

Diseases in Fish Part 5.

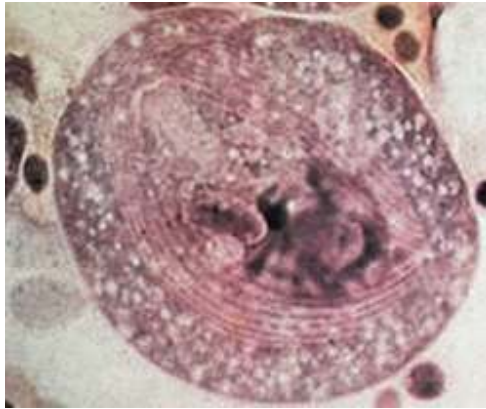
John Shawn Prescott

In the previous article I began the long examination of the various diseases to which are fish are prone, with a division of the ailments into the different divisions which is the methodology used in Fish Pathology. For those of you who read this column, you will recall that I began with the freshwater parasite commonly known as "white spot" or "Ick" , the scientific name being *Ichthyophthirius multifiliis* . This parasite was chosen, because it is probably the most ubiquitous of all the ailments that strike in fresh water Aquaria, & is common in Aquaculture as well.

Afterwards, as I began to contemplate the topics for discussion in the next version, I realized that a high percentage of you, (judging by the "hits" & the articles we have currently) are Salt water enthusiasts, so I have decided from now on, to try & balance the articles, with an examination of a fresh water and a salt water disease with each contribution.

In freshwater this month, we will examine the parasite known as *Chilodonella* , whilst for salt water we will look at the counterpart of *Ichthyophthirius multifiliis* , which is *Cryptocaryon irritans* . If any of you out there in the wide world of cyberspace, have any questions about the articles, or if there is a subject you would especially like me to deal with, please contact me at my E-Mail address john@aquarium-gardening.com

Chilodonella



Chilodonella cyprinii parasite under the microscope

***Chilodonella cyprinii*.** Causative organism: Ciliated protozoan parasite viz:- *Chilodonella cyprinii* . Synonyms (alternative names):- None Geographic distribution. World wide. Water type . Fresh water. Typical signs of infection. *Chilodonella cyprinii*.

Water. Poor water quality can bring on the reproduction of the parasite, as the fish become stressed.

Behaviour. Laboured breathing, and fish may appear at surface gasping for air. Fish will evidence lethargy, and may from time to time, try to "scratch" of the organisms, by rubbing against an object of some kind in the Aquarium. Distress is visibly obvious.

Fins. Fins often become clamped or folded

Body. Excessive mucous production is typical, & parts of the body will manifest a cloudiness as large numbers of the parasite begin feeding of the epithelial layers.

Gills. Gill examination will show large numbers of the leaf shaped organisms .

Skin. (smear). Should show ciliates once an infection has become established.

Life cycle & method of transmission.

This protozoan parasite occurs frequently in fresh water Aquaria, & has a counterpart in marine aquaria called *Brooklynella*. The parasite is vaguely leaf shaped with a length of 40-70 microns, & a width of some 30-50 microns. The ventral side of the parasite is covered with cilia. Inside the cell for those of you, who have a microscope, & wish to examine same, are a nucleus and two contractile vacuoles. These are made more evident, by staining the slide with a smear taken from an infected fish, using a stain such as methylene blue, or methyl violet.

Reproduction of the parasite takes place typically by mitotic division, but from time to time a pairing of two individuals takes place called conjugation, and an exchange of some genetic material probably takes place.

As with many parasitic infestations, *Chilodonella* can lie dormant for long periods of time, but if and when the fish becomes stressed or weakened for any reason, or if the quality of the water conditions in the Aquarium deteriorate, then rapid reproduction of the parasites can ensue, and once the gills are attacked mortality is to be expected.

Prognosis

When a heavy infestation of *Chilodonella* has taken hold, then some casualties are to be expected. Usually certain species such as Discus, will become infected most severely first, but if untreated other varieties will succumb as well. However if correct treatment is applied in good time, then it can not only be checked but it is also possible to eliminate the parasite.

Young fish have less capacity to resist the parasite, and will more easily succumb.

Treatment

Fortunately if successfully diagnosed , there are several treatments that can be used.

These include the use of formaldehyde used as a bath, also Acriflavine type drugs, as well as with Methylene blue, also quinine type drugs, all are effective. One should follow the manufacturer's instructions for treatment, as different producers, use different concentrations, & it is therefore impossible to give a standard treatment for all the medications out there.

In treating the fish, one should always make allowances for the degree of infection, as weakened fish may not always withstand the full dosage, either in strength, or period of time. This call is one which either one builds up experience over time, or enlists the help of a professional, or a dealer whose expertise you can trust.

As *Chilodonella* is not affected by change of water temperature, no alteration should be made to your thermostat.

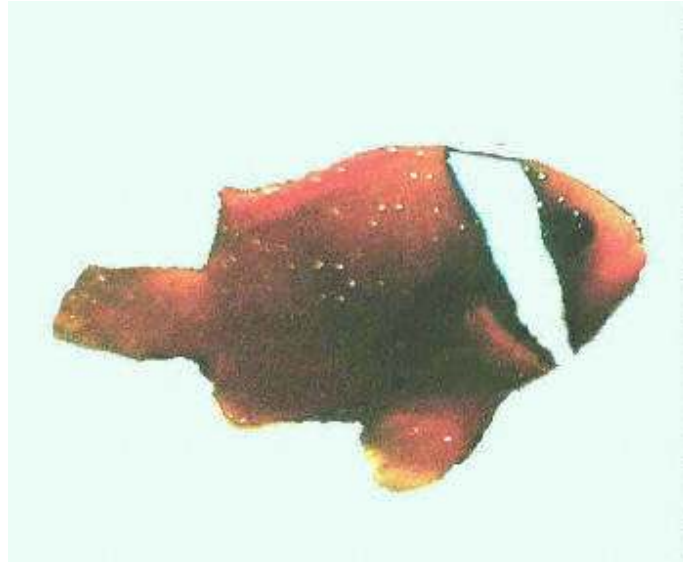
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Cryptocaryon irritans



Moderate to heavy infestation of C. irritans on Tomato Clown

Cryptocaryon irritans Causative organism: Ciliated protozoan parasite viz:- *Cryptocaryon irritans* Synonyms (alternative names):- Marine white spot. Geographic distribution. World wide. Water type . Salt water. Typical signs of infection. *Cryptocaryon irritans*.

Water. Less than optimum water quality, such as a lowering of the pH level, or high Nitrate or Phosphate readings can lead to an outbreak.

Behaviour. Fish will evidence lethargy, and may from time to time, try to "scratch" of the organisms, by rubbing against an object of some kind in the Aquarium. Distress is visibly obvious.

Fins. Fins often become clamped or folded. White spots (after which the disease is popularly named) usually appear often at first on the pectoral fins. As infection progresses, very large numbers of these spots of size 0.5-2.0 mm will spread .

Body. White spots appear on the body, & will if untreated spread so that almost snow like appearance will spread over its entirety. Some haemorrhaging may appear in later stages of the disease.

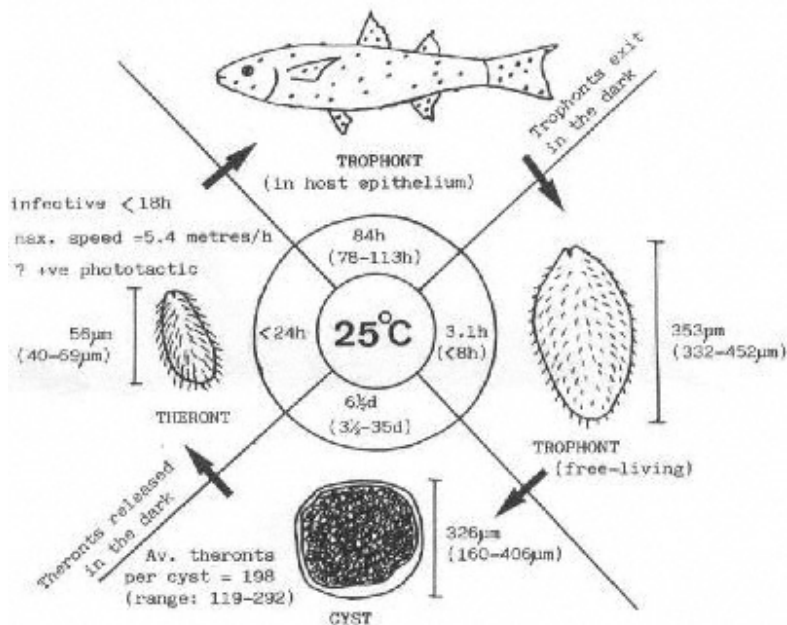
Eyes. In medium to advanced stages of an outbreak, the eyes typically become clouded, & when very heavy blindness can ensue.

Gills. Gill examination will show large numbers of the organisms .

Skin. (smear). Should show ciliates once an infection has become established. Secondary infection with fungal is commonplace once major invasion of the skin has taken place, adding to the problem.

Life cycle

Transmission is direct, with no intermediate hosts. *Cryptocaryon* is an obligate parasite, which means that it must infect a host fish in order to complete development.



Life cycle of *Cryptocaryon irritans*. Chart by Dr.Peter Burgess.

The life cycle of *Cryptocaryon* can be conveniently divided into four basic stages. Susceptible marine fish become infected with the active free-swimming stage, called the theront (or tomite).

The theront is incapable of feeding within the aquatic environment and therefore has a limited time, less than 12 hours, in which to contact and invade a fish, otherwise it will exhaust its energy reserves and die. If invasion is successful, the theront penetrates below the skin epithelium, possibly aided by digestive enzymes such as hyaluronidase, and transforms into the parasitic stage which is known as a trophont. The trophont actively feeds on the fish's tissues, twisting and rotating as it does so. It grows rapidly, doubling in size approximately every 24 hours. By 48 hours, the parasitic trophont is just visible to the naked eye, appearing as a small white spot on the fish. By the third or fourth day of infection, the trophont will have attained 3 to 5 millimetres in length and at about this time it exits from the fish. Although the trophont is equipped with rows of beating cilia it is too bulky to swim away from its host and instead it sediments to the substrate. (Compare with freshwater whitespot in which the trophont stage actively swims after leaving its host). Within a few hours, the trophont has firmly attached to the substrate and rounds up to form a thick-walled cyst. The cyst, also known as a tomont, is the reproductive stage which will eventually give rise to between 100 and 300 infective theronts, thereby completing the life cycle. Of course, not all theronts are successful in locating and infecting a host, even under ideal conditions only about 5-10% succeed. Nevertheless, within an closed environment, *Cryptocaryon* can increase in numbers by approximately tenfold every six to eight days. This enormous reproductive potential explains the sometimes rapid build-up of infection levels in any closed system..

The cyst is the only stage of *Cryptocaryon* which is known to reproduce; there is no conclusive evidence to suggest that the parasitic trophont stage can multiply within the fish's epithelium.

Prognosis

There is no reason why mortalities should take place, as to reach lethal levels this parasite usually takes some 7-12 days. Observant hobbyists should take remedial action, at an early stage & if this is done, and the results CAREFULLY monitored than a successful eradication of the problem is possible. Care must be taken, to ensure that no latent parasitic tomites are still present, so that the problem does not recur.

Treatment

In those Aquaria, where fish only are present, Copper based remedies, are very effective, although those chelated forms of Copper of which there are several have not in the writers experience given good results. The claim that you can use heavy doses of such Coppers, without harming the fish may be true, regrettably the same argument applies to the parasite. With the true Copper treatments that are effective it is vital to use a reliable Copper test kit, & in the first few days of treatment this must be done several times daily, as the Copper in a new tank to be treated, "binds" to the glass the rocks, and just about anything else, so that the therapeutic level drops below the recommended amount, & under this the parasite is able to complete its life cycle. Treatment should be continued for at least 7 days after all signs are absent, to ensure that no latent tomites are waiting the chance to re-infect.

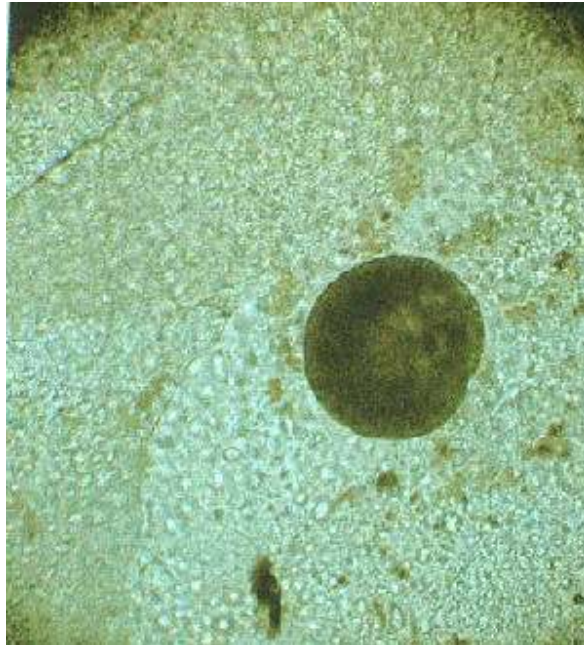
In Reef Aquaria, however no Copper treatments can be used, as they all will have fatal effects on almost all Invertebrate life. This leaves the Hobbyist with the alternative of catching his/her fish, & treating in a separate Aquarium. This is time consuming & can often ruin the appearance of a tank that has been carefully nurtured over a long period of time.

Fortunately Fish-Vet® has today a product called Ecolibrium®, which allows successful treatment of this scourge, and is harmless to all Invertebrates. We will be pleased to advise any Hobbyist where this product can be obtained. No test kits are needed and it biodegrades after a week, after treatment has ceased.

Another technique which can be used to help accelerate the eradication of the problem, is by giving the fish baths in either fresh water, or at a salinity of less than 10 ppt. The parasite cannot tolerate the change in osmotic pressure, though I am not sure if it will affect the tomitic stage as much as it will the free swimming trophont. This technique has been used very successfully in Aquaculture with those species of fish that are highly euryhaline (= able to tolerate wide variations of salinity). Our Aquarium fish for the most part will tolerate baths of up to a half an hour, but one must ensure that the pH & Temperature are similar to the Aquarium water. Also do not do any other task whilst the bath is taking place, as some fish will react more than others. If major distress is observed, the fish must be returned to the Aquarium. I have used this method to reduce the level of infection, and it has proved beneficial, though never absolute. Its greatest advantage is when the fish shows evidence of a high level of infestation, and one wishes to bring it down somewhat before starting more conventional treatment. For more details on the use of this method see the ref. below by Colorni 1987.

There is some evidence that there are 2-3 different strains of *Cryptocaryon irritans*, nobody to my knowledge has yet made a definitive analysis of such, but the empirical evidence would seem to indicate this. One observation made by many observers, is that the treatment that in one case is quickly and totally successful, in another either is not, or takes much longer to have an effect. One pragmatic point that the writer has used with success is those persistent cases, that either do not appear to react to conventional treatments, or do so much more slowly, is that it seems that the parasite is in some way linked in its life cycle to the photoperiod. In order to disrupt its usual timing of division, reproduction etc, I have found it helpful on occasion to leave the lights on for some 2 days, then do the opposite whilst at the same time covering the tank with a dark blanket or suchlike. This "manipulation" of the light seems to have a deleterious effect on the parasite, which coupled with the medication used often results in its elimination. I do not advise this however in the more usual straight forward cases.

A special observation:- The writer has observed with some of his co-workers on many occasions, that *Cryptocaryon irritans* often breaks out under the following conditions. The Hobbyist will have a tank with several specimens all of which are free of any signs of the parasite. A new fish will be introduced & the following day, "white spots" will be observed in a great many cases, NOT on the new introduction, but on one of established inhabitants. This happened so often so years ago, that we made some experiments on apparently "disease free fish". Most especially some powder blue, & yellow Tangs.



Cyst of C.irritans

We found on these fish, which had been free of all problems for more than half a year, that when we did some skin scrapings, that we found evidence of trophonts under the skin. Evidently these had not found it necessary to reproduce & leave the fish, as no sign of disease had occurred over a long period of time

With this evidence we explained the phenomena just mentioned as follows:-

A parasite by definition has a vested interest in co-existing with it's host. As long as no unusual disturbance takes place, it will continue it's idyllic existence , in harmony with it's host. However when a new specimen is introduced to the Aquarium, often the established inhabitants become quite excited, feeling that the newcomer will in some way, take their "space", eat their food, or even team up with their favourite fish/companion. This causes some form of chemical message to course its way through the fishes system, in much the same way, as adrenalin causes us, to become excited if we get a fright or suchlike. This chemical message, in some way alerts the parasite, which in effect says to itself, "Oh boy!, maybe I should get out from here, & look for a new host". The consequences are seen the next day, when it bores out from the host, leaving the telltale white spots.

To counteract this reaction, as much as possible, it is advised when introducing new fish to an established Aquarium, to do the following.

- 1) Introduce all specimens with the lighting as subdued as possible in the room, & with no lights on in the tank, continue this at least until the following day.
- 2) Change if possible one or two rocks, so that the existing fish are concentrating their attention on the change in the habitat they are used to, & not on the newcomer(s).

Of course it is also sensible if the Hobbyist has the facility to quarantine the new specimen, as they also can and do, introduce the parasite to the tank . This should be done if one has a separate quarantine tank, for at least a week, & preferably for 10 days.

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