

DERMOCYSTIDIUM BRANCHIALE LÈGER, 1914  
(HAPLOSPOREA) FOUND ON THE GILLS OF A COMMON  
TROUT (SALMO TRUTTA) FROM THE RIVER SVRATKA  
(CATCHMENT-AREA OF THE DANUBE)

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A b s t r a c t

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The finding of haplosporidia of *Dermocystidium branchiale* on the gills of a common trout (*Salmo trutta*) from the river Svatka near Doubravnik (catchment-area of the Danube) is reported. It is a second finding of this parasite in Czechoslovakia.

Spherical cysts produced by the haplosporidia on the gill filaments were 0.15 to 0.44 mm in diameter and contained spherical spores of 6 to 10 µm in diameter. Histological examination revealed moderate regressive changes in the respiratory epithelium of the gills.

*Dermocystidium branchiale*, Haplosporea, *Salmo trutta*, gills, spores.

The incidence of parasites in common trout (*Salmo trutta*) in Bohemian and Moravian rivers has received rather considerable attention in the past few decades as evidenced by their list in the compendium by Ergens and Lom (1970). According to these writers the species *Dermocystidium branchiale* has been found so far in Swiss and Irish rivers and its incidence in Czechoslovakia is regarded by them as very probable. Their presumption was confirmed by us within an investigation into the health status of common trout (*S. trutta*) in the river Svatka by the finding of cysts containing mature spores of haplosporidia of *Dermocystidium branchiale* on the gills of one common trout.

The incidence of *D. branchiale* in European rivers seems to be rather rare. According to Lèger (1914) as cited by Jírovec (1939) this species was found on the gills of *Trutta fario* in the Dauphinean Alps and was described as a sp. n. Dunckerly (1914) as cited by Jírovec (1939) found it in trout (*S. trutta*) in Westport (Ireland) and identified it as the species *Dermocystidium pusula* that Pèrez (1907) had found in the skin of the newt (*Triturus marmoratus*) in France and called *Dermocystis pusula*.

The information on *Dermocystidium branchiale* (description and the place of its finding) in parasitological and ichthyopathological compendia (Dyk

1954; B y c h o v s k i j et al. 1962; E r g e n s and L o m 1970; S c h ä p e r c l a u s et al. 1979; B a u e r 1984) are based on the data supplied by L è g e r (1914).

The first finding of D. branchiale in fish in Czechoslovakia was reported by P a l á s k o v á (1985) who found it on the gills of common trout in the brook Borovnice in South Bohemia in 1980. Besides the description of the specimens, her report is concerned with the taxonomy of the genus Dermocystidium, its species known hitherto, seasonal occurrence of D. branchiale and infection experiments with this species.

The epizootiological role and pathogenesis of Dermocystidium sp. were considered by R o b e r t s and S c h l o t f e l d t (1985) with reference to the finding of P a u l e y (1967) that dermocystidiosis caused 25 % mortality among 5 000 adult Pacific salmon of the species Onchorhynchus tshawytscha. A l l e n et al. (1968) described a similar disease not only in adult salmon of the aforementioned species but also in fingerlings and concluded that an outbreak of the disease is favoured by temperature lower than 15°C.

In Europe, W o o t t e n and M c V i c a r (1970) described a massive infection in Atlantic salmon in Scotland where particularly young salmon were affected. They found numerous small cysts, 1 mm in diameter, on the gills of adult salmon and described the causative agent as a Dermocystidium sp., without further identification. The wall of the cyst described in their study consisted of fine fibrous tissue and the adjacent gill epithelium was hyperplastic. In some Atlantic salmon they found parasites also in other organs (adipose network of the body cavity, liver, heart, spleen, pancreas and pyloric appendices) and only rarely in the gills and regarded them as members of another species. According to P r o s t (1980) the hosts of D. branchiale are the sea trout (Salmo trutta) and the common trout and the pathological role of the parasite is small.

## M a t e r i a l s   a n d   M e t h o d s

Four common trout, 195 to 226 mm in length and 85 to 141 g in body mass, from the river Svatka (near Doubravník) were subjected to parasitological examination on the 3rd of June 1987. Six common trout, 198 to 251 mm in length and 96 to 138 g in body mass, from the same river were obtained for examination on the 11th of August 1987. Another 6 common trout, 175 to 210 mm in length and 68 to 135 g in body mass, from a stream called Nedvědička (near Věžná) were examined on the 3rd of August 1987. The Nedvědička is tributary to the Svatka and the two localities from which the trout were obtained are about 10 km apart. Cysts on the gills (40 specimens) were diagnosed only in one common trout from the first locality on the 3rd of June 1987.

The fresh material was fixed with 4 % formol. For species identification, native slide preparations and preparations stained with Giemsa stain and with haematoxylin and eosin were prepared. Histological processing was carried out with routine methods using paraffin blocks stained with haematoxylin and eosin and with van Gieson stain.

## R e s u l t s

### Description of the Parasite and of the Pathological Changes

Species: Dermocystidium branchiale

Host: Common trout (Salmo trutta)

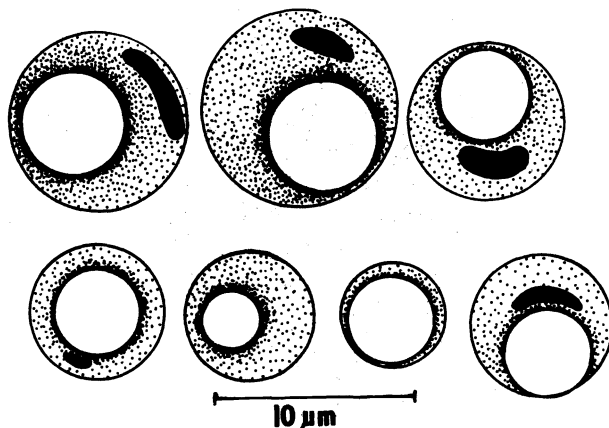


Fig. 1. Spores of Dermocystidium branchiale showing a large refractive vacuole and the elongated nucleus.

Locality: The river Svatka (near Doubravník)  
catchment-area of the Danube

Location: Gills

Intensity: 40 cysts

Percentage of trout infected: 10 % (1 out of 10 trout  
examined)

Mature spores were almost spherical in shape and generally 8  $\mu\text{m}$  (6 to 10  $\mu\text{m}$ ) in diameter. Examination of the native and 4 % formol-stained preparations showed that the spores contained large, spherical, highly refractive homogenous bodies that were generally located excentrically and some of them could be seen even at the rim of the spore. Their size (4 to 6  $\mu\text{m}$  in diameter) was proportional to that of the spore. Some spores showed the presence of a spherical or elongated, frequently slightly bent formation of varying size. In Giemsa-stained preparations, heavily-staining irregular formations suggestive of the nucleus could occasionally be seen in addition to the refractive body.

In histological sections stained with haematoxylin according to Mayer the staining of the nuclei was very intense. The elongated nuclei were 0.002 to 0.003 times 0.002  $\mu\text{m}$  in size.

The spores were located in small cysts. The cysts exhibiting a marked wall and spherical in shape were found

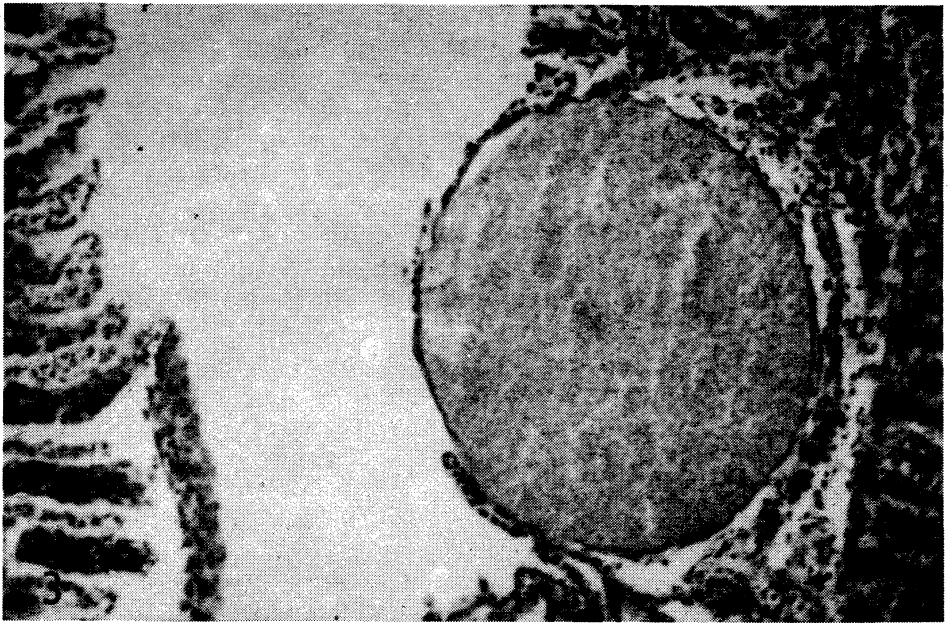
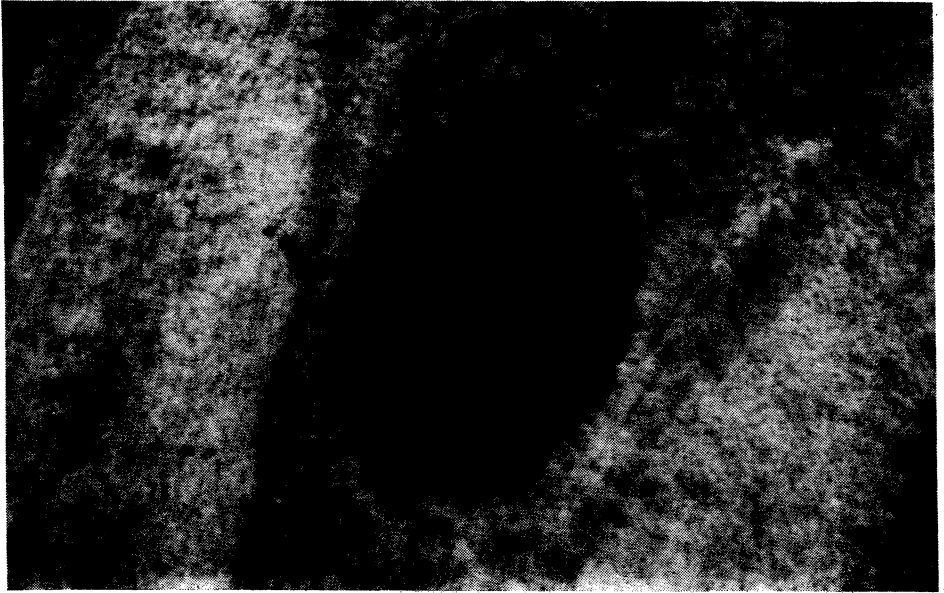


Fig. 2. A cyst of Dermocystidium branchiale between the gill filaments (compression preparation; magnification: obj. x10, oc. x7).

Fig. 3. A cyst of Dermocystidium branchiale located between respiratory plate-like projections of the gill filament and showing a distinct capsule (histological section, HE; magnification: obj. x10, oc. x7).

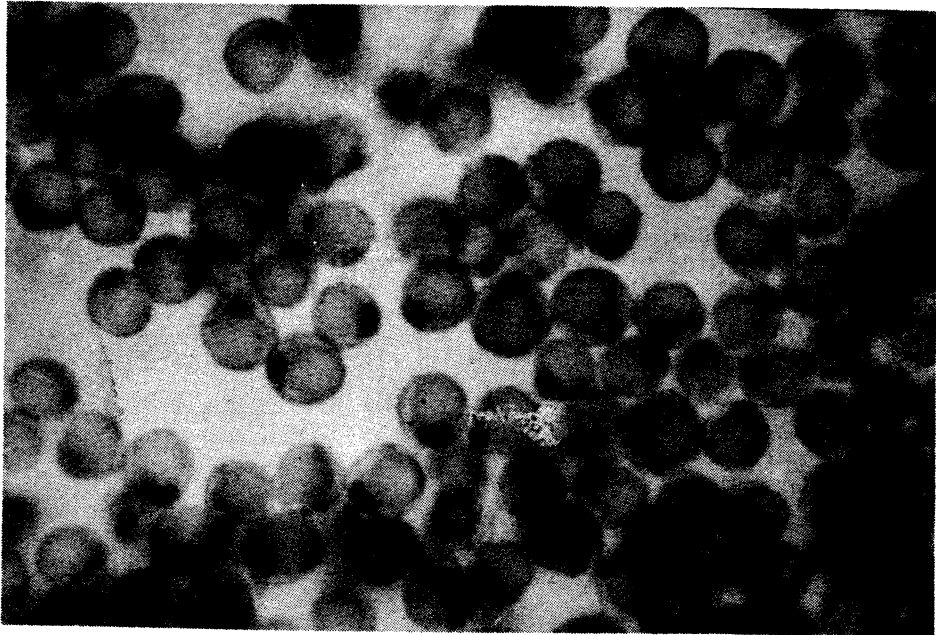
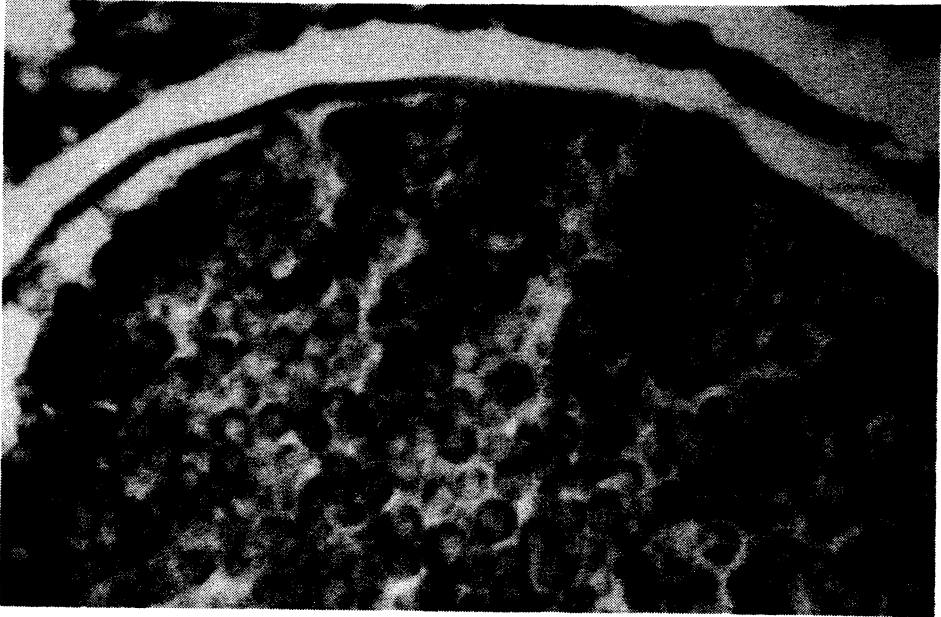


Fig. 4. Part of a cyst of Dermocystidium branchiale with the distinct membrane of the parasite (histological section, van Gieson; magnification: obj. x45, oc. x7).

Fig. 5. Spores of Dermocystidium branchiale showing dark nuclei at the periphery (histological section, HE; magnification: obj. x60, oc. x7).

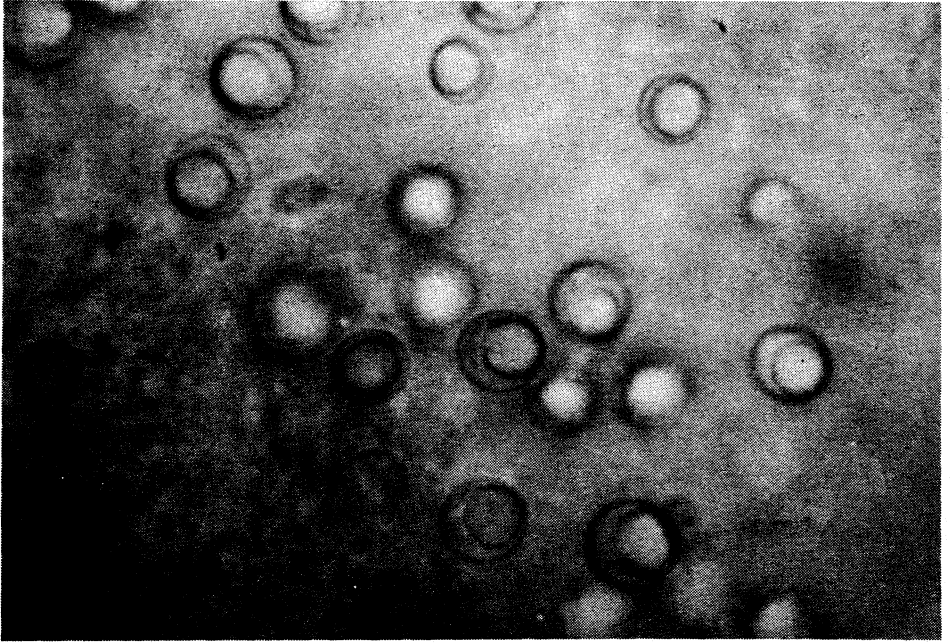


Fig. 6. Spores of Dermocystidium branchiale showing large excentrically located vacuoles (native preparation; magnification: obj. x60, oc. x7).

on the gills both at the base of gill filaments and in the medium and peripheral parts. They were often located between respiratory plate-like projections in the stratified gill epithelium or in the respiratory epithelium. The cysts showed considerable variation in size (15 cysts measured in our study ranged from 0.150 to 0.440 mm in diameter).

Histological examination of the gill samples revealed spherical cystic formations of varying size, generally located between gill filaments. They were enclosed with a delicate capsule of filamentous collagen and showed a slightly basophilic granulated content that proved to be a dense accumulation of spherical spores when examined under higher magnification. Inside the spore a large light vacuole was located slightly excentrically. Its content did not stain with alcian blue and therefore contained no acid mucopolysaccharides. Positive reaction for mucopolysaccharides was shown only by the cell membrane. Located at the periphery of the spore was the basophilic ovoid or slightly curved nucleus.

The respiratory epithelium adjacent to the cysts showed regressive changes of various degree: it was atrophic at the sites of direct contact with the cysts and showed dystrophic injury manifested by vacuolization of the cytoplasm, impaired outline of the cell and occasionally also by necrobiotic changes of the nuclei in more distant areas. A frequent accompanying finding was passive hyperaemia of the gill tissue. No reactive inflammatory processes at the gill epithelium adjacent to the cysts were observed. This finding suggests that the cysts in the gill tissue increase slowly and do not produce a morphologically distinct defensive response of the host.

*Dermocystidium branchiale* Lèger, 1914 (Haplosporea)  
cizopasník žaber *Salmo trutta* z řeky Svratky (povodí Dunaje)

Práce hodnotí výskyt haplosporidie *Dermocystidium branchiale* a popisuje druhý nález tohoto druhu z území ČSSR. Cizopasník byl zjištěn jen u 1 pstruha obecného v řece Svratce (povodí Dunaje) u města Doubravníku v měsíci červnu 1987.

Haplosporidie vytvářely na žaberních lístcích kulovité cysty velikosti 0,15 - 0,44 mm a obsahovaly kulovité spory velikosti 6 - 10  $\mu\text{m}$ . Histologickým vyšetřením byly zjištěny v respiračním epitelu žaber mírné regresní změny.

*Dermocystidium branchiale* Lèger 1914 (Haplosporea)  
жаберный паразит *Salmo trutta* реки Свратки/бассейна Дуная

В работе дается оценка наличия гаплоспоридии *Dermocystidium branchiale* и описание второго по счету выявления данного вида на территории ЧССР. Паразит был установлен лишь у одной форели в реке Свратке (бассейн Дуная) около города Дубравник в июне 1987 г.

Гаплоцпоридии образовали на листиках жабр шарообразные кисты величиной 0,15 - 0,44, мм содержащие шарообразные споры размером 6 - 10 мкм. Гистологическими исследованиями были в эпителии дыхательных путей установлены незначительные регрессивные изменения.

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