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Ecofaunistical investigations in a boggy forest in the Protected Landscape Area at Ócsa (Kiskunság National Park, Hungary)

By

Á. SALLAI*

Abstract. The total number of species of the soil-living macrofauna in the Protected Landscape Area at Ócsa were 24; 9 diplopods, 7 isopods (Oniscidea) and 8 chilopods have been identified. The most abundant species were *Polydesmus schaessburgensis* VERH. (Diplopoda), *Armadillidium zenckeri* BRANDT (Isopoda-Oniscidea) and *Monotarsobius baloghi* LOKSA (Chilopoda).

Experimental studies in the Protected Landscape Area at Ócsa started as a part of a long term program. This program was instigated after 1945. Its purpose is to study the fauna of marshlands, moorlands and temporarily water-logged territories as well as to develop their conservation (KASZAB, 1982). A result of this program is a book on the faunal assembledge of Bátorliget territory.

The present study describes the faunal assembledge of a boggy forest in the Protected Landscape Area at Ócsa. In addition to obtaining faunistical data and completing the previous studies, the aim of the study was to get some knowledge on the adaptive features of the macrofauna as a whole.

Being flooded temporarily, a significant difference was expected to exist between the faunal assembledge of the study area in the case of wet conditions and dry periods.

Material and methods

The study area belongs to the Kiskunság National Park. There were several studies done on the flora of this area (BOROS, 1952; KOMLÓDI, 1958). The fauna of the national park was examined by MAHUNKA (ed.) (1986, 1987).

My research area is a strictly protected wet alder woodland (Fraxineto pannonicae-Alnetum) called "Big Forest".

Samples were taken either monthly or bimonthly from March 1989 to November 1990. Depending on the water level, samples were taken either from the trunks or between the trunks, or from both sites between 8 and 11 a.m.

* *Ágnes Sallai*, Magyar Tudományos Akadémia Könyvtára (Library of the Hungarian Academy of Sciences), 1051 Budapest, Arany János u. 1, Hungary.

Trunks: These were outstanding trunks of alder trees and the surrounding dry area, which had a changing size during the year. This term means the trunk of the tree and its root system reaching out of the water, as well as the base of the branched trees growing from each trunks.

Between the trunks: This means the area among the trees which was temporarily covered by a varying amount of water. 10 or 20 samples were taken from the two habitats depending on the actual water level (20 when it was possible to take samples from both sites; otherwise 10). Quadrant method was used with a size of 25×25 cm. The animals were collected by mesh sieving and later identified in the laboratory.

Dates of collections: 1989: 16. 3., 7., 13. 9., 23. 10. 1990: 6. 2., 13. 3., 18. 4., 5. 6., 24. 7., 3. 9., trunks. 1989: 29. 5., 4. 7., 6. 9., 23. 10. 1990: 5. 6., 24. 7., 3. 9., between the trunks.

Two of the higher taxa examined belong to decomposers: Diplopoda and Isopoda (Oniscidea), one of them was predatorous (Chilopoda).

For identification the keys and articles of SCHUBART (1934), JERMY (1942), LOKSA (1954) [Diplopoda], GRUNER (1965, 1966), SCHMÖLZER (1965), WACHTLER [Isopoda] LOKSA (1955) [Chilopoda] were used.

Results

Altogether 16,275 specimens were found. 8751 of them were Isopoda, 7302 belonged to Diplopoda and 222 were Chilopoda specimens. Nine Diplopoda, eight Chilopoda and seven Isopoda species were found.

Diplopoda species: *Polydesmus schaessburgensis* VERH., *Polydesmus complanatus* LINNÉ, *Polydesmus denticulatus* C. L. KOCH, *Julus terrestris* PORAT, *Leptoiulus cibdellus* CHAMBER., *Glomeris hexasticha* BRANDT. Only a few specimens of *Nopoiulus kochii* GERVAIS., *Ommatoiulus sabulosus* LINNÉ, and *Haasea* sp. were found. From the latter genus there were only juveniles present, so it was not possible to identify them for species.

Isopoda species: *Armadillidium zenckeri* BRANDT, *Porcellium collicola* VERH., *Trachelipus rathkei* BRANDT, *Hyloniscus riparius C. L. KOCH, Haplopthalmus danicus* B.-L., *Asellus aquaticus LINNÉ.* From the genus *Trichoniscus* only female specimens were found, so it was not possible to identify them for species.

Chilopoda species: *Monotarsobius baloghi* LOKSA, *Monotarsobius crassipes* C. L. KOCH, *Lithobius forficatus* LINNÉ, *Lithobius muticus* C. L. KOCH, *Lithobius erythrocephalus* C. L. KOCH, *Pachymerium ferruginem* C. L. KOCH, *Geophilus proximus* C. L. KOCH, *Schendyla nemorensis* C. L. KOCH.

DIPLOPODA

Polydesmus schaessburgensis VERH. — This is a relict species occurring only on the Ócsa-Sáry area within Hungary. This species is an inhabitant of moorlands and boggy forests, as well as high mountain habitats. It was first found in Transsylvania near Segesvár by VERHOEFF (CEUCA, 1992) and also recorded from the southern steppe zone of the former Soviet Union (GOLOVATCH, 1992). This species seemed to prefer wet and cool habitats (LOKSA, 1954; KORSÓS, 1987). I found the same preference as well considering that this area can be characterized by this sort of preference. During the present study this species was found to be the most abundant one.

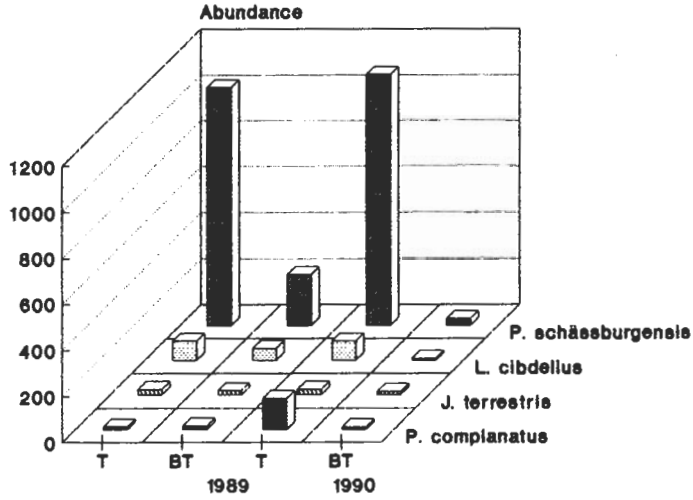

Figure 1. The three most abundant diplopod species *(P. schaessburgensis, L. cibdellus, J. terrestris)* and a common diplopod species *(P. complanatus)* in the studied period (1989—1990). The vertical axis shows the abundance of diplopods. T: trunks, BT: between the trunks

Julus terrestris PORAT. — This species occurs mostly in wet alder woods for example around Barcs (LOKSA, 1973). The distribution of this species is not known. Because of identification difficulties, it was often mixed with other species (LOKSA, 1981).

Leptoiulus cibdellus CHAMBER. — Temporarily occurs in boggy forest. This species has a Northern European distribution (JEDRICZKOWSKY, 1992). It was recorded mostly from wet woods, groves and alder woods. According to the results of ZULKA (1991), this species was found to be able to survive submersion, both in the field and in laboratory conditions. During the present study this species was found to be a permanent member of the fauna living in wet woods. It was missing only once from the territory between the trunks, but even that time it was found on the trunks. It was the second most abundant species at almost all the sites.

ISOPODA

Armadillidium zenckeri BRANDT. — This species was found to be the most abundant among isopod species. It occurred in both habitats and seemed to have a high tolerance for wet and cool conditions. This species shows a Middle European distribution. According to LOKSA (unpublished data) this species has a preference for mostly wet and cool habitats; within Hungary it is said to be a relict species. *A. zenckeri* was dominant in both habitats and was found to be the most abundant at the edge of the forest where there is no water flooding effect.

Porcellium collicola VERH. — This is a widely distributed typical forest inhabitant with a Middle European distribution (LOKSA, 1973). For example it was found in reedbanks of Lake Fertő (GRUNER, 1966). This species was recorded to be the most abundant isopod species from the Bátorliget territory (ALLSPACH & SZLÁVECZ, 1991). During the present study, this was also found to be the most abundant in the area examined.

Hyloniscus riparius C. L. KOCH. — An extremely higrophyl species (LOKSA, 1977, SZLÁVECZ, 1988). Though it is a common species in Hungary, in the case of Bátorliget another species from the same genus was found: *H. transsylvanicus* (ALLSPACH & SZLÁVECZ, 1991). Within Oniscidea this is the most abundant species. According to the literature (GRUNER, 1966) this species is able to survive more than two weeks covered by water and it also occurs in caves as well as in the upper soil layer.

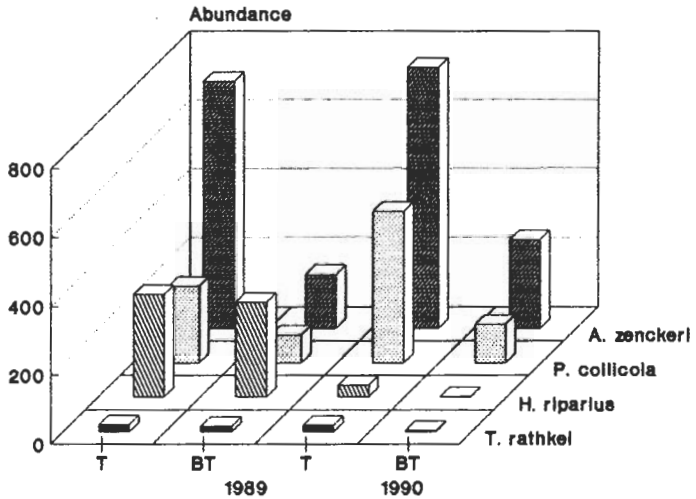

Figure 2. The three most abundant isopod species *(A. zenckeri, P. collicola, H riparius)* and a common isopod species *(T. rathkei)* in the studied period (1989—1990). The vertical axis shows the abundance of isopods. T: trunks, BT: between the trunks

CHILOPODA

Monotarsobius baloghi LOKSA. — This species was described from Ócsa by LOKSA (1955). It was found to be dominant on the trunks, but not always dominant among them. According to the studies of ZULKA (1991) in its natural habitat this species can be tolerant of flooded conditions, but in the case of laboratory conditions when the aeration of the water is not satisfactory it can die within a few hours.

Lithobius muticus C. L. KOCH. — Distributed within Europe with a wide range of ecological tolerance occurring both in wet and dry habitats. It can dig into the soil down to a 10 cm depth.

Summary

The faunal assembledge was found to be diverse but within all three taxa examined, those species which are adopted to the wet and cool microclimate of marshy habitats were found to be the most abundant ones. Among Diplopoda species *P. schaessburgensis,* among Isopoda species *A. zenckeri*, from Chilopoda *M. baloghi.* Among diplopods *P. schaessburgensis, P. complanatus, L. cibdellus* occurred in all sam-

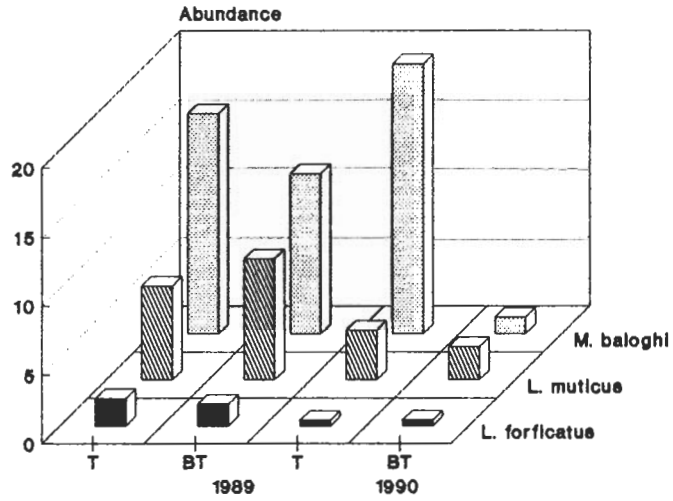

Figure 3. The two most abundant chilopod species *(M. baloghi, L. muticus)* and a common chilopod species *(L. forficatus)* in the studied period (1989—1990). The vertical axis shows the abundance of chilopods. T: trunks, BT: between the trunks

ples from the trunks. Between the trunks *P. schaessburgensis, P. complanatus, J. terrestris* was found in all samples while *L. cibdellus* was missing once. The diplopod fauna was found to be diverse. Six species were almost always found together.

Among isopods *A. zenckeri, P. collicola* and *T. rathkei* were found in all samples from the trunks while *T. rathkei* was missing once from a sample between the trunks. Among diplopods *P. schaessburgensis* was found to be the most abundant species, this seemed to be the dominant one. Among isopods *A. zenckeri* was found to be dominant in both habitats in 1989, and on the trunks in 1990. Among chilopods *M. baloghi* and *L. muticus* were found to be the most abundant dominant species.

From the nine Diplopoda species *P. schaessburgensis, P. denticulatus, P. complanatus* were primarily found in wet woods in a temporarily flooded habitat. *N. kochii, O. sabulosus, J. terrestris* were found to inhabit mostly wet habitats. *G. hexasticha* is a forest inhabitant. The varietas which was found in the study area is a small, darkly pigmented form, which had been reported only from Ócsa, Pótharaszt territories (JERMY, 1942).

According to the literature (SCHUBART, 1934), *P. denticulatus* is a species with a tolerance of dry conditions, living mostly between the trunks. In Hungary, however, this species occurs mostly in wetlands (LOKSA, 1983) such as the moorland in Bátorliget (KORSÓS, 1990), alder woods at Barcs (LOKSA, 1981) and wet alder woods at Ócsa (KORSÓS, 1987).

During the present study 8 isopod species were found. They are mostly inhabitants of wet habitats (*A. zenckeri, H. riparius, H. danicus* and the *Trichoniscus* sp.). *A. aquaticus* is a species which was found in temporarily water-covered habitats. *T. rathkei* can survive a longer period covered by water in temporarily flooded wet woods and graslands, though it is rather found in dry areas. *P. collicola* is also a species with a wide distribution occurring in wet woods (Bátorliget, ALLSPACH & SZLÁVECZ, 1991), and reedbanks (GRUNER, 1966).

Table 1. Species, individual numbers (N) and the dominance values (D%) of the diplopods. N: the total numbers of individuals, D: the dominance value in percentage, T: trunks

T 1989	N	D%
Polydesmus schaessburgensis	559	70.31
Polydesmus complanatus	39	4.91
Polydesmus denticulatus	42	5.28
Jules terrestris	43	5.41
Leptoiulus cibdellus	111	13.96
Glomeris hexasticha	1	0.13
Nopoiulus kochii	—	—
Ommatoiulus sabulosus	—	—
Haasea sp.	—	—
	795	100

T 1990	N	D%
Polydesmus schaessburgensis	85	48.60
Polydesmus complanatus	23	13.13
Polydesmus denticulatus	—	—
Jules terrestris	35	20.00
Leptoiulus cibdellus	29	16.57
Glomeris hexasticha	3	1.70
Nopoiulus kochii	—	—
Ommatoiulus sabulosus	—	—
Haasea sp.	—	—
	175	100

Table 2. Species, individual numbers (N) and the dominance values (D%) of the diplopods. N: the total numbers of individuals, D: the dominance value in percentage, BT: between the trunks

BT 1989	N	D%
Polydesmus schaessburgensis	2596	87.230
Polydesmus complanatus	64	2.150
Polydesmus denticulatus	31	1.040
Jules terrestris	62	2.080
Leptoiulus cibdellus	205	6.890
Glomeris hexasticha	15	0.500
Nopoiulus kochii	1	0.034
Ommatoiulus sabulosus	—	—
Haasea sp.	2	0.067
	2976	100

BT 1990	N	D%
Polydesmus schaessburgensis	2753	83.880
Polydesmus complanatus	233	7.100
Polydesmus denticulatus	1	0.030
Jules terrestris	64	1.950
Leptoiulus cibdellus	218	6.640
Glomeris hexasticha	12	0.370
Nopoiulus kochii	—	—
Ommatoiulus sabulosus	1	0.030
Haasea sp.	—	—
	3282	100

Table 3. Species, individual numbers (N) and the dominance values (D%) of the isopods. N: the total numbers of individuals, D: the dominance value in percentage, T: trunks

T 1989	N	D%
Armadillidium zenckeri	1813	56.34
Porcellium collicola	576	17.90
Trachelipus rathkei	50	1.56
Hyloniscus riparius	763	23.71
Trichoniscus sp.	14	0.45
Haplophthalmus danicus	1	0.04
Asellus aquaticus	—	—
	3218	100

T 1990	N	D%
Armadillidium zenckeri	1944	61.00
Porcellium collicola	1017	32.00
Trachelipus rathkei	45	1.40
Hyloniscus riparius	167	5.20
Trichoniscus sp.	14	0.40
Haplophthalmus danicus	—	—
Asellus aquaticus	—	—
	3187	100

Table 4. Species, individual numbers (N) and the dominance values (D%) of the isopods. N: the total numbers of individuals, D: the dominance value in percentage, BT: between the trunks

BT 1989	N	D%
Armadillidium zenckeri	391	29.40
Porcellium collicola	204	15.30
Trachelipus rathkei	38	2.90
Hyloniscus riparius	691	51.90
Trichoniscus sp.	3	0.20
Haplophthalmus danicus	—	—
Asellus aquaticus	4	0.30
	1331	100

BT 1989	N	D%
Armadillidium zenckeri	155	57.2
Porcellium collicola	112	41.3
Trachelipus rathkei	3	1.1
Hyloniscus riparius	—	—
Trichoniscus sp.	—	—
Haplophthalmus danicus	—	—
Asellus aquaticus	1	0.4
	271	100

Table 5. Species, individual numbers (N) and the dominance values (D%) of the chilopods. N: the total numbers of individuals, D: the dominance value in percentage, T: trunks

T 1989	N	D%
Monotarsobius baloghi	40	60.2
Monotarsobius crassipes	—	—
Lithobius muticus	17	25.9
Lithobius forficatus	5	7.7
Lithobius erythrocephalus	—	—
Pachymerium ferrugineum	3	4.6
Geophilus proximus	1	1.6
Schendyla nemorensis	—	—
	66	100

T 1990	N	D%
Monotarsobius baloghi	49	60.5
Monotarsobius crassipes	12	14.9
Lithobius muticus	9	11.2
Lithobius forficatus	1	1.2
Lithobius erythrocephalus	4	4.9
Pachymerium ferrugineum	4	4.9
Geophilus proximus	1	1.2
Schendyla nemorensis	1	1.2
	81	100

Table 6. Species, individual numbers (N) and the dominance values (D%) of the chilopods. N: the total numbers of individuals, D: the dominance value in percentage, BT: between the trunks

BT 1989	N	D%
Monotarsobius baloghi	29	45
Monotarsobius crassipes	—	—
Lithobius muticus	22	35
Lithobius forficatus	4	6
Lithobius erythrocephalus	1	2
Pachymerium ferrugineum	4	6
Geophilus proximus	4	6
Schendyla nemorensis	—	—
	64	100

BT 1990	N	D%
Monotarsobius baloghi	3	27
Monotarsobius crassipes	—	—
Lithobius muticus	6	55
Lithobius forficatus	1	9
Lithobius erythrocephalus	—	—
Pachymerium ferrugineum	1	9
Geophilus proximus	—	—
Schendyla nemorensis	—	—
	11	100

Among chilopods *M. baloghi* and *M. crassipes* occur in wet woods.

Apparently there is a difference between temporarily flooded habitats (between the trunks) and those which are dry all the time (trunks). Both diversity and abundance were higher on the trunks than in samples between the trunks.

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