentiation has been, however, justified to some degree by the variable objects of investigations; research works were devoted to different groups of animals and the knowledge gained upon them was also differentiated. However the opinion, that it is impossible to create a unified classification, suitable for the whole fauna or for the majority of animal groups at least, seems to be an exaggeration. It is also obvious that the present variability of classification makes the further development of zoogeography quite impossible, especially for as far synthetic works indispensable for this development are concerned.

Classifications developed so far are rather difficult to apply because of:

- over-detailed division²,
- over-generalized division³ or
- lack of clearness concerning the limits between particular units of classification, both basic and secondary ones. For instance a statement that a species occurring over the most of the Palaearctic Region is a "Palaearctic species" can be voluntarily interpreted in any way.

Furthermore, from the point view of the contemporary biogeography such term like "European element" are totally unacceptable since the geographic

¹ Cf. BAŃKOWSKA, 1979; BAZYLUK, 1977; CZECHOWSKI, MIKOŁAJCZYK, 1981; KLIMASZEWSKI, 1975; KOSTROWICKI, 1953, 1965; KUNTZE, 1926; KUNTZE, NOSKIEWICZ, 1938; MAZUR, 1981; MROCZKOWSKI, 1968; NIEDBALA 1980; PAWŁOWSKI, 1967, 1975; PLISKO, 1973; RIEDEL, WIKTOR, 1974; STARĘGA, 1976; STEBNICKA, 1976; TROJAN, 1979; WOJTUSIAK, NIESIOŁOWSKI, 1947.

² KOSTROWICKI (1953) applied in his work, for instance, several tens of zoogeographical categories.

³ NIEDBALA (1980) used a division consisting of four zoogeographical categories only.

notion of Europe does not correspond to any biogeographical category. Europe contains yet a number of bioms begining from tundra up to macquis.

Statements such as "occurrence of some Mediterranean elements in Poland" (viewed as part of the European Forest Province) seems to be also controversial. Taking no account of cases of evident accidental introduction of a Mediterranean species, for instance, into a greenhouse, where it can exist for years, a species appearing in two neighbouring zoo- or biogeographical units should be regarded as common for both and therefore it seems to be the most appropriate to designate it as a Euro-Mediterranean element. This way of thinking can be, of course, opposed by examples of very common species which appear more sparse at the extremes of their distribution in different zoogeographical units. Any classification, however, should be in principle equally valid for all species. However, the majority of species are rare or very rare. Presently, it is very difficult to determine the centres of distribution for many species. This is well evident even in the family *Carabidae* (*Coleoptera*) which is a well studied group. There are many examples here that a particular species has been recorded from three localities in the Mediterranean Region and two localities in Central Europe. It seems to be a correct way to designate that species by a compound name formed from the names of the two zoogeographical units.

Quite another and very important problem is that some dissertations do not inform which species have been grouped into definite zoogeographical elements and report only percentage of those elements. Only percentual participation of those elements is demonstrated. This approach to the problem makes impossible eventual critical examination, situation rather convenient for the author, but does not provide essential information as well as possibilities for adequate adjustments depending on the advance of knowledge in this field.

Taking into account all reservations and arguments mentioned above, the following division of the Polish fauna into zoogeographical elements could be proposed:

1. Holarctic element (species living both in Palaearctic and Nearctic Regions).
2. Palaearctic element (species occurring at least in three units of the division of Palaearctic, among them not less than in two Palaearctic Subregions).
3. Euroarctic element (species living in European Forest Province, western periphery of the Euro-Siberian Province and in the Arctic Subregion). So far this element has not been taken into account in other systems of division.
4. Euro-Siberian element (species living in the European Forest Province and in the Euro-Siberian Province).
5. Euro-Central Asiatic element (species living in the European Forest Province and the Kazakhstan-Mongolian Province of the Central Asiatic Subregion).
6. Euro-Mediterranean element (species living in European Forest Province and in the Mediterranean Subregion).

7. Element of the European Forest Province (containing also montane species of this province and the Carpathian endemites).

This division has been elaborated on this basis of the World's Zoogeographical Map edited by the Soviet Academy of Sciences and with the use of data on the distribution of the *Carabidae* mainly from the Catalogue of the Polish Fauna (BURAKOWSKI, MROCZKOWSKI, STEFAŃSKA, 1973, 1974) as well as those from the basic publications on the distribution of this group of insects (BURMEISTER, 1939; LINDROTH, 1957; ŠAROVA, 1981).

An analysis of natural distribution of 513 native species of *Carabidae* mentioned by the above authors proved that the geobotanical division used in the sole Polish zoogeographical dissertation of the post-war period, concerning the theory of the regionalisation of the Palaearctic Region on the basis of the *Lepidoptera*-Fauna (KOSTROWICKI, 1965) was useless. Natural ranges of particular species of *Carabidae* are much more extended than the units of the geobotanical division cited in that work. A comparison, however, of those ranges of *Carabidae* species with the units of the zoogeographical map of the Soviet Academy of Sciences, very similar to the DENGLEDER'S (1944) Map of Formations of Vegetation, allowed for the separation of the zoogeographical elements proposed previously.

Principle of single or compound (i.e. two-member) names based on the names of the zoogeographical division has been adapted. Single name was applied in cases when the natural range of a species was contained within one unit of the zoogeographical division, such as a province or a region. If a species, however, is recorded from two zoogeographical units, a compound name was applied, for example an Euro-Arctic element. If a species is recorded at least in three zoogeographical units, the name of the major unit i.e. that of region was used, for instance: a Palaearctic element.

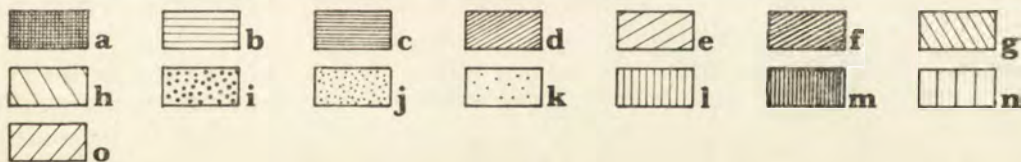
If an investigated group of animals has rather small geographical ranges in a province, for instance in the European Forest Province, the latter should be divided into smaller zoogeographical units, and smaller elements should be distinguished, viz. Central-European or West-Central-European elements. If an investigated group of animals has a wide range, compound names of two regions can be applied. A species occurring at least in three regions should be recognized as a cosmopolitic one¹.

Borders of particular units of this division are displayed on the enclosed section of the World's Zoogeographical Map edited by the Soviet Academy of Sciences (Map 1).

It should be stressed that the authors of the presented map have included the Caucasus into the European Forest Province. This fact has been accepted in the proposed division. However, taking into account that such qualification of Caucasus must appear controversial, the occurrence of some species within

¹ On the condition that one of those regions is Holarctic.

this region has been marked with a letter C (for Caucasus) in the below list of species. This controversial status of the Caucasus results from its location on the adjoining area of three zoogeographical units: European Forest Province, Mediterranean Subregion and Central-Asiatic Subregion. Also the historical and



Map 1

	Provinces	Subregions	Regions
a.	—	Arctic	
b.	Euro-Siberian	Eurosiberian	
c.	European Forest	Mediterranean	
d.	Mediterranean		
e.	Kazakh-Mongolian	Central-Asiatic	
f.	Asiatic montane		Palearctic
g.	Irano-Turanian	Mediterranean	
h.	Kashkaro-Gobian	Central-Asiatic	
i.	Himalayo-Ammanian		
j.	Chino-Koreanian	Chino-Himalayan	
k.	Japano-Central Chinese		
l.	Saharo-Arabian	Mediterranean	
m.	Indian	—	Indo-Malayan
n.	Indochinesian	—	
o.	—	North African	Ethiopian

geological conditions as well as ecological differentiation of the Caucasus contribute to that question. No wonder, then, that various authors evaluated differently this faunistically very interesting region. OLSUFIEV (1980) determined the Caucasus as a separated district of the Euro-Siberian Forest Province. RIEDEL (1966) after LIKHAREV and RAMMELMEIER (1952) includes Caucasian area into the Mediterranean Subregion of Palaearctic and distinguishes even a Caucasus Province with two districts and six sub-districts. MROCZKOWSKI (1968) joins the Caucasus with the Iran-Turan Province, Mediterranean Subregion. CZECHOWSKI and MIKOŁAJCZYK (1981) recommend to include the "Euro-Caucasian" species to the "Southern Euro-Siberian" element, whereas a well known ornithologist STEGMAN (1938) considers Caucasian birds as a Tibetanian type of the Palaearctic fauna. All in all one may say that it is rather difficult to be a zoogeographer as more and more problems emerge in this field. It seems, however, that the zoogeographical qualification of the Caucasus as far as yet has not been solved and special attention should be drawn to the dissertation by WOJTUSIAK and NIESIOŁOWSKI (1947), who determined on the map of the Caucasus three subregions, namely Euro-Siberian, Central-Asiatic and Mediterranean Subregions. This division, however, is nowadays almost useless, since up to now the majority of the faunistic data has in its description only unprecise description of the Caucasus as a whole.

Analysis of the species list of some animal groups existing in Poland and in the Caucasus (PEBEL, 1979; PLISKO, 1973; STEBNICKA, 1976; OLSUFIEV, 1918; BURAKOWSKI, MROCZKOWSKI, STEFAŃSKA, 1974) shows that there is hardly any similarity between those two faunas. Thus their inclusion to the same zoogeographical unit becomes problematic and the present status of the Caucasus in the zoogeographical classification must be considered as a temporary one.

Polish species of the family *Carabidae* participate in the zoogeographical elements distinguished above as follow:

Zoogeographical element	Number of species	%
Holarctic	24	4,7
Palaearctic	178	34,7
Euro-Central Asiatic	2	0,3
Euro-Siberian	60	11,7
Euro-Arctic	7	1,4
Euro-Mediterranean	80	15,6
of European Forest Province (without montane species)	83	16,2
European montane and Carpathian species	79	15,4
Total	513	100,0

In the paper on the *Carabidae* of National Parks of Poland the present writer (LEŚNIAK, 1980), on the basis of a very rich material collected, stated that some of the above elements contained generally rare species, whilst the others contained very common species. This was mostly evident in case of species scantily represented in Poland which belong to the Euro-Mediterranean element and in case of common species which belong to the Euro-Siberian and Euro-Arctic elements.

Classification of the *Carabidae* species native in Poland to the proposed zoogeographical elements

The following list contains the *Carabidae* species native in Poland classified to the proposed zoogeographical elements.

The list shows the following information:

1. Ordinal number and name of a species according to the series "Catalogue of the Polish Fauna", vol. "*Coleoptera*" by BURAKOWSKI, MROCZKOWSKI and STEFAŃSKA (1973, 1974), *Carabidae* part I and II.

2. Remarks abbreviated as follows:

b. m. — boreal-montane species (this category is not a zoogeographical but ecological one);

C. — species occurring in the Caucasus;

L. — holarctic species, according to LINDROTH (1957);

B. — palaeartic species, according to BURMEISTER (1939);

i. — species introduced to the USA or Canada with a ship ballast, according to LINDROTH (1957);

N. — a Northern-Palaeartic species;

W. — a Western-Palaeartic species;

s. — saline-marsch species;

? preceding the species name — appearance in Poland doubtful;

? in the column "Remarks" — hardly recognized distribution of the species, classification to a particular zoogeographical element only temporary;

N. E. — species occurring also in Near East;

m ? — probably montane species;

Cp. — Carpathian species.

No.	Species	Remarks	No.	Species	Remarks
	Holarctic element		96	<i>Miscodera arctica</i>	
49	<i>Nebria rufescens</i>	b.m.	157	<i>Bembidion transparens</i>	L.
57	<i>Nothiophilus aquaticus</i>		165	<i>B. quadrimaculatum</i>	C.
64	<i>Blethisa multipunctata</i>		176	<i>Tachyta nana</i>	
67	<i>Elaphrus riparius</i>		213	<i>Patrobus septentrionis</i>	b.m.
70	<i>Loricera caerulea</i>		249	<i>Amara erratica</i>	b.m.C.
72	<i>Olivina fossor</i>	C.	254	<i>A. quenseli</i>	b.m.
88	<i>Dyschirius politus</i>	C.	256	<i>A. brunnea</i>	

No.	Species	Remarks	No.	Species	Remarks
258	<i>A. apricaria</i>	C.	144	<i>B. ustulatum</i>	i.
329	? <i>Agonum bogemanni</i>	b.m.	153	<i>B. schuppelii</i>	C.
350	<i>A. quadripunctatum</i>		154	<i>B. assimile</i>	C.
340	<i>A. muelleri</i>	L.C.	156	<i>B. fumigatum</i>	C.s.
346	<i>A. mannerheimii</i>		160	<i>B. minimum</i>	C.s.i.
352	<i>A. obscurum</i>	C.	164	<i>B. quadripustulatum</i>	
358	<i>A. pelidnum</i>	L.C.	166	<i>B. doris</i>	N.
421	<i>Harpalus fuliginosus</i>	L.	167	<i>B. articulatum</i>	C.
446	<i>Trichocellus cognatus</i>		168	<i>B. octomaculatum</i>	C.
	Palearctic element		171	<i>B. aeneum</i>	C.
2	<i>Cicindela campestris</i>	C.	173	<i>B. guttula</i>	C.i.
4	<i>C. maritima</i>	C.	177	<i>Tachys bistriatus</i>	W.C.
7.	<i>C. germanica</i>		185	<i>Pogonus luridipennis</i>	W.s.
8	<i>Calosoma inquisitor</i>		187	<i>Perileptus areolatus</i>	C.
9	<i>C. sycophanta</i>		190	<i>Epaphius secalis</i>	N.
11	<i>C. maderae auropunctatum</i>	W.	201	<i>Trechus quadristriatus</i>	W.C.
17	<i>Carabus violaceus</i>	N.i.	202	<i>T. rubens</i>	N.i.b.m.
25	<i>C. clathratus</i>		205	<i>Lasiotrechus discus</i>	
30	<i>C. arcensis</i>		216	<i>Panageus bipustulatus</i>	W.C.
47	<i>Leistus rufescens</i>		217	<i>P. cruxmajor</i>	C.
51	<i>Nebria livida</i>		218	<i>Amara chauldoiri incognita</i>	C.
56	<i>Nothiophilus aesthuans</i>	W.	222	<i>A. plebeja</i>	i.
58	<i>N. biguttatus</i>	i.	223	? <i>A. pseudostrenua</i>	W.s.
61	<i>N. palustris</i>	i.	225	<i>A. tricuspidata</i>	
63	<i>Omophron limbatum</i>	C.	226	<i>A. aenea</i>	i.
65	<i>Elaphrus cupreus</i>	N.	228	<i>A. communis</i>	C.i.
66	<i>E. uliginosus</i>	C.	230	<i>A. curta</i>	C.
71	<i>Clivina collaris</i>	C.	231	<i>A. eyrinota</i>	C.
73	<i>Dyschirius aeneus</i>		233	<i>A. familiaris</i>	C.i.
76	<i>D. chaldeus</i>	s.	235	<i>A. lucida</i>	C.W.
78	<i>D. globosus</i>		236	<i>A. lunicollis</i>	C.i.
86	<i>D. nitidus</i>		240	<i>A. ovata</i>	C.i.
93	<i>D. thoracicus</i>	B.	243	<i>A. similata</i>	C.i.
98	<i>Asaphidion flavipes</i>		244	<i>A. spreta</i>	C.
99	<i>A. pallipes</i>	N.C.	246	<i>A. bifrons</i>	W.
102	<i>Bembidion velox</i>	N.	247	<i>A. complanata</i>	C.
109	<i>B. lampros</i>	C.i.	253	<i>A. pallens</i>	C.
110	<i>B. properans</i>	C.i.	257	<i>A. crenata</i>	W.C.
111	<i>B. punctulatum</i>	C.	260	<i>A. fulva</i>	N.C.i.
113	<i>B. bipunctatum</i>	C.	261	<i>A. majuscula</i>	
116	<i>B. obliquum</i>	C.	262	<i>A. aulica</i>	N.C.i.
117	<i>B. semipunctatum</i>	C.	265	<i>A. equestris</i>	C.i.
118	<i>B. varium</i>	C.i.	268	<i>Pterostichus cupreus</i>	C.i.
119	<i>B. prasinum</i>	N.C.	276	<i>P. vernalis</i>	C.i.
129	<i>B. andreae</i>	C.	278	<i>P. aterrinus</i>	
131	<i>B. femoratum</i>	C.	280	<i>P. oblongopunctatus</i>	C.
134	<i>B. lunatum</i>		283	<i>P. anthracinus</i>	
137	<i>B. nitidulum</i>		284	<i>P. brunneus</i>	C.
139	<i>B. sazatile</i>		286	<i>P. nigrita</i>	C.i.
			288	<i>P. diligens</i>	N.

No.	Species	Remarks	No.	Species	Remarks
289	<i>P. ovoideus</i>	C.	430	? <i>H. politus</i>	C.
290	<i>P. strenuus</i>	C.i.	432	<i>H. psittaceus</i>	C.
315	<i>Calathus ambiguus</i>	C.	433	<i>H. quadripunctatus</i>	N.C.
316	<i>C. erratus</i>	C.	435	<i>H. rubripes</i>	C.i.
317	<i>C. fuscipes</i>	W.C.i.	436	<i>H. rufitarsis</i>	C.
318	<i>C. melanocephalus</i>	C.i.	437	<i>H. serripes</i>	C.
320	<i>C. micropterus</i>	N.C.	438	<i>H. servus</i>	
321	<i>C. mollis</i>	C.i.	440	<i>H. tardus</i>	C.i.
323	<i>Sphodrus leucophthalmus</i>	W.C.	443	<i>H. winkleri</i>	N.
325	<i>Dolichus halensis</i>	C.	444	<i>Trichotichnus maculicornis</i>	C.
331	<i>Agonum dolens</i>	N.	447	<i>Trichocellus placidus</i>	N.C.
332	<i>A. ericeti</i>	N.	449	<i>Bradycellus collaris</i>	N.C.
333	<i>A. gracilipes</i>		454	<i>Acupalpus dorsalis</i>	C.
336	<i>A. impressum</i>		457	<i>A. exiguum</i>	B.
338	<i>A. marginatum</i>	W.C.	465	<i>A. mixtus</i>	C.
339	<i>A. moestrum</i>	C.	468	<i>Zabrus tenebrioides</i>	C.
341	<i>A. sexpunctatum</i>	N.C.	470	<i>Masoreus wetterhallii</i>	C.
342	<i>A. versutum</i>	N.C.	471	<i>Lebia chlorocephala</i>	C.
348	<i>A. assimile</i>	C.	472	<i>L. cyanocephala</i>	C.
353	<i>A. dorsale</i>	C.i.	473	<i>L. cruzminor</i>	
355	<i>A. fuliginosum</i>	C.	475	<i>Demetrias atricapillus</i>	i.
356	<i>A. gracile</i>	N.	477	<i>D. imperialis</i>	C.
357	<i>A. micans</i>	i.	479	<i>Dromius linearis</i>	i.
362	<i>Badister bipustulatus</i>	C.i.	481	<i>D. agilis</i>	
367	<i>B. unipustulatus</i>	C.	489	<i>D. melanocephalus</i>	W.
368	<i>B. dilatatus</i>	C.	490	<i>D. nigriventris</i>	W.
372	<i>Licinus depressus</i>	C.	492	<i>D. sigma</i>	C.
374	<i>Callistus lunatus</i>	W.C.	493	<i>Metabletus foveatus</i>	C.i.
378	<i>Chlaenius nigricornis</i>	C.	496	<i>M. truncatellus</i>	C.
381	<i>Ch. tristis</i>	C.	497	<i>Microlestes maurus</i>	W.i.
382	<i>Ch. vestitus</i>		498	<i>M. minutulus</i>	C.
387	<i>Oodes helopioides</i>		502	<i>Cymindis axillaris</i>	W.
390	<i>Diachromus germanus</i>	W.C.	506	<i>C. vaporariorum</i>	N.
392	<i>Anisodactylus binotatus</i>	C.i.	507	<i>Colliuris melanura</i>	C.
395	<i>Harpalus azureus</i>	W.	508	<i>Drypta dentata</i>	W.
396	<i>H. brevicollis</i>	W.	509	<i>Polistichus connexus</i>	
397	<i>H. cordatus</i>	C.	510	<i>Brachynus explodens</i>	
400	<i>H. punctatulus</i>	C.	511	<i>B. crepitans</i>	
401	<i>H. puncticeps</i>	W.C.			
402	<i>H. puncticollis</i>	C.			
408	<i>H. griseus</i>	C.			
409	<i>H. rufipes</i>				
413	<i>H. hirtipes</i>				
414	<i>H. zabroides</i>	C.	1	<i>Cicindela arenaria vienensis</i> ?	
415	<i>H. affinis</i>	C.i.	3	<i>C. hybrida</i>	
416	<i>H. anxius</i>	C.	5	<i>C. sylvatica</i>	
417	<i>H. atratus</i>	W.C.	10	<i>Calosoma investigator</i>	
419	? <i>H. cupreus</i>	W.C.	21	<i>Carabus convezus</i>	C.
423	<i>H. latus</i>	N.C.	22	<i>C. marginalis</i>	
427	<i>H. modestus</i>	C.	26	<i>C. granulatus</i>	? C.
			28	<i>C. cancellatus</i>	

Euro-Siberian element

No.	Species	Remarks	No.	Species	Remarks
87	<i>Dyschirius obscurus</i>		501	<i>Cymindis angularis</i>	
95	<i>Brosicus cephalotes</i>	C.	505	<i>C. macularis</i>	
100	<i>Bembidion argenteolum</i>				
101	<i>B. litorale</i>				Euro-Central Asiatic element
104	<i>B. striatum</i>				
114	<i>B. ruficolle</i>		33	? <i>Carabus besseri</i>	
115	<i>B. dentellum</i>	C.	34	<i>C. scabriusculus</i>	N.E. ?
152	<i>B. gilvipes</i>	C.			
158	<i>B. azurescens</i>				Euro-Arctic element
172	<i>B. biguttatum</i>	C.	16	<i>Carabus problematicus</i>	
175	<i>B. mannerheimii</i>	C.	23	<i>C. nitens</i>	
206	<i>Trechoblemus micros</i>	C.	37	<i>C. glabratus</i>	
211	<i>Patrobis atrorufus</i>	C.	42	<i>Cychnus caraboides</i>	
232	<i>Amara famelica</i>	C.	46	<i>Leistus ferrugineus</i>	
238	<i>A. montivaga</i>	? C.	210	<i>Patrobis assimilis</i>	
239	<i>A. nitida</i>		234	<i>Amara littorea</i>	
245	<i>A. tibialis</i>				
250	<i>A. infima</i>				Euro-Mediterranean element
251	<i>A. ingenua</i>	? C.			
252	<i>A. municipalis</i>	C.	45	? <i>Leistus spinibarbis</i>	
259	<i>A. consularis</i>	C.	55	<i>Nebria brevicollis</i>	C.
263	<i>A. convexiuscula</i>	C.s.	89	<i>Dyschirius rufipes</i>	
267	<i>Pterostichus caerulescens</i>	C.	90	<i>D. salinus</i>	s.
270	<i>P. punctulatus</i>		92	<i>D. strumosus</i>	s.
271	<i>P. sericeus</i>	C.	97	<i>Asaphidion caraboides</i>	C.
273	<i>P. virens</i>		103	<i>Bembidion foraminosum</i>	C.
275	<i>P. chameleon</i>		105	<i>B. laticolle</i>	
277	<i>P. macer</i>	C.	124	<i>B. geniculatum</i>	C.
281	<i>P. niger</i>	C.	125	<i>B. tibiale</i>	C.
282	<i>P. vulgaris</i>	C.	126	<i>B. varicolor</i>	C.
285	<i>P. guentheri</i>	C.	130	<i>B. decorum</i>	m. ?
326	<i>Synuchus nivalis</i>	? C.	159	<i>B. latiplaga</i>	C.
343	<i>Agonum viduum</i>	? C.	161	<i>B. normannum</i>	s.
345	<i>A. livens</i>		162	<i>B. tenellum</i>	s.
349	<i>A. krynickii</i>		174	<i>B. lunulatum</i>	
350	<i>A. longiventre</i>		178	<i>Tachys micros</i>	
359	<i>A. piceum</i>		179	<i>T. bisulcatus</i>	C.
383	<i>Chlaenius quadrisulcatus</i>		180	<i>T. parvulus</i>	
384	<i>Ch. sulcicollis</i>		181	<i>T. quadrisignatus</i>	
385	<i>Ch. costulatus</i>		182	<i>T. sexstriatus</i>	
389	<i>Dicheirotichus rufithorax</i>		183	<i>T. hoemorroidalis</i>	
404	<i>Harpalus sabulicola</i>	C.	184	<i>Pogonus chalceus</i>	s.
410	<i>H. calceatus</i>	C.	188	<i>Thalassophilus longicornis</i>	m. ?
412	<i>H. froelichii</i>	C.	193	<i>Trechus austriacus</i>	
422	<i>H. honestus</i>	? C.	196	<i>T. obtusus</i>	
439	<i>H. smaragdinus</i>	? C.	220	? <i>Amara fulvipes</i>	
442	<i>H. vernalis</i>	? C.	221	? <i>A. kulti</i>	
462	<i>Acupalpus consputus</i>	? C.	227	? <i>A. anthobia</i>	
476	<i>Demetrius monostigma</i>	C.	266	<i>Stomis pumicatus</i>	
486	<i>Dromius quadraticollis</i>		272	? <i>Pterostichus striatopunctatus</i>	

No.	Species	Remarks	No.	Species	Remarks
274	<i>P. longicollis</i>	C.	Element of the European Forest Province		
324	<i>Aechmites terricola</i>	C.i.	12	<i>Calosoma reticulatum</i>	
327	<i>Olisthopus rotundatus</i>	C.	13	<i>Carabus coriaceus</i>	
328	<i>O. sturmii</i>	C.	15	<i>C. intricatus</i>	
337	<i>Agonum lugens</i>	C.	20	<i>C. auronitens</i>	m. †
344	<i>A. viridicupreum</i>		24	<i>C. auratus</i>	
351	<i>A. albipes</i>	? C.i.	27	<i>C. menetriesi</i>	
361	? <i>Perigona nigriceps</i>	?	29	<i>C. ulrichii</i>	
366	<i>Badister sodalis</i>	C.N.E.	32a	<i>C. scheidleri excelens</i>	
369	<i>B. peltatus</i>	C.	32b	<i>C. scheidleri preysleri</i>	
371	<i>Licinus cassideus</i>	C.	35	<i>C. nemoralis</i>	i.
373	? <i>L. silphoides</i>	C.i.	36	<i>C. hortensis</i>	
375	? <i>Chlaenius spoliatus</i>		44	<i>Leistus rufomarginatus</i>	C. †
376	<i>Ch. festivus</i>	C.	59	<i>Notiophilus germinyi</i>	C.
380	<i>Ch. tibialis</i>		60	<i>N. laticollis</i>	
386	<i>Oodes gracilis</i>	C.	62	<i>N. rufipes</i>	C. ? N.E.
391	<i>Anisodactylus poeciloides</i>	s.	68	<i>Elaphrus aureus</i>	
393	<i>A. nemorivagus</i>	C.	69	<i>E. ullrichii</i>	
394	<i>A. signatus</i>		74	<i>Dyschirius angustatus</i>	
398	<i>Harpalus melletii</i>		75	<i>D. bonelli</i>	
399	<i>H. obscurus</i>	C.	77	<i>D. digitatus</i>	
403	<i>H. rupicola</i>	C.	79	<i>D. gracilis</i>	C. †
406	<i>H. signaticornis</i>	C.	80	<i>D. impunctipennis</i>	† s.
407	? <i>H. zigzag</i>		81	<i>D. intermedius</i>	
420	? <i>H. flavicornis</i>		82	<i>D. laeviusculus</i>	?
426	<i>H. melancholicus</i>	C.	83	<i>D. lucidus obenbergeri</i>	?
428	<i>H. neglectus</i>	C.	84	<i>D. makolskii</i>	
441	<i>H. tenebrosus</i>		85	<i>D. neresheimeri</i>	
443	<i>Bradycellus ruficollis</i>		94	<i>D. tristis</i>	
451	<i>B. harpalinus</i>	C.	106	<i>Bembidion pygmaeum</i>	
452	<i>B. verbasci</i>	C.	107	<i>B. splendidum</i>	N.E.
456	<i>Acupalpus elegans</i>	s.	108	<i>B. nigricorne</i>	
458	<i>A. flavicollis</i>	C.	112	<i>B. pallidipenne</i>	s.
459	<i>A. maculatus</i>	? C.s.	127	<i>B. monticula</i>	C.
460	<i>A. meridianus</i>	C.i.	132	<i>B. fluviatile</i>	
461	<i>A. suturalis</i>	C.	135	<i>B. milleri</i>	
463	<i>A. longicornis</i>	C.	141	<i>B. stephensii</i>	
464	<i>A. discophorus</i>		142	? <i>B. subcostatum javurkovae</i>	
466	<i>A. skrimshiranus</i>	C.	143	<i>B. testaceum</i>	
467	<i>A. teutonius</i>		146	<i>B. tetragrammum illigeri</i>	
469	<i>Zabrus spinipes</i>		155	? <i>B. clarkii</i>	
474	<i>Lebia marginata</i>		163	<i>B. humerale</i>	
486	<i>Dromius quadrimaculatus</i>	C.	169	<i>B. obtusum</i>	
488	<i>D. spilotus</i>		170	<i>B. quinquestriatum</i>	
491	<i>D. quadrisignatus</i>		186	<i>Pogonum peisonis</i>	s.
494	<i>Metabletus obscuroguttatus</i>		189	<i>Epaphius rivularis</i>	
495	<i>M. pallipes</i>	C.	219	<i>Amara concinna</i>	?
499	<i>Microlestes plagiatus</i>		224	<i>A. strenua</i>	s.
500	<i>Lionychus quadrillum</i>		229	<i>A. convexior</i>	†
504	<i>Cymindis humeralis</i>				

No.	Species	Remarks	No.	Species	Remarks
241	<i>A. pseudocommunis</i>		43	<i>Leistus montanus</i>	
248	<i>A. cursitans</i>	m. ?	48	<i>L. piceus</i>	+ near
255	<i>A. roubali</i>				Białowie-
269	<i>Pterostichus kugelanni</i>				ża and
279	<i>P. angustatus</i>	C.s.			Kalinin-
291	<i>P. taksonyis</i>				grad
297	<i>P. aethiops</i>		50	<i>Nebria jockischi</i>	
299	? <i>P. madidus</i>		52	<i>N. picicornis</i>	
309	<i>Abax parallelepipedus</i>		53	<i>N. fuscipes</i>	Cp.
310	<i>A. parallelus</i>		54	<i>N. tetrica</i>	Cp.
322	<i>Calathus piceus</i>		91	<i>Dyschirius similis</i>	
334	? <i>Agonum holdhausi</i>	C.	121	<i>Bembidion atrocaeruleum</i>	?
335	<i>A. hypocrita</i>	?	120	<i>B. ascedens</i>	
360	<i>A. scitulum</i>		122	<i>B. conforme</i>	
363	<i>Badister dorsiger</i>		123	<i>B. fasciolatum</i>	
364	<i>B. kineli</i>		128	<i>B. fulvipes</i>	
365	<i>B. lacertosus</i>		133	<i>B. incognitum</i>	
377	<i>Chlaenius kindermanni</i>	?	136	<i>B. modestum</i>	
379	<i>Ch. nitidulus</i>	?	140	<i>B. scapulare lomnickii</i>	Cp.
388	<i>Dicheirotichus gustavii</i>	s.	145	<i>B. glaciale</i>	
405	<i>Harpalus seladon</i>		147	<i>B. atroviolaceum</i>	
411	<i>H. flavescens</i>	C.	148	<i>B. decoratum</i>	C.
418	<i>H. autumnalis</i>	?	149	<i>B. millerianum</i>	
424	<i>H. luteicornis</i>		150	<i>B. ruficorne</i>	C.
429	<i>H. picipennis</i>		151	<i>B. doderoi</i>	
431	<i>H. progrediens</i>		191	<i>Trechus alpicola</i>	
443	<i>H. roubali</i>		192	<i>T. amplicollis</i>	
450	<i>Bradycellus csikii</i>		194	<i>T. latus</i>	
453	<i>Acupalpus brunripes</i>		195	<i>T. montanellus</i>	
455	<i>A. dubius</i>		197	<i>T. pilisensis</i>	
478	<i>Dromius longiceps</i>	C.	198	<i>T. plicatulus</i>	Cp.
482	<i>D. angustus</i>		199	<i>T. pulchellus</i>	
483	<i>D. fenestratus</i>		200	<i>T. pulpani</i>	Cp.
484	<i>D. laeviceps</i>	?	203	<i>T. splendens</i>	
487	<i>D. schneideri</i>		204	<i>T. striatulus</i>	
			207	<i>Pseudanopthalmus pilosellus</i>	Cp.
Montane species of the European Forest Province			208	<i>Duvalius subterraneus</i>	Cp.
			209	<i>D. microphthalmus</i>	Cp.
6	<i>Cicindela sylvicola</i>	?	212	<i>Patrobus quadricollis</i>	Cp.
14	<i>Carabus fabricii</i>	Cp.	214	<i>Deltomerus carpathicus</i>	Cp.
18	<i>C. irregularis</i>		215	<i>D. tetricus</i>	Cp.
19	<i>C. variolosus</i>		237	? <i>Amara meschniggi</i>	Cp.
31	<i>C. obsoletus</i>	Cp.	242	<i>A. schimperii</i>	?
32	<i>C. zawadzki</i>	Cp.	264	<i>A. helleri</i>	?
38	<i>C. sylvestris</i>		287	<i>Pterostichus negligens</i>	
39	<i>C. transsylvanicus</i>	Cp.	292	<i>P. unctulatus</i>	
40	<i>C. linnaei</i>		293	<i>P. pumillio</i>	North
41	<i>Cychrus attenuatus</i>				Siberian

No.	Species	Remarks	No.	Species'	Remarks
294	<i>P. blandulus</i>	? Cp. (+North Siberian)	306	<i>P. pilosus</i>	
			307	<i>Abax carinatus</i>	
			308	<i>A. ovalis</i>	m.?
295	<i>P. tatricus</i>	Cp.	311	<i>A. schueppeli rendschmidtii</i>	
296	<i>P. sudeticus</i>	(Karkono- sze Mts.	312	? <i>Molops elatus</i>	
			313	<i>M. piceus</i>	
298	<i>P. cordatus</i>	Cp. (+Su- deten Mts.	314	<i>Platyderes rufus</i>	
			319	<i>Calathus metallicus</i>	
300	<i>P. rufitarsis</i>	Cp. (+Su- deten Mts.	347	<i>Agonum scrobiculatum</i>	
			354	<i>A. antennarium</i>	
301	<i>P. burmeisteri</i>		370	<i>Licinus hofmannseggii</i>	
302	<i>P. foveolatus</i>	Cp.	425	<i>Harpalus marginellus</i>	m.?
303	<i>P. jurine</i>		445	<i>Trichotichnus laevicollis</i>	
304	<i>P. melas</i>	C.?	480	<i>Dromius strigiceps</i>	
305	<i>P. morio</i>		503	<i>Cymindis cingulata</i>	

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Instytut Zoologii PAN
00–679 Warszawa, Wilcza 64

STRESZCZENIE

[Tytuł: Analiza zoogeograficzna *Carabidae* (*Coleoptera*) Polski]

W pracy przedstawiono propozycję nowego uproszczonego podziału fauny *Carabidae* Polski na elementy zoogeograficzne. Podział ten może być zastosowany także do dowolnej innej grupy świata zwierząt.

Przyjęto zasadę nazw jedno- i dwuczłonowych, tworzonych od nazw jednos-

tek podziału zoogeograficznego. Nazwy jednoczłonowe stosowano w tych przypadkach, gdy areal danego gatunku mieścił się w granicach jednej jednostki podziału zoogeograficznego — prowincji lub regionu. O ile występowanie jakiegoś gatunku notowane jest w dwu jednostkach zoogeograficznych, przyjmowano nazwę dwuczłonową, np. element euroarktyczny. Jeśli występowanie gatunku stwierdzono co najmniej w trzech jednostkach zoogeograficznych, przyjmowano nazwę jednostki wyższego rzędu, to jest krainy, np. element palearktyczny. Zgodnie z tą zasadą przyjęto następujące nazwy elementów zoogeograficznych: holarktyczny, palearktyczny, euroarktyczny, eurosyberyjski, eurośrodkowoazjatycki, eurośroziemnomorski, element Europejskiej Prowincji Leśnej (ten ostatni zawiera również gatunki europejskie górskie i endemity karpackie). Jako podstawę podziału przyjęto mapę zoogeograficzną świata wydaną przez AN ZSRR (1964) oraz dane o rozprzestrzenieniu *Carabidae* zawarte głównie w Katalogu Fauny Polski (BURAKOWSKI, MROCZKOWSKI i STEFAŃSKA 1973, 1974) i w podstawowych publikacjach dotyczących rozmieszczenia gatunków tej rodziny owadów. W wyniku pracy ustalono procentowy udział *Carabidae* Polski w wyróżnionych elementach zoogeograficznych (tabela na str. 302).

РЕЗЮМЕ

[Заглавие: Зоогеографический анализ *Carabidae* (Coleoptera) Польши]

В работе дается предложение нового упрощенного расчленения фауны *Carabidae* Польши на зоогеографические элементы. Можно его применить также к любой иной группе животного мира.

Применен принцип названий, состоящих из одного или двух членов образованных от названий зоогеографических единиц. Одночленные названия применены в тех случаях, когда ареал данного вида находится в пределах одной единицы зоогеографического подразделения — провинции или региона. Но, если распространение какого-либо вида отмечено в двух зоогеографических единицах, приняты двухчленные названия: напр., европейскоарктический элемент. Если распространение вида отмечено не менее, чем в трех зоогеографических единицах, тогда принимается название высшей зоогеографической единицы, т.е. области: напр., палеарктический элемент. Согласно этому принципу приняты следующие названия зоогеографических элементов: голарктический, палеарктический, европейскоарктический, европейскосибирский, европейскосредиземноморский, элемент Европейской лесной провинции (в него включены также европейские горные виды и карпатские эндемики). За основу настоящего подразделения приняты зоогеографическая карта мира, изданная АН СССР (1964) и данные по размещению *Carabidae*, содер-

жащиеся главным образом в Каталоге Фауны Польши (Бураковски, Мрочковски и Стефаньска 1973, 1974), а также в фундаментальных публикациях, касающихся распространения видов этого семейства насекомых. В результате проведенного анализа констатировано процентное содержание *Carabidae*. Польши в выделенных зоогеографических элементах — см. таблицу на стр. 302.
