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GROUND BEETLES (*COLEOPTERA, CARABIDAE*) ON FALLOW STANDS NEAR RZESZÓW

The research presented here was conducted during April – October 2002 period in the Zalesie suburb of Rzeszów. Three not neighbouring test stands, 500 m^2 each, in agriculturally idle area were used. Altogether, 734 beetles of Carabidae family, representing 39 species, were caught on tested stands. The stand # 3 was observed to be richest in species and in species number of Carabidae.

Key words: Coleoptera, Carabidae, ground beetles, fallow stands

I. INTRODUCTION

The basic importance of carabids (*Col. Carabidae*) is connected with their predatory live style. As useful insects, they control these herbivorous organisms which, in excess, would be likely to be dangerous for farming crops. Since they occur practically everywhere, live in various habitats and are characterized by high voracity, they are ranked to be the most important predators among ground beetles. They contribute significantly to reducing of the population of plant pests, taking part in biological control, as one of the most important plant protection method. The main purpose of this method is to improve the biocenose conditions durably or temporarily on areas covered by agriculture or forestry, by reinstating useful organisms to their proper roles on those areas [4,12,15].

The objective of the observations was to study the composition of species of the *Carabidae* family of beetles occurring on fallow areas around Rzeszów.

II. MATERIAL AND METHODS

The research were conducted during April – October 2002 period in the Zalesie suburb of Rzeszów. Three not neighbouring test stands, 500 m^2 each, in agriculturally idle area were used. Stand # 1 was located on a warm south-western slope, inclined at 45-55^o. This stand was homed by lean meadow ground flora of the *Arrhenatherum elatioris* L. society, in secondary growth on that currently idle slope. In respect of wetting this stand was temporarily dry. The stand # 2 was

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located on a sun-lit western slope inclined at 30-40°. It was a strip of *Poa-Festucetum rubrae* plant assembly that had homed lean dried clay soils. The stand # 3 was located near the top of the hill, with slight slope down in south-western direction (inclined at ≤ 10°). It was a typical example of wasteland, formerly (4-6 years back) an arable soil that used to be ploughed and intensively fertilized. That was evidenced by numerous species of arable land weeds, as well as by a relatively dense occurrence of *Agropyrum repens* L. As a result of secondary succession, this stand began to take form of *Holcetum lanati* L. plant assembly although the number of meadow species characteristic for this assembly was still small. The soil was optimally wetted and rich in minerals.

Carabidae were caught into Barber's soil traps, i.e. plastic cups 8 cm in diameter filled with 25% ethylene-glycol solution up to ¼ of their volume. Two trap each was located in the central part of each stand, 2 m apart from each other. The caught beetles were removed every two weeks. Fourteen catches were performed on each of the three stands.

The species names of carabids described in this paper were specified according to Aleksandrowicz [1], systematics according to Hůrka [7].

III. RESULTS

The maximum quantity of *Carabidae* on test stands 1 and 2 was observed in the first decade of August, whereas in stand 3, in the third decade of August (Fig. 1).

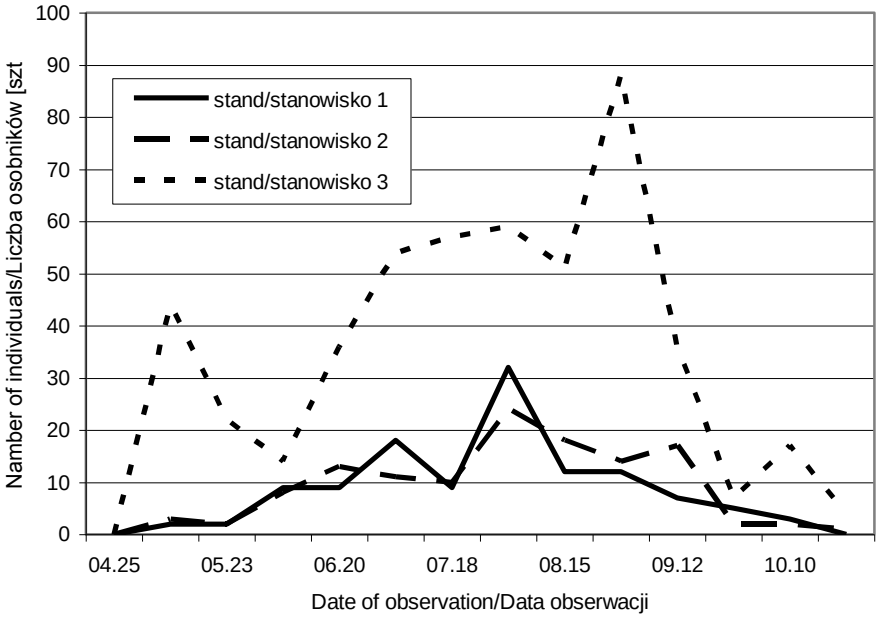

Fig. 1. Dynamics of ground beetles communities in observed stands
Rys. 1. *Dynamika zgrupowań biegaczowatych na badanych stanowiskach*

Altogether, 734 speciments of *Carabidae* family, representing 39 species, were caught on tested stands (tab. 1). The stand # 3 was observed to be most abundant in species (31) and in quantities of *Carabidae* (489 individuals).

Table 1- *Tabela 1*

Ecological characteristic and quantative-qualitative structure of ground beetles caught on observed stands
Charakterystyka ekologiczna i struktura ilościowo-jakościowa biegaczowatych odłowionych na badanych stanowiskach

Species / *Gatunki*	Ecological characteristic *Charakterystyka ekologiczna*		Number of individuals *Liczba osobników* [szt.]			Relative number *Liczebność względna* [%]		
			Stands/*Stanowiska*			Stands / *Stanowiska*		
	Feeding group zoophages *Grupy troficzne zoofagów*	Environment of life *Środowisko życia*	# 1	# 2	# 3	# 1	# 2	# 3
Leistus ferrugineus (L.)	Sz	F	1	1	5	0,8	0,8	1,0
Nebria brevicollis (F.)	Sz	F	0	0	1	0	0	0,2
Carabus granulatus L.	Lz	OaF	1	2	16	0,8	1,6	3,3
Carabus ullrichi Germ.	Lz	O	9	22	19	7,5	17,6	3,9
Carabus cancellatus Ill.	Lz	O	10	2	9	8,3	1,6	1,8
Carabus glabratus Payk.	Lz	F	0	0	1	0	0	0,2
Carabus convexus F.	Lz	O	0	0	2	0	0	0,4
Carabus violaceus L.	Lz	F	1	1	14	0,8	0,8	2,7
Carabus coriaceus L.	Lz	F	1	16	15	0,8	12,8	3,1
Cychrus caraboides (L.)	Lz	F	0	1	0	0	0,8	0
Bembidion lampros (Herbst)	Sz	O	2	0	1	1,7	0	0,2
Bembidion properans (Steph.)	Sz	O	2	0	1	1,7	0	0,2
Poecilus cupreus (L.)	Sz	OaF	3	1	10	2,5	0,8	2,0
Poecilus lepidus (Leske)	Sz	O	36	0	0	30,0	0	0
Pterostichus vernalis (Panz.)	Sz	OaF	0	0	4	0	0	0,8
Pterostichus ovoideus (Sturm)	Sz	O	0	2	4	0	1,6	0,8
Pterostichus melanarius (Ill.)	Lz	O	7	12	39	5,8	9,6	8,0
Pterostichus niger (Schall.)	Lz	F	3	9	173	2,5	7,2	35,4
Abax parallelus (Dufts.)	Lz	F	0	0	1	0	0	0,2
Platynus assimilis (Payk.)	Sz	F	0	1	0	0	0,8	0
Amara aenea (De Geer)	Hz	O	0	0	1	0	0	0,2
Amara lunicollis Schiödte	Hz	O	0	0	1	0	0	0,2
Amara ovata (F.)	Hz	O	1	0	4	0,8	0	0,8
Amara similata (Gyll.)	Hz	O	0	0	1	0	0	0,2
Amara bifrons (Gyll.)	Hz	O	1	0	0	0,8	0	0
Amara equestris (Dufts.)	Hz	O	13	0	1	10,8	0	0,2
Amara apricaria (Payk.)	Hz	O	0	0	1	0	0	0,2
Amara aulica (Panz.)	Hz	O	4	4	0	3,3	3,2	0
Zabrus tenebrioides (Goeze)	Hz	O	1	0	0	0,8	0	0
Badister bullatus (Schrank)	Sz	O	0	1	0	0	0,8	0
Badister sodalist (Dufts.)	Sz	O	0	1	0	0	0,8	0
Anisodactylus binotatus (F.)	Sz	O	1	0	7	0,8	0	1,4
Acupalpus parvulus (Sturm)	Sz	O	0	0	1	0	0	0,2

Ophonus puncticollis (Payk.)	Hz	O	10	1	1	8,3	0,8	0,2
Harpalus rufipes (De Geer)	Hz	O	9	47	140	7,5	37,6	28,6
Harpalus afinis (Schrank)	Hz	O	1	0	4	0,8	0	0,8
Harpalus latus (L.)	Hz	O	2	1	8	1,7	0,8	1,6
Harpalus rubripes (Dufts.)	Hz	O	1	0	3	0,8	0	0,6
Drypta dentata (Rossi)	Hz	O	0	0	1	0	0	0,2
Total	-	-	120	125	489	100	100	100

[Feeding group zoophages: Lz - large zoophages, Sz - small zoophages, Hz – hemizoophages. Environment of life: F - forest, O - open areas, OaF - open areas and forest]
[Grupy troficzne zoofagów: Lz - duże zoofagi, Sz - małe zoofagi, Hz - hemizoofagi. Środowisko życia: F - las, O - tereny otwarte, OaF - tereny otwarte i lasy]

The value of species similarity ratio of caught beetles was lower between stands 2 and 3 (36, 1%), while stands 1 and 3 appeared to be most similar (54, 3%) (tab. 2).

Table 2 - *Tabela 2*

Similarity of carabid groupings to the Marczewski and Steinhause index
Wskaźnik podobieństwa zgrupowań biegaczowatych wg Marczewskiego i Steinhausa

Compared stands *Porównywane stanowiska*	Similarity of carabid groupings index [%] *Wskaźnik podobieństwa zgrupowań biegaczowatych [%]*
1-2	46,4
1-3	54,3
2-3	36,1

IV. DISCUSSION

Harpalus rufipes, *Pterostichus niger* and *Pterostichus melanarius* dominated among gathered species. Besides, *Poecilus lepidus* and *Carabus ullrichi* have clearly marked their presence (in stands # 1 and 2, respectively). A similar structure of carabid fauna domination on legumes was reported by Olbrycht and Jaworska [10]. The above mentioned species and *Harpalus rufipes* dominated also in fodder-beet crops and on temporarily not cultivated stands [9], on onion plantation [14], in winter-rape crops [3, 11], in various types of field bushes [8], as well as on annual crops [5] and strawberry crops [6].

All observed stands were characterized by similar numbers of zoophages of the *Carabus* genus. Their share in the group on stand # 1 was 21,7%, that on stand # 2 – 27,% and on stand # 3 – 22,6%. It should be mentioned that most of the species of the *Carabus* genus was observed on stand # 3. The only species observed here were *Carabus glabratus* and *C. convexus*. According to Cykowski [2] there is a territorial distribution of ground beetles of that genus in the ecotones of meadow and forests, i.e. they occur most often in forests and in forest-adjoining strips of meadows. As reported by Szujecki [13], the carabids occur in greater numbers in thick layers of duff. The stand # 3 was characterized by high plant growth, thus creating a favourable microclimate for *Carabidae* development.

V. CONCLUSIONS

Among beetles caught on all stands *H. rufipes* appeared to be the dominating species. Most (140) of individuals representing this species were caught in stand # 3.

The subrecedent class was most numerously represented in coleopteron groups on each stand. This class comprised 61,5% of all coleopterons collected from stands under observation.

Species of *Carabus* genus, most important from ecological point of view, consisted of 17,9 % of the collected coleopteron fauna. Again, the stand # 3 appeared to be most abundant in zoophages.

VI. REFERENCES

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BIEGACZOWATE (*COLEOPTERA, CARABIDAE*)
STANOWISK ODŁOGOWANYCH W OKOLICACH RZESZOWA

Streszczenie

Badania przedstawione w artykule, prowadzono w okresie od kwietnia do października 2002 roku w Rzeszowie w dzielnicy Zalesie. Obiekt badań stanowiły trzy nie sąsiadujące ze sobą stanowiska o powierzchni około 5 arów każde, położone w terenie wyłączonym z produkcji rolniczej. Na obserwowanych stanowiskach łącznie odłowiono 734 osobniki z rodziny Carabidae zaliczone do 39 gatunków. Największe bogactwo gatunkowe (31 gatunków) i liczebność Carabidae (489 osobników) zaobserwowano na stanowisku nr 3.

Słowa kluczowe: Coleoptera, Carabidae, biegaczowate, stanowiska odłogowane