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**Freshwater *Gastrotricha* of Poland. III. *Gastrotricha*
from the Białowieża Forest and the Białowieża Glade**

[With 2 tables]

Abstract. The authors report 54 gastrotrichan species from water-logged woods of the Białowieża Forest and extremely eutrophic water bodies of the Białowieża Glade. *Chaetonotus tenuis* and *Ch. multispinosus* were for the first time reported from Poland.

INTRODUCTION

The two previous papers of the series presented the results of the faunistic research carried out on gastrotrichs of various water bodies of the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) as well as on gastrotrichs of young lakes of sea origin (KISIELEWSKA and KISIELEWSKI 1986). The present paper deals with gastrotrichs found in waters of the Białowieża Forest — the most primeval forest complex in the Central Europe. The studies included also analyses of much eutrophicated water bodies located on the vast Białowieża Glade, surrounded with wide forest belts. The comparison of the *Gastrotricha* forest fauna to that of the adjacent open area allowed to evaluate the degree of interaction between the two groups of fauna populating one and the same area, yet different environments. Some types of the environments studied in the present paper (alder woods, extremely eutrophicated water bodies) are subject to research in the next papers of the series. Due to a unique character of the Białowieża Forest, an extensive complex of primeval forests, the data obtained in the course of the present research will not be made use of in the papers to follow, regardless of the similarity of the environments under study.

METHODS

The methods employed in the present research did not differ from those applied in the former papers of the series. They had been described in details in the first paper (KISIELEWSKI and KISIELEWSKA 1986). However, certain issues require some further explanatory notes. All the samples were hand-taken directly into a container. Due to the proximity of a standing laboratory, there was no need to carry out a field research, hence it was possible to analyze the sampled material by means of a high standard microscope (Amplival, Carl Zeiss, Jena). Samples of a greater volume (5–20 dm³) earmarked for parenting further aquarium cultures were taken more often in the present research than in the previous ones. The material thus collected turned out much ampler in case of the present paper as compared to the former ones.

MATERIAL AND CHARACTERISTICS OF THE STUDY AREA

The Białowieża Forest is a broad forest complex spreading over the area of about 1250 km². As compared to the other forest complexes of the Central Europe, it was subject to the least alterations caused by man-management. All the studies on forest waters were conducted solely within the range of the Białowieża National Park. This area became a nature protection zone as early as in 1921, and since 1947 it has been functioning as a natural monument reservation, where any economic operations and activities are banned. The area of the National Park embraces miscellaneous forest habitats, i.e. pine woods, mixed forests as well as deciduous forests. A part of the area is overgrown with temporarily or permanently water-logged forests (ash marshes, alder woods). Also peat-bogs, peat-bog pine woods and peat-bog spruce woods may be found on the area of the Park. Gastrotrichs of peat-bog environments of the Białowieża Forest were subject to earlier studies by KISIELEWSKI (1981). Across the National Park the Hwoźna River flows, whose banks are overgrown either with reed rushes or sedge communities (*Magnocaricion*). There may also be found tiny slow-flowing water courses or ditches with stagnant water on the Park area.

The Białowieża Glade is an open space of 4 × 4 km in area, on all sides surrounded with forest belts at least 13 km wide. Originally the area was overgrown with forest, which was cleared out in historical times. A large village of Białowieża is located on the Glade, where no industrial production is permitted. The area of the Glade is criss-crossed with the Narewka River and its arms. Some minute water bodies may also be found on the river flood terrace, several of them being of a morass character. All the water bodies of the Glade are extremely eutrophicated. In the park in the village there are located some eutrophic ponds.

The studies were conducted since May 1977 till March 1983. 25 samples were taken in total, each comprising 1–4 sub-samples, depending on local conditions. 16 samples were taken from the Forest area, out of which 15 contained gastrotrichs. Alder woods were subject to most thorough examination (10 samples), whereas from the remaining environments (alder-ash carr, oak-hornbeam wood, sedge marsh) 1–2 samples were taken. 9 samples were collected from the Glade area, gastrotrichs having been found in all of them.

In the list given below, the localities in the Białowieża National Park were denoted with corresponding forest section numbers.

The Białowieża Forest

1. Sedge marsh on the right bank of the Hwoźna River, at the latitude of 224 forest section. Entirely flooded at high water. 1 positive sample.
2. Reed rushes on the left bank of the Hwoźna River, near Dziędzinka. Duckweed and sedges in places. 1 positive sample.
3. Alder woods spreading on parts of 255 and 285 forest sections. 1 positive sample.

4. Mid-forest ditch on the border of 288 and 289 forest sections, located in alder-ash carr with an admixture of spruce-trees. Rampant duckweed, *Holtonia palustris* and sedges. 1 negative sample.
5. Alder-ash carr spreading on parts of 314, 315, 340 and 341 forest sections. 2 positive samples.
6. Oak-hornbeam wood enclosing parts of 318 forest section, the bottom overgrown with tall sedge communities. 1 positive sample.
7. Alder wood with a large admixture of spruce-tress, embracing parts of 344 and 345 forest sections. 9 positive samples.

The Białowieża Glade

8. Morass at the right bank of the Narewka River, at the bridge near the road to the Białowieża Towarowa railway station. Extremely eutrophic water body of about 250 m² in area, overgrown with *Stratiotes aloides*, *Hydrocharis morsus-ranae* and *Lemna* sp. Rarely frozen over in winter. 4 positive samples.
9. Stagnant left-bank arm of the Narewka River, on the village area, near the post-office. Extremely eutrophic water body totally overgrown with *Stratiotes aloides*, *Hydrocharis morsus-ranae*, *Typha latifolia* and other plant species. 4 positive samples.
10. Eutrophic pond in the Palace Park, partly overgrown with *Lemna* sp., *Nuphar luteum* and *Hydrocharis morsus-ranae*. 1 positive sample.

THE SURVEY OF SPECIES

Genus *Chaetonotus* EHRENBERG

1. *Ch. simrothi* VOIGT, 1909

Material. The Forest. 1 locality, 2 samples, 2 specimens (including 1 from the aquarium culture). Alder wood (7). May.

The species was described from Germany, subsequently reported from the Soviet Union near Moscow (PREOBRAŽENSKAJA 1926), from Italy (MOLA 1932), Hungary (VARGA 1949) and Romania (RUDESCU 1967). Bound to eutrophic water boodies and peat-bogs. In Poland recorded by ROSZCZAK (1968) at numerous localities in Great Poland and by KISIELEWSKA (1982) in peat-hags near Siedlee. KISIELEWSKI (1981) found one specimen in a dystrophic lake in Great Poland.

2. *Ch. brevispinosus* ZELINKA, 1889

Material. The Glade. 1 sample, 5 specimens (all from the aquarium cultures). Extremely eutrophic water body (9).

The species occurs at numerous localities all over Europe. Also reported from the United States (STOKES 1887, see ZELINKA 1889) and from India (NAIDU 1962). Occurs mainly in eutrophic water bodies, also reported from peat-bogs. In Poland recorded in numerous water bodies of various fertility in Great Poland (ROSZCZAK 1968), also in peat-bog spruce wood in the Białowieża Forest and in a dystrophic lake in Great Poland (KISIELEWSKI 1981).

3. *Ch. cordiformis* GREUTER, 1917

Material. The Forest. 1 sample, 6 specimens (including 3 from the aquarium cultures). Alder wood (7). August. The Glade. 1 specimen (from the aquarium culture). Extremely eutrophic water body (8).

The species has been recently reported from one of the seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

4. *Ch. disiunctus* GREUTER, 1917

Material. The Forest. 3 localities, 5 samples, 15 specimens (including 7 from the aquarium cultures). Alder wood (3, 7) and oak-hornbeam wood (6). May, August. The Glade. 2 localities, 7 samples, 117 specimens (including 94 from the aquarium cultures). Extremely eutrophic water bodies (8, 9). February, March, July, August.

The species has been recently reported from waters of the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

5. *Ch. heideri* BREHM, 1917

Material. The Forest. 1 specimen from the aquarium culture. Alder wood (7). The Glade. 1 locality, 2 samples, 3 specimens (including 2 specimens from the aquarium cultures). Extremely eutrophic water body (9). August.

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

6. *Ch. maximus* EHRENBERG, 1830

Material. The Glade. 2 localities, 3 samples, 17 specimens (including 16 from the aquarium cultures). Extremely eutrophic waters (8, 9). July.

The species has been recently reported from the waters of the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and in seaside lakes (KISIELEWSKA and KISIELEWSKI 1986).

7. *Ch. microchaetus* PREOBRAŽENSKAJA, 1926

Material. The Forest. 1 locality, 2 samples, 2 specimens (only from the aquarium cultures). Alder wood (7). The Glade. 1 specimen found in the aquarium culture. Extremely eutrophic water body (9).

The species was described from eutrophic water bodies in the vicinity of Moscow, subsequently reported by KISIELEWSKI (1979) from two eutrophic ponds in Poland (one located in the Wielkopolski National Park and the other near Siedlce). KISIELEWSKI (1981) supplied further two localities in eastern Poland (transitional peat-bog and alder wood). *Ch. microchaetus* has been recently reported from Italy, from a lake in Apennines (BALSAMO 1983).

8. *Ch. multispinosus* GRÜNSPAN, 1908

Material. The Forest. 1 specimen. Alder wood (7). May.

The species known from numerous localities all over Europe. New to the fauna of Poland.

9. *Ch. murrayi* REMANE, 1929

Material. The Forest. 1 specimen. Alder wood (7). May.

The species was described from Germany. The only later record comes from transitional peat-bogs in Poland, where the species was found at four localities (KISIELEWSKI 1981).

10. *Ch. oculifer* KISIELEWSKI, 1981

Material. The Forest. 2 localities, 2 samples, 4 specimens (only from the aquarium cultures). Alder wood (7).

The species has been recently reported as common in waters of the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986), as well as in a seaside lake of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

11. *Ch. pawlowskii* KISIELEWSKI, 1984

Material. The Forest. 1 locality, 2 samples, 2 specimens. Alder wood (7). May. The Glade. 1 specimen from the aquarium culture. Extremely eutrophic water body (8).

The species was described from numerous localities all over Poland, situated in various environments, seaside lakes among others (KISIELEWSKA and KISIELEWSKI 1986).

12. *Ch. polyspinosus* GREUTER, 1917

Material. The Forest. 1 specimen. Reed rushes (2). August.

The species has been recently recorded in the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and in seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

13. *Ch. poznaniensis* KISIELEWSKI, 1981

Material. The Forest. 1 specimen from the aquarium culture. Alder wood (3).

The species recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from a seaside lake (KISIELEWSKA and KISIELEWSKI 1986).

14. *Ch. rafalskii* KISIELEWSKI, 1979

Material. The Forest. 1 locality, 2 samples, 2 specimens (including 1 from the aquarium culture). Alder wood (7). May.

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

15. *Ch. similis* ZELINKA, 1889

Material. The Glade. 1 specimen from the aquarium culture. Extremely eutrophic water body (8).

The species has been recently reported from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from seaside lakes (KISIELEWSKA and KISIELEWSKI 1986).

16. *Ch. sphagnophilus* KISIELEWSKI, 1981

Material. The Forest. 1 specimen. Oak-hornbeam wood (6). July. The Glade. 1 specimen from the aquarium culture. Extremely eutrophicated water body (8).

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

17. *Ch. tennis* GRÜNSPAN, 1908

Material. The Glade. 1 sample, 2 specimens from the aquarium cultures. Extremely eutrophic water body (8).

The species was described from the south-western part of the Soviet Union, subsequently reported from Romania (RUDESCU 1967). In Poland recorded for the first time.

18. *Ch. zelinkai* GRÜNSPAN, 1908

Material. The Forest. 1 specimen from the aquarium culture. Alder wood (7).

Ch. zelinkai has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and one of the seaside lakes (KISIELEWSKA and KISIELEWSKI 1986).

19. *Ch. hystrix* MEČNIKOV, 1865

Material. The Forest. 4 localities, 8 samples, 16 specimens (including 10 from the aquarium cultures). Alder woods (3, 7), oak-hornbeam wood (6), sedge marsh (1), May, July. The Glade. 2 localities, 3 samples, 6 specimens (all coming from the aquarium cultures). Extremely eutrophic water bodies (8, 9).

Ch. hystrix was one of the most common species on the studied area. Recently found in the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

20. *Ch. macrochaetus* ZELINKA, 1889

Material. The Forest. 2 localities, 2 samples, 6 specimens (including 5 specimens from the aquarium cultures). Alder woods (3, 7). May. The Glade. 1 sample, 2 specimens coming from the aquarium cultures. Extremely eutrophic water body (9).

The species has been recently reported from the Tatra and Karkonosze Mountains, where it ranked among the most common gastrotrichan species (KISIELEWSKI and KISIELEWSKA 1986), as well as from lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

21. *Ch. bisacer* GREUTER, 1917

Material. The Forest. 1 locality, 3 samples, 4 specimens (including 3 coming from the aquarium cultures). Alder wood (7). August.

Ch. bisacer has been recently reported from one of the seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

22. *Ch. macrolepidotus* GREUTER, 1917

Material. The Forest. 1 sample, 3 specimens from the aquarium culture. Alder wood (7). The Glade. 1 locality, 2 samples, 4 specimens (only from the aquarium cultures). Extremely eutrophic water body (8).

The species was described from Switzerland and subsequently reported from the vicinity of Moscow (PREOBRAŽENSKAJA 1926) and from Romania (RUDESCU 1967). It occurs in eutrophic ponds and peat-bogs. In Poland the species was recorded by ROSZCZAK (1968) from one locality in Great Poland and by KISIELEWSKA (1982) in a peat-hag near Siedlce, where it occurred irregularly.

23. *Ch. multisetosus* PREOBRAŽENSKAJA, 1926

Material. The Glade. 1 specimen from the aquarium culture. Extremely eutrophic water body (9).

The gastrotrich was described from an eutrophic pond near Moscow. Reported also from Romania (RUDESCU 1967) as rare and not numerous species.

In Poland 3 specimens of *Ch. multisetosus* have been recently found by KISIELEWSKA (1982) in peat-hags near Siedlce.

24. *Ch. ophiogaster* REMANE, 1927

Material. The Glade. 1 sample, 3 specimens coming from the aquarium culture. Extremely eutrophic water body (8).

Ch. ophiogaster was described from an eutrophic water body near Berlin. So far all the subsequent records have come from Poland. KISIELEWSKI (1974) found it in two astatic fertile water bodies in western Poland and, later (1981), he came across one specimen on a transitional peat-bog in Poznań. KISIELEWSKA (1982) reported the species from peat-hags near Siedlce, where it occurred regularly and numerous in some basins.

25. *Ch. succinctus* VOIGT, 1902

Material. The Glade. 2 localities, 2 samples, 4 specimens (including 3 from the aquarium cultures). Extremely eutrophic water body (8), eutrophic pond (10). August.

Ch. succinctus has been reported from numerous localities all over Europe as well as from Japan (SAITO 1937). It occurs mainly in fertile water bodies and on peat-bogs. In Poland the species was recorded for the first time on the Otomino Swamp near Gdańsk (LUCKS 1909), then in eutrophic water bodies in Great Poland (ROSZCZAK 1968), on lowland transitional peat-bog (KISIELEWSKI 1981) and in peat-hags near Siedlce (KISIELEWSKA 1982). In the latter environment the species occurred regularly.

26. *Ch. greuteri* REMANE, 1927

Material. The Glade. 1 sample, 4 specimens coming from the aquarium cultures. Extremely eutrophic water body (8).

Described from Switzerland by GREUTER (1917, see REMANE 1927), then found in Germany (REMANE 1927) and Romania (RUDESCU 1967). It occurs on peat-bogs and in eutrophic waters. Reported from Poland by KISIELEWSKI (1981) who found it on a transitional peat-bog near Siedlce.

Genus *Heterolepidoderma* REMANE

27. *H. brevitubulatum* KISIELEWSKI, 1981

Material. The Forest. 1 specimen. Alder wood (7). August.

The species has been recently reported from one of seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

28. *H. gracile* REMANE, 1927

Material. The Forest. 2 localities, 4 samples, 23 specimens (including 15 from the aquarium cultures). Oak-hornbeam wood (6), alder wood (7). May, August. The Glade. 3 localities, 5 samples, 27 specimens (including 15 from the aquarium culture). Extremely eutrophic water bodies (8, 9), eutrophic pond (10). July, August.

One of the most common species on the area under studies. Recently reported from lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

29. *H. macrops* KISIELEWSKI, 1981

Material. The Forest. 1 specimen from the aquarium culture. Alder wood (7). The Glade. 2 specimens coming from the aquarium cultures. Extremely eutrophic water body (8).

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

30. *H. majus* REMANE, 1927

Material. The Forest. 5 localities, 9 samples, 14 specimens (including 7 specimens from the aquarium cultures). Sedge marsh (1), alder woods (3, 7), carr (5), oak-hornbeam wood (6). May, August. The Glade. 1 sample, 2 specimens. Extremely eutrophic water body (8). July.

The species was one of the most common on the forest area, occurring almost in all the environments. The studies have revealed that it does not display any close links to extremely eutrophic water bodies.

The species has been recently reported from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

31. *H. ocellatum* (MEČNIKOV, 1865) sensu KISIELEWSKI 1981

Material. The Forest. 2 localities, 4 samples, 4 specimens (including 2 specimens from the aquarium culture). Carr (5), alder wood (7). May. The Glade. 1 specimen coming from the aquarium culture. Extremely eutrophic water body (8).

The species has been recently reported from waters of the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986).

32. *H. tenuisquamatum* KISIELEWSKI, 1981

Material. The Forest. 1 sample, 5 specimens. Carr (5). May.

The species was described from peat-bogs in Poland (KISIELEWSKI 1981). It occurs rarely and in small numbers on raised and transitional peat-bogs both on lowland and in the mountains.

Genus *Lepidodermella* BLAKE33. *L. squamatum* (DUJARDIN, 1841)

Material. The Glade. 1 specimen from the aquarium culture. Extremely eutrophic water body (9).

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from seaside lakes (KISIELEWSKA and KISIELEWSKI 1986).

Genus *Aspidiophorus* VOIGT34. *A. bibulbosus* KISIELEWSKI, 1979

Material. The Forest. 1 locality, 2 samples, 7 specimens (including 3 from the aquarium culture). Alder wood (7). May, August. The Glade. 1 sample, 6 specimens coming from the aquarium culture. Extremely eutrophic water body (8).

A. bibulbosus has been recently reported from one of the lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

35. *A. oculifer* KISIELEWSKI, 1981

Material. The Forest. 1 specimen coming from the aquarium culture. Alder wood (7).

The species recently reported from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) as well as from a seaside lake (KISIELEWSKA and KISIELEWSKI 1986).

36. *A. polonicus* KISIELEWSKI, 1981

Material. The Forest. 1 sample, 2 specimens. Alder wood (7). May.

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

37. *A. aff. paradoxus* VOIGT (KISIELEWSKI 1986)

Material. The Glade. 1 specimen coming from the aquarium culture. Extremely eutrophic water body (8).

The sampled specimen, differing from typical specimens of *A. paradoxus*, was described in a separate paper.

Genus *Ichthyidium* EHRENBERG38. *I. forficula* REMANE, 1927

Material. The Forest. 1 specimen. Alder wood (7). August.

The species was described from Germany, where it was found in a much eutrophicated water body. Also reported from Bulgaria (VALKANOV 1937), and Romania (RUDESCU 1967) as well as from Japan (SAITO 1937) and the United States (BRUNSON 1950, see KISIELEWSKI 1981). Recorded mainly in bottom slime and among vegetation in fertile water bodies. In Poland, contrary to the majority of actual records, the occurrence of *I. forficula* seems to be restricted to lowland *Sphagnum* bogs of all types. In these environments the species is one of the most common and most numerous gastrotrichs (KISIELEWSKI 1981). The instance of finding one specimen on the area of the alder wood in the present research may be explained by the proximity of a peat-bog pine wood.

39. *I. maximum* GREUTER, 1917

Material. The Glade. 1 sample, 2 specimens coming from the aquarium culture. Extremely eutrophic water body (8).

One dubious record of this species has been recently stated from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

40. *I. palustre* KISIELEWSKI, 1981

Material. The Forest. 1 locality, 3 samples, 3 specimens. Alder wood (7). May. The Glade. 1 specimen from the aquarium culture. Extremely eutrophic water body (8).

The species has been recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986).

41. *I. podura* (MÜLLER, 1778)

Material. The Glade. 2 localities, 2 samples, 2 specimens coming from the aquarium cultures. Extremely eutrophic water bodies (8, 9).

The species, whose diagnostic criteria were vaguely defined, was reported from numerous localities in Europe and on other continents. D'HONDT (1978) considered it a cosmopolitan species. In Poland reported by ROSZCZAK (1935, 1968) from eutrophic water bodies and by KISIELEWSKI (1981) from lowland transitional peat-bogs.

Genus *Polymerurus* REMANE

42. *P. nodicaudus* (VOIGT, 1901)

Material. The Forest. 1 sample, 2 specimens (including 1 from the aquarium culture). Alder wood (7). August. The Glade. 2 localities, 2 samples, 5 specimens coming from aquarium cultures. Extremely eutrophic water bodies (8, 9).

P. nodicaudus was recorded at very numerous localities in Europe as well as in the United States (DAVISON 1938, PACKARD 1959), Japan (SAITO 1937) and India (VISVESVARA 1964). Reported from various environments. In Poland reported by ROSZCZAK (1968) from water bodies of various fertility in Great Poland, as well as by KISIELEWSKA (1982) in peat-hags near Siedlce, where the species occurred irregularly. One specimen was found by KISIELEWSKI (1981) in an eutrophic lake in the Wielkopolski National Park.

43. *P. rhomboides* (STOKES, 1887)

Material. The Glade. 2 localities, 3 samples, 12 specimens (including 8 from the aquarium cultures). Extremely eutrophic water bodies (8, 9). August.

P. rhomboides has been recently reported from seaside lakes of the Słowiński National Park (KISIELEWSKA and KISIELEWSKI 1986).

44. *P. serraticaudus* (VOIGT, 1901)

Material. The Glade. 2 localities, 3 samples, 4 specimens from the aquarium cultures. Extremely eutrophic water bodies (8, 9).

Described from Germany, from an eutrophic pond. Also reported from the European part of the Soviet Union (FADEEV 1929), Italy (MOLA 1932), Hungary (VARGA 1949) and from Romania (RUDESCU 1967). Seems to be primarily bound to much eutrophicated water bodies where it is frequently found in bottom slime. In Poland it was recorded at single localities on a swamp in Warmia (STEINECKE 1924), in a bog near Poznań (ROSZCZAK 1968) and in a peat-hag near Siedlce (KISIELEWSKA 1982).

Genus *Dasydytes* GOSSE

45. *D. ornatus* VOIGT, 1909

Material. The Glade. 1 sample, 5 specimens coming from the aquarium culture. Extremely eutrophic water body (8).

Described from a fertile water body in Germany, later reported from Switzerland (GREUTER 1917). In Poland recorded by ROSZCZAK (1968) in small eutrophic water bodies in Great Poland, as well as by KISIELEWSKI (1981) on

a transitional and raised peat-bog (also in the Białowiecki National Park) and by KISIELEWSKA (1982) in peat-hags near Siedlce, where it occurred regularly and numerously all year long except for summer time.

46. *D. crassus* GREUTER, 1917

Material. The Forest. 1 sample, 3 specimens (including 2 coming from the aquarium cultures). Alder wood (7). August. The Glade. 1 locality, 2 samples, 5 specimens (including 3 from the aquarium culture). Extremely eutrophic water body (8). August.

Described from Switzerland, also reported from Romania (RUDESCU 1967) and Argentina (GROSSO 1973). In Poland recorded by KISIELEWSKI (1974) in eutrophic lakes in Great Poland. The author (1981) stated *D. crassus* as a species occurring in small numbers in transitional peat-bogs of western Poland. It occurred numerously and regularly all year long in peat-hags near Siedlce (KISIELEWSKA 1982).

47. *D. tongiorgii* BALSAMO, 1983

Material. The Forest. 1 locality, 3 samples, 11 specimens (including 4 from the aquarium cultures). Alder wood (7). May, August. The Glade. 1 locality, 2 samples, 25 specimens (including 24 from the aquarium cultures). Extremely eutrophic water body (8). February.

The specimens sampled during the present research were ordered to the same species as the gastrotrichs denoted by KISIELEWSKI (1981) as *D. bisetosus* THOMPSON, 1891 and found on peat-bogs of Poland, as well as those denoted by KISIELEWSKA (1982) as *D. dubius* VOIGT, 1909 and recorded in peat-hags. Their general body habit corresponded to that of *D. bisetosus*, yet their spines grew in scattered tufts and had a delicate, sometimes hardly noticeable lateral denticle. The length of the two spines growing out from the posterior body end was always unequal. BALSAMO (1983) has recently described *D. tongiorgii* from Italy, whose description corresponds most fully to the appearance of the Polish specimens. It seems that all the three names denote one and the same species, and inaccuracies of the descriptions by THOMPSON (1891) and VOIGT (1909) result from their observations having been conducted with the use of inferior microscopes. Until the time a closer synonymy is established, we use for Polish specimens the name *D. tongiorgii*.

Genus *Stylochaeta* HLAVA

48. *S. fusiformis* SPENCER, 1890

Material. The Forest. 1 sample, 2 specimens. Alder wood (7). May. The Glade. 2 localities, 2 samples, 4 specimens (including 1 specimen from the aquarium culture). Extremely eutrophic water bodies (8, 9). August.

The species commonly occurring all over Europe. Also reported from the United States (DAVISON 1938). Its primary environment is eutrophic water, yet it also was reported from *Sphagnum* bogs. In Poland recorded for the first time by ROSZCZAK (1935, 1968) in eutrophic ponds in Great Poland. *S. fusiformis* is the only species of the family *Dasydytidae* regularly occurring on low-

land transitional peat-bogs in Poland (KISIELEWSKI 1981). The species occurred in small numbers also in peat-hags near Siedlce in summer time (KISIELEWSKA 1982).

CHARACTERISTICS OF OCCURRENCE

General remarks

The *Gastrotricha* fauna of the Białowieża Forest and Glade is exceptionally rich. 54 species were recorded to occur there, out of which 48 were determined. Two of the identified species, i. e. *Chaetonotus tenuis* and *Ch. multispinosus* are new to Polish fauna. The following species are rarely found in Poland: *Ch. murrayi*, *Ch. microchaetus*, *Ch. pawlowskii*, *Ch. multisetosus* and *Heterolepidoderma brevitubulatum*. Unusually numerous were the species of the genus *Aspidiophorus*, namely, 9 species were recorded in total, out of which three are known to science (all of them having been recently described from Poland), one is similar to *A. paradoxus* VOIGT, wide-spread in Europe, whereas the remaining five are new to science. The latter were not subject to any detailed characteristic due to the scanty of the collected material and insufficiency of scientific recognition.

Characteristics of the fauna of particular environments

Alder woods

Alder woods were subject to most thorough examinations of all the environments on the studied area of the Białowieża National Park. 33 gastrotrichan species were noted there, 25 having been found in samples directly after sampling and the remaining 8 — only in the aquarium cultures. Out of the species recorded in this environment, 15 were not found in the studied eutrophic waters of the Białowieża Glade (Table I). *Chaetonotus hystrix*, *Aspidiophorus*

Table I. The list of species and individual dominance values (*D*) of *Gastrotricha* found in the studied eutrophic water bodies of the Białowieża Glade and in the alder woods of the Białowieża National Park. (Species reported from the aquarium cultures only are marked with +).

No	Species	Eutrophic water bodies	Alder woods
1	2	3	4
1	<i>Chaetonotus simrothi</i>		1.2
2	<i>Ch. brevispinosus</i>	+	
3	<i>Ch. cordiformis</i>	+	3.5
4	<i>Ch. disiunctus</i>	33.8	9.4

Table I — cont.

1	2	3	4
5	<i>Ch. heideri</i>	1.5	+
6	<i>Ch. maximus</i>	1.5	
7	<i>Ch. microchaetus</i>	+	+
8	<i>Ch. multispinosus</i>		1.2
9	<i>Ch. murrayi</i>		1.2
10	<i>Ch. oculifer</i>		+
11	<i>Ch. pawlowskii</i>	+	2.4
12	<i>Ch. polyspinosus</i> *		
13	<i>Ch. poznaniensis</i>		+
14	<i>Ch. rafalskii</i>		1.2
15	<i>Ch. similis</i>	+	
16	<i>Ch. sphagnophilus</i>	+	
17	<i>Ch. tenuis</i>	+	
18	<i>Ch. zelinkai</i>		+
19	<i>Ch. sp.</i>	1.5	
20	<i>Ch. hystrix</i>	+	5.9
21	<i>Ch. macrochaetus</i>	+	2.4
22	<i>Ch. bisacer</i>		1.2
23	<i>Ch. macrolepidotus</i>	+	+
24	<i>Ch. multisetosus</i>	+	
25	<i>Ch. ophiogaster</i>	+	
26	<i>Ch. succinctus</i>	1.5	
27	<i>Ch. greuteri</i>	+	
	<i>Chaetonotus</i> — indetermined	11.8	7.1
28	<i>Heterolepidoderma brevitubulatum</i>		1.2
29	<i>H. gracile</i>	17.6	9.4
30	<i>H. macrops</i>	+	+
31	<i>H. majus</i>	2.9	5.9
32	<i>H. ocellatum</i>	+	2.4
33	<i>H. tenuisquamatum</i> *		

Table I — cont.

1	2	3	4
34	<i>Lepidodermella squamatum</i>	+	
35	<i>Aspidiophorus bibulbosus</i>	+	4.7
36	<i>A. oculifer</i>		+
37	<i>A. polonicus</i>		2.4
38	<i>A. aff. paradoxus</i>	1.5	
39	<i>A. sp. 1</i>	+	
40	<i>A. sp. 2</i>		7.1
41	<i>A. sp. 3</i>		1.2
42	<i>A. sp. 4</i>		1.2
43	<i>A. sp. 5</i>	1.5	
	<i>Aspidiophorus</i> — indetermined	1.5	
44	<i>Ichthyidium forcicula</i>		1.2
45	<i>I. maximum</i>	+	
46	<i>I. palustre</i>	+	3.5
47	<i>I. podura</i>	+	
48	<i>Polymerurus nodicaudus</i>	+	1.2
49	<i>P. rhomboides</i>	5.9	
50	<i>P. serraticaudus</i>	+	
	<i>Chaetonotidae</i> — indetermined	8.8	9.4
51	<i>Dasydytes ornatus</i>	+	
52	<i>D. crassus</i>	2.9	2.4
53	<i>D. tongiorgii</i>	1.5	8.2
54	<i>Stylochaeta fusiformis</i>	4.4	2.4
Total	Number of species	37	33
	Dominance (D)	100.1	100.5

* Recorded in the study area in other environments only.

bibulbosus and *Dasydytes tongiorgii* were pronouncedly dominating in alder woods (D values ranging 4.7–8.2%), while in extremely eutrophic water bodies of the Białowieża Glade they were notably less numerous or were reported solely from the aquarium cultures.

The fauna of the studied alder woods was marked for a large species number as well as for relatively level dominance rates. None of the species was estimated to exceed the value of D 10.0%. The value of the general species diversity index H' calculated for all the samples taken from this environment in total, amounted to 2.95. The presently estimated value was higher than all the so far calculated corresponding values supplied in earlier papers on inland water *Gastrotricha*.

The mean abundance value (Table II) amounted to 20.6 specimens/cm³ of slime, hence approximating the value estimated for extremely eutrophic waters of the Białowieża Glade. As regards the data on abundance found in

Table II. The number of species, abundance and general species diversity index (H') of the two most thoroughly examined environments. (Number of samples included in counts given in brackets).

No	Environment	Number of species	Abundance		H'
			mean	highest recorded	
1	Eutrophic water bodies of the Białowieża Glade	37	18.4 [5]*	50.0	1.82
2	Alder woods of the Białowieża Forest	33	20.6 [3]*	45.9	2.95

* All samples were positive.

earlier papers it seemed most interesting to compare the present counts with the data provided by KISIELEWSKA (1982) concerning a complex of peat-hags located on the area of a degraded alder wood near Siedlce (the peat-hags under comparison were denoted in the quoted paper as B complex). The value of the *Gastrotricha* abundance estimated for the peat-hags was three times higher than that calculated for the alder woods of the Białowiecki National Park.

Other forest environments

Three samples taken from an alder-ash carr and oak-hornbeam wood situated in the Białowiecki National Park, contained altogether the following 7 species: *Chaetonotus disiunctus*, *Ch. sphagnophilus*, *Ch. hystrix*, *Heterolepidoderma gracile*, *H. majus*, *H. ocellatum* and *H. tenuisquamatum*. The latter two and *Chaetonotus sphagnophilus* were clearly bound to *Sphagnum* peat-bogs which adjoined the studied environments in the Białowiecki National Park and from where the species in question had been reported in an earlier paper (KISIELEWSKI 1981).

Sedge marshes

The two following species were recorded in the only sample taken from this environment: *Chaetonotus hystrix* and *Heterolepidoderma majus*.

Reed rushes

The only sample taken from this environment contained specimens of *Chaetonotus polypinosus*.

Extremely eutrophic and eutrophic water bodies

In the Białowieża Glade water bodies 37 gastrotrichan species were recorded. It should be emphasized that only 13 species were found directly after sampling, while the remaining ones were present in the aquarium cultures only, frequently a long time after the sampling date. It is the first instance in all the papers of the present series, when the method of setting aquarium cultures turned out to be more effective than direct after-sampling analyses of the collected material. It may be assumed that a majority of the recorded species occurred in the studied water bodies only temporarily and that actual aquarium culture conditions conduced the development also of these species which in the taken samples were present only in the form of eggs. Out of all the species identified in this environment, 19 were not found in the equally intensively examined alder woods. It is worth mentioning that this group of species included, among others, *Polymerurus rhomboides*, i. e. one of the dominating species in the extremely eutrophic water bodies (D 5.9%). *Chaetonotus disiunctus* and *Heterolepidoderma gracile* were noted to have attained exceptionally high dominance rate in the environment in question (33.8 and 17.6% respectively). Both of them ranked among most numerous species also in the examined alder woods of the forest area, however, their dominance rate was much lower (D 9.4% each).

The value of the general species diversity index H' for the water bodies of the Białowieża Glade was relatively low. Although a great number of species was recorded, yet the H' value amounted barely to 1.82, due to the above-mentioned high dominance rate of *Chaetonotus disiunctus* and *Heterolepidoderma gracile*. The abundance values, both the mean and the highest recorded, corresponded to those estimated for the alder woods (Table II).

COMPARISON OF THE FAUNA OF THE BIAŁOWIEŻA
FOREST AND GLADE

As it has already been mentioned above, more than a half of the species reported from the forest waters was not found in the extremely eutrophic water bodies of the Białowieża Glade. Similarly, approximately the same amount of species recorded on the Glade area was not to be found in the forest. However,

it should be stressed that the observed regularity concerned primarily the species occurring in small numbers and, most likely, under more thorough examination the species found in one environment might also be recorded in the other.

18 species were claimed to have been of common occurrence for the Białowieża Forest and Glade. As it has been mentioned above, *Chaetonotus disiunctus* and *Heterolepidoderma gracile* ranked among the most numerous in both of the studied environments. A more comprehensive evaluation of the degree of interacting of the fauna found in the two environments in the vicinity of Białowieża will be feasible only after detailed comparative studies on gastrotrichs of alder woods and extremely eutrophic water bodies located in other parts of the country, which are to be dealt with in further paper of the series.

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STRESZCZENIE

[Tytuł: *Gastrotricha* słodkowodne Polski. III. *Gastrotricha* Puszczy i Polany Białowieskiej]

Autorzy przeprowadzili w latach 1977-1983 badania brzuchorzęsków w podmokłych lasach Puszczy Białowieskiej (głównie w olsach) oraz w skrajnie eutroficznych zbiornikach wodnych dużej polany puszczańskiej. Stwierdzone zostały 54 gatunki brzuchorzęsków, spośród których 48 zostało oznaczonych. *Chaetonotus tenuis* i *Ch. multispinosus* są nowe dla fauny Polski. Wykrytych zostało aż 9 gatunków z rodzaju *Aspidiophorus*.

Największą różnorodnością odznaczała się fauna olsów, czego wyrazem jest stwierdzenie tu 33 gatunków oraz wartość ogólnego wskaźnika różnorodności gatunkowej $H' = 2,95$, wyższa od kiedykolwiek podawanej dla brzucho-

rzęsków słodkowodnych. W skrajnie eutroficznych zbiornikach Polany Białowieskiej wykrytych zostało 37 gatunków, jednak ze względu na znacznie mniej równomierną strukturę dominacji wartość H' była wyraźnie niższa i wynosiła 1,82. Abundancja brzechorzęsków w olsach i zbiornikach skrajnie eutroficznych była niezbyt wysoka, przyjmując wartości średnie odpowiednio 20,6 i 18,4 osobnika/cm³ mułu.

Lista gatunków stwierdzonych tak w olsach, jak i w zbiornikach skrajnie eutroficznych obejmuje w obu przypadkach ponad połowę taksonów nie stwierdzonych w drugim z porównywanych środowisk. Gatunki te należą jednak głównie do nielicznych, podczas gdy dwa najliczniejsze gatunki każdego ze środowisk są te same (*Chaetonotus disiunctus* i *Heterolepidoderma gracile*).

РЕЗЮМЕ

[Заглавие: Пресноводные *Gastrotricha* Польши. III. *Gastrotricha* Беловежской пуши и Беловежской поляны]

В 1977—1983 годах авторы провели исследования по брюхоресничным в подмокших лесах Беловежской пуши (главным образом в ольсах) и в крайне эвтрофных водоемах большой поляны пуши. Было констатировано 54 вида брюхоресничных, среди которых 48 были определены. *Chaetonotus tenuis* и *Ch. multispinosus* являются новыми для фауны Польши. Обнаружено 9 видов, принадлежащих к роду *Aspidiophorus*.

Наиболее разнообразна фауна ольсов, где найдено 33 вида, а величина показателя разнообразия видов $H' = 2,95$ — выше, чем когда-либо подаваемых для пресноводных брюхоресничных. В крайне эвтрофных водоемах Беловежской поляны обнаружено 37 видов, однако, вследствие значительно менее равномерной структуры доминирования величина H' была четко ниже и составляла 1,82. Абунданция брюхоресничных в ольсах и крайне эвтрофных водоемах была не особенно высокая, достигая соответственно в среднем 20,6 и 18,4 особи/см³ ила.

Список видов, констатированных как в ольсах так и в крайне эвтрофных водоемах охватывает в обоих случаях свыше половины таксонов не обнаруженных в другом из сравниваемых биотопов. Эти виды, однако, принадлежат в основном к немногочисленным. В то время, как два наиболее многочисленных вида каждого из биотопов те же самые — *Chaetonotus disiunctus* и *Heterolepidoderma gracile*.