CONTENT

Abstract

This contribution summarizes distributional and ecological data on 80 carabid species from the Belgian fauna. Besides distribution maps, results on distribution analyses, time analyses, morphology and ecology of the mentioned species are tabulated.

INTRODUCTION

In the framework of a detailed study on the distribution of Belgian Ground and Tiger beetles, we recently gathered as much data on these beetles as possible and revised all available specimens from collections. In a previous contribution (DESENDER, 1985) a checklist was presented in which 379 species are mentioned for our country.

The following contribution is the first in a series on the detailed distribution and ecology of our carabid beetles. Besides distribution maps and results from our analyses, we also tried to summarize the present knowledge on different morphological and ecological species characteristics. This was based on the literature as well as on own observations. In this way we hope to make such information more accessible to all interested entomologists and students. Discussion of the results from our analyses has been kept here to a minimum because more general analyses on the entire fauna are more meaningful and will be published in the future. Nomenclature and classification in this paper were used according to our recently published checklist (DESENDER, 1985).

Comments, criticisms or complementary information and new data concerning this paper will be much appreciated.

MATERIAL AND METHODS

a) Collection and representativity of the material

Private collections as well as collections from different institutes were checked. Doubtful literature data which could not be confirmed or checked were omitted. Additional data were obtained from many sampling campaigns in different parts of Belgium (1973-1984). These campaigns were mostly performed by means of pitfall trapping (mostly by Lab. Oecologie der Dieren, Zoögeografie en Natuurbehoud, State University Ghent) and yielded more than 100.000 individuals from approximately 60 different localities. All data for this and the other planned contributions were gathered until the end of 1984. Subsequently the data set was analysed. We nevertheless continued gathering new data which are not included here.

As already mentioned in earlier contributions, carabid beetles have been very well collected in the past in our country. Moreover within many collections a lot of additional data from Luxembourg were encountered, which were not mentioned by MOUSSET (1973). Therefore all available data on Luxembourg were also incorporated.

For each species all distribution data were reduced to all different locality-year data which means that for example only one record was used for a given species sampled by means of a pitfall-year-cycle on a given site. After this reduction we obtained on the whole 60.298 different records on the 379 species, divided into 32.196 records before 1950 and 28.102 records from 1950 onwards.

b) Data processing and preparation of distribution maps

The U.T.M. (Universal Transverse Mercator projection) grid system was adopted (cf European Invertebrate Survey, LECLERCQ, 1968; HEATH & LECLERCQ, 1969). Before the preparation of distribution maps, records were further reduced to presence/absence per species per U.T.M. 10 km square before 1950, after 1950 or in both time periods. After this final reduction we obtained 29.465 U.T.M. records, 14.269 before 1950 and 15.196 from 1950 onwards. Belgium and Luxembourg contain a 'wedge' in the U.T.M. grid (compensation zone). Until now statistical analyses were performed similarly with data from this zone as compared to the other complete 10 km squares.

By means of self developed computer programms (BASIC) data were sorted in different steps (localities, U.T.M. codes) to enhance the laborious task of searching for codes. Per species U.T.M. records were then stored on tape. Simultaneously U.T.M. codes were converted into a coördinate system. Furthermore we developed all necessary software for the preparation of provisional maps and the statistical analyses. All data processing was performed on a Tektronix 4051 desk calculator.

c) Distribution and time analyses

Distribution data from each species were compared with different abiotic and biotic factors for each U.T.M. square : altitude, most important soil type, the presence or absence of chalk in the soil, the presence or absence of acid sands or acid clay, woodland cover and woodland type, the presence of running water with high fall and finally four climatological indices (annual precipitation, an index for relative aridity, the first day each year a minimal temperature of 5°C is reached and the annual number of days with frost).

In an attempt to correct for underworked squares, all analyses were once performed with data on well-studied squares (at least 50 carabid species found : 202 U.T.M. squares) and once with squares wherefrom at least one carabid species is known (400 U.T.M. squares; total number of U.T.M. squares = 405). However, in almost any case, results were very similar when using one or the other data set. This means that the well-studied squares are scattered all over the country in very different situations.

Hereafter we will briefly describe the consulted sources for the mentioned abiotic and biotic factors. The distinguished classes or types are further given in detail as explanation together with the tabled results.

1. Mean altitude for each U.T.M. square : detailed maps (1/50.000) with U.T.M. grid were used. At the four corners of a central 5km square within each U.T.M. square the nearest altitudinal line was searched for and noted. The mean value for these four was subsequently used as an approximation for the mean altitude per U.T.M. square.

2. Altitudinal class : source : DE ROECK & TILMONT (1970). The following classes were retained : 0-5m, 5-20m, 20-50m, 50-100m, 100-200m, ..., 600-700m. In an attempt to distinguish distribution patterns (e.g. Atlantic European distribution, Mid-European distribution) these classes were analysed in a cumulative way.

3. Most important soil type : source : DE ROECK & TILMONT (1970).
The following classes were tested : maritime clay, dune sand, fine sand and gravel, sand - loam mixtures, loam, stony loam, clay or clay-loam on chalk and finally pure chalk or chalky clay. Subsequently some of these types were also taken together and tested again (e.g. dune sand and fine sand and gravel, all soil types with sand, loam and sand - loam mixtures, all soil types with loam, all soil types with clay, ...).

4. Presence of chalky soil : source : VAN ROMPAEY & DELVOSALLE (1978).

5. Presence of acid sands or acid clay : source : VAN ROMPAEY & DELVOSALLE (1978).

6. Woodland cover for each U.T.M. square : source : ANONIEM (1973).
Using a small grid of the size of one 10 km square , all U.T.M. squares were covered and the percentage of woodland cover estimated in one of the following classes : < 1%, 1-10%, 11-20%, ..., 91-100%. These results were also analysed in a cumulative way.

7. Most important woodland type : source : ANONIEM (1973).
Distinction was made between oak, beech, coniferous trees and poplar, whereas

we also once grouped deciduous forest.

8. Presence of running water with a high fall : source : ANONIEM (1973). Only U.T.M. squares with rivers or rivulets with more than 50 m fall per km were retained.

9. Climatological data : annual precipitation normals are after DUPRIEZ & SNEYERS (1979). Relative aridity (index of De Martonne II), the first day each year a minimal temperature of 5°C is reached and the annual number of days with frost were all taken from maps in VAN ROMPAEY & DELVOSALLE (1978). These data were classified in 7-10 classes. In each of these cases a cumulative analysis was performed (see further).

Changes in distribution and commonness occurring in the course of time were also evaluated (time analysis) : within each species the number of records (locality-year data) before 1950 and those from 1950 onwards were compared to the total number of records before 1950 and from 1950 onwards for all species except the tested species. This was equally done with the (reduced) number of U.T.M. records. Independence tests were used to evaluate the changes statistically (see further).

d) Statistical analyses and interpretation of the results

Except for the calculation of a mean altitude of occurrence for each species, all other factors were compared with the distributional data for each species by means of different tests of independence : in each case (for two different levels of sampling intensity: once with data from U.T.M. squares with at least 50 carabid species and with at least one species) 3 different test values were calculated : X^2 test and G test of independence and an equality test to compare two percentages (SOKAL & ROLPH, 1969). Without going into much statistical details we can describe these tests as the comparison of presence and absence of the species with the presence and absence of a factor (two-way tables). Only when the test values were statistically significant for the three tests, they were listed here. In cumulative analyses we retained the cumulative class, yielding the highest test values (highest dependence). Prior to this cumulative analysis some classes were grouped to obtain not to low frequencies for testing. By means of the mentioned analyses we thought the necessary corrections for differences in sampling intensity to be incorporated.

Of course, this does not imply that statistically significant results self-evidently should have a causal and biological meaning to explain the observed distribution patterns. At least two important restrictions have to be taken into account in this respect .

1°. First of all, other and maybe more important factors can be the real causes for distribution patterns : e.g. factors which can only be studied on a much smaller scale and which are lost when using one value for one 10 km square. Especially microclimatology and vegetation structure are probably very important in this context (cf. THIELE, 1977).

2°. Secondly we must not forget that many of the tested factors are themselves not independently occurring in our country : e.g. the Ardennes are situated at higher altitude but also have a higher annual rainfall, more days of frost and a higher percentage of woodland cover ... . This means that according to the species it is necessary to try to evaluate what factor might be most important. Such an evaluation is difficult but in many cases possible when comparing these results to what is already known on the habitat preference and other ecological needs of the species. For example, the species Perileptus aerolatus occurs significantly more in our country in U.T.M. squares with more than 20 % of woodland cover and also in squares with a high fall of water : the latter factor seems more causal because this species is known to prefer gravelly banks along fast running rivers, where beetles and larvae are really living in pores between gravel.

To conclude we would like to stress that, nevertheless these difficulties in interpretation, our analyses have proved to make at least the grouping of species in typical distribution patterns possible. General results in this respect will be given in the future (DESENDER, in prep.).

e) Morphological and ecological data

Data on commonness and rarity, total distribution area, mean beetle size, wing developmental type, main reproductive period and habitat preference have also been tabulated.

For each species commonness or rarity follows from the number of different U.T.M. squares with that species and the number of records. Distribution area codes are mainly according to LINDROTH (1945) and TURIN et al. (1977). We have also mentioned if a species shows a coastal distribution

pattern in its entire distribution area and finally if our country is situated central, near the limits or marginal (distribution limit across Belgium) as compared to the total distribution area.
Mean beetle size was calculated after FREUDE et al. (1976).
Data on wing development are based on own observations of material from our country. If differences turned up with the literature it is also mentioned. For wing dimorphic species (when longwinged and shortwinged beetles occur within the same species) all our data on checked individuals are compiled in an additional table.
Data on main reproductive period are basically after LINDROTH (1945).
Habitat preference codes are also based on literature data (mainly LINDROTH, 1945) and on own obwervations.

RESULTS

a) Distribution maps

All distribution maps on species 1-80 are given on p. 16-29. Numerical and taxonomical order as well as nomenclature are according to DESENDER (1985).

The following symbols are used :

○ data before 1950 only

● data after 1950 only

■ data from both time periods

b) Distribution analyses

All results in this respect are summarized and explained in Table I.

c) Morphology and ecology of the species

Table II. summarizes these results. Data on wing dimorphism and polymorphism only apply to the following species :

SPECIES	macropterous individuals	brachypterous individuals	total number of individuals checked
Carabus granulatus	6	1712	1718
Notiophilus aquaticus	29	336	365
Notiophilus biguttatus	704	97	801
Notiophilus germinyi	3	45	48
Notiophilus palustris	23	49	72
Notiophilus quadripunctatus	24	56	80
Clivina fossor	212	4062	4274
Trechus obtusus	252	9138	9390

Wing development in Notiophilus quadripunctatus was not yet mentioned in literature. Carabus clathratus, Dyschirius globosus and Trechus rivularis are known as wing dimorphic species but until now we only encountered brachypterous individuals in Belgium (on resp. 101, 2483 and 51 individuals).

d) Time analysis

These results are also mentioned in Table II : from this list 33 species show a relative decrease against 18 only which relatively increased during recent decades. More general results on a time analysis for all species will be given in the future (DESENDER, in prep.).

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Nr	Species	1	2	3	4	5	6	7	8	9	10	11	12
1	*Cicindela campestris*	191	-4	SL		*	2	5		-2	-2		-2
2	*Cicindela germanica*	171	-4								-2	-1	-1
3	*Cicindela hybrida*	107	3	FZ								4	3
4	*Cicindela maritima*	14	4	Z						3	2	3	1
5	*Cicindela silvicola*	398											
6	*Cicindela sylvatica*	107	3	Z+ZL			2	3					3
7	*Omophron limbatum*	51	4	Z+ZL		*				2	2	2	1
8	*Carabus arvensis*	269	-2	SL		*	2	3		-3	-3	-3	-3
9	*Carabus auratus*	177		AL							-2		
10	*Carabus auronitens*	264	-3	SL	*		2	5		-2	-2	-2	-3
11	*Carabus cancellatus*	202		AL							-1	-3	-3
12	*Carabus clathratus*	126		FZ		*	2	3					
13	*Carabus convexus*	241	-3		*		2			-3	-2	-3	-3
14	*Carabus coriaceus*	219	-3	SL			2			-3	-2	-3	-3
15	*Carabus glabratus*	370											
16	*Carabus granulatus*	137	3									2	3
17	*Carabus intricatus*	312	-2	SL		*	2			-3	-4	-4	-3
18	*Carabus irregularis*	383											
19	*Carabus monilis*	177	-4	AL	*						-2		-1
20	*Carabus nemoralis*	202	-3	SL			2			-3	-1	-3	-3
21	*Carabus nitens*	83	3	FZ		*					2	3	3
22	*Carabus problematicus*	234	-3	SL		*	2			-2	-2	-3	-3
23	*Carabus violaceus purpurascens*	203	-4	AL	*					-3	-2	-2	-1
24	*Calosoma auropunctatum*	83											
25	*Calosoma inquisitor*	174	-4	SL									
26	*Calosoma reticulatum*	39											
27	*Calosoma sycophanta*	93	2							3	3	2	3
28	*Cychrus attenuatus*	295	-3	SL			2	5		-2	-2	-3	-3
29	*Cychrus caraboides*	196				*	2			-2			
30	*Leistus ferrugineus*	94	3	Z+ZL						2	3	2	3
31	*Leistus fulvibarbis*	51	3	L+ZL						2	2	3	2
32	*Leistus piceus*	317	-3	SL	*		2	5		-2	-2	-4	-3
33	*Leistus rufescens*	126	4	Z+ZL							2	2	2
34	*Leistus rufomarginatus*	86	3							2	3	5	3
35	*Leistus spinibarbis*	139										-1	
36	*Nebria brevicollis*	153											
37	*Nebria livida*	3											
38	*Nebria salina*	122	2	Z+ZL							2	4	3
39	*Notiophilus aestuans*	188	1				2						
40	*Notiophilus aquaticus*	114	4	Z+ZL							2	2	
41	*Notiophilus biguttatus*	156					1						
42	*Notiophilus germinyi*	138		Z			2				2		
43	*Notiophilus palustris*	130	2								3	5	
44	*Notiophilus quadripunctatus*	50	3	Z+ZL						2		2	2
45	*Notiophilus rufipes*	70	3	Z+ZL						3	3	2	3
46	*Notiophilus substriatus*	72	3							2	3	2	3
47	*Blethisa multipunctata*	81	3							3	3	2	3
48	*Elaphrus aureus*	95											
49	*Elaphrus cupreus*	153											
50	*Elaphrus riparius*	111	4	FZ						2	2	3	2
51	*Elaphrus uliginosus*	121									4		
52	*Loricera pilicornis*	148											
53	*Dyschirius aeneus*	96	2							3	3	2	3
54	*Dyschirius angustatus*	84	1	DZ							1		1
55	*Dyschirius chalceus*	5											
56	*Dyschirius extensus*	3											
57	*Dyschirius globosus*	133											
58	*Dyschirius impunctipennis*	3											
59	*Dyschirius intermedius*	86	3	L+ZL								4	3
60	*Dyschirius laeviusculus*	49											
61	*Dyschirius luedersi*	38	3	Z+ZL						2	2	2	2
62	*Dyschirius nitidus*	85	2	L+ZL						2			2
63	*Dyschirius obscurus*	4	4	DZ							1		1
64	*Dyschirius politus*	70	4	Z+ZL						4	2	2	3
65	*Dyschirius salinus*	8	4	MC							2	2	1
66	*Dyschirius semistriatus*	65										1	
67	*Dyschirius thoracicus*	47	4	Z+ZL						3	2	3	3
68	*Clivina collaris*	95								3	3	2	2
69	*Clivina fossor*	141	4								2		2
70	*Broscus cephalotes*	116	3	Z+ZL							2	3	3
71	*Patrobus atrorufus*	221		AL			3			-3	-4	-4	-2
72	*Perileptus areolatus*	240	-3	SL	*		2	1	*	-2	-2	-2	-2
73	*Thalassophilus longicornis*	246	-3	SL					*	-2	-2		-2
74	*Trechus discus*	71	3	Z+ZL						2	2	2	2
75	*Trechus micros*	78	2	ZL						2	2	2	2
76	*Trechus obtusus*	134	4							2	2	2	2
77	*Trechus quadristriatus*	118	3	L+ZL						2	3	3	2
78	*Trechus rivularis*	558											
79	*Trechus rubens*	286	-3	SL		*	2			-3	-3	-4	-3
80	*Trechus secalis*	327	-3	SL		*	2			-3	-4	-3	-3

TABLE I. Results from distribution analyses based on the presence/absence data per U.T.M. 10 km square.

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1 : mean altitude for each species

2 : significant results after comparison of cumulative altitudinal classes with species distribution :
1 = significantly more occurring below 400 m;
-1 = idem above 400 m
2, 3, 4 = idem below respectively 300 m, 200 m, 50 m;
-2, -3, -4 = idem above respectively 300 m, 200 m, 50 m

3 : significant reactions to most important soil type per U.T.M. square :
MC = maritime clay, DZ = dune sand, FZ = fine sand and gravel, Z = DZ+FZ
ZL = sand-loam mixtures, L = loam, SL = stony loam, AL = all loam mixtures

4 : species significantly more occurring in U.T.M. squares with chalk in the soil (mostly species which are more or less thermophilic)

5 : species significantly more occurring in U.T.M. squares with acid sands or acid clay (mainly species from oligotrophic situations)

6 : significant results after comparison with cumulative classes of woodland cover :
1, 2, 3 = more than respectively 1 %, 20 % or 40 % of woodland cover

7 : significant positive reactions to most important woodland type :
1 = oak, 2 = beech, 3 = coniferous trees, 5 = deciduous trees

8 : species significantly more occurring in U.T.M. squares with rivers or rivulets with more than 50 m fall per km.

9 : significant reactions to annual precipitation cumulative classes :
2, 3, 4 = less than respectively 800, 900 or 1000 mm precipitation
-2, -3, -4 = more than respectively 800, 900 or 1000 mm precipitation

10 : significant reactions to relative aridity index cumulative classes :
1, 2, 3, 4 = less than respectively 35, 40, 45 or 50 of index value
-1, -2, -3, -4 = more than respectively 35, 40, 45 or 50 of index value

11 : significant reactions with the first day each year a minimal temperature of 5°C is reached (in cumulative classes) :
1, 2, 3, 4, 5 = respectively before 5, 10, 15, 20 or 25 March
-1, -2, -3, -4 = respectively after 5, 10, 15 or 20 March

12 : significant reactions to annual number of days with frost :
1, 2, 3 = less than respectively 55, 65 or 75 days
-1, -2, -3 = more than respectively 55, 65 or 75 days.

Nr	Species	1	2	3	4	5	6	7	8	9	10
1	*Cicindela campestris*	213	721	S	A		c	12.5	m	F	19
2	*Cicindela germanica*	26	46	DD	E		c	9.0	m	F	
3	*Cicindela hybrida*	129	389	D	A		c	13.5	m	F	15
4	*Cicindela maritima*	19	45	DD	A	*	c	11.5	m	F	16
5	*Cicindela silvicola*	3	3		B		m	14.0	m	F	
6	*Cicindela sylvatica*	39	79	DD	A		r	17.0	m	F	8
7	*Omophron limbatum*	48	66	S	A		c	5.5	m	FH	3
8	*Carabus arvensis*	73	146	DD	A		c	19.0	b	F	6
9	*Carabus auratus*	200	499	D	B		c	23.5	b	F	19
10	*Carabus auronitens*	98	210	I	B		c	26.0	b	F	5,7
11	*Carabus cancellatus*	119	175	DD	A		c	24.5	b	F	19
12	*Carabus clathratus*	17	48	DD	A		m	28.0	b-d	F	3
13	*Carabus convexus*	44	73	DD	A		c	17.0	b	F	18
14	*Carabus coriaceus*	125	205	DD	D		c	35.0	b	H	6
15	*Carabus glabratus*	2	2		B		m	28.0	b	H	5
16	*Carabus granulatus*	187	489	II	A		c	20.0	d	F	7
17	*Carabus intricatus*	38	83	DD	B		c	30.0	b	F	5
18	*Carabus irregularis*	3	3		B		m	24.5	b	F	5
19	*Carabus monilis*	166	327	S	B		c	24.5	b	HF	13
20	*Carabus nemoralis*	180	427	S	B		c	23.0	b	F	19
21	*Carabus nitens*	36	84	DD	B		c	15.5	b	F	9,8
22	*Carabus problematicus*	171	389	II	B		c	25.0	b	H	6
23	*Carabus violaceus purpurascens*	157	342	II	A		r	28.5	b	H	6
24	*Calosoma auropunctatum*	7	8	DD	C		r	25.0	m	F	15
25	*Calosoma inquisitor*	78	125	DD	A		c	16.8	m	F	21,5
26	*Calosoma reticulatum*	1	1		A		m	23.0	m	F	8
27	*Calosoma sycophanta*	35	56	DD	A		c	22.8	m	F	21,5
28	*Cychrus attenuatus*	51	90	I	B		m	14.0	b	H	5
29	*Cychrus caraboides*	105	152	II	B		c	16.3	b	H	5
30	*Leistus ferrugineus*	161	304	II	E		c	6.3	m	H	19
31	*Leistus fulvibarbis*	80	147	II	D		m	6.8	m	H	6
32	*Leistus piceus*	22	28	II	B		m	6.5	b	H	5
33	*Leistus rufescens*	113	148	II	A		r	6.0	m	H	20
34	*Leistus rufomarginatus*	83	125	II	E		r	8.5	m	H	6
35	*Leistus spinibarbis*	89	150	DD	D		c	8.3	m	H	5,8
36	*Nebria brevicollis*	256	727	II	C		c	11.5	m	H	19
37	*Nebria livida*	1	1		A		m	13.5	m	H	3
38	*Nebria salina*	125	261	D	B		c	10.8	m	H	14
39	*Notiophilus aestuans*	7	10	S	C		c	4.7	m	HF	18,15
40	*Notiophilus aquaticus*	95	146	D	F		c	4.8	d	F	8,15
41	*Notiophilus biguttatus*	226	695	II	E		c	4.5	d	F	6
42	*Notiophilus germinyi*	28	34	S	E		c	4.3	d	H	8,16
43	*Notiophilus palustris*	182	383	DD	A		c	4.8	d	F	20
44	*Notiophilus quadripunctatus*	19	32	S	C		m	4.3	d	F	5,13
45	*Notiophilus rufipes*	77	121	S	C		c	4.8	m	F	5
46	*Notiophilus substriatus*	119	257	S	D		c	4.5	m	F	14
47	*Blethisa multipunctata*	30	47	DD	F		c	11.3	m	F	3
48	*Elaphrus aureus*	6	6		B		m	6.0	m	F	
49	*Elaphrus cupreus*	176	412	II	A		c	8.0	m	F	20
50	*Elaphrus riparius*	138	305	S	F		c	6.3	m	F	3
51	*Elaphrus uliginosus*	42	80	DD	A		c	8.0	m	F	2
52	*Loricera pilicornis*	234	466	II	F		c	7.0	m	F	20
53	*Dyschirius aeneus*	84	135	D	A		c	3.0	m	F	4
54	*Dyschirius angustatus*	13	19	S	B		c	3.0	m	F	16,15
55	*Dyschirius chalceus*	4	10	D	A	*	r	5.5	m	F	1
56	*Dyschirius extensus*	1	1		B	*	m	4.8	m	F	1
57	*Dyschirius globosus*	177	447	S	A		c	2.4	b-d	F	20
58	*Dyschirius impunctipennis*	2	9	D	B	*	r	4.5	m	F	17
59	*Dyschirius intermedius*	16	41	DD	B		c	3.0	m	F	3
60	*Dyschirius laeviusculus*	2	4		B		m	2.9	m	F	
61	*Dyschirius luedersi*	59	96	II	A		c	3.5	m	F	2
62	*Dyschirius nitidus*	11	11	DD	A		c	4.5	m	F	4
63	*Dyschirius obscurus*	5	20	D	C		r	4.0	m	F	17
64	*Dyschirius politus*	37	62	DD	A		c	4.3	m	F	3
65	*Dyschirius salinus*	12	25	S	C	*	c	4.0	m	F	1
66	*Dyschirius semistriatus*	5	8		B		r	3.5	m	F	3
67	*Dyschirius thoracicus*	55	113	D	A		c	4.0	m	F	3
68	*Clivina collaris*	119	270	S	C		c	5.0	m	F	20
69	*Clivina fossor*	179	417	I	F		c	5.8	p-d	F	19
70	*Broscus cephalotes*	97	237	D	A		c	19.5	m	H	15
71	*Patrobus atrorufus*	84	150	S	A		c	8.3	b	H	5
72	*Perileptus areolatus*	16	23	D	A		m	2.5	m	F	4
73	*Thalassophilus longicornis*	8	15	D	D		m	3.9	m		4
74	*Trechus discus*	34	38	S	A		c	5.0	m	H	2
75	*Trechus micros*	51	78	S	A		c	4.5	m	F	14,22
76	*Trechus obtusus*	143	235	II	D		c	3.8	d	HF	19
77	*Trechus quadristriatus*	177	491	D	C		c	3.8	m	H	12
78	*Trechus rivularis*	1	1		B		m	4.8	b-d	H	11
79	*Trechus rubens*	21	26	S	F		r	5.8	m	F	5,11
80	*Trechus secalis*	37	62	S	A		r	3.5	b	H	11

Table II. Commonness and rarity, recent relative increase or decrease, total distribution area, mean beetle size, wing developmental type, main reproductive period and habitat preference.

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1 : number of different U.T.M. 10 km squares with the species

2 : number of records (locality/year data) per species

3 : recent relative increase , decrease or stagnation of the species in our country since 1950 :
D = significantly decreasing (based on the number of records)
DD = significantly decreasing (based on the number of records as well as based on the number of U.T.M. squares with the species)
I = idem as D but increasing
II = idem as DD but increasing
S = stagnation although there are enough data to allow statistical analysis

4 : total distribution area :
A = palearctic, B = entirely european, C = western palearctic, D = euro-mediterranean, E = euro-caucasian, F = circumpolar, G = amphi-atlantic

5 : species with a coastal distribution pattern

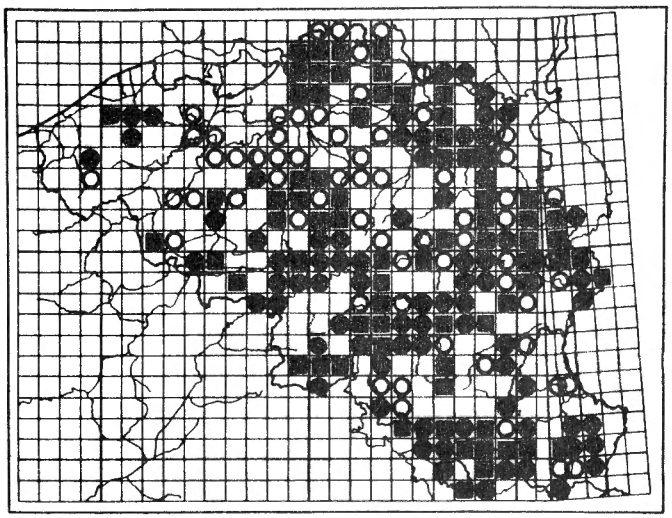
6 : position of Belgium in the total distribution area :
c = central, r = near limits (but distribution limit not across Belgium), m = marginal (distribution limit across Belgium)

7 : mean beetle size in mm

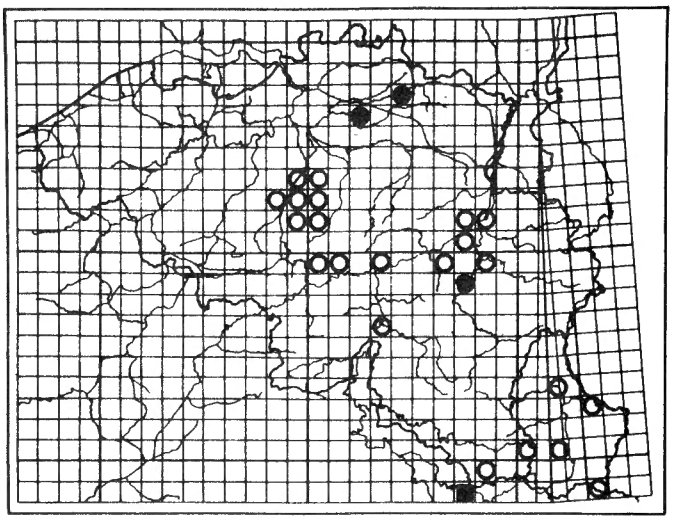
8 : wing developmental type in our country :
m = constantly macropterous, b = constantly brachypterous, d = wing dimorphic and p = wing polymorphic species; if two codes are given the first always refers to our own observations (material from our country), whereas the second refers to the literature

9 : main reproductive period :
F = during Spring, H = during Summer-Autumn, FH = mainly during Spring, HF = mainly during Autumn

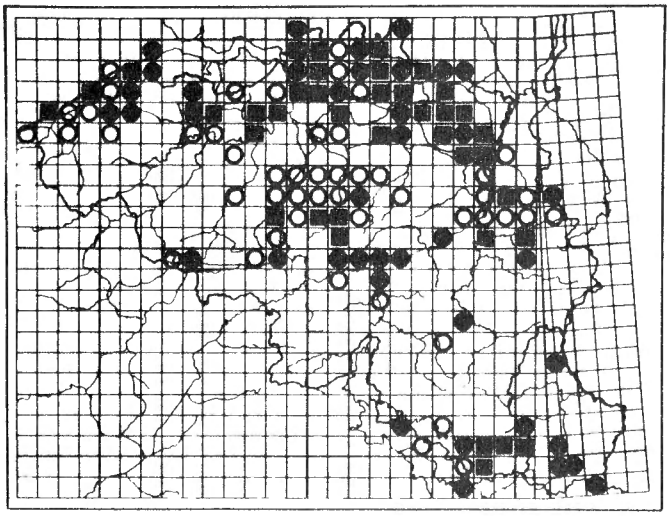
10 : Habitat preference codes : species known mainly to occur in :
1 (salt marshes), 2 (eutrophic riparian habitats), 3 (oligotrophic riparian habitats), 4 (river banks near running water), 5 (woodland, stenotopic), 6 (woodland, eurytopic), 7 (meadow forests), 8 (dry heathland), 9 (wet heathland), 10 (marshland), 11 (bogs), 12 (ruderal habitats and cultivated fields), 13 (wet grasslands), 14 (dry grasslands), 15 (different habitats on dry sandy soil), 16 (dry dune habitats), 17 (beaches and dune slacks), 18 (stony slopes and chalck grasslands), 19 (different dry habitats, eurytopic), 20 (different humid habitats, eurytopic), 21 (living on trees), 22 (caves, cellars).



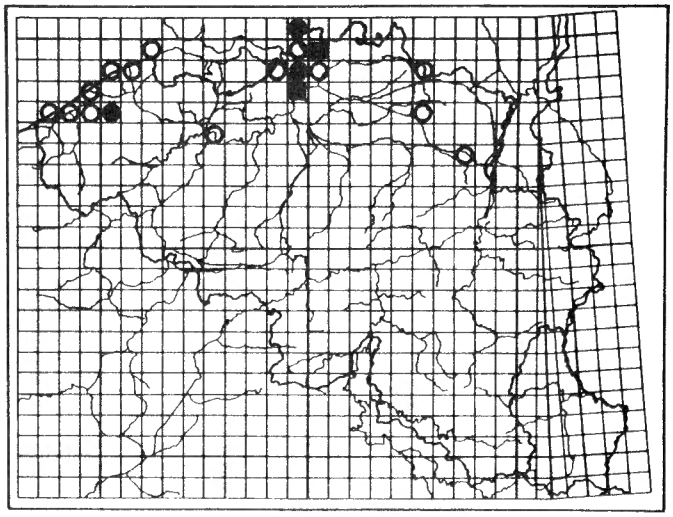
1. *CICINDELA campestris*



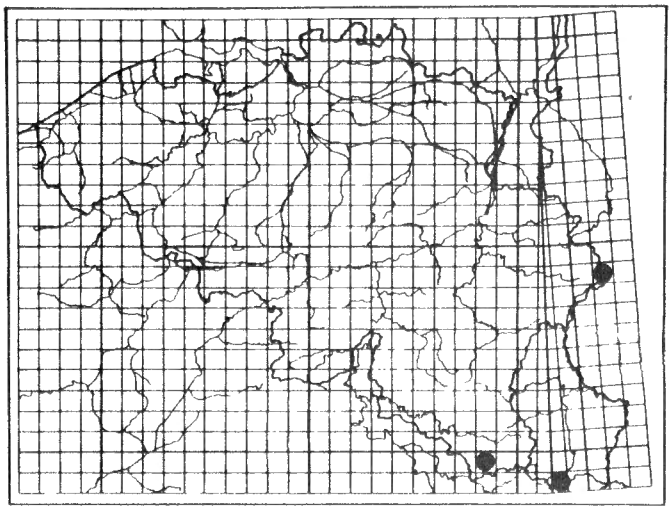
2. *CICINDELA germanica*



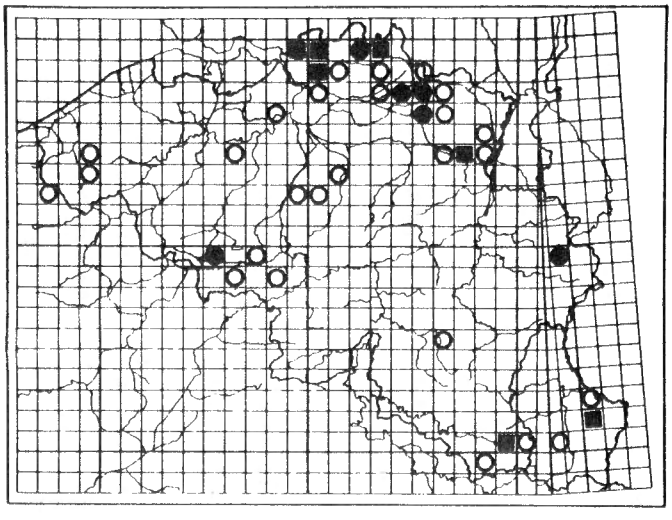
3. *CICINDELA hybrida*



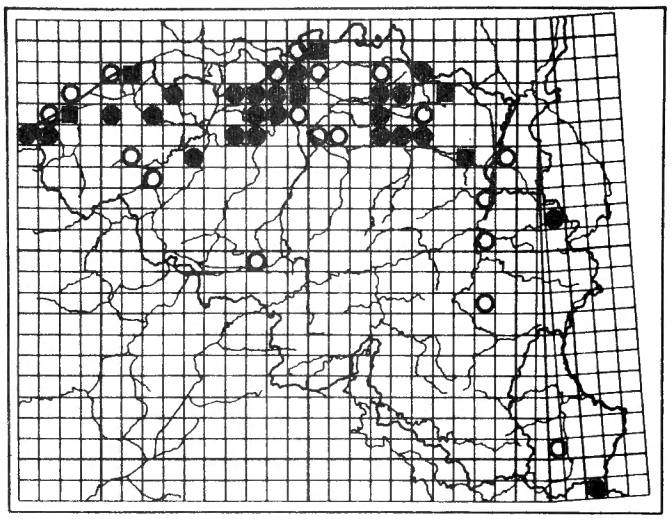
4. *CICINDELA maritima*



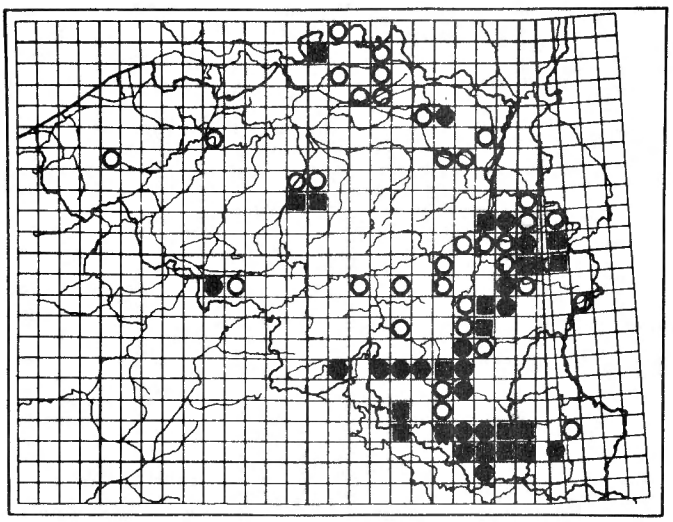
5. *CICINDELA silvicola*



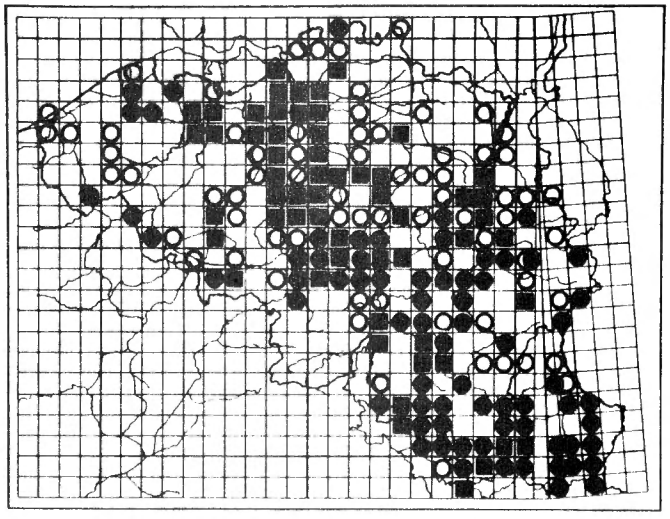
6. *CICINDELA sylvatica*



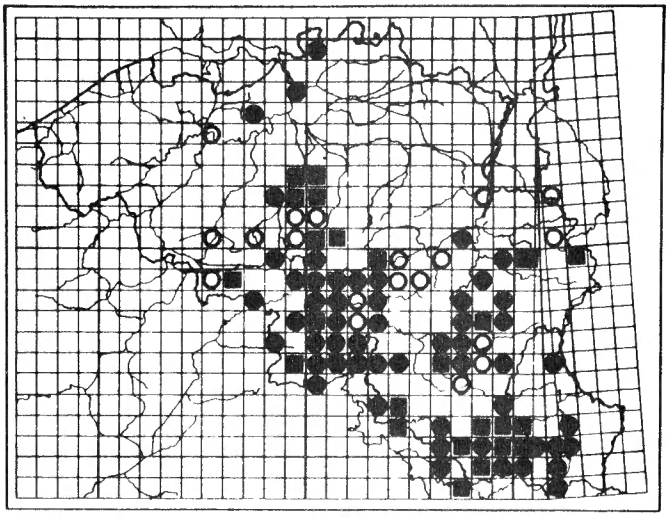
7. *OMOPHRON limbatum*



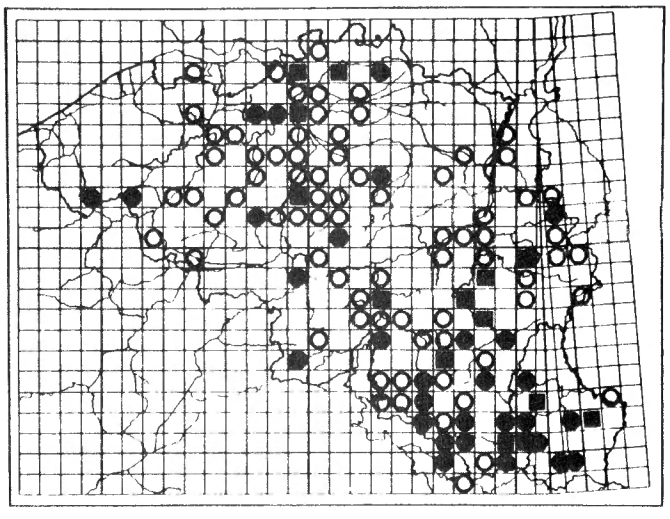
8. *CARABUS arvensis*



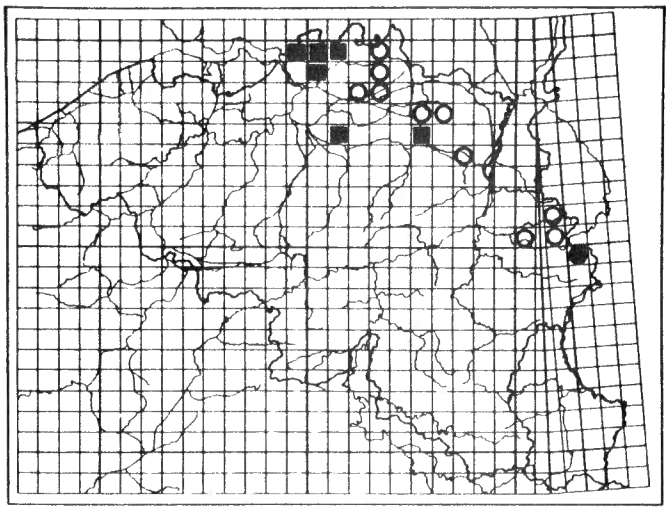
9. *CARABUS auratus*



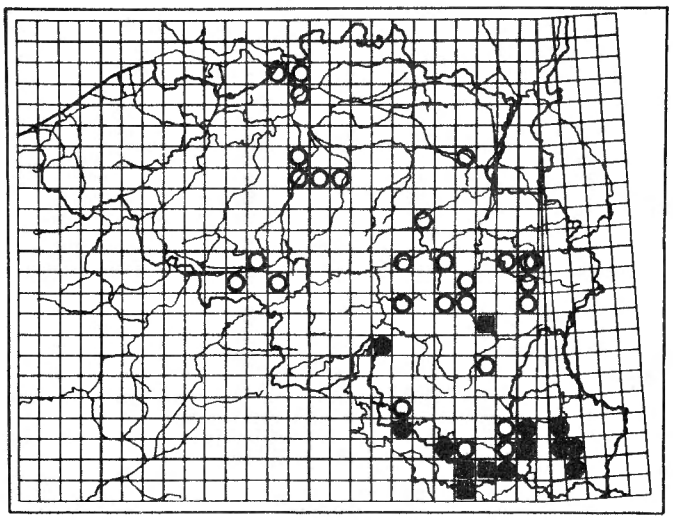
10. *CARABUS auronitens*



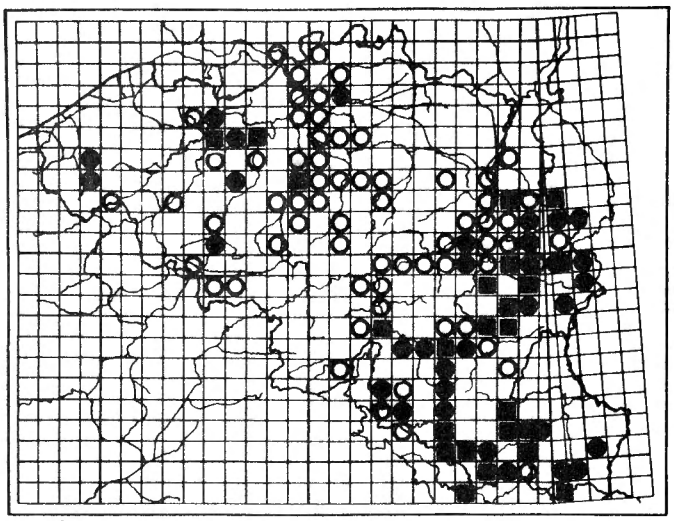
11. *CARABUS cancellatus*



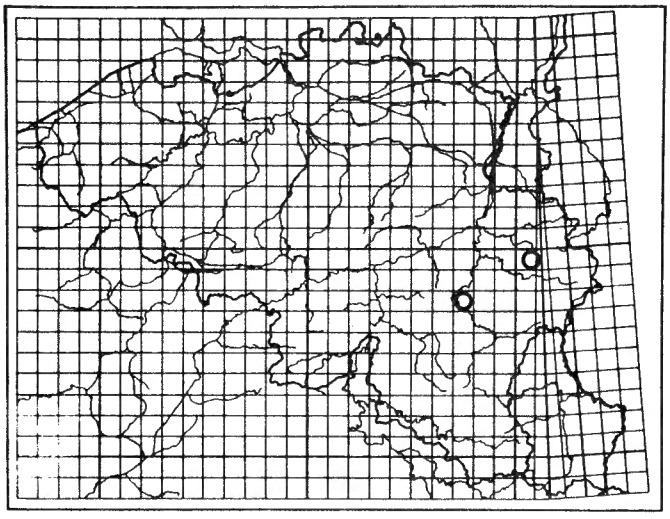
12. *CARABUS clathratus*



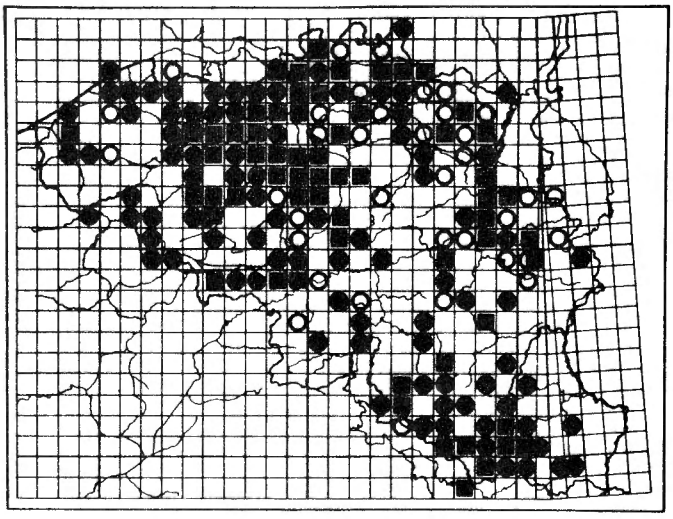
13. *CARABUS convexus*



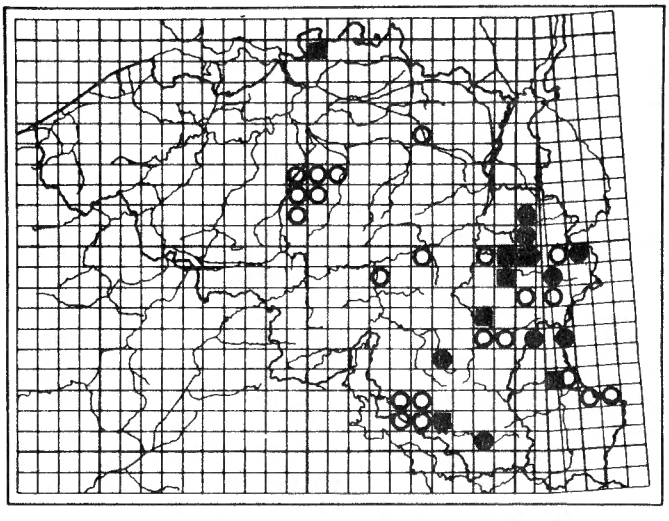
14. *CARABUS coriaceus*



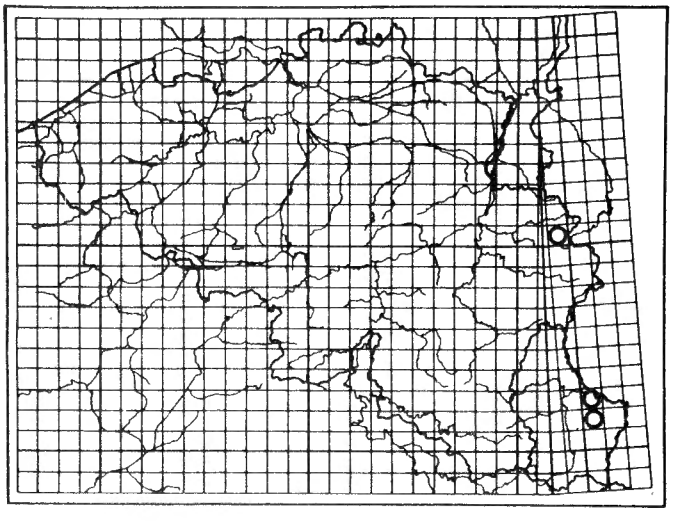
15. *CARABUS glabratus*



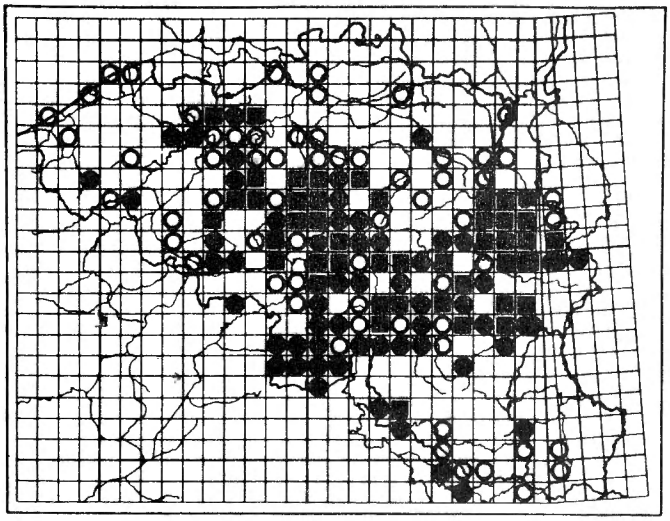
16. *CARABUS granulatus*



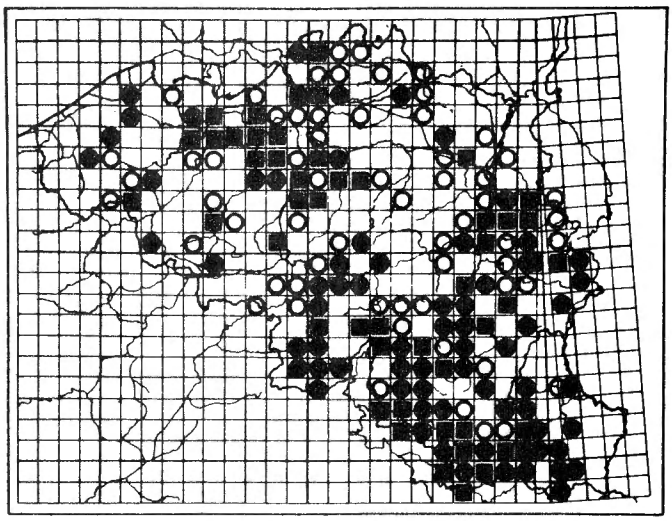
17. *CARABUS intricatus*



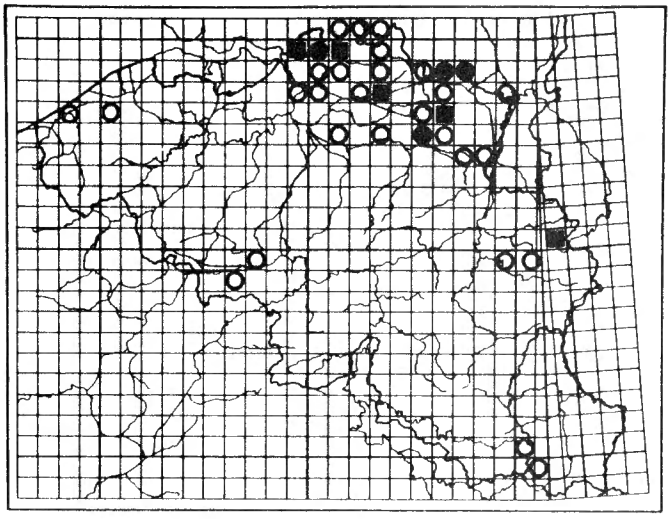
18. *CARABUS irregularis*



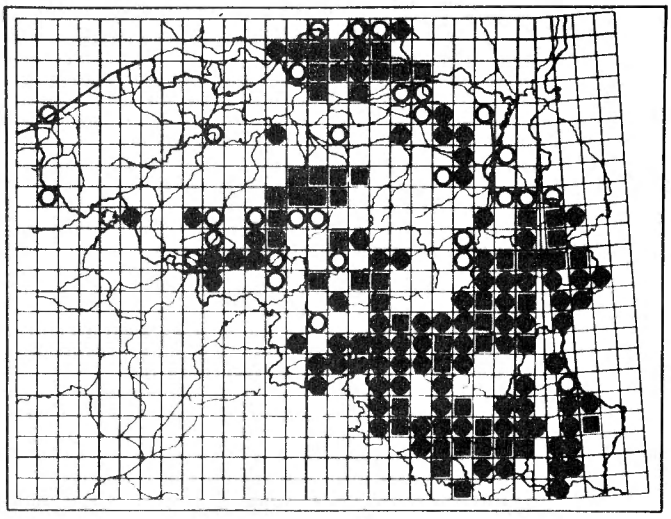
19. CARABUS monilis



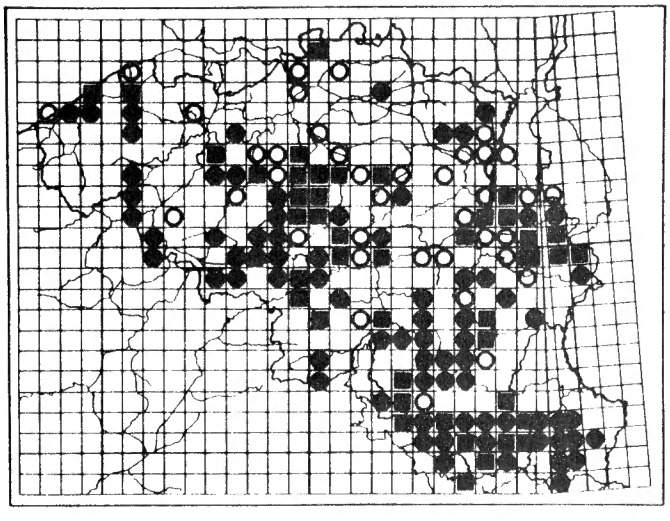
20. CARABUS nemoralis



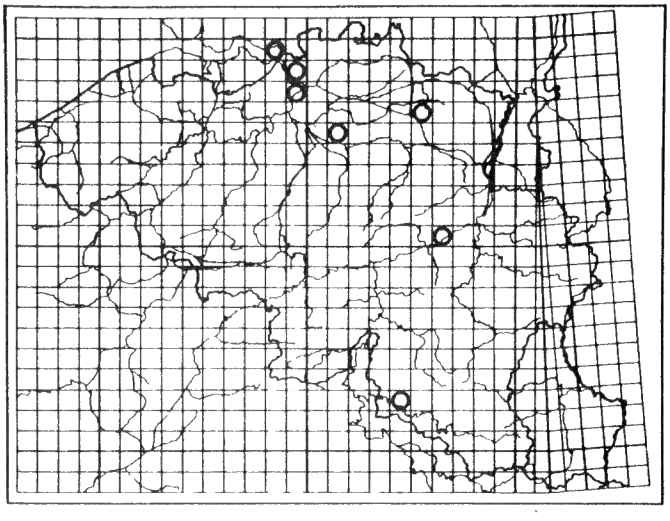
21. CARABUS nitens



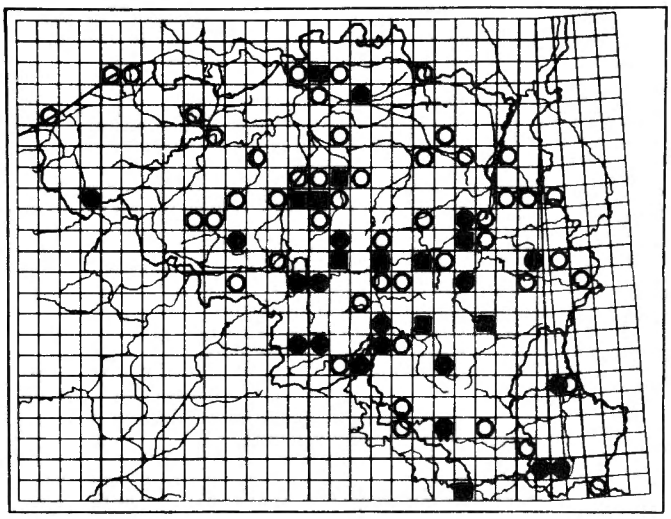
22. CARABUS problematicus



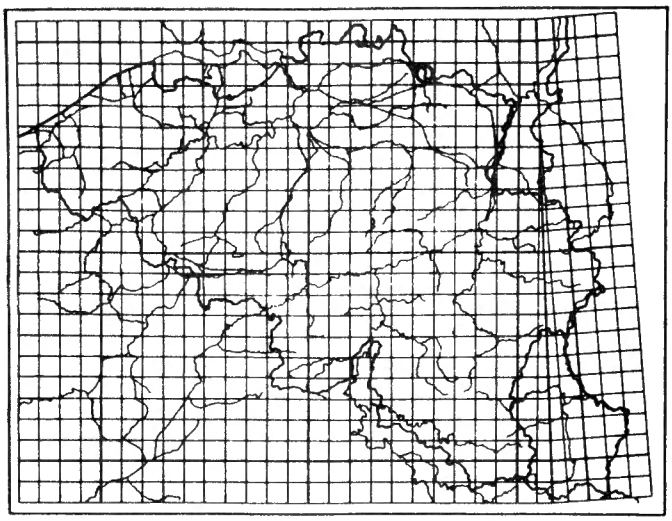
23. CARABUS violaceus purpurascens



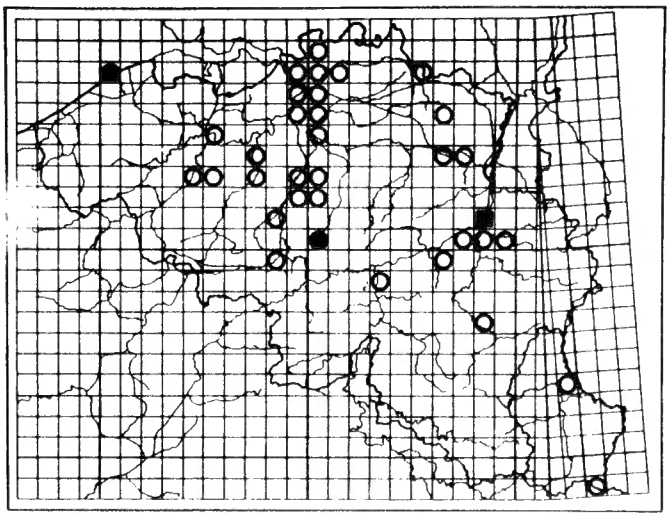
24. CALOSOMA auropunctatum



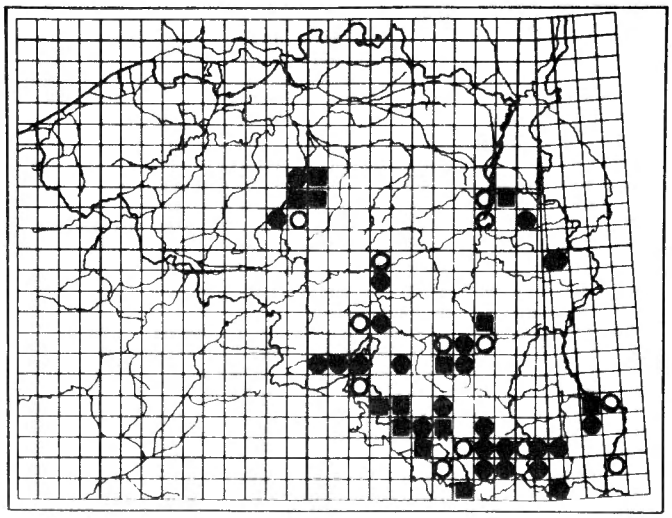
25. CALOSOMA inquisitor



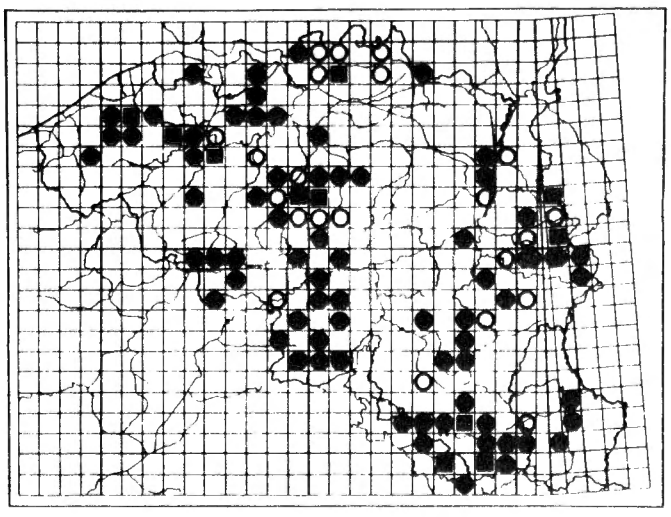
26. CALOSOMA reticulatum



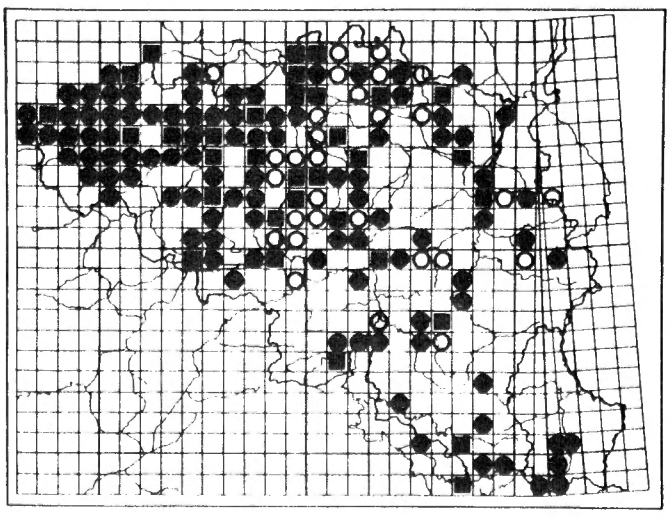
27. CALOSOMA sycophanta



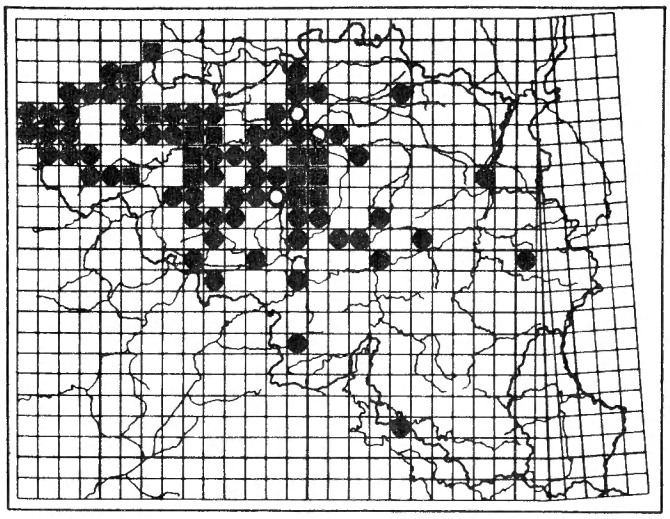
28. CYCHRUS attenuatus



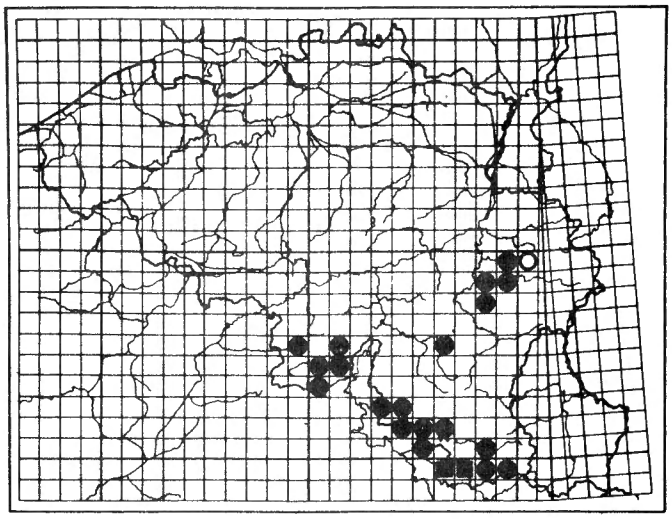
29. CYCHRUS caraboides



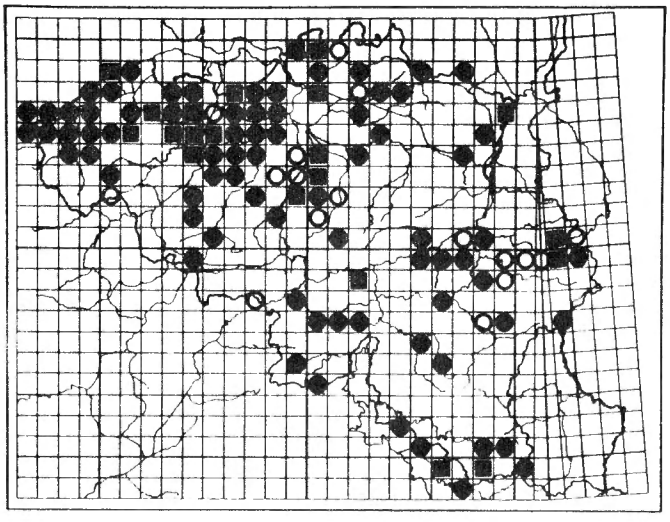
30. LEISTUS ferrugineus



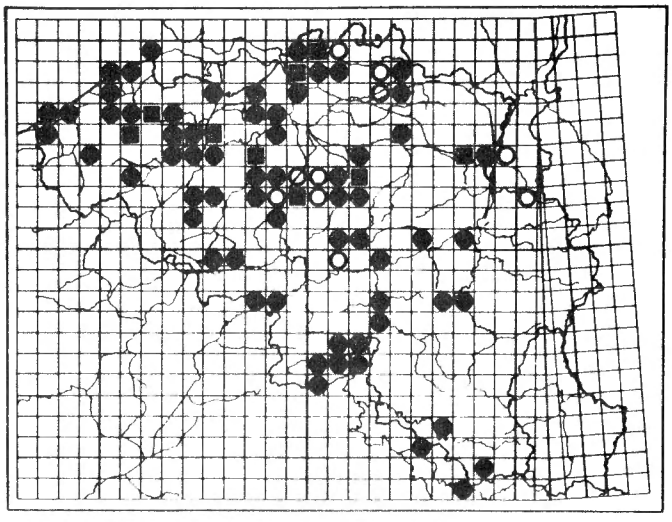
31. LEISTUS fulvibarbis



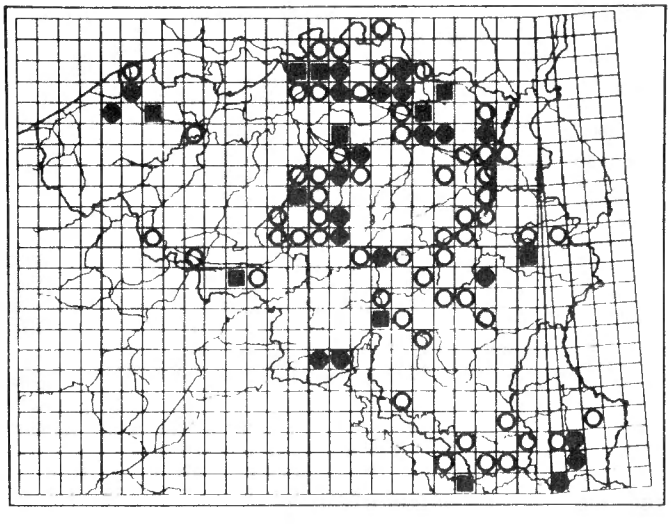
32. LEISTUS piceus



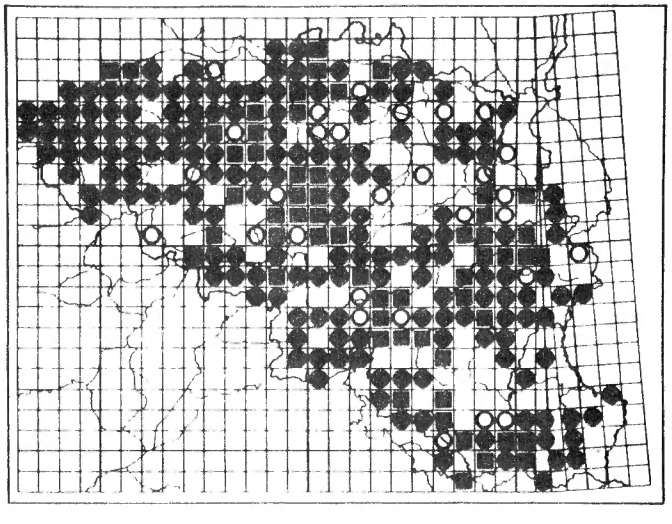
33. LEISTUS rufescens



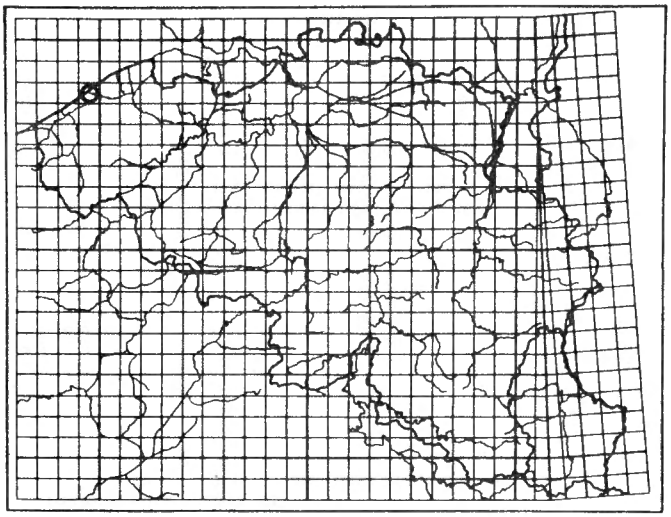
34. LEISTUS rufomarginatus



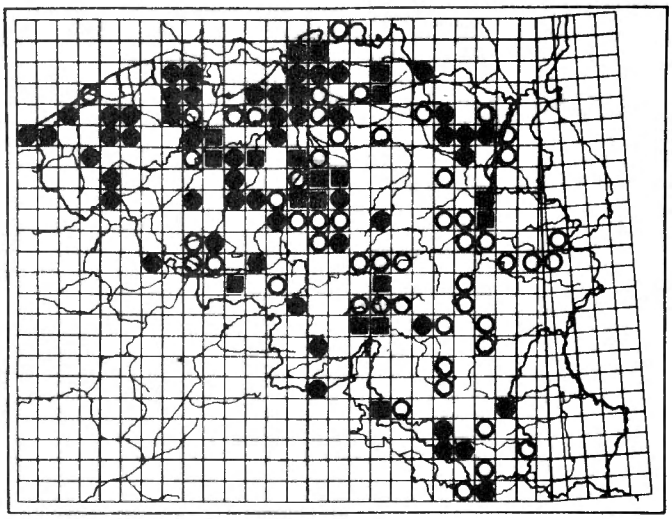
35. LEISTUS spinibarbis



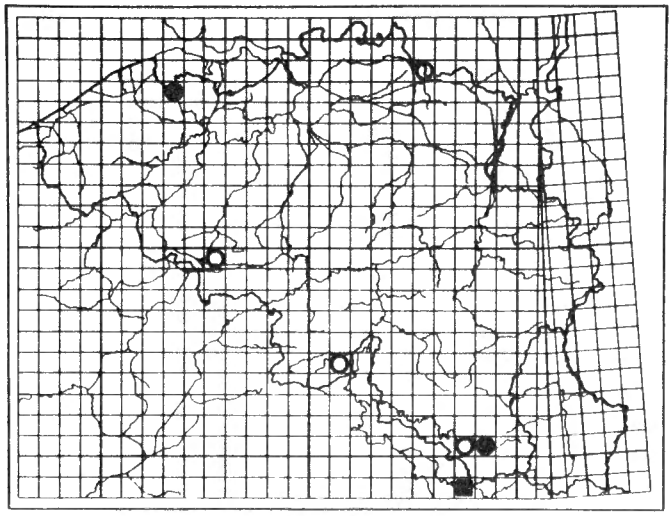
36. NEBRIA brevicollis



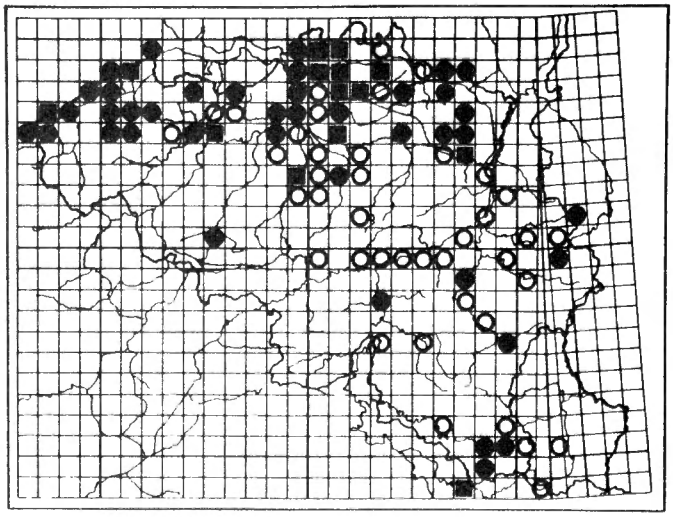
37. *NEBRIA livida*



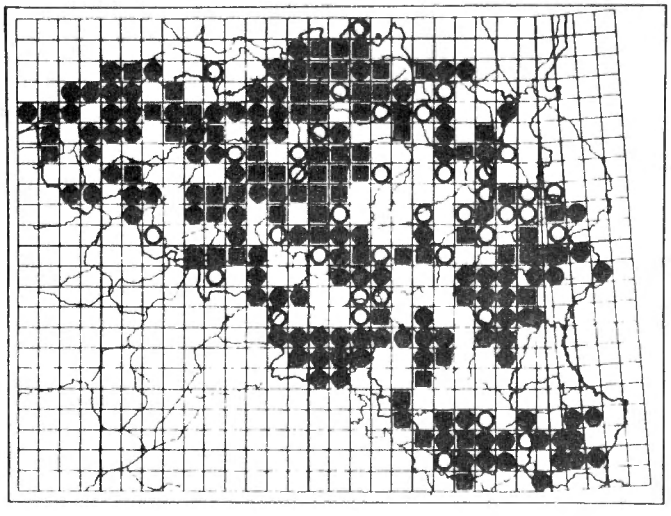
38. *NEBRIA salina*



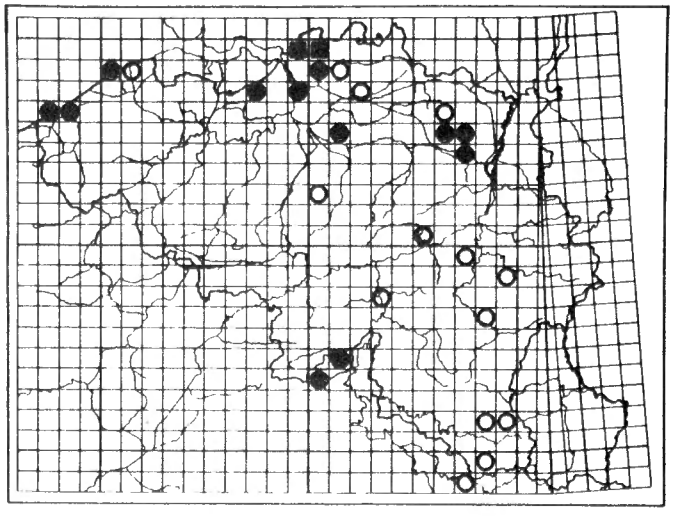
39. *NOTIOPHILUS aestuans*



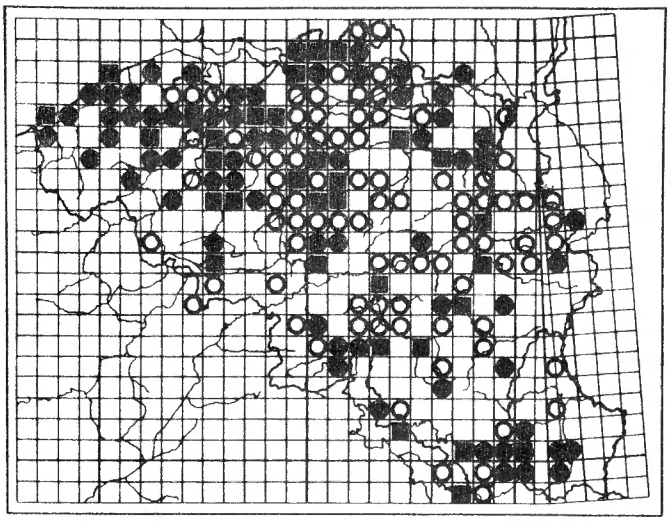
40. *NOTIOPHILUS aquaticus*



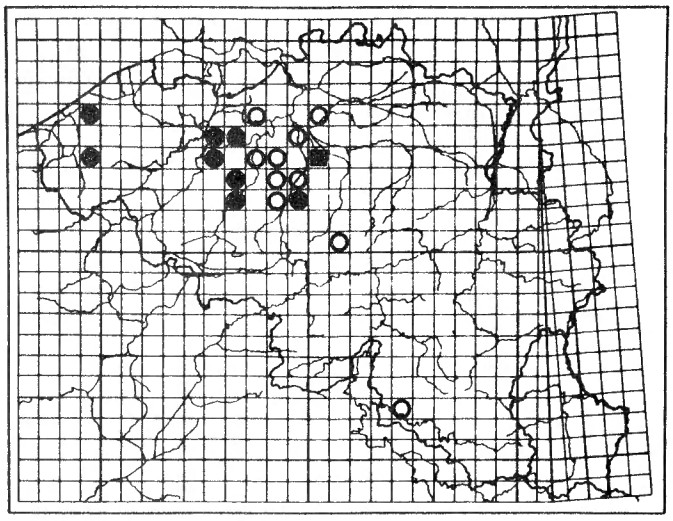
41. *NOTIOPHILUS biguttatus*



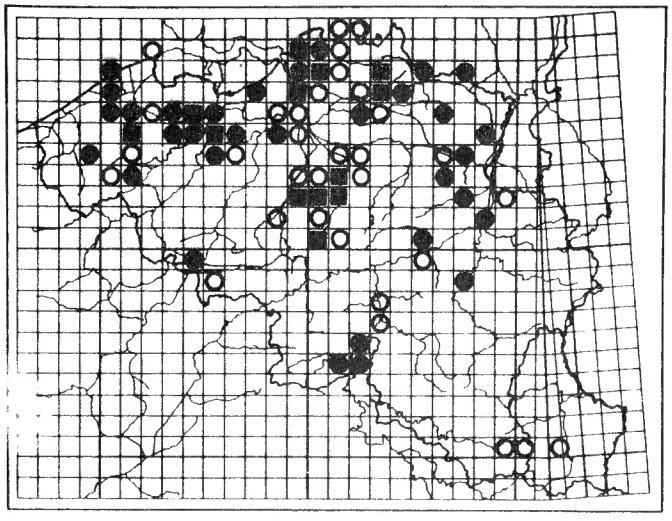
42. *NOTIOPHILUS germinyi*



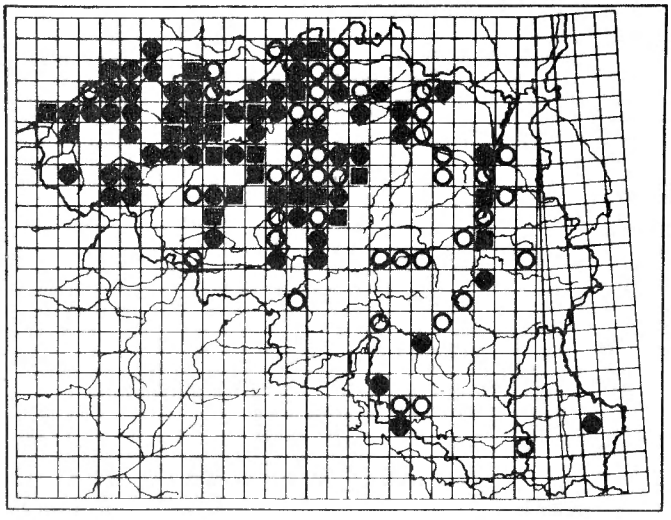
43. *NOTIOPHILUS palustris*



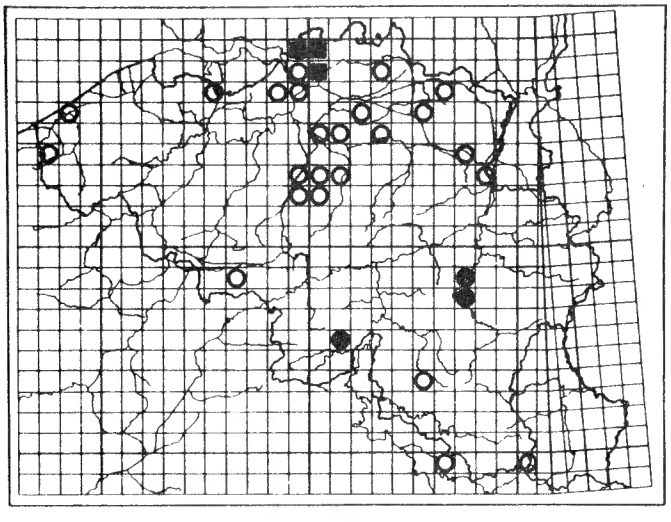
44. *NOTIOPHILUS quadripunctatus*



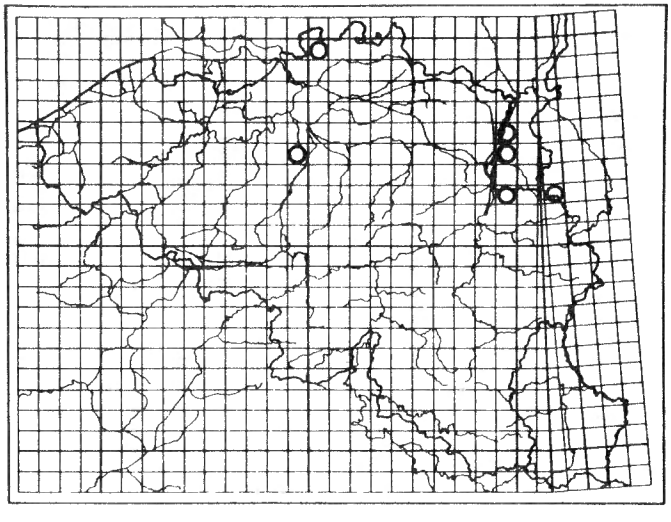
45. *NOTIOPHILUS rufipes*



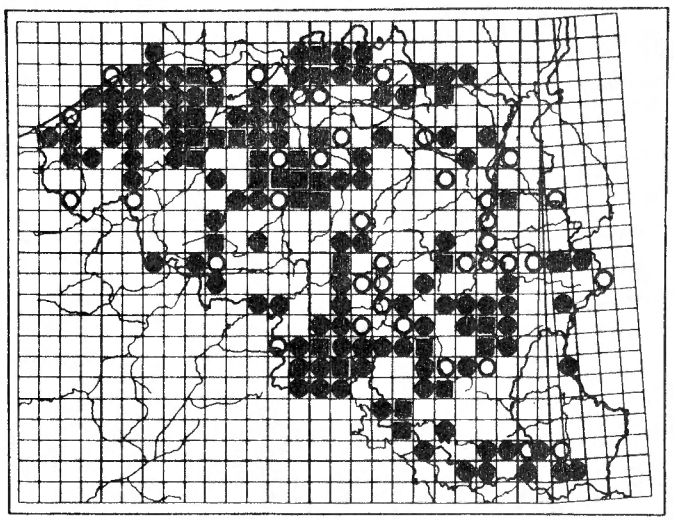
46. *NOTIOPHILUS substriatus*



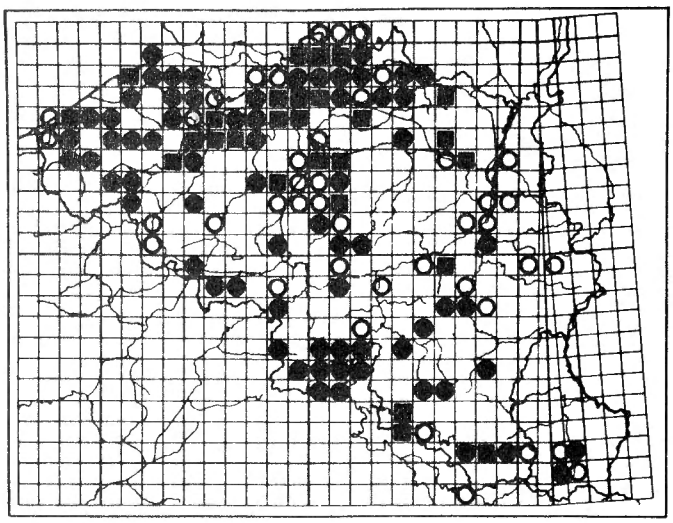
47. *BLETHISA multipunctata*



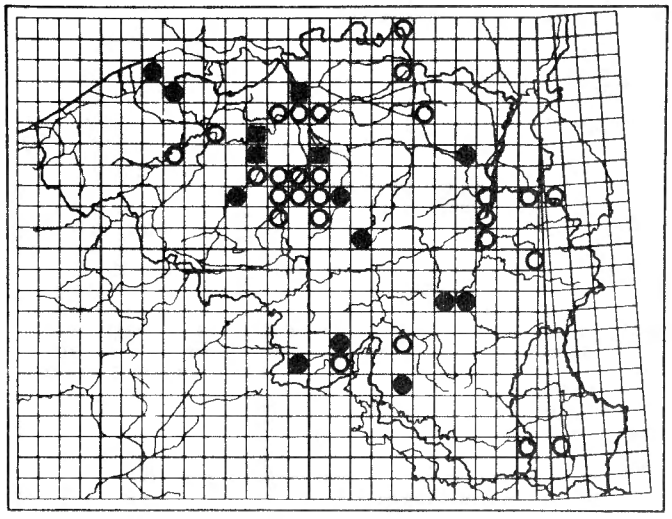
48. *ELAPHRUS aureus*



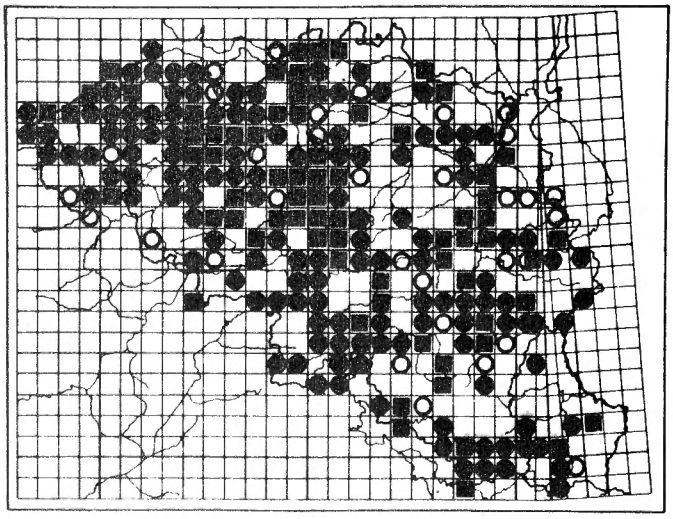
49. ELAPHRUS cupreus



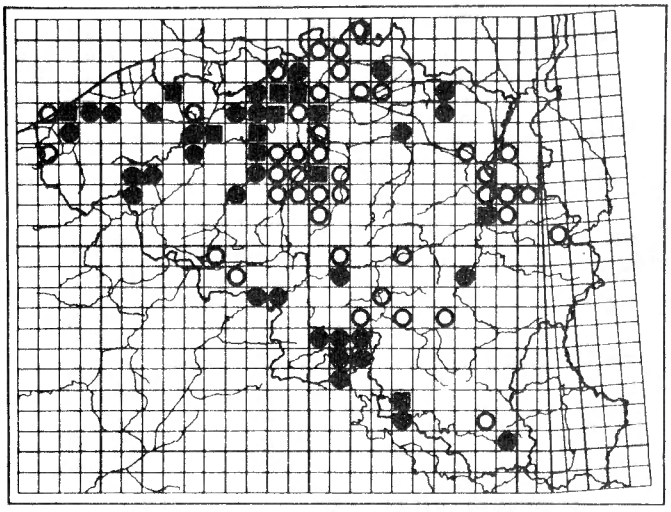
50. ELAPHRUS riparius



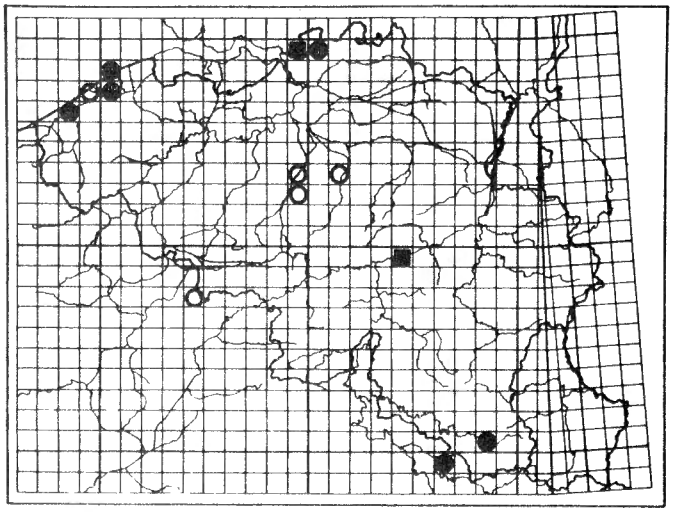
51. ELAPHRUS uliginosus



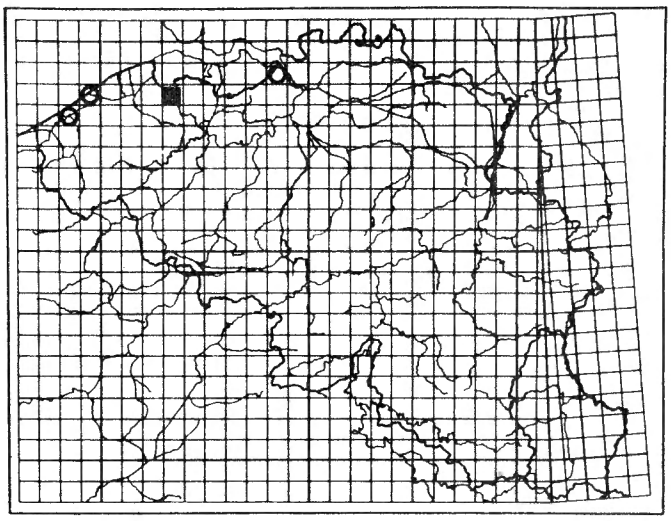
52. LORICERA pilicornis



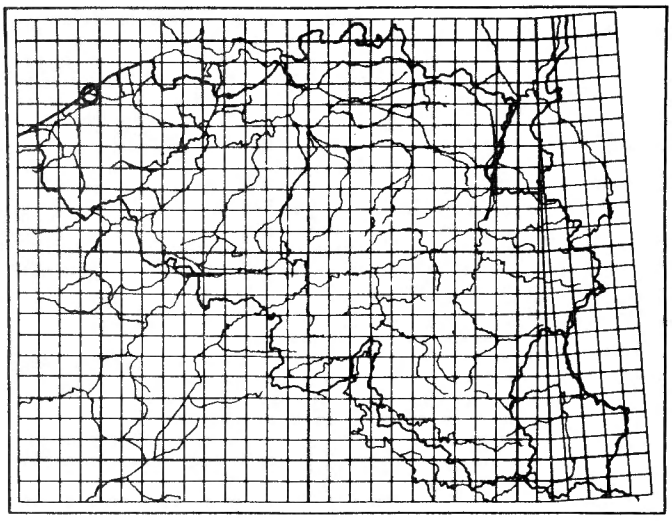
53. DYSCHIRIUS aeneus



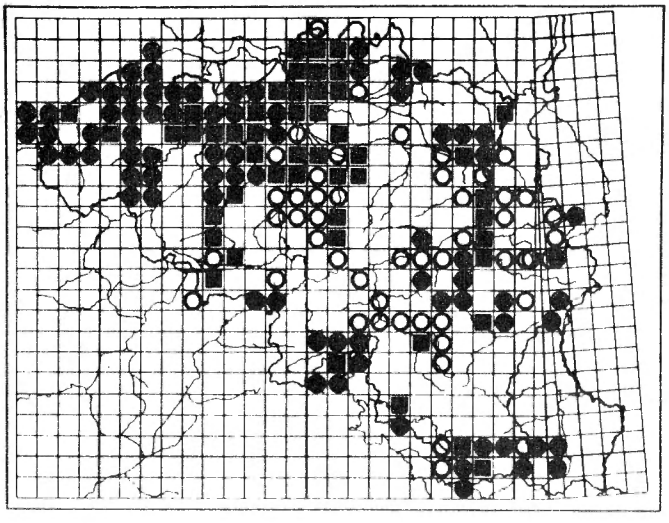
54. DYSCHIRIUS angustatus



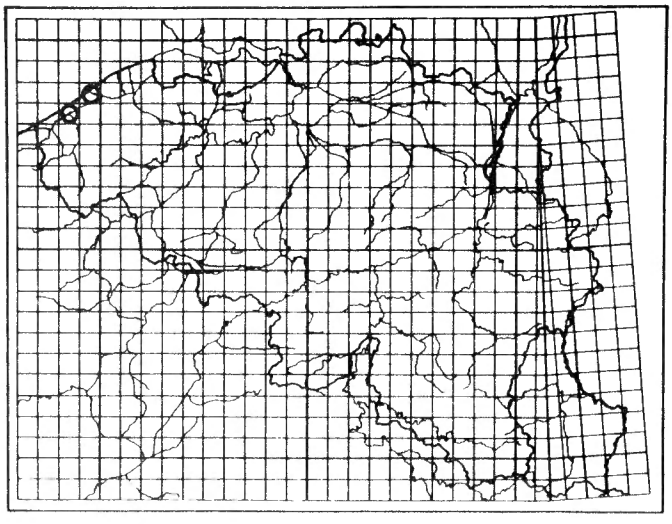
55. *DYSCHIRIUS chalceus*



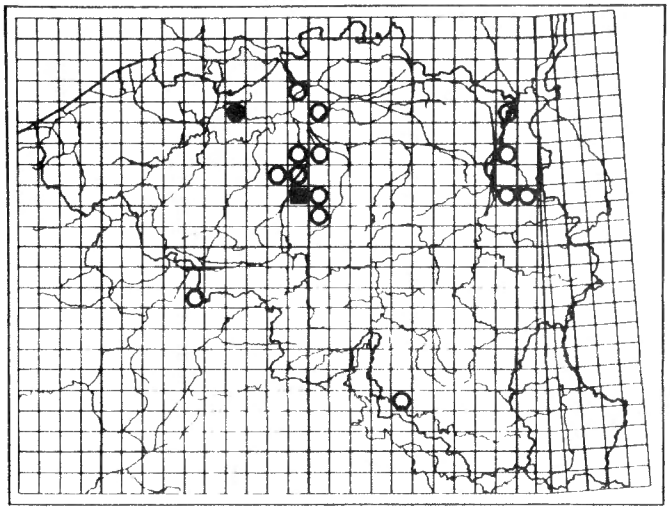
56. *DYSCHIRIUS extensus*



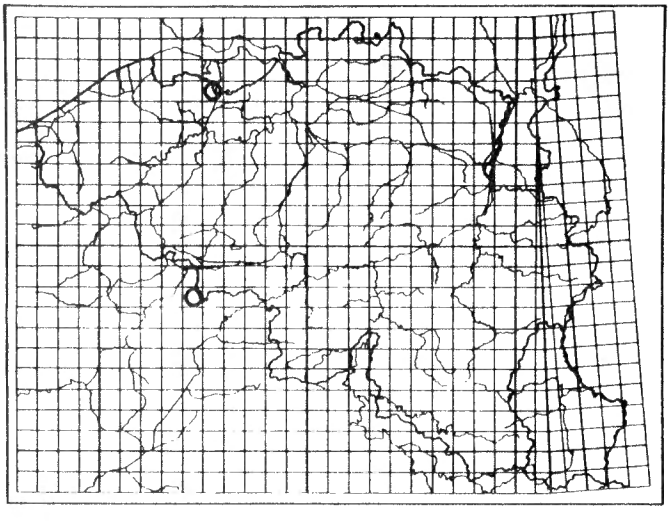
57. *DYSCHIRIUS globosus*



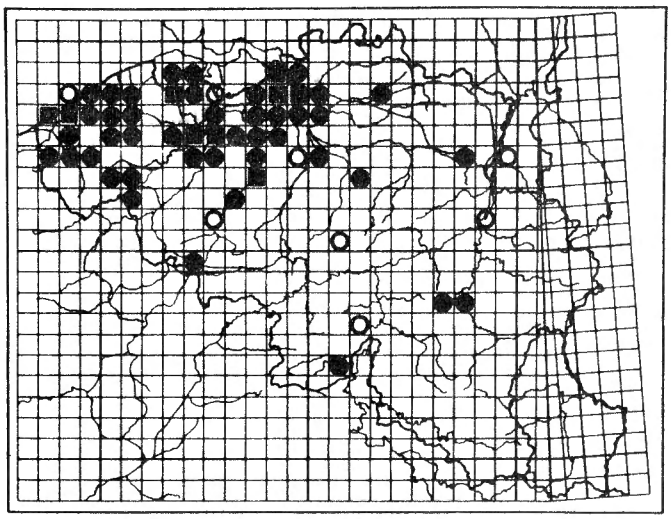
58. *DYSCHIRIUS impunctipennis*



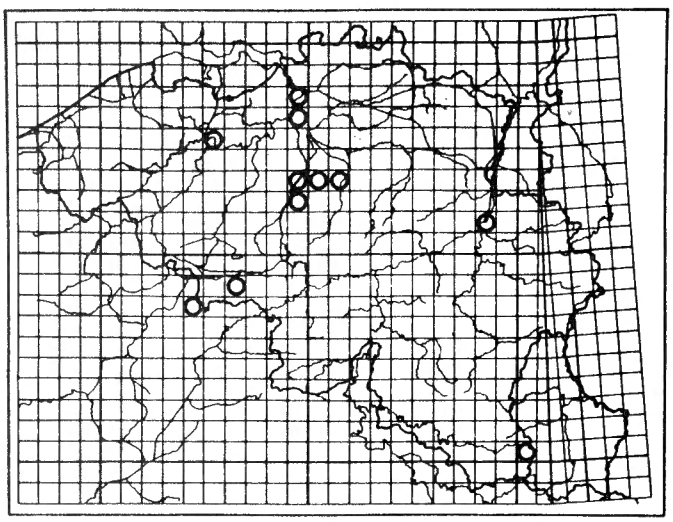
59. *DYSCHIRIUS intermedius*



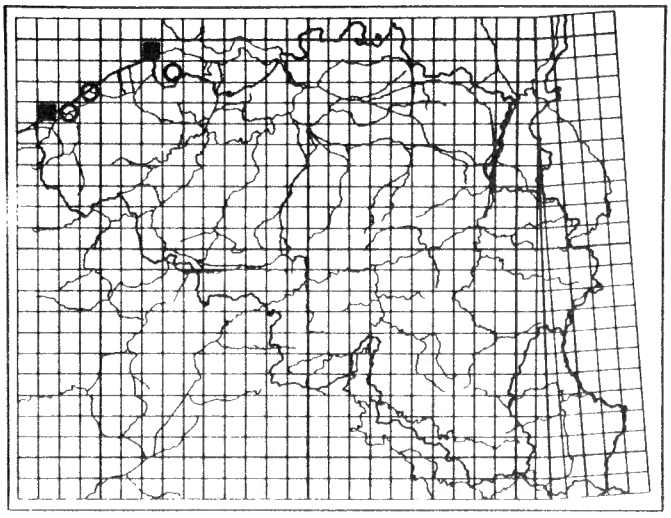
60. *DYSCHIRIUS laeviusculus*



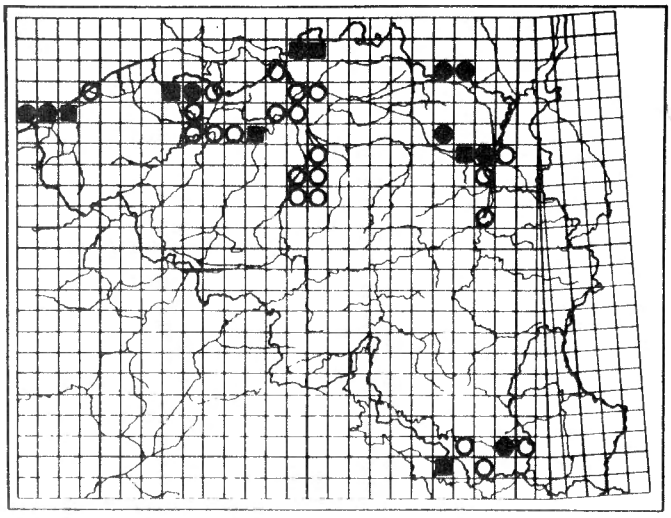
61. DYSCHIRIUS luedersi



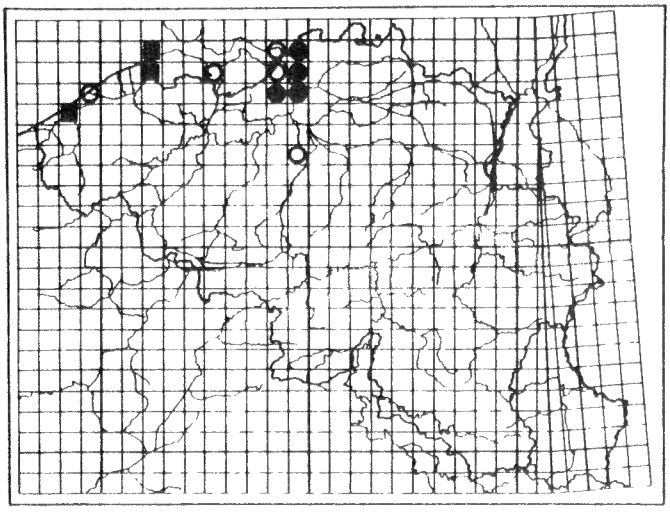
62. DYSCHIRIUS nitidus



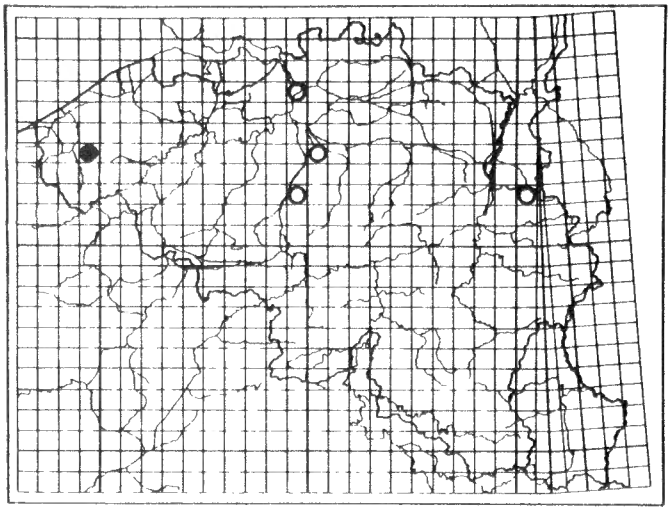
63. DYSCHIRIUS obscurus



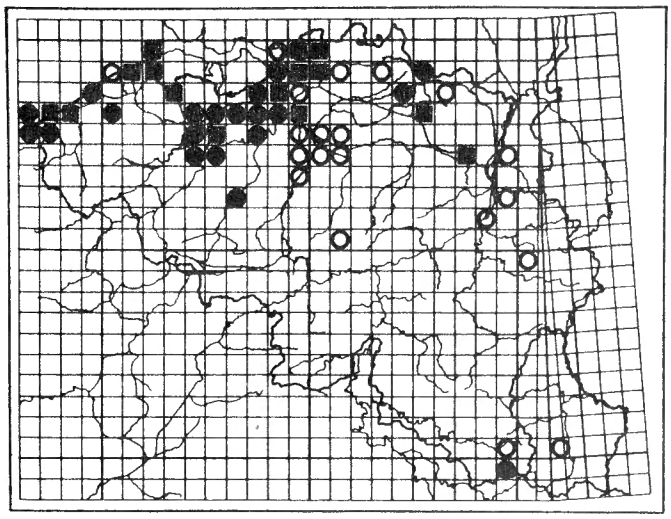
64. DYSCHIRIUS politus



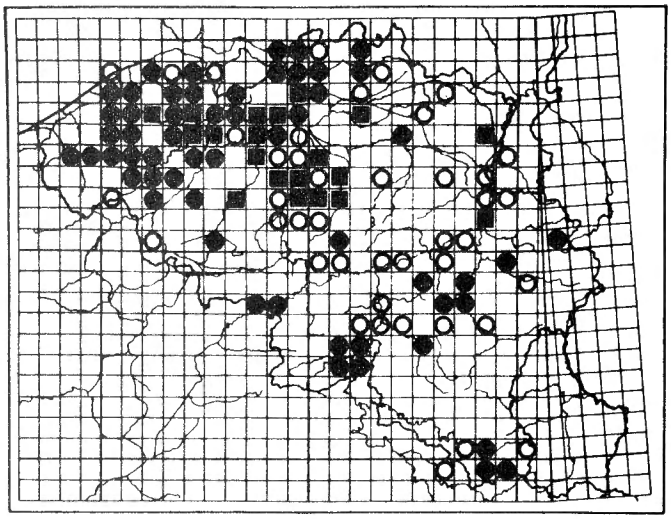
65. DYSCHIRIUS salinus



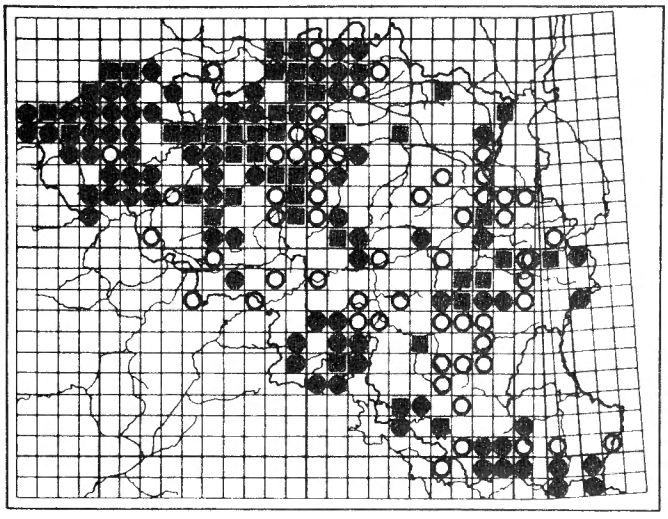
66. DYSCHIRIUS semistriatus



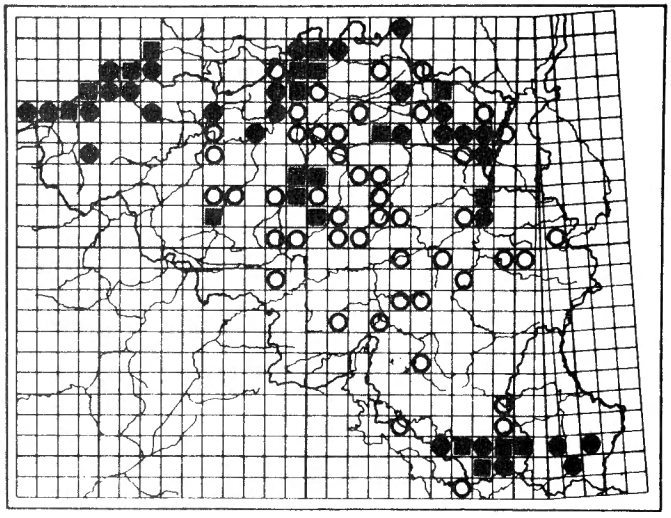
67. *DYSCHIRIUS thoracicus*



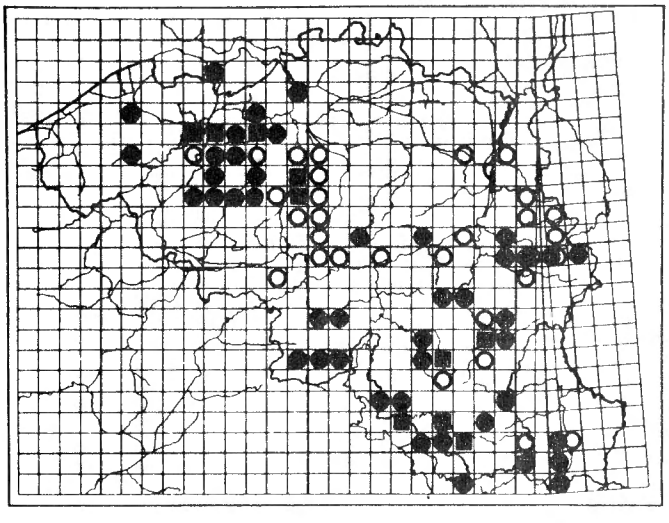
68. *CLIVINA collaris*



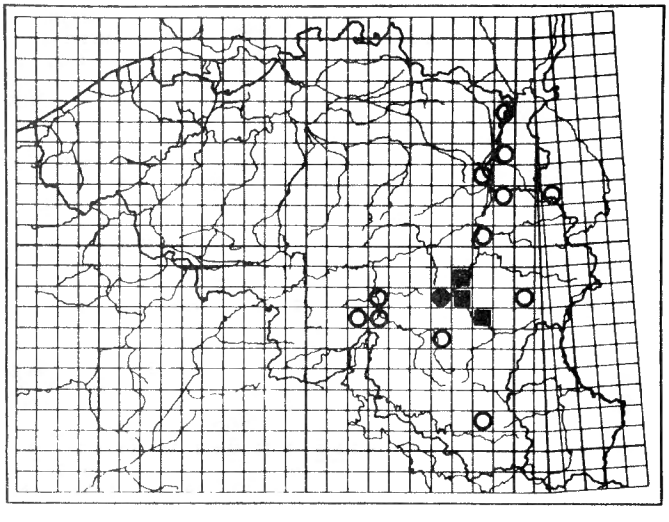
69. *CLIVINA fossor*



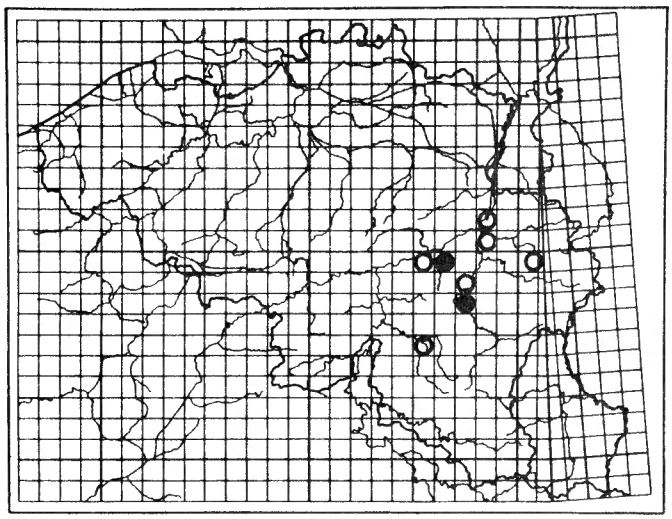
70. *BROSCUS cephalotes*



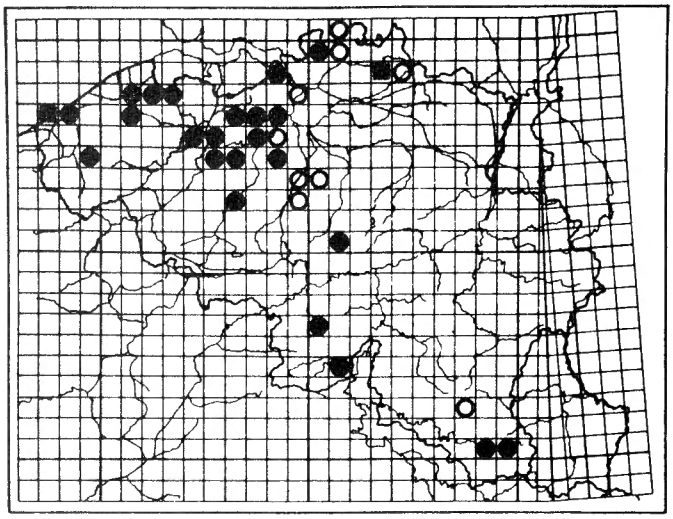
71. *PATROBUS atrorufus*



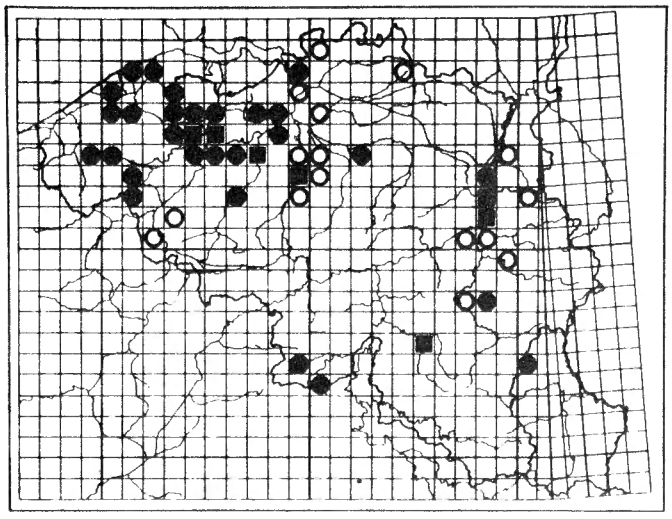
72. *PERILEPTUS areolatus*



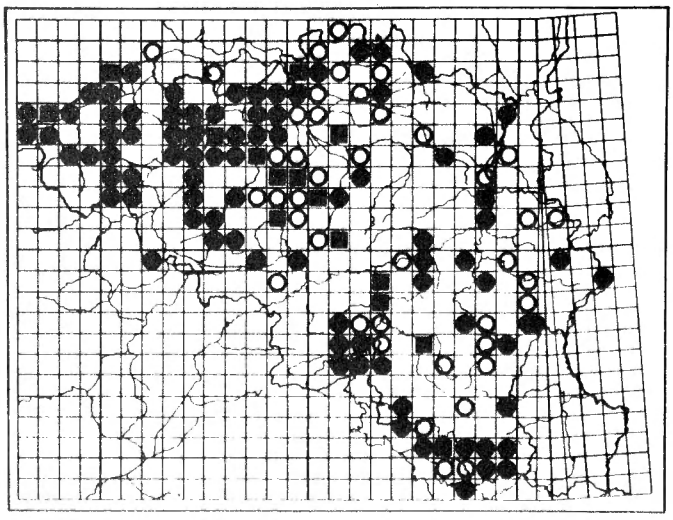
73. THALASSOPHILUS longicornis



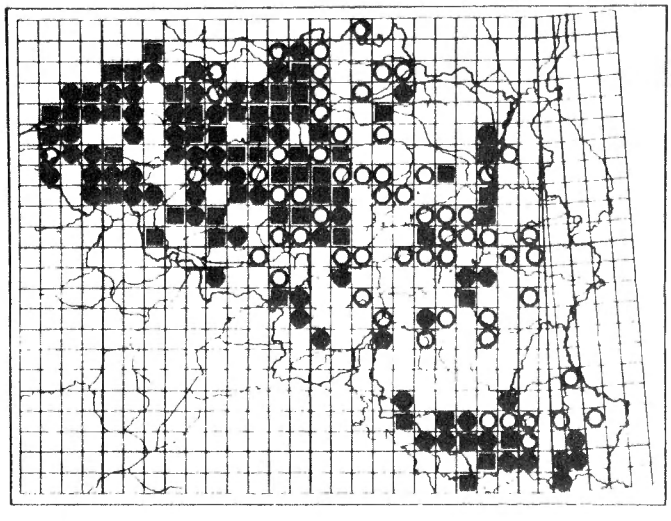
74. TRECHUS discus



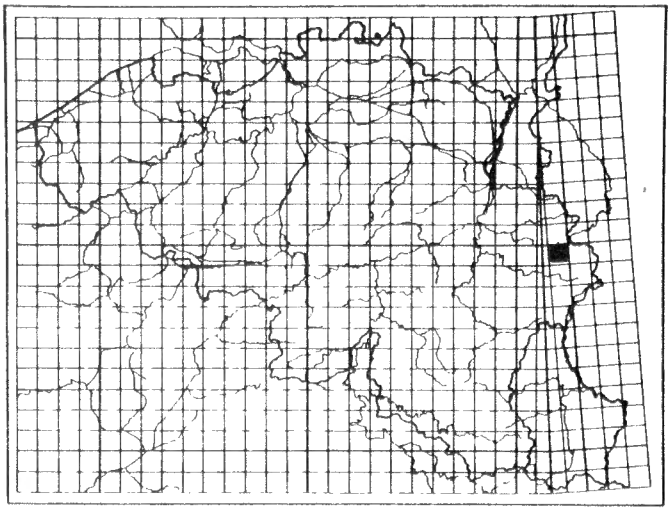
75. TRECHUS micros



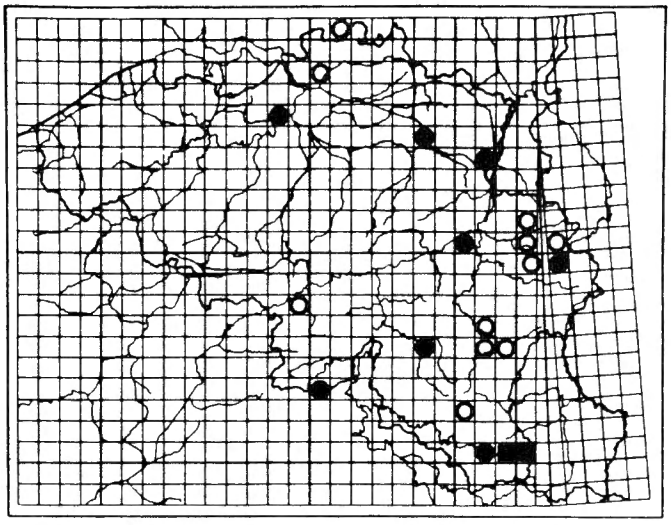
76. TRECHUS obtusus



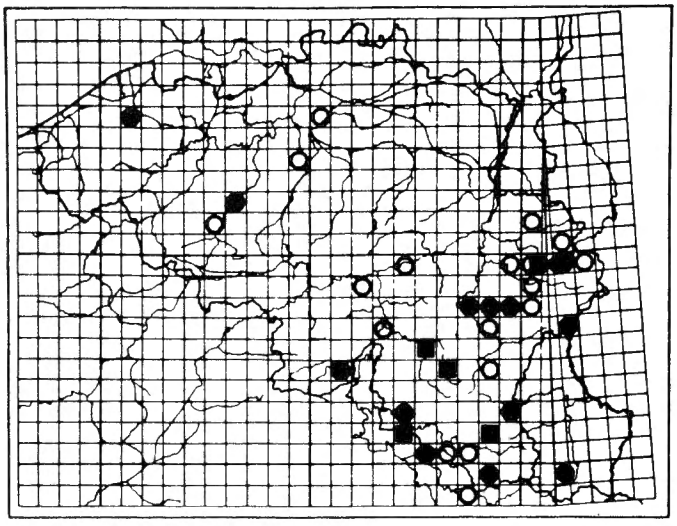
77. TRECHUS quadristriatus



78. TRECHUS rivularis



79. TRECHUS rubens



80. TRECHUS secalis

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