

A new *Ichthyophthirius*

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The end of the 20th century was characterized by an increase of interest in the ornamental fish industry. Because of favorable conditions there was an exceptional boom in breeding, cultivation and export of ornamental fishes in South-eastern Asia. However, in these countries water used in containers for breeding of ornamental fishes usually comes from natural reservoirs. Local fish inhabit these reservoirs and they may be carriers of parasites hazardous to fish from other zoogeographical regions. Pathogenic organisms of fish can get into breeding containers with source water since special water treating facilities are usually not applied in the fish farms. Thus import of ornamental fish into countries of Western Europe has caused a number of problematic diseases.



Botia macracantha heavily infected with *Neolichthyophthirius schlotfeldti*.

PHOTO: G. BASSLEER

Some time ago I had to inspect several private aquariums, where there was a great loss of fish from *Ichthyophthirius*. Even at a brief investigation we understood that we are dealing with new species of parasite: the morphology of *Ichthyophthirius*, namely the structure of the large nucleus (macronucleus) and the size of body, differed from all previously known species (Fig. 3).

This new-found *Ichthyophthirius* seemed to have a long, thin, ring-shaped macronucleus. But after careful long-term monitoring of the

parasite outside the fish it appeared that the nucleus was not ring-shaped, but instead a round unclosed spiral. Another difference was that unlike European *Ichthyophthirius* the majority of these ciliates had not just one ring-shaped nucleus but two. That meant the fission process takes place directly inside the fish without having to leave it – right under the skin. It is known from scientific publications that for its breeding *Ichthyophthirius multifiliis* have to leave the fish in the form of a reproductive cysts (throphonts) to reproduce. Inside the cyst the fission process and the formation of wandering stages takes place. Later, having left the cyst, they infect fish.

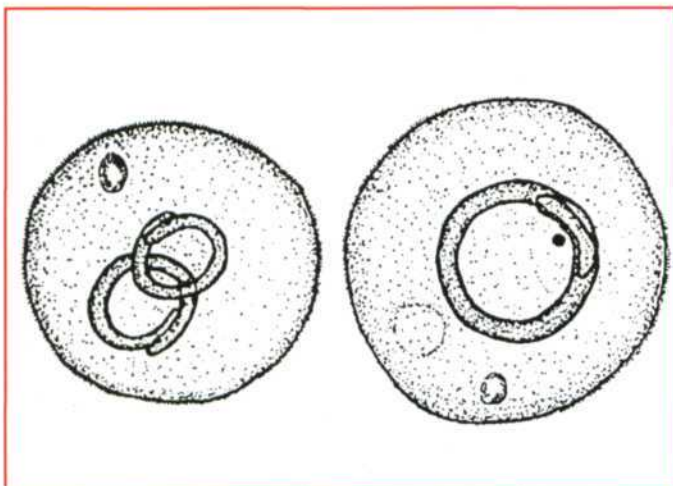


Fig.1. *Neolichthyophthirius schlotfeldti* (after Bauer, Yunchis 2001).

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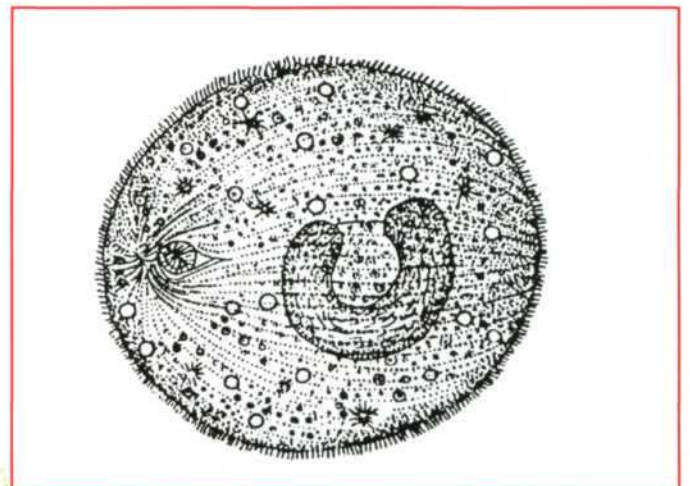


Fig.2. After Determinant of freshwater fish parasites of USSR, *Ichthyophthirius multifiliis*, 1962.

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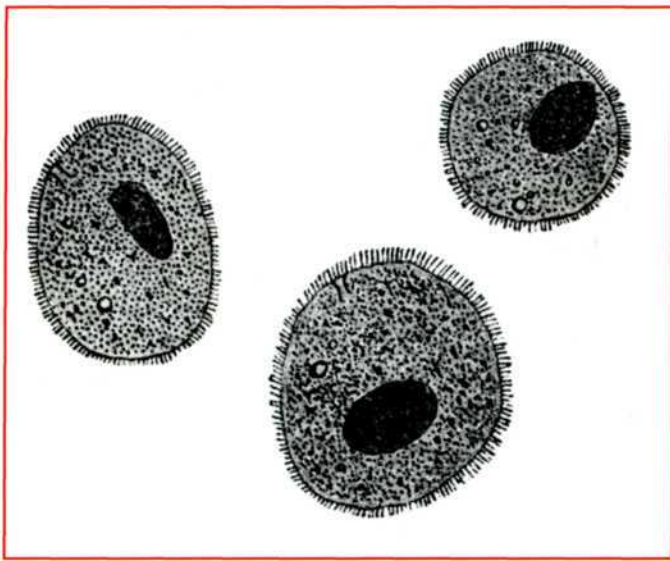


Fig.3. *Ichthyophthirius multifiliis* (after Zolotnitsky, 1916).

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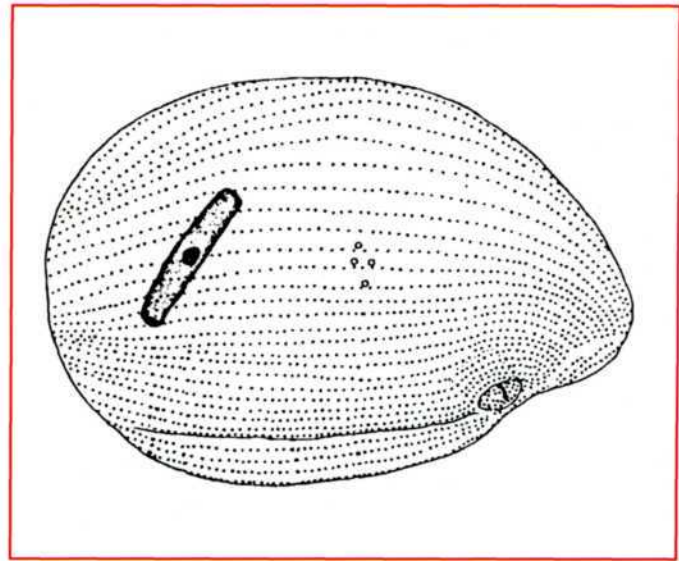


Fig.4. *Ichthyophthirius browni* (after Rogue, Putorac, 1968)

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There was another difference between the new parasite and *I. multifiliis*: in the same place under the skin epithelium we could find 5-10 trophonts. Therefore another sign that the parasite's reproduction process takes place inside the fish.

We have also noted that there were a lot of vacuoles in the protoplasm of this new *Ichthyophthirius*. Later, when studying biological characteristics of the new species, we were able to figure out that the most comfortable temperature for its development was 28-30°C. Reproduction can still occur at a temperature of 32-34°C, but in this situation the parasite will slow down its development. This means that new parasite is a thermophilic species.

As we had discovered a new, previously undescribed species of parasite, and we have called it *Ichthyophthirius schlotfeldti*, after the famous Russian ichthyopathologist Nicholas A. Schlotfeld, former President of the European Association of Ichthyopathologists, who now lives in Hannover. First description of this species was published in Schotland in the materials of the 7th international

conference of ichthyopatologists in 1997. Later we together with professor O.N. Bauer, by morphological analysis of available material, found it correct to organize the parasite into the new genus and called it *Neolchthyophthirius schlotfeldti* (published in the magazine "Parasitology", 2001).

Symptoms

At temperatures normal for tropical fish (20-26°C) there are no obvious symptoms of the disease on fish infected with *Neolchthyophthirius schlotfeldti*, though the number of parasites increases slowly. Fish look healthy. But in 1,5 or 2 months the symptoms of ichthyophthiriasis start to appear. Inexperienced aquarists would probably blame this on contamination of the aquarium. In reality, the disease was on the fish all the time but in a hidden form.

We observed this process many times when we examined the details of *N. schlotfeldti* life cycle. It turned out that if the parasite was introduced into the tank at water temperature 22-24°C first

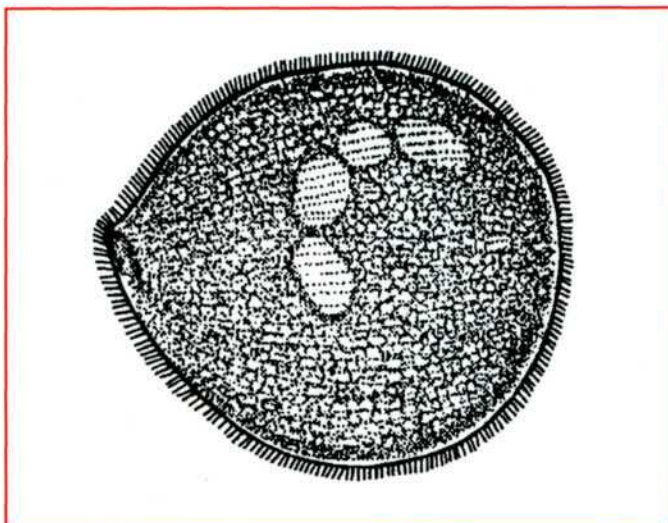


Fig.5. *Cryptocaryon irritans* (after Bassleer).

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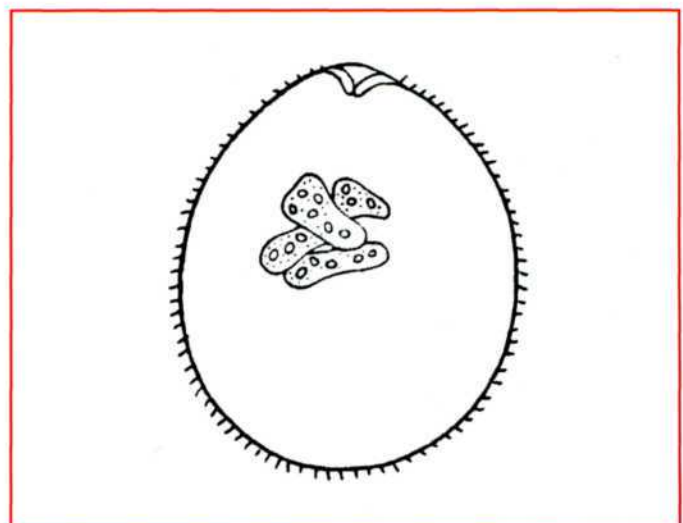


Fig.6. *Cryptocaryon irritans* (after Lom, Brown, 1963).

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visual manifestations of disease were observed only in 35-40 days. Most attempts of treatment with high temperatures (30-34°C) were successful in case of *Ichthyophthirius multifiliis*. But every time we dealt with the new thermophilic species *N. schlotfeldti* this kind of treatment failed.

It should be noted that if *Neolichthyophthirius schlotfeldti* has not yet fully infected the fish (and fish is just a vector) there are no signs of the disease. Sometimes the first signs of infection appear not in the form of white spots, as it happens in cases with *Ichthyophthirius multifiliis*, but in a form of grayish wave-like coating. White spots start to appear only when the amount of parasites becomes too much.

While studying the "Encyclopedia of aquarium fish" by G. Axelrod, we noticed the picture of *Ichthyophthirius* placed in the section "Fish Diseases". This picture depicts a typical *Neolichthyophthirius schlotfeldti* while it is captioned as *Ichthyophthirius multifiliis*. That means this species of parasite has also been introduced into American aquarium industry. However, we do believe that its place of origin is South-eastern Asia. We also assume that this species is found on fishes of the Amur River and lake Khanka, although previously we thought it to be a new strain of *I. multifiliis*, found by us.

Difficulties of treatment

When starting therapy against ichthyophthiriasis we should remember that the difficulty of treatment is that the parasite is not on outside of the fish but under the epithelium. That means applied medicines can only affect the parasites being out on the skin or when they emerge out of their cysts (toronts). At that time formaline, salt, etc. baths are effective. Baths with FMC are even more effective, but they cannot affect parasites which remain under the skin. For this reason, the use of one-time bath treatment will not cure the fish completely. For this reason, the use of one-time bath treatment will not cure the fish completely.

There is only one relatively nontoxic medicine that can act through the skin barrier and capable to partially destroy the parasites – it is malachite green. But still it is not quite effective for the *Ichthyophthirius multifiliis*.

Since recently we had to deal with ichthyophthiriasis caused by two species of parasite simultaneously, and it is only skillful ichthyopathologist that can give the correct diagnosis, we would recommend using malachite green in a solution of 300 mg per 100 ml of water with the addition of 0.05 potassium iodide (1ml of solution per 50 liters of water) for 4-5 days every day. On the first day of treatment we also recommend the application of trypaflavin (only once) 200 mg per 50 liters of water (trypaflavin should be introduced into the tank in dry form, as in solution it loses its effectiveness during 3-4 days, while the water continues to be colored for a long time).

Preventive measures

To prevent ichthyophthiriasis it is recommended to introduce all purchased live-stock into quarantine. Do not wait for disease manifestations. Start applying treatment with malachite green at a temperature of 26-27° C for 4 days right after delivery of fish (especially if you know that the livestock has arrived from South-eastern Asia).

We assume that in the wild there may be several species of ichthyophthiriasis pathogens which are distinguished by their morphology, biology and epizootology. For successful treatment it is necessary to figure out the exact species of parasite because sometimes ichthyophthiriasis can be confused with the larval stage of trematodes, which is treated with other methods and medicines. In conclusion we would like to remind the aquarists that it is better to have diseases of ornamental inspected by a professional ichthyopathologist who not only knows diseases and their treatment but also the biology of fish.

Literature

- Bauer O. N., Yunchis O. N., 2001.** The new genus of parasitic ciliary from tropical fish. Magazine "Parasitology" Vol.35, 2, p.142-144.
- Zolotnitskij N.F., 1916.** An aquarium of non professional aquarist. Determinant of freshwater fish parasites of USSR, 1962.
- Ljm Iiri and Dykova Iva 1992.** Protozoan parasites of Fishes. Elsevier AMSTERDAM - London-New York - Tokyo p. 315
- Paperna I., 1972.** Infection by *Ichthyophthirius multifiliis* on fish in Uganda. Progr. Fish Culture. Vol.34., p. 162-164
- Roque M., Putorac P., 1967.** Intraciliaturedu novel Ophryoglenidat *Ichthyophthirioides* Brawn n.g., n. sp/ Protistologica. Vol.3. F.4. p. 465-474.
- Yunchis O.N., 1997.** A new species of *Ichthyophthirius* Fouquet. 1876. European Association of fish pathologists. 7th international conference "Diseases of fish and shellfish", p. 197.