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Parasitology

ANALYSIS OF MATURITY OF *ASYMPHYLODORA IMITANS* (MÜHLING, 1898)  
(*TREMATODA: MONORCHIIDAE*) IN DEFINITE HOSTS

ANALIZA STOPNIA DOJRZAŁOŚCI *ASYMPHYLODORA IMITANS* (MÜHLING, 1898)  
(*TREMATODA: MONORCHIIDAE*) W ŻYWCIELU OSTATECZNYM

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Observations on *Asymphylogora imitans* (Mühling, 1898) from *Abramis brama* (L.), *A. ballerus* (L.), and *Blicca bjoerkna* (L.) carried out over 3 years allowed to describe the maturity stages of the parasite in its definite hosts. Juvenile and mature forms were separated among the trematodes found. The percentage distribution of the two groups in monthly samples of the fish species studied is described.

INTRODUCTION

The available literature contains few works in which maturity of trematodes of the genus *Asymphylogora* Looss, 1899 in their definite hosts is taken into account. Such reports focus mainly on *A. tincae* (Modeer, 1790). The seasonal dynamics of the species in *Tinca tinca* (L.) from ponds near Lvov was described by Komarova (1951). Wierzbicka (1970) studied maturity of the parasite in *T. tinca* from lakes and ponds of the Masurian Lake District (Poland). When describing the morphology of *A. imitans* (Mühling, 1898)

from *Abramis brama* (L.), Wierzbicka (1965) pays attention to a varying degree of maturity in the parasites collected in October – December. Later, in 1977, when studying trematodes in the north-western Poland, the author followed an intensified invasion of the species in *A. brama*, *A. ballerus* (L.), and *Blicca bjoerkna* (L.) in different seasons of the year.

It seemed purposeful to check the maturity stage of *A. imitans* in sympatric fishes collected over a period of three years.

## MATERIAL AND METHODS

The trematodes *Asymphylogora imitans* collected from three fish species: *Abramis brama* (L.), *A. ballerus* (L.), and *Blicca bjoerkna* (L.) were studied. The fishes were caught in the Lake Dąbie, an area connected with the river Odra mouth region. The detailed description of the habitat was given by Wierzbicka (1977). The studies reported herein were carried out in different seasons over the period of 1969–1971. Monthly samples of each species consisted usually of 10–16 individuals. A total number of 233 *A. brama*, 295 *A. ballerus*, and 229 *B. bjoerkna* individuals was examined. The age ranged from 1+ to 10+, 1+ to 9, and 1+ to 10+ in *A. brama*, *A. ballerus*, and *B. bjoerkna*, respectively. The trematodes were collected by decantation. Flattened individuals were fixed in 75% alcohol, stained with alum carmine, dehydrated in the alcohol series, and mounted in Canada balsam.

*A. brama* yielded a total number of 14005 *A. imitans* individuals (Table 1), 508 and 5894 individuals being collected from *A. ballerus* (Table 2) and *B. bjoerkna* (Table 3), respectively.

## RESULTS

*Asymphylogora imitans* is a common parasite of the alimentary tract of the fish species studied in the Lake Dąbie 87.8% and 86.7% of *A. brama* and *B. bjoerkna*, respectively, being highly intensively infested. A much lower invasion (25.9%) was observed in *A. ballerus*. The infestation of *A. brama* and *B. bjoerkna* remained high throughout the entire period of study, while the *A. ballerus* infestation tended to decrease in autumn-winter and early spring, falling at times to null. The problem was treated in depth by Wierzbicka (1977).

The *A. imitans* individuals found in the three fish species showed a varying degree of their maturity. They can be divided into two basic groups: juveniles and mature individuals, the main differences lying in the gonad development and body size. The juveniles grouped the youngest individuals with very small testes and ovaries, boundaries between them not always clear. The genital pore and penis sheath are very poorly developed. Older trematodes in this group showed fully developed testes, ovaries, and penis sheath with a more or less well developed seminal vesicle, the vitellaria being in

Table 1

Juvenile and mature *Asymphyiodora imitans* (Mühling, 1898) in *Abramis brama* (L.)

Total no. of trematodes			Month	Juveniles (%)			Adults (%)		
1969	1970	1971		1969	1970	1971	1969	1970	1971
—	—	656	March	—	—	65.4	—	—	34.6
—	516	528	April	—	52.1	35.6	—	47.9	64.4
—	413	284	May	—	16.9	7.4	—	83.1	92.6
998	577	661	June	15.2	19.6	0	84.8	80.4	100
176	3828	1331	July	13.6	45.5	0.5	86.4	54.5	99.5
656	1277	16	August	6.3	10.3	0	93.7	89.7	100
400	268	451	September	38.7	28.4	5.3	61.3	71.6	94.7
217	38	—	October	39.6	5.3	—	60.4	94.7	—
376	275	—	November	26.9	26.5	—	73.1	73.5	—
—	63	—	December	—	22.2	—	—	77.8	—

Table 2

Juvenile and mature *Asymphylogora imitans* (Mühling, 1898) in *Abramis ballerus* (L.)

Total no. of trematodes			Month	Juveniles (%)			Adults (%)		
1969	1970	1971		1969	1970	1971	1969	1970	1971
—	—	0	March	—	—	0	—	—	0
—	0	0	April	—	0	0	—	0	0
—	18	5	May	—	83.3	60.0	—	16.7	40.0
36	84	24	June	19.4	71.4	37.5	80.6	28.6	62.5
206	36	47	July	9.2	47.2	36.2	90.8	52.8	63.8
16	4	7	August	0	0	0	100	100	100
14	5	1	September	71.4	20.0	0	28.6	80.0	+
2	0	—	October	+	0	—	+	0	—
0	1	—	November	0	+	—	0	0	—
—	2	—	December	—	+	—	—	0	—

Table 3

Juvenile and mature *Asymphylogora imitans* (Mühling, 1898) in *Blicca bjoerkna* (L.)

Total no. of trematodes			Month	Juveniles (%)			Adults (%)		
1969	1970	1971		1969	1970	1971	1969	1970	1971
—	—	8	March	—	—	0	—	—	100
—	107	47	April	—	63.3	17.0	—	33.7	83.0
—	282	186	May	—	26.6	1.6	—	73.4	98.4
1202	738	55	June	11.8	7.3	23.6	88.2	92.7	76.4
48	1638	111	July	6.2	61.0	8.1	93.8	39.0	91.9
268	79	40	August	56.7	38.0	0	43.3	62.0	100
54	108	123	September	7.4	35.2	13.0	92.6	64.8	87.0
192	157	—	October	62.0	84.1	—	38.0	15.9	—
194	100	—	November	24.7	67.0	—	75.3	33.0	—
—	157	—	December	—	75.8	—	—	24.2	—

different developmental stages. The group of mature parasites consisted of individuals showing in their uteri single or very numerous eggs, sometimes the eggs completely covering the internal organs.

No regular pattern in monthly percentage distribution of the juvenile and mature individuals of *A. imitans* in their hosts over the three years could be detected. Mature and juvenile parasites were present in almost every sample. The juveniles were absent in two 1971 samples of *A. brama* (Table 1) and *B. bjoerkna* (Table 3), and in three August samples of *A. ballerus* (Table 2).

Over the period of study, *A. brama* showed a higher or lower predomination of adult trematodes; it was only in March 1971 and April 1970 that the contribution of egg-bearing parasites dropped slightly below 50% (Table 1). However, differences in some months were rather considerable, e.g., in July of the consecutive years the juveniles contributed 13.6, 45.5, and 0.5%.

The juvenile-mature trematodes ratio was slightly different in *B. bjoerkna* (Table 3). The domination of juveniles was found in 7 samples. The highest percentage of these forms (67.0–84.1%) was being recorded from October till December 1970, while *A. brama* collected at the same time was found to contain only 5.3–26.5% of immature trematodes. Similarly to *A. brama*, *B. bjoerkna* showed in some months clear fluctuations in percentages of mature and juvenile trematodes, e.g., in July the juveniles made up 6.2–61.0% (Table 3).

The predomination of juveniles (60.0–83.3%) in *A. ballerus* was observed in 4 samples taken in September 1969, May 1970, May 1971, and June 1970 (Table 2). In those months of every year of study *A. brama* and *B. bjoerkna* contained much more numerous egg-bearing parasites.

The youngest individuals of *A. imitans* with barely visible gonads were found in almost every monthly sample over the whole period of study. Also the trematodes with single eggs, assigned to the adult group, were recorded in various seasons.

The infestation of the three species with adult and juvenile trematodes in a sample, regardless of fish age, varied. An example is provided by *A. brama* and *B. bjoerkna* caught in July 1970, when almost all the fishes were relatively strongly infested with the trematode. Some fishes contained exclusively the adult parasites, in others a domination of either the adult or juvenile trematodes was observed. A few fishes showed similar numbers of juveniles and egg-bearing specimens.

## DISCUSSION

A detailed examination of intestines of *A. brama*, *A. ballerus*, and *B. bjoerkna* showed the presence of *Asymphylogora imitans* in various maturity stages to occur in its definite hosts, regardless of season. The youngest forms as well as completely mature ones were being found in every season. Similar results were recorded by Wierzbicka (1965) in *A. brama* caught from the Vistula of Toruń in October – December. The paper

mentioned contains figures of the juvenile and adult forms, their sizes and percentage infestation with each group in the three months being stated.

When the present data are compared to those reported by Wierzbicka (1970) for *A. tincae* parasitising *Tinca tinca*, a considerable similarity is seen. The degree of maturity of *A. tincae* in its definite host differed from season to season. Divergent results were arrived at by Komarova (1951) who studied the maturity of the species in *T. tinca* in the vicinity of Lvov. In summer (July) only the mature trematodes were encountered, while the juveniles occurred in winter (January) and in spring (April). Komarova concluded that the entire life cycle of *A. tincae* was completed within a year. It is possible that different environmental conditions had influenced her results; her materials were collected in ponds subject to exploitation.

The juvenile-adult *A. imitans* ratios in the three species was not always the same in every sample. However, immature trematodes and egg-bearing specimens were being found in those hosts in every season.

To conclude, it can be said that *A. imitans* belongs to those parasites unaffected in their development by seasonality, similarly to *A. tincae* (Wierzbicka, 1970).

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#### ANALIZA STOPNIA DOJRZAŁOŚCI *ASYMPHY LODORA IMITANS* (MÜHLING, 1898) (*TREMATODA: MONORCHIDAE*) W ŻYWCIELU OSTATECZNYM

#### Streszczenie

Badania prowadzono w latach 1969–1971 pobierając materiał w różnych miesiącach. Ryby pochodziły z jeziora Dąbie łączącego się z ujściowym odcinkiem Odry. Łącznie zbadano 233 leszcze, 295 rozpiórów i 229 krąpi.

*Asymphy lodora imitans* (Mühling, 1898) jest pospolitym pasożytem przewodu pokarmowego badanych ryb w jeziorze. Najczęściej spotykano przywry o różnym rozwoju gonad. Do grupy osobników młodocianych zaliczono pasożyty bez jaj. Starszą grupę stanowiły przywry, które posiadały w macicy pojedyncze lub bardzo liczne jaja. Procentowe zestawienie form młodocianych i

dojrzałych *A. imitans* w poszczególnych miesiącach, w ciągu trzech lat, u trzech żywicieli nie wykazało jakiegokolwiek regularności (tabl. I, II, III). Pasożyty niedojrzałe i z jajami występowały niemal we wszystkich próbach niezależnie od pory roku. Uzyskane wyniki wskazują na brak sezonowości w rozwoju badanych przywr.

Я. Вежбицка

АНАЛИЗ СТЕПЕНИ ЗРЕЛОСТИ *ASYMPHYLODORA IMITANS* (MÜHLING, 1898)  
(ТРЕМАТОДА: MONORCHIIDAE) В ОКОНЧАТЕЛЬНОМ ХОЗЯИНЕ

Р е з ю м е

Исследования проводили в 1969–1971 годах собирая материал в различных месяцах. Рыбы получали из оз. Домбе, соединенного с устьевым отрезком р. Одры. Провели исследования 233 лещей, 295 синцов и 229 шт. густер.

*Asymphyldora imitans* (Mühling, 1898) является обычным паразитом пищевого тракта исследуемых рыб в озере. Наиболее часто встречали трематоды с различной степенью развития гонад. В группу молодых особей зачили паразиты без яиц. Старшую группу составляли особи которые имели в матке одичные или очень многочисленные яйца. Процентное составление молодых и зрелых форм *A. imitans* в отдельные месяцы, в течение Злет у 3 носителей не показало какой-нибудь повторяемости (таб. I, II, III).

Паразиты незрелые и с яйцами обнаружили почти во всех пробах независимо от периода года. Полученные результаты показывают на отсутствие сезонного характера развития исследуемых трематод.

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Received: 6 VIII 1981 r.

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