Acta Agrophysica, 2006, 7(2), 461-465

DEGREE OF MAINTENANCE OF WET HABITAT IN THE KOZŁOWIECKI LANDSCAPE PARK AND THE OCCURRING COMMUNITY OF CLICK-BEETLE (*COLEOPTERA: ELATERIDAE*)*

Krzysztof Pawlęga

Department of Zoology, Agricultural University
ul. Akademicka 13, 20-950 Lublin, Poland
e-mail: krzysztof.pawlega@ar.lublin.pl

A b s t r a c t. In the present study groups of click-beetle of wet habitats in the Kozłowiecki Landscape Park were examined. The research was carried out in the following plant communities: alder communities, wet meadow, and low peat lands. Adult forms were collected with use of the entomological net and umbrella. 11 species of click-beetle were found. The most numerously collected were: *Dalopius marginatus*, *Actenicerus siaelandicus*, *Agrypnus murinus* and *Athous subfuscus*. The investigated communities had a low participation of hygrophilous species. Ecological and zoogeographical analysis has also been done.

K e y w o r d s: South-east Poland, wet habitat, Kozłowiecki Landscape Park, beetle, click-beetle

INTRODUCTION

Elateridae is a family of beetles of which adult forms are usually found in the places of larvae development [8]. That is why the type of habitat, the presence of development microbiotopes and edaphic conditions (for example the sort of soil and its humidity), affect the abundance of species occurrence of these insects in a given environment. In Polish fauna, species linked with wet habitats belong mainly to the *Negastriinae* and *Elaterinae* subfamilies and a few to the *Agrypninae* subfamily.

Kozłowiecki Landscape Park is placed in the Lubartów Plain, several kilometres from the northern edge of Lubelska Highland. In order to preserve a big forest complex with fragments of trees of almost natural character, and also accompanying meadows, swamps and ponds, the Kozłowiecki Landscape Park was set up in

* The paper was presented and published in the frame of activity of the Centre of Excellence AGROPHYSICS – Contract No.: QLAM-2001-00428 sponsored by EU within the 5FP.

1990. The Park area is 6121 ha. Over 90.5% of its surface is covered with forests, whereas its lag occupies 7432 ha [1].

METHODS AND MATERIAL

The examination of click-beetles of wet habitat in the Park was conducted in 2004, in 5 stations (Fig. 1).

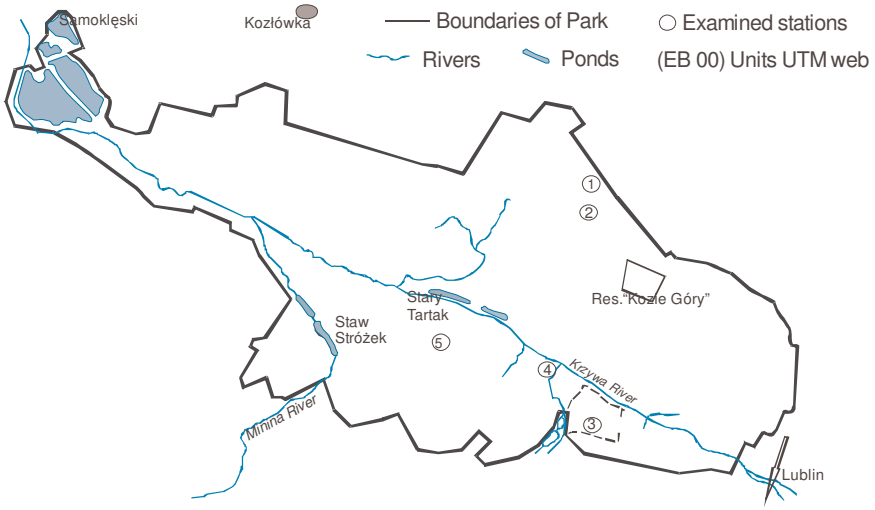

Fig. 1. The distribution of examined station on the area of Kozłowiecki Landscape Park
Examined station: 1 and 2. Majdan Kozłowiecki (FB 90), 3. Wielosił (FB 90), 4. Nowy Staw (FB90), 5. station between Nowy Staw-Stary Tartak

The research on the adult forms of click-beetle was conducted in the following plant communities: alder (stations nr 1, 4, 5), wet meadows (stations nr 3, 4), and low peat lands (stations nr 1, 2).

The quantitative take of adult forms was made with the use of the entomological net. One sample consisted of 100 net strokes (4 series of 25 sweeps each). For qualitative samples a multiplication of 25 strokes was used, depending on the size of the investigated area. The click-beetles from trees and bushes were shaken down to the entomological umbrella (only in alder). For one quantitative sample the branches of five trees or bushes, accessible from ground level, were shaken. The quantitative take of adult click-beetles was done regularly twice a month (from April to August).

The analysis included biocenotic indices: domination (D%), ecological importance (Q%) and species variability index (d) in accordance with SIMPSON formula [5]. Ecological and zoogeographical analysis has also been done.

RESULTS

Generaly, in 2004 in all the investigated plant communities 25 species of Elateridae (19 % of country fauna) were collected. In the wet habitats 11 species of click-beetle were caught. Species such as: *Prosternon tessellatum*, *Paraphotistus impressus* and *Dicronychus rubripes* were only collected in alder communities. The most numerous was *Dalopius marginatus* (28 individuals, D=40.6%) – a forest species from wet meadows. The second dominant was *Actenicerus siaelandicus* (16 indiv., D=23.2%), a hygrophilous species, obtaining a high ecological importance index (Q=61.7% and Q =26.7%, respectively) in the wet meadows and low peat land communities. To eudominants also belonged *Agrypnus murinus* (9 indiv., D=13.0%) and *Athous subfuscus* (7 indiv., D=10.1%). The first is an eurytypic species and the second is a forest species. The rest of the species, like *Athous haemorrhoidalis*, *Prosternon tessellatum*, *Paraphotistus impressus*, *Adrastus limbatus*, *Ectinus aterrimus*, *Agriotes obscurus* and *Dicronychus rubripes* were in the subdominant and recedent class (Tab. 1).

Table 1. Presence of adults of click-beetles in examined plant communities and in stations of Kozłowiecki Landscape Park

L 1 – alder, L 2 – wet meadows, L 3 – low peat lands , "+" presence of species in a community, D% – domination, in order to define the species dominance structure the following scale was used: eudominants (D – >10%), dominants (D – 5.1-10%), subdominants (D – 2.1-5.0%), recedents (D – 1.1-2.0%) and subrecedents (D – <1.0%)

Species	D%	Plant community			
		L 1	L 2	L 3	Examined stations
Agrypnus murinus (Linnaeus, 1758)	13.0	+	+	–	3,4
Athous haemorrhoidalis (Fabricius, 1801)	2.9	–	+	–	3
Athous subfuscus (O. F. Müller, 1764)	10.1	+	–	+	1,5
Actenicerus sjaelandicus (O.F.Müller, 1764)	23.2	+	+	+	3,4
Prosternon tesselatum (Linnaeus, 1758)	1.4	+	–	–	4
Paraphotistus impressus (Fabricius, 1792)	1.4	+	–	–	1
Adrastus limbatus (Fabricius, 1776)	1.4	–	+	–	3
Dalopius marginatus (Linnaeus, 1758)	40.6	+	–	+	1,2,4
Ectinus aterrimus (Linnaeus, 1761)	2.9	+	–	–	4
Agriotes obscurus (Linnaeus, 1758)	1.4	–	+	–	4
Dicronychus rubripes (Germar, 1824)	1.4	+	–	–	5
Sum species	11	8	5	3	–

Among the investigated wet communities of the Park the biggest number of species (8) of Elateridae was noted in alder communities (Tab. 1). The click-beetles complex of alder communities had also the highest species differentiation index „d" (d=4.7). The most numerously collected were: *Dalopius marginatus*, *Athous subfuscus*, *Ectinus aterrimus* – mainly forest species and the eurytypic species *Agrypnus murinus*. Species whose development is linked with soil microbiotopes, occurring in rotting stumps, had prevailing participation (75%).

The second in number (5 species) was the wet meadow complex of click-beetles. The species differentiation index ”d” was 3.1. The biggest quantitative participation in these communities was achieved by *Actenicerus siaelandicus* (12 indiv., D=57.1%), a typical species for wet meadows biotopes. To eudominants also belonged *Agrypnus murinus* (5 indiv., D=23.8%). The second species occurring in wet habitats was subdominant *Adrastus limbatus* (1 indiv., D=4.8%). Neither the recedent nor subrecedent class was noted. Except for *Actenicerus siaelandicus,* the rest of the species belonged to soil species.

The smallest differentiation index „d” and, simultaneously, the smallest number of species had Elateridae of low peat lands (d=1.8) (Tab. 1). All the species were in the eudominant group and the most numerously collected was *Dalopius marginatus* (D=50.0%).

In the fauna of Elateridae of the examined wet complexes four zoogeographical elements were included. The biggest qualitative participation had holarctic, eurosyberian and european elements (each 27.3%). The fourth element – euroasian, achieved the participation of 18.2%.

DISCUSSION

In the investigated wet communities of the Park 11 species of Elateridae were collected. In the marshy meadow of Białołęka Dworska 13 species of click-beetles were noted by Nowakowski [4]. Honczarenko [2,3] describes 14 and 10 species of Elateridae in wet meadows of Szczecin and Lublin regions. Pawlęga [6,7] describes 31 species of Elateridae in wet habitats of the „Lasy Janowskie” Landscape Park (containing: alder communities, wet meadows, low, transitional and high peat lands and marshy meadows). In both previous studies a detailed description and analysis of Elateridae complexes of wet habitats were made. That allows comparison with the present results and drawing conclusions. The composition of Elateridae of wet habitats of the Kozłowiecki Landscape Park, especially hygrophilous species, was probably influenced by small area occupied by particular wet communities and close neighbourhood and penetration of other types of habitats. The domination of *Dalopius marginatus* – a forest species, in alder and low peat lands communities can be similarly explained. The biggest number of species noted in alders resulted from the widest range of microbiotopes o these insects’ development (soil, rotting stumps and rotting trunks).

CONCLUSIONS

1. 11 species of click-beetle were found.

2. The fauna of Elateridae of the Kozłowiecki Landscape Park had a low participation of hygrophilous species (only 2 species).

3. The small area occupied by particular wet communities and close neighbourhood and penetration of other types of habitats were the factors that affected the composition of Elateridae species of wet habitats in Kozłowiecki Landscape Park.

4. The investigated wet communities of the Park were occupied by species having a wide and medium zoogeographical range.

REFERENCES

1. **Fijałkowski D.:** Nature and natural environment preservation in south-east Poland (in Polish). Wydawnictwo UMCS, Lublin, 1996.
2. **Honczarenko J.:** Occurrence of *Elateridae* and *Scarabeidae* (*Col*.) larvae on Bystrzyca river meadows in the Lublin region (in Polish). Ann. UMCS, sectio C, Lublin, 11, 227-268, 1956.
3. **Honczarenko J.:** Soil entomofauna in various meadow communities (in Polish). Soc. Sc. Stett., Wydz. Nauk Przyr.-Roln., Szczecin, 14, 2, 1-47, 1956.
4. **Nowakowski E.:** Soil click-beetles (*Elateridae*, *Coleoptera*) (in Polish). Fragm. Faun., Warszawa, 26, 229-245, 1981.
5. **Odum E. P.:** The elements of ecology (in Polish). PWRiL, Warszawa, 1982.
6. **Pawlęga K.:** The click-beetle (*Coleoptera*: *Elateridae*) of wet habitat in the "Lasy Janowskie" Landscape Park. Acta Agrophysica, Lublin, 1(3), 485-491, 2003.
7. **Pawlęga K.:** The click-beetles (*Coleoptera*: *Elateridae*) of the marshy meadow comunities in the "Lasy Janowskie" Landscape Park, Teka Kom. Ochr. Kszt. Środ. Przyr., PAN, Lublin, 1, 174-179, 2004.
8. **Tarnawski D.:** *Elateridae* click-beetles (*Insecta*: *Coleoptera*), part I (general part and subfamilies: *Agrypninae*, *Negastriinae*, *Diminae* i *Athoinae*) (in Polish). Fauna Polski, Waszawa, 21, 1-413, 2000.

STOPIEŃ ZACHOWANIA BIOTOPÓW WILGOTNYCH KOZŁOWIECKIEGO PARKU KRAJOBRAZOWEGO A ZASIEDLAJĄCA JE FAUNA SPRĘŻYKOWATYCH (*COLEOPTERA: ELATERIDAE*)

Krzysztof Pawlęga

Katedra Zoologii, Akademia Rolnicza
ul. Akademicka 13, 20-950 Lublin
e-mail: krzysztof.pawlega@ar.lublin.pl

S t r e s z c z e n i e. W pracy badano zgrupowania sprężykowatych częściowo zasiedlających wilgotne zbiorowiska Kozłowieckiego Parku Krajobrazowego. Były to zbiorowiska: olsowe, wilgotnych łąk i torfowisk niskich. Postacie dorosłe Elateridae zbierano za pomocą czerpaka i parasola entomologicznego. Ogółem złowiono 11 gatunków tych owadów. Najliczniej występowały: *Dalopius marginatus*, *Actenicerus siaelandicus*, *Agrypnus murinus* i *Athous subfuscus*. Badane zbiorowiska cechowały się małym udziałem gatunków higrofilnych. Dokonano również analizy ekologicznej i zoogeograficznej.

S ł o w a k l u c z o w e: Polska południowo-wschodnia, biotopy wilgotne, Kozłowiecki Park Krajobrazowy, sprężykowate