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Parasitology

**CILIATES (CILIOPHORA) PARASITIC ON THE GILLS OF THE BLUE
BREAM, *ABRAMIS BALLERUS* (L.) FROM DĄBIE LAKE (POLAND)**

**ORZĘSKI (CILIOPHORA) PASOŻYTUJĄCE NA SKRZELACH
ROZPIÓRA *ABRAMIS BALLERUS* (L.) Z JEZIORA DĄBIE (POLSKA)**

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Parasite fauna of the ciliates inhabiting the gills of the blue bream from Dąbie Lake connected with the Odra River estuary, consisted of 5 species, namely: *Chilodonella hexasticha*, *Ch. piscicola*, *Capriniana piscium*, *Ichthyophthirius multifiliis*, *Trichodina kupermani*. These parasites were recorded for the first time on the blue bream in Poland. *T. kupermani* is a new species for the Polish fauna, while the blue bream is a new host for *C. piscium*. The seasonal dynamics of the infection of the fishes with *T. kupermani* was studied and the detailed measurements of this species are provided.

INTRODUCTION

Metazoan parasites of the blue bream, *Abramis ballerus* were in different aspects described by numerous authors (Izjumova 1960; Gläser 1965; Molnár 1966; Wierzbicka 1974, 1977a, b, 1978 and others). Protozoan parasites of this host are substantially less known. Among the relevant publications, the studies of Arthur and Lom (1984) deserve particular attention. These authors described morphology of trichodinid ciliates recovered, among other fishes, also from the gills of the blue bream from the Rybinskij Reservoir (USSR). Šul'nan (1984) listed 6 species of this family found on the blue bream in the former Soviet Union. There have been no data on parasitic protozoans on this host in Poland. It prompted the present author to process the unused material collected during the surveys on the metazoan parasites (Wierzbicka 1974, 1977a, b, 1978).

The aim of this work was to enhance the knowledge on the parasitic ciliates from the gills of the blue bream from Dąbie Lake, as well as to contribute to the monitoring of the dynamics of infection of the fish with *Trichodina kupermani* Arthur and Lom, 1984. There have been no studies on this aspect conducted yet.

MATERIAL AND METHODS

The fish for the survey were collected from Dąbie Lake, linked directly to the Odra River estuary and situated within the city limits of Szczecin. A total of 295 specimens of the blue bream, *Abramis ballerus* (L.) was collected. The standard length/total length of the fish ranged from 7.0/8.5 to 36.5/44.0 cm. Their weight did not exceed 800 g, while the age varied from 1+ to 9 years. The material was collected between June 1969 and September 1971. The samples were collected approximately in one-month intervals. Only in January and February the samples were not acquired. The size of the samples varied from 7 to 22 specimens with the exception of April 1970 when a single blue bream was studied (Tab. 1).

Table 1

Number and standard length (cm) of the studied fish infected with protozoans
Trichodina kupermani in the respective months

Month	Number		Length		
	Total examined	Infected	Total examined	Infected	Uninfected
1 9 6 9					
Jun	10	8	17.0–32.0	17.0–32.0	23.5–26.4
Jul	20	18	18.5–28.0	18.5–28.0	26.0
Aug	21	10	13.5–30.5	13.5–26.0	19.5–30.5
Sep	22	11	10.0–30.0	10.0–30.0	13.5–30.0
Oct	15	2	20.5–33.0	27.0–28.5	20.5–33.0
Nov	13	1	22.0–33.0	23.5	22.0–33.0
1 9 7 0					
Apr	1	1	22.5	22.5	—
May	16	14	20.5–34.0	20.5–34.0	21.0–32.0
Jun	14	13	21.0–35.0	21.0–35.0	23.5
Jul	21	15	15.0–29.0	17.0–29.0	15.0–25.5
Aug	7	4	22.5–33.5	27.5–33.5	22.5–32.5
Sep	16	2	7.0–31.0	25.0–29.0	7.0–31.0
Oct	13	1	24.0–32.0	31.0	24.0–32.0
Nov	16	0	24.5–30.0	—	24.5–30.0
Dec	17	0	21.0–31.5	—	21.0–31.5
1 9 7 1					
Mar	7	1	24.0–33.0	26.0	24.0–33.0
Apr	9	4	21.5–36.5	26.5–31.0	21.5–36.5
May	12	10	21.5–31.5	21.5–31.5	27.0–27.5
Jun	11	3	7.5–30.5	8.3–10.3	7.5–30.5
Jul	14	3	10.0–35.0	10.2–20.5	10.0–35.0
Aug	11	7	12.5–33.5	12.5–23.3	12.5–33.5
Sep	9	1	15.5–29.5	27.0	15.5–29.5

Scrapped material was collected from the fresh fish and subsequently studied under a microscope. Mucous smears were also prepared from the gills. These preparations were silvered with 1% solution of AgNO_3 (Klein method) or they were stained with Delafield hematoxylin and mounted with Canada balsam.

RESULTS

A total of 5 protozoan species was recovered from the surveyed blue bream, *Abramis ballerus*, namely: *Chilodonella hexasticha* (Kiernik, 1909), *Ch. piscicola* (Zacharias, 1894), *Capriniana piscium* (Bütschli, 1889), *Ichthyophthirius multifiliis* Fouquet, 1876, and *Trichodina kupermani* Arthur and Lom, 1984.

Table 2

Weight (g) of the studied fish infected with protozoans *Trichodina kupermani* in the respective months

Month	Total examined	Infected	Uninfected
1 9 6 9			
Jun	75–550	75–550	180–270
Jul	90–370	90–370	280–300
Aug	40–500	40–290	120–500
Sep	20–440	20–400	40–440
Oct	115–570	310–350	115–570
Nov	140–710	170	140–710
1 9 7 0			
Apr	150	150	—
May	120–500	120–500	120–500
Jun	130–600	130–600	180
Jul	40–420	60–420	40–230
Aug	150–730	380–730	150–600
Sep	8–510	220–400	8–510
Oct	140–670	500	140–670
Nov	210–390	—	210–390
Dec	140–490	—	140–490
1 9 7 1			
Mar	180–610	280	180–610
Apr	160–680	340–440	160–680
May	200–480	200–480	290–310
Jun	9–440	9–11	9–440
Jul	10–800	10–130	10–800
Aug	35–610	35–160	35–610
Sep	50–400	270	50–400

The most abundant was *Trichodina kupermani* (Figs. 1–4), attaining the prevalence of 43.7% and the intensity ranging from single to uncountable specimens. The morphometric characters of this species are listed in Tab. 3. The material collected through almost three-year-long survey, suggests that *T. kupermani* exhibited variable seasonal dynamics of infection (Fig. 5). The highest infection of the blue bream was observed from May to August. Maximal prevalence reached in different years: up to 87.5% in May, up to 92.8% in June, up to 90% in July, and up to 63.6% in August. In this period only in June and July of 1971 a low prevalence was recorded (Fig. 5). Substantially lower prevalence was recorded in two samples from September and also in October, November and March. In November and December 1970 no protozoans were found (Tab. 1; Fig. 5). The intensity of infection varied similarly in the material studied. The overall values were

Table 3Particulars concerning *Trichodina kupermani*

	Range	$\bar{x}$
Diameter of: -		
body (n = 12)	41.0–58.0	49.3
adhesive disc	28.4–39.6	34.3
denticulate ring	18.0–24.0	21.0
macronucleus	23.0–33.0	27.6
Number of:		
denticles (n = 93)	21–28	24.8
radial pins/denticle	8–10	
Dimension of denticles (n = 21):		
blade	4.0–5.6	4.8
thorn	3.4–6.4	4.1
central part	1.0–1.6	1.4
length	4.4–6.0	4.8
Width of border membrane	3.6–4.4	4.1

Dimensions are given in μm according to the method of Lom and Dyková (1992)

1.4%, with *Capriniana piscium*—1.7%, and with *Ichthyophthirius multifiliis*—1.0%. Only single specimens of *I. multifiliis* were being encountered, while the intensity of the infection with the remaining species ranged from single to numerous specimens.

DISCUSSION

A single species of the family Trichodinidae—*Trichodina kupermani*—was found on the gills of the blue bream from Dąbie Lake. These ciliates were frequently encountered in the present material. They were found, for the first time, on the gills of this host from the Rybinskij Reservoir on the Volga River, and subsequently described by Arthur and Lom (1984) as a new species. These authors also noted the presence of single specimens representing *T. nigra* Lom, 1961, *T. ophiocephalus* Kastenko et Karaev, 1976, *Paratrachodina incisa* (Lom, 1959), and *Trichodinella epizootica* (Raabe, 1950). According to Šul'man (1984) a total of 6 other species was recorded on the blue bream in the former Soviet Union. The second record of *T. kupermani* was on Philipines from juvenile specimens of *Ctenopharyngodon idella* (Valenciennes) imported from Taiwan (Albaladejo and Arthur 1989). These ciliates are a new species for Polish fauna.

the highest from May to August, with an exception for the samples of June and July 1971. It is evident from the lists of dimensions and weights of the infected and uninfected fish (Tabs. 1, 2), that the size and age of the studied blue bream did not have impact neither on the low infection parameters in June and July 1971 nor on the results obtained in the other samples.

The remaining ciliate species were found relatively rarely on the blue bream of Dąbie Lake. The prevalence of the infection with *Chilodonella hexasticha* (Fig. 6) reached 3.0%, with *Ch. piscicola* (Fig. 7)—

Figs. 1-4. *Trichodina kupermani*; Fig. 4—specimen with longer thorns (scale bar = 20 μm)

photographed by Mr. P. Šmietana

Fig. 6. *Chilodonella hexasticha*; Fig. 7. *Chilodonella piscicola* (scale bar = 20 μ m)

photographed by Mr. P. Šmietana

Fig. 5. Prevalence of infection of *Abramis ballerus* with protozoans *Trichodina kuiperi* in the respective months of the three-year-long survey

Comparing the present morphological and morphometric data with the original description of the species (Arthur and Lom 1984) no significant differences are visible. Only the length of denticles given by the above authors is higher, amounting to 6.1–9.2 (7.5) μm , whereas in the material from Dąbie Lake it is 4.4–6.0 (4.8) μm . My results concerning the dimensions approximated those of Albaladejo and Arthur (1989).

My study conducted in different seasons of a year filled a void in the literature on the seasonal dynamics of the fish infection with protozoans *Trichodina kupermani*. My results, however, are a little different from the seasonality of *T. jadratica* Raabe, 1958, a parasite of the gills of the European eel, *Anguilla anguilla*. The latter species exhibited higher prevalence on the eels from the Este River (Portugal) in August, secondly—in July, October, and November (Saraiva 1994).

Ichthyophthirius multifiliis and *Chilodonella piscicola* have been recorded in Poland from many hosts (Grabda 1971 and others). Detailed study on the separate specific identity of *Ch. piscicola* and *Ch. hexasticha* was given by Kazubski and Migala (1974), while the description of *Capriniana piscium* was provided by Prost (1952). Presently found *Ch. piscicola* and *Ch. hexasticha* do not differ from the descriptions of Kazubski and Migala (1974) and Šul'man (1984). Also the morphology of *C. piscium* is similar to the data of Prost (1952), Šul'man (1984) and Lom and Dyková (1992).

The above mentioned 4 species: *Ch. piscicola*, *Ch. hexasticha*, *C. piscium*, and *I. multifiliis* have not been hitherto recorded on the blue bream in Poland. In addition to that the blue bream is a new host for *C. piscium*.

CONCLUSIONS

1. Parasite fauna of the ciliates from the gills of the blue bream from Dąbie Lake consisted of 5 species: *Chilodonella hexasticha*, *Ch. piscicola*, *Capriniana piscium*, *Ichthyophthirius multifiliis*, and *Trichodina kupermani*.
2. All of the above-mentioned species were recorded for the first time on the blue bream in Poland. One of them—*T. kupermani* is a new species for Polish fauna, while the blue bream is a new host for *C. piscium*.
3. The most prevalent and of the highest intensity were ciliates *T. kupermani*. They exhibited seasonal dynamics in infecting the fish. The highest prevalence and intensity of infection was observed from May to August.
4. The seasonality of infection of *T. kupermani* was not influenced by the size of the studied blue bream.

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ORZĘSKI (CILIOPHORA) PASOŻYTUJĄCE NA SKRZELACH ROZPIÓRA
ABRAMIS BALLERUS (L.) Z JEZIORA DĄBIE (POLSKA)

STRESZCZENIE

Fauna pasożytnicza orzęsków na skrzelach rozpióra z jeziora Dąbie, mającego bezpośrednie połączenie z ujściowym odcinkiem rzeki Odry, obejmowała pięć gatunków. Były to: *Chilodonella hexasticha* (Kiernik, 1909), *Ch. piscicola* (Zacharias, 1894), *Capriniana piscium* (Bütschli, 1889), *Ichthyophthirius multifiliis* Fouquet, 1876 i *Trichodina kupermani* Arthur, Lom, 1984. Pasożyty te stwierdzono po raz pierwszy u rozpióra na terenie Polski. Pierwotniaki *T. kupermani* są nowym gatunkiem dla fauny Polski, natomiast rozpiór jest nowym żywicielem *C. piscium*.

Najczęściej i najliczniej występującymi pasożytami okazały się jedynie orzęski *Trichodina kupermani*. Średnia ekstensywność zarażenia rozpióra tym gatunkiem wynosiła 43,7%, a intensywność wahała się od pojedynczych do masowo występujących osobników. Orzęski te wykazywały sezonową dynamikę zarażenia ryb; najwyższą ekstensywność i intensywność zarażenia obserwowano w okresie od maja do sierpnia. Na sezonowość zarażenia *T. kupermani* nie miała wpływu wielkość badanych rozpiórów.

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