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An investigation of "black spot" disease of bream (*Abramis brama*) from the Curonian Lagoon, south-eastern Baltic Sea

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Abstract

"Black spot" disease of bream from the Curonian Lagoon was studied. Disease occurred in 23 % of bream. Prevalence of the black spots grew from 0.5% to 46% with increase in fish length from 2.8 to 54.0 cm, and numbers of spots per specimen increased from 1 to 268. Two types of black spots were found. The first type did not contain cysts with parasites. Spots of the second type contained cysts with metacercariae of *Posthodiplostomum cuticola.* The metacercariae had a wide size range (0.7 – 2.1 mm); a larval length 1-1.5 mm was most common. Metacercariae were found mostly in the pharynx and gills. Seasonal dynamics of "black spot" disease of bream were studied: Black spots of the first type were found all year, while black spots of the second type were found from April to October.

Introduction

Black spot or "pigment spot" (melanosis) disease is one of the most common diseases of marine and freshwater fishes. The basic symptom of this disease is the presence on skin, under scales or on fins, of black spots containing parasites, which are surrounded by black pigment (melanin). More than 30 species of parasites (marine and freshwater) causing similar symptoms are registered at present (Kurochkin & Biserova, 1996). It is necessary to identify which parasite species is causative for proper diagnosis. There are two species of parasites (*Apophallus muehlingi* and *Postodiplostomum cuticol*a) causing "black spot" diseases of fishes in the Curonian Lagoon (Geceviciute, 1959; Vershinina, 1968; Paskeviciute, 1981; Rautskis, 1988). These parasites were found on different fishes, but most frequently they occur in *Cyprinidae*. The parasite causing "black spot" disease of bream (*Abramis brama*) is defined and peculiarities of bream infection are presented in the present study.

Materials and Methods

"Black spot" disease of bream from the Curonian Lagoon was studied during January 1998 - December 1999. A total of 4047 specimens of fresh fish (Length = 2.8-54.0 cm) were examined. All samples were taken from the Russian part of the Lagoon.

Metacercariae were fixed in 10% formalin and stored in 70% alcohol. The worms were stained in alum carmine after washing in distilled water, dehydrated in alcohol, cleared in clove oil and mounted in Canada balsam. Metacercariae were studied using light microscopy.

Site of black spot	proportion(%)
pharynx and gill	30
abdominal and anal fins	20
head	18
skin	12
dorsal fin	10
caudal fin	10

Table 1. sites of black spots among bream

To study the occurrence of *P.cuticola* metacercariae with different body lengths, they were divided into three groups: 0.7-0.9 mm, 1.0-1.49 mm, 1.5-2.1 mm.

Seasonal dynamics of "black spot" disease of bream was studied for fish with total length 22-54 cm.

Results

Disease occurred in 23 % of fish. No difference in occurrence of "black spot" disease in bream males and females was found. The relationship between fish length and occurrence of black spots was established: Prevalence of the black spots increased from 0.5% to 46% with increase in fish length from 2.8 cm to 54.0 cm. The number of spots per individual increased from 1 to 268.

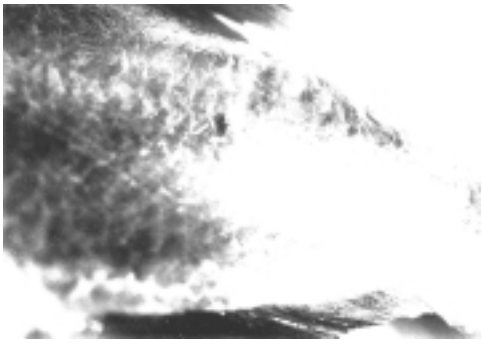

Figure 1. First type of black spots in bream

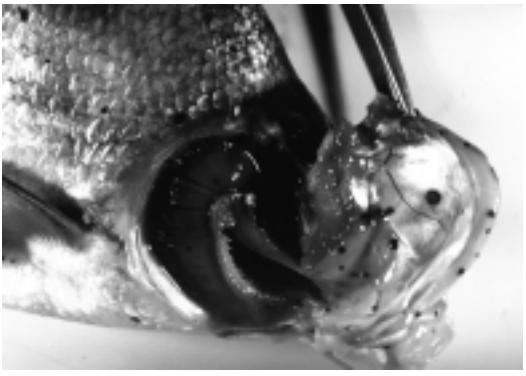

Figure 2. Second type of black spots in bream

The majority of black spots (30%) occured on the pharynx and gills (table 1). Two types of black spot were found. The first type, diameter of 2-5 mm with no precise border, ranged from dark grey to black incolour and had no cysts with parasites. The spots of the second type were convex with the precisely outlined borders and diameter of 1-3 mm. These were jet black in colour and had cysts with living metacercariae of *P.cuticola.* (Fig.1, 2).

The following description was based on measurement (in mm) of 404 larvae. Body length 1.28 ± 0.08 (range 0.7 – 2.1); oval forebody with pointed anterior, length 0.9 ± 0.06 (0,68-1.31), width 0.51 ± 0,03 (0.34-0.82); pear-shaped hindbody length 0.37 ± 0.03 (0.26-0.68), width 0.37 ± 0.03 (0.2-0.65). Oral sucker isubterminal, length 0.05 ± 0.004 (0.04-0,08), width 0.05 ± 0.003 (0.03-0.08). Acetabulum located posterior to middle of the body, length 0.06 ± 0.003 (0.04-0.08), width 0.05 ± 0,003 (0.04-0.08). Pharynx almost spherical, diameter 0.04 ± 0.003 (0.02-0.07). Adhesive organ (organ of Brandes) ioval or spherical, length 0.16 ± 0,01 (0,12-0,26), width 0.14 ± 0.01 (0.08-0.2). Distance from anterior border of body to acetabulum is 0.57 ± 0.044 (0.38-0.88).

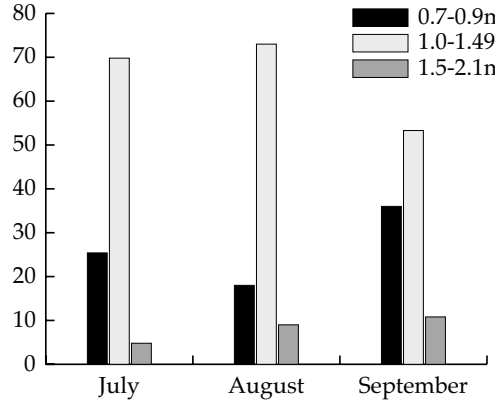

Figure 3. Occurence of metacercariae of *P. cuticola* with different body length.

The metacercariae were characterized by large range of sizes. Occurrence of *P.cuticola* metacercariae of different body length was studied for July-September 1998. Metacercariae with length of 1-1.5 mm were most common. In September the largest metacercariae (1.5-2.1 mm) occurred twice as often as in July (Fig.3).

Seasonal dynamics of "black spot" disease of bream were also studied. The black spots of the first type occurred within the whole period of observation. The living metacercariae in bream (the second type of the black spot) were found from April to October. Most frequently, bream "black spot" disease was found in the period from June to September, when about 60-100 % of fish were infected. (Fig. 4).

Discussion

Black spot disease occurred in 23 % of fish in our sample. This considerably exceeds the data from previous research in the same region (Geceviciute, 1959; Paskeviciute, 1981). This may be connected with the availability of intermediate hosts such as the gastropods *Lymnaea* and *Planorbis* and definitive hosts of *P.cuticola* ie. herons (Sudarikov, 1960, Ginetsinskaya, 1968) which occur more frequently in the central and southern parts of the Curonian Lagoon (Gasiunas, 1959, Aristova, 1965), where our samples of fish were taken.

Black spot disease was traditionally considered to be a disease of young fish; it is especially dangerous during the first 4 months of their life (Ginetsinskaya, 1968). Higher infection indices for bream fry (prevalence 20%; mean intensity 1.5) were marked in comparison with adult fish (prevalence 13,3%; mean intensity 1.5) in the Curonian Lagoon (Gecevi?i?t?, 1959). But according to our data the parameters of infection increased with increase in their length. The inclusion of bream fry (TL=2.8-7.0 cm) showed that less than 2 % of fishes were infected (mean intensity 1.0).

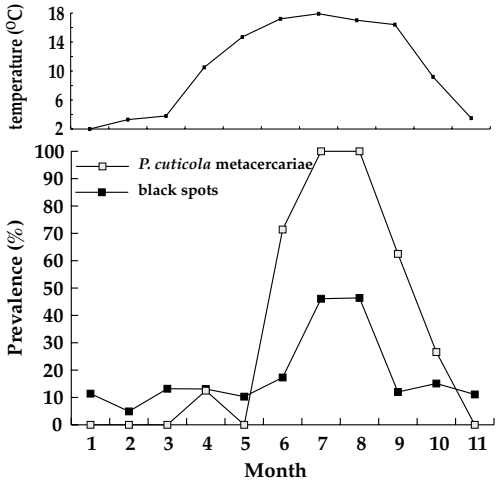

Figure 4. Seasonal dynamics of black spot disease in bream.

The basic food of adult bream is larval chironomiuds and mollusks (Panasenko, 1978). Free-swimming cercariae easily find feeding fish. Thus sucking-in feeding movements characteristic of bream easily allow them to become infected with cercariae. This may also explain why the most black spots are found on the pharynx and gills.

The maximum life expectancy of metacercariae of *P.cuticola* is about 3.5 years (Dönges, 1964), but we did not find live metacercariae in the winter of 1998-1999. During study period, only the first type of black spot were found. The first living metacercariae were detected in April at water temperature 10-12°C. The peak of infection occured with increased in temperature up to 17°C (July - August). Increase in the summer occurrence of *P.cuticola* metacercariae indicates continuous infection of fish with new generations of parasites and accumulation and growth of metacercariae in the fish during this period. Our study suggests that the water temperature was the main factor influencing seasonal changes in occurrence of black spot disease in bream from the Curonian Lagoon.

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