POLSKA AKADEMIA NAUK
INSTYTUT ZOOLOGII

FRAGMENTA FAUNISTICA

Tom 30 Warszawa, 1986.11.15 Nr 13

Teresa NESTERUK

Freshwater *Gastrotricha* of Poland. IV. *Gastrotricha* from fish ponds in the vicinity of Siedlce

[With 5 tables]

Abstract. In the course of studies carried out on gastrotrichs of fish ponds in the vicinity of Siedlce (central-east Poland), 39 species were recorded, including 5 very likely new to science. Identity of *Chaetonotus magnus* with *Ch. robustus* was evidenced. The present studies provided the third record ever of the occurrence of *Ichthydium bifurcatum*. *Ch. multisetosus*, *Ch. acanthocephalus* and *Heterolepidoderma tenuisquamatum* were for the third time reported from Poland in the course of the present research.

INTRODUCTION

So far studies were carried out mainly on gastrotrichs of natural water bodies or man-made lakes, both of them not being subject to steady man-control. Gastrotrichs of these environments were the subject matter of the three former papers of the present series (KISIELEWSKI and KISIELEWSKA 1986, KISIELEWSKA and KISIELEWSKI 1986a, b).

The aim of the present work was to examine the species composition and abundance of gastrotrichs in fish ponds. An account on the previous studies on freshwater gastrotrichs of Poland as well as a general review of methods applied in the papers of the series may be found in KISIELEWSKI and KISIELEWSKA (1986). For this reason the chapter on methods in the present paper will deal with employed modifications only and will provide detailed data.

MATERIAL AND METHODS

The studies were carried out since April 1979 till November 1982. In the initial period of studies only qualitative analyses were made; since July 1981 samples were taken from each of the studied complexes once a season all year long and were subsequently

subject to quantitative examinations, employing the method worked out by KISIELEWSKA (1982). The method was slightly modified according to the following description. Each quantitative sample included five sub-samples taken at five stands located 5–10 m off one from the other. Out of every sub-sample 0.2 cm³ of slime was taken out by means of a syringe and having been placed on Petri dishes it was subject to thorough scanning so as to count out all the animals. Hence the total amount of the examined material came to 1 cm³ of slime. The obtained data were the basis for calculating abundance (A), the value of which denoted the number of specimens in 1 cm³ of slime. Abundance was estimated for particular species for each pond complex in every season of the year. Individual dominance (D) for every complex was calculated on the basis of both quantitative and qualitative samples. The samples were examined during 48 hours after sampling. In order to obtain more precise data on the species composition, aquarium cultures were established, similarly as in the former papers of the series.

In order to compare the *Gastrotricha* fauna of the studied fish ponds with that of other environments, particular species were ordered to the following dominance classes (KISIELEWSKI 1981): D_5 (dominance over 10%) – eudominants, D_4 (dominance ranging 5.01–10.00%) – dominants, D_3 (dominance 2.01–5.00%) – subdominants, D_2 (dominance 1.01–2.00%) – recedents, D_1 (dominance below 1%) – subrecedents. Also a general diversity index H' was made use of in the fauna characteristic, similarly as in the former papers of the series.

CHARACTERISTICS OF THE POND COMPLEXES STUDIED

The studies were carried out in five complexes of fish ponds located in Siedlce, Kotuń, Mordy, Golice and Mościbrody.

Siedlce. The complex was made up of eight ponds of 188 ha in total area. Surrounded mainly with arid meadows. The shores overgrown with reed vegetation. Birches and willow shrubs in the northern part of the complex. The samples were taken from the second pond, counting from the fishing hut. The pond area of about 20 ha. Shores overgrown with willow shrubberies, *Typha latifolia*, *Acorus calamus*. Also *Berula erecta*, *Equisetum limosum*, *Lemna minor*, *Hydrocharis morsus-ranae* occurred scarcely. 30 m off the shore a couple of young birches and willows grew. Dark and fairly thick slime. The depth of water at the sampling stand ranged 30–40 cm depending on the season of the year. Water temperature at the slime surface varied from 0°C in winter to 18°C in summer. In total 39 samples were taken from this locality, including 6 quantitative and 33 qualitative samples.

Kotuń. The complex composed of 18 ponds situated south of the Siedlce-Warsaw railway track. 87 ha in area. Surrounded with arid meadows, only in the western part of the complex a water-logged meadow was found, wooded with willows, alders and poplars. The samples were taken from the second pond counting from the village, of about 18 ha in area. The shores were overgrown with willow shrubs. Abundant *Acorus calamus*, *Typha latifolia* and *Phragmites communis*, scarce *Lemna minor*. The depth at the sampling stand amounted to 50 cm. Fine and loose slime. Water temperature 17°C in summer, 0°C in winter. 14 samples were altogether taken, including 8 qualitative and 6 quantitative samples.

Mordy. The complex composed of 12 ponds located 20 km off Siedlce, at the right side of the Siedlce–Mordy road. 95 ha in area. Surrounded with wet meadows and swamps. The samples were taken from the first pond at the road, before the railway track. The pond area 18 ha. The shores overgrown with *Acorus calamus*, *Typha latifolia* and *Phragmites communis*. The depth at the sampling stand 50 cm. The slime fine and loose at the shore, darker and thicker farther inlake. Water temperature taken at the slime surface ranged 0°C in winter to 18°C in summer. 8 samples were altogether taken, including 3 qualitative and 5 quantitative samples.

Golice. The complex composed of 10 ponds located about 5 km north-west off Siedlce. 44 ha in area. Surrounded by meadows and crop fields. The complex artificially drained for winter. The samples were taken from the second pond past the village, counting along the Siedlce road. 7 ha in area. The depth at the sampling stand 40 cm. Vegetation: *Acorus calamus, Typha latifolia, Phragmites communis, Lemna minor*. Very fine and loose slime. Water temperature taken at the slime surface varied from 0°C in winter to 17°C in summer. Altogether 5 quantitative samples were taken.

Mościbrody. The complex composed of 12 ponds, located at the Siedlce–Łuków route, about 8 km off Siedlce. 115 ha in area. The direct vicinity made up of meadows and crop fields wooded with sparse, individual willows; water-logged meadows in the northern part. The complex subject to artificial drainage for winter. The samples were taken from the second pond counting from the bus stop at Mościbrody. The pond of 10 ha in area. The shores overgrown with *Typha latifolia, Phragmites communis* and *Acorus calamus. Equisetum limosum, Sparganium ramosum* and *Lemna minor* occurred scantily. Very loose and very fine slime. The depth at the sampling stand ranged 50–60 cm. Water temperature at the slime surface amounted to 0°C in winter and 15–18°C in summer. 5 quantitative samples were taken.

SYSTEMATIC REVIEW OF SPECIES

In the course of the present research 39 species were recorded belonging to seven genera and two families. More detailed characteristics were given only for these species which had not been formerly reported in the earlier papers of the series. Rudimentary diagnostic features along with actual measurements juxtaposed with the respective data from literature were provided for certain species.

Genus *Chaetonotus* Ehrenberg

1. *Ch. simrothi* Voigt, 1909

Material. Siedlce: May–October 1979, 4 samples, 3 specimens; July–August 1981, 3 samples, 6 specimens; September 1982, 1 specimen; aquarium cultures, 1 sample, 2 specimens. Kotuń: October 1981, 1 sample, 1 specimen; June–August 1982, 2 samples, 2 specimens. Mordy: June 1982, 1 specimen. Mościbrody: August 1982, 1 specimen; May 1982, 1 specimen.

The species has recently been reported from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

2. *Ch. insigniformis* Greuter, 1917

Material. Siedlce: June, August 1979, 2 samples, 2 specimens. Kotuń: September, October 1979, 2 samples, 2 specimens; June, August 1982, 2 samples, 2 specimens; aquarium cultures, 1 sample, 1 specimen.

The species reported from Switzerland (Greuter 1917), the Soviet Union (Preobraženskaja 1926) and Poland (Roszczak 1968, Kisielewski 1981, Kisielewska 1982). It occurs in water bodies of various fertility and in much eutrophicated peat-hags.

Dimensions:

	Greuter (1917)	Preobraženskaja (1926)	Kisielewski (1981)	the author's measurements
body length	300–325 μm	157–159 μm	252 μm	210 μm
the length of caudal appendages	26 μm	17–25 μm	23 μm	34 μm
pharynx length	62.5–75.0 μm	–	53 μm	82 μm

3. *Ch. schultzei* Mečnikov, 1865

Material. Siedlce: 1979, aquarium cultures, 2 samples, 2 specimens.

The species has been recently reported from the Gardno Lake (Kisielewska and Kisielewski 1986a).

4. *Ch. maximus* Ehrenberg, 1830

Material. Siedlce: April–October 1979, 4 samples, 4 specimens; aquarium cultures, 1 sample, 3 specimens; November 1982, 1 specimen. Kotuń: September, October 1979, 2 samples, 2 specimens. Mordy: July 1979, 1 specimen.

The species has recently been recorded in the Białowieża Forest (Kisielewska and Kisielewski 1986b).

5. *Ch. disiunctus* Greuter, 1917

Material. Siedlce: May–October 1979, 5 samples, 17 specimens; July 1981, 2 samples, 8 specimens; March–September 1982, 3 samples, 6 specimens; aquarium cultures, 1 sample, 1 specimen. Kotuń: October 1977, 1 sample, 3 specimens; January 1980, 1 sample, 1 specimen; October 1982, 1 specimen, June, August 1982, 2 samples, 2 specimens; aquarium cultures, 1 sample, 3 specimens. Mordy: September, November 1982, 2 samples, 5 specimens; aquarium cultures, 2 samples, 3 specimens. Golice: June, August 1982, 2 samples, 2 specimens. Mościbrody: May, September, December 1982, 3 samples, 3 specimens.

Also reported from the Tatra and Karkonosze Mountains (Kisielewski and Kisielewska 1986) and from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

6. *Ch. robustus* Davison, 1938

Chaetonotus magnus Kisielewski, 1979, **syn. n.**[1]

Material. Siedlce: July 1981, 1 specimen; May 1982, 1 specimen.

The species was described from the United States (Davison 1938) and by Kisielewski (1979) from a transitional peat-bog in the Wielkopolski National Park.

The specimens found by the author occurred along with *Heterolepidoderma gracile*, *Polymerurus rhomboides*, *Chaetonotus similis* and *Ch. simrothi*. Both as regards the body habit and dimensions, they match the original description.

7. *Ch. oculifer* Kisielewski, 1981

Material. Siedlce: 1979, aquarium cultures, 1 specimen.

---

[1] The specimens described as *Ch. magnus* are, as a matter of fact, identical with the species *Ch. robustus*, formerly described from North America; both names should be therefore considered synonyms (J. Kisielewski, personal communication).

The species has been recently reported from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and in the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

8. *Ch. pawlowskii* KISIELEWSKI, 1984

Material. Siedlce: April–August 1979, 4 samples, 8 specimens; July, August 1981, 3 samples, 3 specimens; aquarium cultures, 1 specimen. Mordy: August 1981, 1 specimen.

The species has been recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

9. *Ch. polyspinosus* GREUTER, 1917

Material. Siedlce: August 1981, 1 specimen; September 1982, 1 sample, 2 specimens; aquarium cultures, 1 specimen. Kotuń: September 1979, 1 specimen; September, October 1981, 2 samples, 9 specimens; June, August 1982, 3 samples, 7 specimens. Mordy: June, September 1982, 2 samples, 4 specimens. Golice: September, November 1981, 2 samples, 3 specimens; June, August 1982, 2 samples, 4 specimens.

The species has been recently recorded in the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

10. *Ch. similis* ZELINKA, 1889

Material. Siedlce: May, September 1979, 2 samples, 2 specimens; aquarium cultures, 1 specimen. Kotuń: August, October 1981, 2 samples, 3 specimens; August 1982, 2 samples, 5 specimens. Mordy: August 1981, 1 specimen.

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

11. *Chaetonotus* sp. 1.

Material. Siedlce: May 1982, 2 specimens.

Length over 200μm. Posterior head lobes flattened as in *Ch. simrothi*. Pincer-like caudal appendages as in *Ch. heteracanthus* REMANE. Adhesive tubes 18 μm long. Pharynx 51 μm long. Mouth very wide. Body covered with scales out of which spines grow with a lateral denticle. Scales arranged into 25 longitudinal rows, 30 scales in each. In the central part of the body there are irregularly distributed longer spines with a lateral denticle. On the dorsal side of the caudal appendage basal segments there are spines 10 μm long. On the ventral field a pair of terminal spined scales is found, also numerous spined scales on the intestine and pharyngeal field sections.

The aforelisted set of features gives reasons to assume that this is a new species. Due to the scantity of material it has not been given a name.

12. *Chaetonotus* sp. 2.

Material. Kotuń: February 1982, 1 specimen.

Length 186 μm. Head with 5 poorly separated lobes. Body covered with numerous scales, each having a short spine. Scale edges well visible. The scales resemble those of *Ch. disiunctus*. One longitudinal row comprises about 30 spined scales. The length of spines gradually increases towards the poste-

rior body end, the two last pairs of lateral spines being longer than all the other body spines. Ventral field with spined terminal scales; the intestine section has several longitudinal rows of short spines growing out of scales, whose shape resembles the dorsal scales. Pharynx of medium length, fairly narrow, and having no callosities.

The aforelisted set of features gives reasons to assume that this is also a new species, yet due to the scantity of material it has not been given a name.

13. *Ch. hystrix* MEČNIKOV, 1865

Material. Siedlce: May 1979, 1 specimen; March, September 1982, 2 samples, 2 specimens; aquarium cultures, 6 samples, 6 specimens. Kotuń: January 1980, 1 specimen; October 1981, 1 specimen; June–August 1982, 3 samples, 3 specimens. Mordy: July 1979, 1 specimen; September, November 1982, 2 samples, 3 specimens. Mościbrody: August 1981, 2 samples, 2 specimens.

The species recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

14. *Ch. macrochaetus* ZELINKA, 1889

Material. Siedlce: April–October 1979, 5 samples, 4 specimens; May, November 1982, 2 samples, 2 specimens; aquarium cultures, 2 samples, 12 specimens. Kotuń: August 1982, 1 sample, 3 specimens. Mordy: July 1979, 1 sample, 3 specimens.

Recently recorded from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

15. *Ch. greuteri* REMANE, 1927

Material. Siedlce: July 1981, 2 samples, 2 specimens. Mordy: July 1979, 1 sample, 6 specimens. Golice: November 1981, 1 specimen; June 1982, 1 specimen.

The species recently recorded in the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

16. *Ch. acanthocephalus* VALKANOV, 1937

Material. Mordy: August 1981, 1 sample, 2 specimens.

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

17. *Ch. ophiogaster* REMANE, 1927

Material. Siedlce: June, August 1979, 2 samples, 2 specimens.

Recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

18. *Ch. succinctus* VOIGT, 1902

Material. Siedlce: July–August 1979, 2 samples, 2 specimens; aquarium cultures, 1 specimen.

Recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

19. *Ch. multisetosus* PREOBRAŽENSKAJA, 1926

Material. Mordy: July 1979, 1 specimen.

The species recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

20. *Ch. macrolepidotus* GREUTER, 1917

Material. Siedlce: July 1981, 1 specimen. Kotuń: September 1979, 1 sample, 2 specimens; aquarium cultures, 1 sample, 1 specimen. Mordy: August 1981, 1 specimen.

Recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

Genus *Heterolepidoderma* REMANE

21. *H. gracile* REMANE, 1927

Material. Siedlce: August, October 1979, 4 samples, 15 specimens; July, August 1981, 4 samples, 10 specimens; March–November 1982, 4 samples, 10 specimens; aquarium cultures, 4 samples, 10 specimens. Kotuń: September 1979, 1 specimen; August, October 1981, 2 samples, 6 specimens; February–August 1982, 4 samples, 16 specimens; aquarium cultures, 1 sample, 2 specimens. Mordy: July 1979, 1 sample, 3 specimens; March–September 1982, 3 samples, 12 specimens. Golice: September, November 1981, 2 samples, 8 specimens; June, August 1982, 2 samples, 12 specimens. Mościbrody: August, December 1981, 2 samples, 4 specimens; May, September 1982, 2 samples, 6 specimens.

The species has been recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

22. *H. majus* REMANE, 1927

Material. Siedlce: July 1981, 1 sample, 6 specimens; May–November 1982, 3 samples, 4 specimens; aquarium cultures, 1 sample, 1 specimen. Kotuń: September 1979, 1 sample, 4 specimens; August, October 1981, 2 samples, 8 specimens; June–August 1982, 3 samples, 7 specimens. Mordy: August 1981, 1 sample, 2 specimens; June–November 1982, 3 samples, 6 specimens. Golice: September, November 1981, 2 samples, 8 specimens; June, August 1982, 2 samples, 8 specimens. Mościbrody: August 1981, 1 sample, 2 specimens; May, September 1982, 2 samples, 3 specimens.

Recently reported from the Tatra and Karkonosze Mountains (KISIELEWSKI and KISIELEWSKA 1986) and the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

23. *H. macrops* KISIELEWSKI, 1981

Material. Siedlce: May, August 1979, 2 samples, 2 specimens.

The species recently reported from the Tatra Mountains (KISIELEWSKI and KISIELEWSKA 1986) and from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

24. *H. tenuisquamatum* KISIELEWSKI, 1981

Material. Siedlce: August 1979, 1 specimen.

Recently also reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

25. *Heterolepidoderma* sp.

Material. Mordy: July 1979, 1 sample, 2 specimens.

Its habit resembles *H. majus*, yet its head is distinctly five-lobed and the animal has two pairs of tufts of cephalic cilia. Very numerous longitudinal rows of keels with an exceptionally low number of keels in a row. Unvisible scales. Basal segments of caudal appendages covered with keels (as in *H. majus*), yet their scales are not visible either. A group of less than 10 keels on the ventral field.

Dimensions:

pharynx length	35 μm
mouth diameter	5.5 μm
length of body scales	4.0 μm
total number of longitudinal rows of scales	80
number of scales in a row	26
scale distribution index	over 308%

The aforelisted set of features gives reasons to assume that this is a new species, yet due to the scantity of material it has not been given a name.

Genus *Aspidiophorus* Voigt

26. *A. bibulbosus* Kisielewski, 1979

Material. Siedlce: July 1979, 1 sample, 2 specimens; July 1981, 1 specimen.

Recently reported from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

27. *A. paradoxus* (Voigt, 1902)

Material. Siedlce: August 1979, 1 specimen.

Reported from many countries in Europe. A typical form of the species was recorded by Roszczak (1968) in Great Poland. Also found by Kisielewska (1982) in peat-hags near Siedlce.

28. *Aspidiophorus* sp.

Material. Mordy: August 1979, 1 sample, 2 specimens.

Five-lobed head. Body covered with pedunculated scales. Very similar to *A. paradoxus*, yet the hind head lobes are less distinct. A pair of thin, terminal spines at the posterior body end. Intestine section of the ventral field covered with wide and short scales, similar to those found on the ventral field of *Ch. ophiogaster*. No spines in the caudal bifurcation. Relatively long pharynx.

Dimensions:

body length:	150 μm
pharynx length	37 μm
mouth diameter	5 μm
spine length	15.5 μm
length of body trunk scales	6 μm
length of peduncle of the body trunk scale	2.5 μm

The aforelisted set of features gives reasons to assume that this is a new species, yet due to the scantity of data it has not been given a name.

Genus *Ichthydium* Ehrenberg

29. *I. bifurcatum* Preobraženskaja, 1926

Material. Siedlce: August 1979, 1 specimen.

The species described from the Soviet Union (Preobraženskaja 1926), where it was found on a peat-bog among *Sphagnum*.

In Poland reported only by Kisielewski (1979) from a peat-hag in Pomerania.

30. *I. palustre* Kisielewski, 1981

Material. Siedlce: August 1979, 1 sample, 2 specimens; July 1981, 2 samples, 5 specimens; March, November 1982, 2 samples, 2 specimens; aquarium cultures, 2 samples, 3 specimens. Kotuń: October 1981, 1 specimen; June 1982, 1 specimen. Mordy: July 1979, 1 specimen. Golice: September, November 1981, 2 samples, 5 specimens; June, August 1982, 2 samples, 4 specimens. Mościbrody: August 1981, 1 specimen; May 1982, 1 specimen.

The species recently reported from the Tatra Mountains (Kisielewski and Kisielewska 1986) and in the Białowieża Forest (Kisielewska and Kisielewski 1986b).

31. *I. podura* (Müller, 1773)

Material. Siedlce: September 1982, 1 specimen. Kotuń: August 1981, 1 specimen, August 1982, 1 sample, 2 specimens. Mordy: August 1981, 1 specimen; June, September 1982, 2 samples, 2 specimens.

Recently reported from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

Genus *Polymerurus* Remane

32. *P. nodicaudus* (Voigt, 1901)

Material. Siedlce: June, October 1979, 2 samples, 4 specimens; July 1981, 5 samples, 15 specimens, September 1982, 1 specimen; aquarium cultures, 1 sample, 1 specimen. Mordy: September 1982, 1 sample, 11 specimens. Mościbrody: September 1982, 1 sample, 2 specimens.

Recently reported from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

33. *P. rhomboides* (Stokes, 1887)

Material. Siedlce: August 1979, 3 samples, 9 specimens; July, August 1981, 3 samples, 8 specimens; March, May, November 1982, 3 samples, 6 specimens; aquarium cultures, 2 samples, 7 specimens. Kotuń: August, October 1981, 2 samples, 3 specimens; February, June, August 1982, 4 samples, 9 specimens. Mordy: July 1979, 1 sample, 5 specimens; August 1981, 1 sample, 2 specimens, September 1982, 1 specimen; aquarium cultures, 1 sample, 1 specimen. Golice: September 1981, 1 sample, 2 specimens; August 1982, 1 specimen. Mościbrody: August, December 1981, 2 samples, 2 specimens; January, May 1982, 2 samples, 3 specimens.

Recently reported from the Białowieża Forest (Kisielewska and Kisielewski 1986b).

Genus *Dasydytes* GOSSE

34. *D. ornatus* VOIGT, 1909

Material. Siedlce: May 1982, 1 specimen.

Also recorded to occur in the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

35. *Dasydytes* sp.

Material. Mordy: July 1979, 1 specimen.

The body of 168 μm in length. The length of body including the spine length — 231 μm. Spines in six tufts, each spine having double lateral denticle and not bifurcated at the end. The sampled specimen resembles *D. ornatus*, yet the presence of well visible double lateral denticle gives reason to assume it may be ordered to a certain other species.

36. *D. tongiorgii* BALSAMO, 1983

Material. Golice: November 1981, 1 sample, 2 specimens; June, August 1982, 2 samples, 5 specimens.

Recently recorded from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

37. *D. primus* GRÜNSPAN, 1908

Material. Mordy: July 1979, 1 specimen.

The species reported from Switzerland, the Soviet Union, Hungary and Romania (RUDESCU 1967). In Poland recorded by ROSZCZAK (1968) in Great Poland.

38. *D. crassus* GREUTER, 1917

Material. Siedlce: July, August 1981, 2 samples, 3 specimens. Kotuń: October 1981, 1 specimen; June, August 1982, 3 samples, 3 specimens. Mordy: July 1979, 1 sample, 6 specimens. Golice: September 1981, 1 specimen; June, August 1982, 2 samples, 2 specimens. Mościbrody: August 1981, 1 specimen; May 1982, 1 specimen.

The species recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

Genus *Stylochaeta* HLAVA

39. *S. fusiformis* (SPENCER, 1890)

Material. Siedlce: September 1982, 1 specimen; aquarium cultures, 1 sample, 4 specimens. Kotuń: September 1979, 1 sample, 14 specimens. Mordy: July 1979, 1 sample, 12 specimens.

The species recently reported from the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b).

CHARACTERISTICS OF OCCURRENCE

The *Gastrotricha* fauna found in the five complexes of fish ponds under study belonged to the family *Chaetonotidae* and *Dasydytidae*. 33 species were ordered to the family *Chaetonotidae*, whereas 6 of the recorded species were classified to the family *Dasydytidae*.

It is worth mentioning that out of 6 species reported from Poland as many as four species of the subgenus *Zonochaeta* REMANE were noted to occur in the studied localities. The present studies provided the third record ever reported from Poland of *Chaetonotus multisetosus*, *Ch. acanthocephalus* and *Heterolepidoderma tenuisquamatum*. Attention should also be paid to the second in Po-

Table I. Dominance (%) in particular pond complexes since May till October.

Species	Pond complex				
	Siedlce	Kotuń	Mordy	Golice	Mościbrody
Chaetonotus simrothi	4.8	1.9	0.8		7.0
Ch. insigniformis	0.8	3.2			
Ch. schultzei	0.4				
Ch. maximus	2.0	0.6	0.9		
Ch. disiunctus	12.8	8.4	6.5	2.6	4.6
Ch. robustus	0.8				
Ch. polyspinosus	2.0	13.5	3.7	9.1	2.3
Ch. similis	1.2	5.2	0.9		
Ch. hystrix	1.2	1.9	3.7		4.6
Ch. macrochaetus	6.4	1.9	2.8		
Ch. greuteri	0.8		5.6	2.6	
Ch. acanthocephalus			1.9		
Ch. ophiogaster	0.8				
Ch. succinctus	1.2				
Ch. multisetosus			0.9		
Ch. macrolepidotus	0.4	1.9	0.9		
Ch. pawlowskii	5.2		0.9		
Chaetonotus sp.	0.8				
Heterolepidoderma gracile	16.8	14.2	12.1	28.6	25.6
H. majus	2.4	12.3	7.5	11.7	23.3
H. macrops	0.8				
H. tenuisquamatum	0.4				
Heterolepidoderma sp.			1.9		
Aspidiophorus bibulbosus	1.2				
A. paradoxus	0.4				
Ichthydium bifurcatum	0.4				
I. palustre	4.8	1.3	0.9	11.7	4.6
I. podura	0.4	1.9	2.8		
Polymerurus nodicaudus	5.6		10.3		4.6
P. rhomboides	13.6	7.1	8.4	3.9	7.0
Dasydytes ornatus	0.4				
D. tongiorgii				18.2	
Dasydytes sp.			0.9		
D. primus			0.9		
D. crassus	1.2	3.9	6.5	3.9	9.3
Stylochaeta fusiformis	2.0	9.0	11.2		
Chaetonotus indet.	3.6	5.8	3.7	3.9	4.6
Chaetonotidae indet.	4.4	5.8	2.8	3.9	2.3
Total	100.0	99.8	99.4	100.1	99.8

Table II. Dominance (in classes) of particular species in various environments.
Abbreviations: S – Siedlce, K – Kotuń, M – Mordy, G – Golice, M-y – Mościbrody.

No	Environment / Species	Peat-bogs (Kisielewski 1981)	Peat-bags (Kisielewska 1982)	Oligotrophic mountain lakes (Kisielewski and Kisielewska 1986)	Eutrophicated mountain water bodies (Kisielewski and Kisielewska 1986)	Eutrophic water bodies (Białowieża Glade) (Kisielewska and Kisielewski 1986b)	Alder woods (Białowieża Forest) (Kisielewska and Kisielewski 1986b)	The author's data				
								S	K	M	G	M-y
1	*Chaetonotus simrothi*		D_1–D_2				D_2	D_3	D_2	D_1		D_4
2	*Ch. insigniformis*							D_1	D_3			
3	*Ch. schultzei*							D_1				
4	*Ch. maximus*			D_5	D_3	D_2		D_2	D_1	D_1		
5	*Ch. disiunctus*	D_2	D_1–D_4	D_3	D_5	D_5	D_4	D_5	D_4	D_4	D_3	D_3
6	*Ch. robustus*							D_1				
7	*Ch. polyspinosus*	D_5	D_1		D_3–D_5			D_2	D_5	D_3	D_4	D_3
8	*Ch. similis*			D_3–D_5	D_3–D_5			D_2	D_4	D_1		
9	*Ch. pawlowskii*						D_3	D_4		D_1		
10	*Ch. hystrix*	D_3		D_3	D_3		D_4	D_2	D_2	D_3		D_3
11	*Ch. macrochaetus*	D_2–D_5		D_5	D_3–D_5		D_3	D_4	D_2	D_3		
12	*Ch. greuteri*							D_1		D_4	D_2	
13	*Ch. acanthocephalus*	D_2								D_2		
14	*Ch. ophiogaster*		D_1–D_5					D_1				
15	*Ch. succinctus*		D_2–D_4			D_2		D_2				
16	*Ch. multisetosus*		D_1							D_1		

17	*Ch. macrolepidotus*		D_1–D_2					D_1	D_2	D_1		
18	*Heterolepidoderma gracile*	D_3	D_1–D_3			D_5	D_4	D_5	D_5	D_5	D_5	D_5
19	*H. majus*	D_5			D_4–D_5	D_3	D_4	D_3	D_5	D_4	D_5	D_5
20	*H. macrops*				D_5			D_1				
21	*H. tenuisquamatum*							D_1				
22	*Aspidiophorus bibulbosus*	D_2	D_1–D_3				D_3	D_2				
23	*A. paradoxus*		D_1–D_4					D_1				
24	*Ichthydium bifurcatum*							D_1				
25	*I. palustre*		D_1–D_5		D_3		D_3	D_3	D_2	D_1	D_5	D_3
26	*I. podura*							D_1	D_2	D_3		
27	*Polymerurus nodicaudus*		D_2–D_4				D_2	D_4		D_5		D_3
28	*P. rhomboides*		D_1			D_4		D_5	D_4	D_4	D_3	D_4
29	*Dasydytes ornatus*		D_1–D_5					D_1				
30	*D. tongiorgii*		D_5			D_2	D_4				D_5	
31	*D. primus*									D_1		
32	*D. crassus*		D_3–D_5			D_3	D_3	D_2	D_3	D_4	D_3	D_4
33	*Stylochaeta fusiformis*	D_2–D_3	D_1–D_3			D_3	D_3	D_2	D_4	D_5		

land record of *Ichthydium bifurcatum*. The genus *Lepidodermella* BLAKE was not noted to occur in any of the pond complexes examined.

On the basis of the sampled material individual dominance (*D*) was estimated for particular species of each of the studied complexes for the period since May till October (Table I). The value of the individual dominance of particular species differed considerably in particular complexes. *H. majus* turned out to be a eudominant in three out of five studied complexes (Kotuń, Golice, Mościbrody), but a subdominant in the Siedlce complex. Another instance of a distinct diversity in the dominance of particular species in the examined complexes was the fact that *Ch. polyspinosus* ranked among dominants in the Kotuń complex, yet it was merely a recedent in the Siedlce complex. As regards the family *Chaetonotidae*, only *H. gracile* was a eudominant in all of the studied complexes.

Table II provides a survey of the occurrence of gastrotrichs in various environments: on peat-bogs (KISIELEWSKI 1981), in peat-hags (KISIELEWSKA 1982), in oligotrophic mountain lakes and in fairly eutrophicated mountain waters (KISIELEWSKI and KISIELEWSKA 1986), in eutrophic water bodies of the Białowieża Glade and in alder woods of the Białowieża Forest (KISIELEWSKA and KISIELEWSKI 1986b) and in fish ponds in the vicinity of Siedlce.

The comparison of *Gastrotricha* species dominance in natural environments to that in fish ponds revealed pronounced differences between the analyzed parameters. It follows from the tabulated data that one of the gastrotrichan species most numerously occurring in the studied ponds, namely, *H. gracile*, occurred in much smaller numbers in a majority of the compared environments. The values of dominance of this species on raised and transitional peat-bogs ranged 2.01–5.00 % (D_3), in peat-hags in the vicinity of Siedlce they never exceeded 1 % (D_1), while in oligotrophic mountain lakes and in fairly eutrophicated mountain waters the species did not occur at all. *Ch. simrothi* ranked among dominants (D_4) in the complex of Mościbrody ponds. In peat-hags near Siedlce and in alder woods of the Białowieża Forest the species was a recedent (D_1–D_2). The species was not reported from the remaining environments. Similarly *Ch. polyspinosus*, a eudominant (D_5) in the Kotuń pond complex (dominance 13.5 %), did not occur in oligotrophic mountain lakes, neither was it found in eutrophic water bodies of the Białowieża Glade nor in alder woods of the Białowieża Forest, while in peat-hags dominance of this species figured out at below 1 % (D_1). Dominance of *P. rhomboides* in all the complexes of fish ponds was high, its greatest value, calculated for the Siedlce complex, amounting to 13.6 % (D_5). This species also ranked among eudominants (D_5) in eutrophic water bodies of the Białowieża Glade. Comparatively, dominance of this species in peat-hags figured out at less than 1 % (D_1). The species was not reported from other environments under comparison. *Ch. ophiogaster* and *D. ornatus*, ranking among eudominants (D_5) in peat-hags, were reported only from the Siedlce complex out of all the examined fish pond complexes;

Table III. Abundance (*A*) of particular species in five complexes of fish ponds in four seasons. Abbreviations: S – Siedlce, K – Kotuń, M – Mordy, G – Golice, M-y – Mościbrody.

No	Species	Spring (IV, V, VI)					Summer (VII, VIII, IX)					Autumn (X, XI, XII)					Winter (I, II, III)				
		S	K	M	G	M-y	S	K	M	G	M-y	S	K	M	G	M-y	S	K	M	G	M-y
1	*Chaetonotus simrothi*		1.0	1.0		2.0	2.0	0.5			0.5	1.0	1.0								
2	*Ch. insigniformis*		1.0					0.5					1.0								
3	*Ch. maximus*											1.0									
4	*Ch. disiunctus*	2.0	1.0		1.0	1.0	1.0	0.5	1.5	0.5	0.5	2.0	1.0	2.0		1.0	2.0				
5	*Ch. robustus*	1.0																			
6	*Ch. pawlowskii*						0.3		0.5									1.0			
7	*Ch. polyspinosus*		2.0	2.0	2.0	1.0	1.0	4.5	1.0	1.5		2.0	3.0		2.0						
8	*Ch. similis*	1.0					0.3	3.0	0.5				1.0								
9	*Ch.* sp.	2.0																			
10	*Ch. hystrix*		1.0				0.3		1.0		1.0		1.0	1.0			1.0				
11	*Ch. macrochaetus*	1.0										1.0									
12	*Ch. greuteri*				1.0		0.3								1.0						
13	*Ch. acanthocephalus*								1.0												
14	*Ch. macrolepidotus*								0.5												
15	*Heterolepidoderma gracile*	5.0	4.0	9.0	5.0	5.0	2.0	5.5	0.5	6.5	3.0	2.0	3.0		4.0	2.0	3.0	1.0	2.0		
16	*H. majus*	1.0	3.0	3.0	4.0	2.0	1.3	2.5	2.0	1.0	4.0	1.0	5.0	1.0	3.0						
17	*Ichthydium palustre*		1.0		3.0	1.0	1.3			1.5	0.5	1.0	1.0		3.0		1.0				
18	*I. podura*			1.0			0.3	1.5	1.0												
19	*Polymerurus nodicaudus*						0.7		5.5		1.0	1.0									
20	*P. rhomboides*	4.0	2.0			2.0	3.0	3.5	1.5	1.5	0.5	1.0	1.0			1.0	1.0	1.0			1.0
21	*Dasydytes ornatus*	1.0																			
22	*D. tongiorgii*				3.0					1.0					10.0						
23	*D. crassus*		2.0		1.0	1.0	1.0	0.5		1.0	1.5		1.0								
24	*Stylochaeta fusiformis*						0.3														
25	*Chaetonotus* indet.	1.0	1.0			2.0	0.6	0.5	1.0	0.5			1.0		2.0		3.0	3.0			
26	*Chaetonotidae* indet.						0.3	0.5	1.5	0.5			1.0		1.0						
	Total	19.0	19.0	16.0	20.0	17.0	16.0	23.5	19.0	15.5	12.5	13.0	21.0	4.0	26.0	4.0	11.0	6.0	2.0	0.0	1.0

moreover, dominance of these species came down to less than 1 % (D_1). Furthermore, *H. macrops*, merely a subrecedent (D_1) in the Siedlce pond complex, turned out to be a eudominant (D_5) in one of fairly eutrophicated water bodies in the Tatra Mountains.

ABUNDANCE

Seasonal changes in abundance were observed (Table III). In all the studied complexes a decrease in abundance was noted in winter and at the Mordy and Mościbrody complexes – also in autumn. The lowest abundance values were recorded in the Golice and Mościbrody complexes in winter (0 and 1.0 respectively), while in spring the abundance value rose to 20.0 in the Golice complex and to 17.0 in the Mościbrody complex. The highest abundance value for all the studied complexes was noted in the Golice complex in autumn. The high value of abundance in this complex resulted from a numerous occurrence of *Dasydytes tongiorgii*, which attained its abundance peak in autumn ($A = 10.0$). The character of seasonal changes in abundance was different in particular complexes (Table IV).

Table IV. Seasonal changes in gastrotrichan abundance in particular pond complexes.

Pond complex	Mean abundance				
	Spring	Summer	Autumn	Winter	Year
Siedlce	19.0	16.0	13.0	11.0	14.7
Kotuń	19.0	23.5	21.0	6.0	17.4
Mordy	16.0	19.0	4.0	2.0	10.2
Golice	20.0	15.5	26.0	0	15.4
Mościbrody	17.0	12.5	4.0	1.0	8.6
Total for all complexes	18.2	17.3	13.6	4.0	13.3

The lowest amplitude of seasonal changes in *Gastrotricha* abundance was observed in the pond complex at Siedlce. This complex was also marked for the greatest diversity of the species occurring there. The highest amplitude of abundance changes was recorded at the Mordy complex. KISIELEWSKA (1982) noticed pronounced seasonal changes in the occurrence of two species of the family *Dasydytidae*, namely, *Stylochaeta fusiformis* and *Dasydytes ornatus*. Any distinctly seasonal character of the occurrence of all the species found was not observed in the studied complexes.

In order to compare the studied pond complexes to the previously examined natural environments with respect to species diversity, the values of the

Table V. Species diversity of various types of natural environments and fish ponds.

No	Environment	Source	H'
1	Peat-bogs	Kisielewski (1981)	1.98–2.64
2	Peat-hags	Kisielewska (1982)	1.45
3	Oligotrophic mountain lakes	Kisielewski and Kisielewska (1986)	1.63–1.68
4	Eutrophicated mountain water bodies	Kisielewski and Kisielewska (1986)	2.03–2.54
5	Eutrophic water bodies of the Białowieża Glade	Kisielewska and Kisielewski (1986b)	1.82
6	Alder woods of the Białowieża Forest	Kisielewska and Kisielewski (1986b)	2.95
7	Fish ponds:	The author's data	
	Siedlce		2.73
	Kotuń		2.53
	Mordy		2.75
	Golice		1.90
	Mościbrody		2.01

diversity index H' calculated for all the compared environments were provided in Table V. As regards the fish ponds, the greatest value of the H' index was estimated for the Mordy complex (2.75) and the Siedlce complex (2.73), while the lowest – for the Golice complex (1.90). The value of the diversity index H' counted for the Mordy and Siedlce complexes approximated the highest H' value estimated in the course of earlier studies for alder woods of the Białowieża Forest (Kisielewska and Kisielewski 1986b). The low value of the diversity index H' in the Golice pond complex resulted from a marked dominance of *H. gracile* over all the other species reported from this complex.

REFERENCES

Davison D. B. 1938. A new species of Gastrotrichan – *Chaetonotus robustus*, new species. Amer. Mus. Novit., New York, 972, 7 pp.

Greuter A. 1917. Beiträge zur Systematik der Gastrotrichen in der Schweiz. Rev. suisse Zool., Genève, **25**: 37–76, 2 tt.

Kisielewska G. 1982. *Gastrotricha* of two complexes of peat hags near Siedlce. Fragm. faun., Warszawa, **27**: 39–57, 3 ff., 4 tt.

Kisielewska G., Kisielewski J. 1986a. Freshwater *Gastrotricha* of Poland. II. *Gastrotricha* from the seaside lakes in the Słowiński National Park. Fragm. faun., Warszawa, **30**: 182–194.

Kisielewska G., Kisielewski J. 1986b. Freshwater *Gastrotricha* of Poland. III. *Gastrotricha* from the Białowieża Forest and the Białowieża Glade. Fragm. faun., Warszawa, **30**: 195–213.

Kisielewski J. 1979. New and insufficiently known freshwater *Gastrotricha* from Poland. Ann. zool., Warszawa, **34**: 415–435, 17 ff.

Kisielewski J. 1981. *Gastrotricha* from raised and transitional peat bogs in Poland. Monogr. Fauny Pol., **11**. Kraków, 143 pp.

Kisielewski J. 1984. Three new freshwater *gastrotrichs* of the genus *Chaetonotus* Ehrenberg from Poland. Bull. Acad. pol. Sci., Biol., Varsovie **32**: 293–301.

Kisielewski J., Kisielewska G. 1986. Freshwater *Gastrotricha* of Poland. I. *Gastrotricha* from the Tatra and Karkonosze Mountains. Fragm. faun., Warszawa, **30**: 157–182.

Preobraženskaja E. N. 1926. Zur Verbreitung der Gastrotrichen in der Gewässern der Umgebung zu Kossino. Arb. biol. Stat. Kossino, Moskva, **4**: 3–14, 1 t.

Roszczak R. 1968. Brzuchorzęski (*Gastrotricha*) Środkowej Wielkopolski. Pr. Kom. biol. PTPN, Poznań, **32**, 6, 92 pp., 56 ff.

Rudescu L. 1967. *Gastrotricha*. Fauna Republicii Socialiste Romania, **2**, 3, Bucureşti, 289 pp., 151 ff.

Zakład Zoologii WSR-P
Prusa 12, 08–100 Siedlce

STRESZCZENIE

[Tytuł: *Gastrotricha* słodkowodne Polski. IV. *Gastrotricha* stawów rybnych okolic Siedlec]

Autorka przeprowadziła w latach 1979–1982 badania jakościowe i ilościowe brzuchorzęsków w pięciu kompleksach stawów rybnych w okolicach Siedlec.

Stwierdzono 39 gatunków, w tym 33 z rodziny *Chaetonotidae* i 6 z rodziny *Dasydytidae*, 5 z nich to prawdopodobnie formy dotąd nie opisane. Znalezienie *Ichthydium bifurcatum* jest drugim stwierdzeniem w Polsce, a trzecim na świecie. *Chaetonotus multisetosus*, *Ch. acanthocephalus* i *Heterolepidoderma tenuisquamatum* są notowane po raz trzeci w Polsce. Nazwę *Chaetonotus magnus* Kisielewski, 1979 uznano za młodszy synonim *Ch. robustus* Davison, 1938. Najbardziej licznymi gatunkami w stawach okazały się *H. gracile* i *H. majus*.

Ogólny wskaźnik różnorodności gatunkowej H' osiągnął dla poszczególnych kompleksów stawów wartości od 1,90 do 2,75. Średnioroczna abundancja wahała się w poszczególnych kompleksach od 8,6 do 17,4 osobników/cm^3 mułu. Najwyższe wartości w poszczególnych kompleksach (17,0–26,0) zanotowano wiosną, latem lub jesienią, zimą zaś we wszystkich badanych stawach obserwowano wyraźny spadek liczebności.

Wykazano również istotne różnice między fauną brzuchorzęsków w stawach rybnych i badanymi przez innych autorów środowiskami naturalnymi.

РЕЗЮМЕ

[Заглавие: Пресноводные *Gastrotricha* Польши. IV. *Gastrotricha* рыбных прудов в окрестностях Седлец]

В 1979—1982 годах автор провела исследования по количественному и качественному составу брюхоресничных в пяти комплексах рыбных прудов в окресностях г. Седльце.

Констатировано 39 видов, 33 из которых принадлежат к семейству *Chaetonotidae* и 6 к семейству *Dasydytidae*, 5 из них — это, по-видимому формы до сих пор не описанные. Находка вида *Ichthydium bifurcatum* является вторым местонахождением на территории Польши и третим на свете. *Chaetonotus multisetosus*, *Ch. acanthocephalus* и *Heterolepidoderma tenuisquamatum* отмечены в Польше третий раз. Название *Chaetonotus magnus* KISIELEWSKI, 1979 признано младшим синонимом *Ch. robustus* DAVISON, 1938.

Общий показатель видового разнообразия *H'* достиг для отдельных комплексов прудов величину от 1,90 до 2,75. Среднегодичная абунданция колебалась в пределах 8,6–17,4 особей/см^3 для отдельных комплексов прудов. Наиболее высокие величины (17,0–26,0) были отмечены весной, летом и осенью. В зимний период во всех исследованных прудах наступало четкое падение численности.

Отмечены также существенные различия между фауной брюхоресничных рыбных прудов и исследованных другими авторами природных биотопов.

Praca wykonana w ramach problemu MR II-3.
Redaktor pracy — doc. dr W. Staręga