

Cryptocaryon

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 hemorrhaging may appear in later stages of the disease.

Eyes. In medium to advanced stages of an outbreak, the eyes typically become clouded, and 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.

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 tomite.

The free swimming tomite has less than 12 hours to find and invade a host fish, otherwise it will exhaust its energy reserves and die.

If an invasion is successful, the tomite penetrates below the skin 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 has attained 3 to 5 millimeters in length and about this time it exits from the fish and drops down to the substrate.

Within a few hours the trophont has firmly attached to the substrate, forming a thick walled cyst. The cyst, known as a tomont, is the reproductive stage which will eventually give rise to between 100 and 300 infective tomites, thereby completing the life cycle.

Of course, not all tomites are successful in locating and infecting a host, even under ideal conditions only about 5 - 10% succeed. Nevertheless, within a 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.

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 and 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 tomonts 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, & 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 tomonts are waiting the chance to reinfect.

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 [No-Ich](#), which allows successful treatment of this parasite, and is harmless to all invertebrates. No test kits are needed & it biodegrades after a week, when treatment is 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 tomite 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 while the bath is taking place, as some fish will react worse than others. If major distress is observed, the fish must be returned immediately 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, & 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 while at the same time covering the tank with a dark blanket or such. 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" (specifically Powder Blue Tangs and Yellow tangs).

When we took skin scrapings from these fish that had been healthy for more than a year 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 its host. As long as no unusual disturbance takes place, it will continue its idyllic existence, in harmony with its 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 favorite 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 become frightened. 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, and 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, and preferably for 10 days.

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