TREATING WHITE SPOT

Denis James

White spot is probably the most common disease which appears in the aquarium. Nevertheless, there does not appear to be a general consensus of opinion as to the reasons for its appearance or as to methods of treating it. At the risk of adding to the confusion, I would like to make a few observations on the treatment of white spot which I have had to learn through hard experience. Before doing so, however, it is probably useful to refresh memories and briefly describe the nature of the disease.

White spot is caused by the protozoan Ichthyopthirius multifiliis. The invasive form of the organism is called a trophozoite. These tiny organisms swim freely in the tank until they find a host fish. They bore through the skin of the fish and settle between the epidermis and the dermis, where they live parasitically on inter-cellular fluid. They can move some distance by tunnelling between the two skin layers and a number can even congregate at the same site. The fish develops a white blister over the site of this invasion, creating the typical 'white spot'. More important and damaging, however, is the often unseen invasion of the gill tissues, which causes respiratory problems and death.

The trophzoite stays on the fish for 1 to 3 weeks before migrating out of the fish and sinking to the bottom of the tank. There it forms a multi-nucleate cyst within a day. These cysts finally burst, releasing up to 2000 new trophozoites. The duration of the this life cycle depends upon temperature. At 25°C-27°C, the cycle will take around 10 days while at lower temperatures, the process can take a number of weeks.

Some writers argue that these infective agents cannot live for more than 48 hours without finding a new host. However, it seems that there must be some dormant reservoir of the protozoan in every tank or in the water supply, since an onset of the disease can be brought on through various exogenous causes such as allowing a sudden drop in the aquarium temperature. In a well functioning aquarium, the most common cause of the disease is probably the introduction of new fish which may not be showing obvious signs of the disease when placed in the tank.

Cures

Given the problems associated with introducing drugs into the tank, any non-chemical method of curing a disease is to be preferred. The suggested technique of moving the fish to a new tank every day does not receive general approval and would also be highly impractical. The manufacturers of the diatom filter argue that micro-organisms such as white spot can be filtered out, but this surely could not eliminate all the infective agents in a tank.

It is well known that most protozoa can exist only within definite temperature and pH ranges. Temperature and pH can influence the ability of protozoa to assimilate nutriments. Raising the temperature also reduces the oxygen content of the water and it appears that the trophozoites of Ichthyopthirius are highly susceptible to a reduction in oxygen. Temperature and pH control might therefore be useful ways of combating the disease. Certainly, raising the temperature speeds up the life cycle of the disease and, in healthy fish, should reduce the period of stress and enable them to maintain a reasonable level of natural resistance which may help them combat a secondary infection. It has been argued, however, that raising the temperature to 30°C-33°C will in fact destroy the trophozoites. Similarly, it has been suggested that reducing the pH to around 5.5 also kills the organism.

Unfortunately, these temperature or pH conditions, if maintained for the necessary 10 days or so, could seriously stress fish and obviously could only be used for fish which can tolerate these conditions. I am very wary of using the temperature method after trying it in a tank where white spot had been brought on by the biosystem in the tank going out of balance. The higher temperatures simply speeded up the life cycle of the disease and spread it through the tank like wildfire!

There are several drugs which are commonly suggested for the treatment of white spot. They include the antiseptic dyes (methylene blue, malachite green and acriflavine), quinine derivatives and antibiotics such as chloramphenicol and the tetracyclines. Each of these has its advantages and disadvantages. The quinine treatments so widely written about can basically be ignored. The soluble compound quinine hydrochloride is virtually unavailable. The more common quinine sulphate is fairly insoluble in water, expensive and usually sold as sugar-coated tablets which are unusable. The main advantage of the quinine drugs is that they are very selective against protozoa and very little active against other bacteria. As a result they will not interfere greatly with a tank's biofiltration.

Of the antiseptic dyes, malachite green is probably to be preferred. The main problem with methylene blue is that it can stain rocks in the aquarium and both methylene blue and acriflavine can be toxic to plants. Acriflavine also has the disadvantage of causing sterility, especially in livebearers. Malachite green does not stain very badly as it decolourises within an hour after being added to the water. These dyes can be removed from the tank by activated carbon filtration.

Both malachite green and methylene blue can, in therapeutic doses, be toxic to small fish such as neon tetras and guppies and also to botias. Where these fish are present in a tank, a lower than recommended dose can be tried. I have found that the white spot cure "W.S.3" works well against white spot and does not affect botias and small fish. I have even overdosed with this compound without distressing my botias. The W.S.3 is fairly expensive, but at one drop per gallon, the bottle lasts a long time. It obviously contains some malachite green which, according to some researchers, encourages a premature migration of the parasite out of the fish. Hence the manufacturers of W.S.3 claim that the

product is effective against the organism even while it is on the fish. If so, this gives it an advantage over non-malachite based cures which only appear to be effective against the free swimming stage of the organism. I have also found W.S.3 to be very effective against other parasitic diseases such as Costia infections (which cause 'slimy skin' in fish).

Of the anti-biotics, chloramphenicol is the easiest to use. It is very soluble and does not discolour the water. It works by interfering with the protein synthesis of micro-organisms.

A couple of members of the Society, myself included, have recently had outbreaks of white spot which would not respond to multiple doses of the malachite green based W.S.3. Obviously some form of dye resistant organism is responsible. In these instances, treatment with chloramphenicol proved successful. I gave my tank 2 treatments, three days apart, of chloramphenicol at the rate of around 75mg per gallon.

Always if possible, when treating the disease the water temperature should be raised to at least 27°C and the medication must be allowed to remain in the water for at least 10 days before a water change is made. If a water change has to be made, add some more of the drug to the water to maintain a therapeutic concentration. It is unfortunate that very little is available concerning the time required for anti-biotics to lose their effectiveness in a tank. It would appear that the tetracyclines retain some activity in the tank for about 2 days, but I have not seen similar figures for chloramphenicol.

Unfortunately, since white spot pervades the entire tank, the entire tank must be treated. It is not possible only to remove the infected fish to a hospital tank. Care should therefore be taken when using anti-bacterial drugs, to look for signs of the bio-system going out of balance (eg. distressed fish, water discolouring etc.). Above all, try to avoid transferring water eg. on plants, hands and implements, from the infected tank to healthy tanks.

A further moral of the story of course, is that the time taken to quarantine new fish in the first place can sure save a lot of headaches at some later date!

* * * * * * *