

Zofia STĄCZEK

**Ladybirds (Coleoptera, Coccinellidae) of the Lublin Coal Basin \***

Biedronki (Coleoptera, Coccinellidae) Lubelskiego Zagłębia Węglowego

Божьи коровки (Coleoptera, Coccinellidae) Люблинского угольного бассейна

Investigations on ladybirds fauna were carried out in 1977—1980 upon 8 lake stands located in Kaniwola, Wólka Wytycka, Dratów and Płotycze. Subject to those investigations were: peat-bog associations — *Caricetum limosae* (stand I) and *Caricetum lasiocarpae* (stand II); high-sedges associations — *Caricetum gracile* (stand III) as well as *Caricetum elatae* (stand IV); and meadow associations — *Poa Festucetum rubrae* (stands V—VIII). The characteristics of the stands were presented in the paper by Cmoluch et al. (2).

The present paper aims at determining the composition of ladybirds species and their number with regard to zoogeographical analysis. The insects were collected during the whole vegetation season at 10-day intervals by means of mowing with entomological net. One sample was a series of 8×25 catches. The numerical results of investigations were listed in Tables 1 and 2 and in Figs. 1 and 2.

ZOOECOENOLOGICAL ANALYSIS

During 4-year investigations upon the area of the Lublin Coal Basin 431 ladybirds, belonging to 12 species, were found. Among meadow communities there were caught 253 specimens represented by 9 species, among boggy communities — 112 specimens (11 species), and among sedge communities — 67 specimens (7 species) — Table 1.

Most ladybird species were found in transitory peat-bogs — stands I, II (Table 1). In *Caricetum limosae* association (stand I) *Coccinella septempunctata* prevailed; its share was 46%. Considerably numerous was also

\* The paper was written within the project "Structure and Dynamics of Numerical Force of Insect Fauna of the Lublin Coal Basin" investigated by research workers of the Department of Zoology of Maria Curie-Skłodowska University under the direction of prof. dr. hab. Z. Cmoluch.

Table 1. Zoogeographic and ecological structure of ladybirds fauna of the investigated area

Elements	Number of species	Number of specimens	
Palaearctic	8	400	92.3
Euro-Siberian	3	26	6.0
Holarctic	1	5	1.2
Stenotopic	5	164	38.1
Eurytopic	3	216	50.1
Oligotopic	3	30	6.9
Polytopic	1	21	4.9
Aphidiphagous	10	419	97.2
Phytaphagous	2	12	2.8
Mesohygrophilous	6	249	57.0
Hygrophilous	4	31	7.2
Xerophilous	2	151	35.0

*Propylea quatuordecimpunctata* — 16%. In this habitat 4 hygrophilous forms were caught, one of which — *Coccidula scutellata* — is a boggy species settling in extremely moist biotopes. The three other taxons: *Coccidula rufa*, *Hippodamia tredecimpunctata* and *Anisostica novemdecimpunctata* are also characteristic of hygrophilous biotopes (1). Their share was 2—5% (Fig. 1).

In *Caricetum lasiocarpae* three ladybird species of the same quantity but different ecological requirements prevail. These are: hygrophilous *Anisostica novemdecimpunctata*, dendrophilous *Adalia decempunctata* and eurytopic *Coccinella septempunctata* (each 22%). The occurrence of *Adalia decempunctata* was conditioned by close vicinity of alder shrubs. In the investigated community *Propylea quatuordecimpunctata* (Fig. 1) had a considerable share.

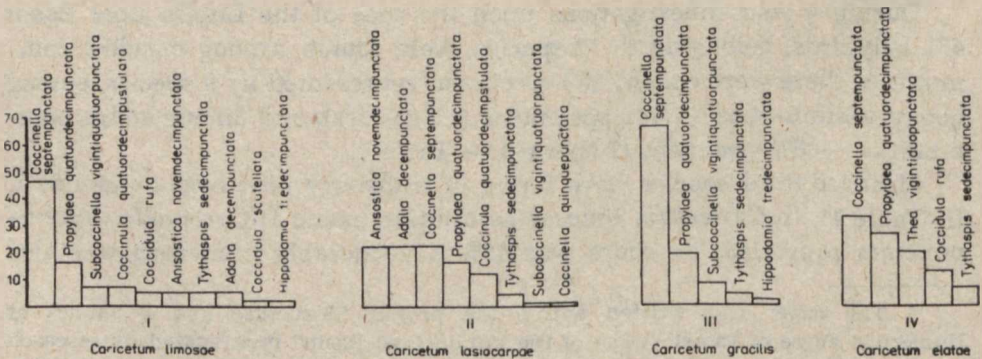


Fig. 1. Per cent share of ladybirds found in boggy and sedge communities of the Lublin Coal Basin

In two high-sedge associations (stands III, IV) 7 ladybirds species were caught (Table 1). The highest number and prevalence had *Coccinella septempunctata* whose share was 33—67% specimens. Much less in number was *Propylea quatuordecimpunctata* (19—27%). The occurrence of hygrophilous species at these stands: *Hippodamia tredecimpunctata* (stand III) and *Coccidula rufa* (stand IV) proved that these habitats are strongly moist at some places. In both plant associations phytophagous species were found: *Subcoccinella vigintiquatuor punctata* and *Thea vigintiduo punctata* (Fig. 1). The latter one feeds with lower fungi (the powdery mildews) parasitising on nettles.

In four meadow communities (stands V—VIII) 9 ladybird species were caught. Their number at the particular areas was from 5 to 7 species (Table 1). Upon three stands (V, VI, VIII) xerophilous *Tytthaspis sedecimpunctata* prevailed, being the most numerous component of hay-growing meadows fauna; its share was 42—66%. The value of this index upon the area VII decreased to 17% in favour of eurytopic species *Coccinella septempunctata* — 60%. This ladybird was less numerously represented upon other stands (V, VI, VIII). Upon all the areas there were also caught a few or several specimens of *Propylea quatuordecimpunctata*, its share being 8—34% (Fig. 2). Apart from *Tytthaspis sedecimpunctata* another xerophilous species on hay-growing meadow was *Coccinula quatuordecimpustulata* which was caught in single specimens. There were also found in small numbers species of hygrophilous ladybirds: *Anisostica novemdecimpunctata* and *Hippodamia tredecimpunctata* whose presence was probably connected with nearby common reed.

When determining geographic location of the discussed species the authors based on Pawłowski's paper (3). Among the investigated ladybirds the following elements have been found: palaeartic, Euro-Siberian and holarctic. The most numerous, represented by 8 species

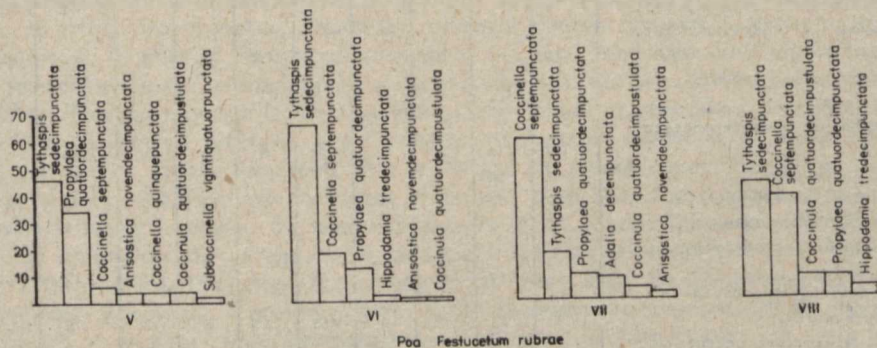


Fig. 2. Per cent share of ladybirds found in meadow communities of the Lublin Coal Basin

was palaeartic element (92.8% specimens). 3 species were included among Euro-Siberian element, 1 species — among holarctic element (Table 2).

Most species within the analysed faunistic material are stenotopic forms (41.7% of species composition) comprising 38.1% of total number of specimens. The following hygrophilous species belonged here: *Coccidula rufa*, *C. scutellata*, *Hippodamia tredecimpunctata* and *Anisostica novemdecimpunctata* as well as xerophilous *Tytthaspis sedecimpunctata*. Among the eurytopes *Coccinella septempunctata*, *C. quinquepunctata* and *Propylea quatuordecimpunctata* were included; their share was 25%, while their number was the highest: 50.1% *Subcoccinella vigintiquatuor punctata*, *Coccinula quatuordecimpunctulata* and *Thea vigintiduopunctata* belong to the group of oligotopes. Polytopic species was represented by *Adalia decempunctata* (Table 2).

Among the caught insects 10 aphidophagous species constituting 97.2% of all ladybirds, as well as 2 phytophagous species, were found (Table 2).

In the obtained material 3 groups of ladybirds were distinguished, differing among each other in moisture requirements: 6 mesohygrophilous species (57.8% total number of specimens), 4 hygrophilous species being in the least number and 2 xerophilous species, which occurred in considerable quantity (Table 2).

Table 2. Species composition and number of ladybirds found in lake communities of the Lublin Coal Basin

No.	Species	Kani-wola	Wólka Wyt-ycka	Dra-tów	Pło-tycze	Kani-wola	Wólka Wyt-ycka	Dra-tów	Pło-tycze	Sum of speci-mena	Share %
		stand I	stand II	stand III	stand IV	stand V	stand VI	stand VII	stand VIII		
1	<i>Subcoccinella vigintiquatuor punctata</i> /L./	3	1	4		1				9	2.08
2	<i>Coccidula rufa</i> /Hbst./	2			2					4	0.92
3	<i>Coccidula scutellata</i> /Hbst./	1								1	0.23
4	<i>Hippodamia tredecimpunctata</i> /L./	1		1			2		1	5	1.16
5	<i>Anisostica novemdecimpunctata</i> /L./	2	15			2	1	1		21	4.87
6	<i>Tytthaspis sedecimpunctata</i> /L./	2	3	2	1	24	81	9	11	133	30.85
7	<i>Adalia decempunctata</i> /L./	2	15					4		21	4.87
8	<i>Coccinella septempunctata</i> L.	20	15	35	5	3	22	31	10	141	32.70
9	<i>Coccinella quinquepunctata</i> L.		1			2				3	0.69
10	<i>Coccinula quatuordecimpunctulata</i> /L./	3	8			2	1	2	2	18	4.17
11	<i>Propylea quatuordecimpunctata</i> /L./	7	11	10	4	18	15	5	2	72	16.7
12	<i>Thea vigintiduopunctata</i> /L./				3					3	0.69
Total		43	69	52	15	52	122	52	26	431	99.93

The records included in this paper are the initial material for future estimation of the investigated group of insects.

#### REFERENCES

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#### STRESZCZENIE

Przedstawiono wyniki czteroletnich badań (1977—1980) nad fauną biedronek zasiedlających zbiorowiska przyjeziorne Lubelskiego Zagłębia Węglowego. Zanalizowano skład gatunkowy biedronek oraz ich liczebność z uwzględnieniem analizy zoogeograficznej. Badania przeprowadzono na 8 stanowiskach zlokalizowanych w Kaniwoli, Wólce Wytyckiej, Drajowie i Płotyczu. Objęto nimi zespoły torfowisk przejściowych — *Caricetum limosae* (stanowisko I) i *Caricetum lasiocarpae* (stanowisko II), wysokich turzyc — *Caricetum gracile* (stanowisko III) i *Caricetum elatae* (stanowisko IV) oraz łąkowe — *Poa-Festucetum rubrae* (stanowiska V—VIII). Na wszystkich powierzchniach zebrano łącznie 431 osobników biedronek, z których wyróżniono 12 gatunków. Najwyższą liczebnością w uzyskanym materiale faunistycznym charakteryzowały się 3 gatunki: *Coccinella septempunctata*, *Tytthaspis sedecimpunctata* i *Propylea quatuordecimpunctata* (tab. 1). Wśród fauny biedronek wyróżniono 3 elementy zoogeograficzne: palearktyczny, reprezentowany przez 8 gatunków, euro-syberyjski — 3 gatunki i holarktyczny — 1 gatunek (tab. 2). Zagadnienie struktury populacji biedronek w zakresie dominacji przedstawiono na ryc. 1 i 2.

#### РЕЗЮМЕ

В работе содержатся результаты четырехлетних исследований (1977—1980) над фауной божьих коровок, обитающих в приозерных сообществах Люблинского угольного бассейна. Приведен видовой состав божьих коровок и их численность с учетом зоогеографического анализа. Исследования проводили на 8 местообитаниях, находящихся в Каниволе, Вулька-Вытыцке, Дратове и Плотыче. Исследованиями были охвачены ассоциации переходных торфяников — *Caricetum limosae* (местооб. I) и *Caricetum lasiocarpae* (местооб. II), осок высоких — *Caricetum gracile* (местооб. III) и *Caricetum elatae* (местооб. IV) и луговые ассоциации *Poa-Festucetum rubrae* (местооб. V—VIII). Всего было собрано 431 особь божьих коровок, из которых выделено 12 видов. Наиболее многочисленными в полученном материале были 3 вида: *Coccinella septempunctata*, *Tytthaspis sedecimpunctata*, *Propylea quatuordecimpunctata* (табл. 1). Среди фауны божьих коровок вырелили 3 зоогеографических элемента: полеарктический, представленный 8 видами, евро-сибирский — 3 видами и голарктический — 1 видом (табл. 2). Вопрос структуры популяции божьих коровок в области доминации представлен на рис. 1 и 2.

