

Diseases of Fish Part 8

By John Shawn Prescott

In this article as the saying goes in so much advertising "in response to several requests", I am going to deal with the parasite *Amlyodinium* or Oodinium. Quite a few readers have written or phoned me about this disease, including one person from Argentina, so I feel now is the time to address this so often fatal infection



Velvet like dust spots on skin . Oodinium pillularis

Many of you will be aware that although they are variants, there are two forms that attack our fish, one that causes the freshwater infestation (which also has more than variant), and the other which attacks saltwater fish. I will deal with both starting with the sweet-water form.

Oodinium pillularis . This is the Latin name given to the parasite that causes the disease more popularly known as Velvet , Gold dust or Rust disease. This variant is the most often encountered, but as indicated below there are also a couple at least, of other very similar forms in freshwater which occur from time to time..

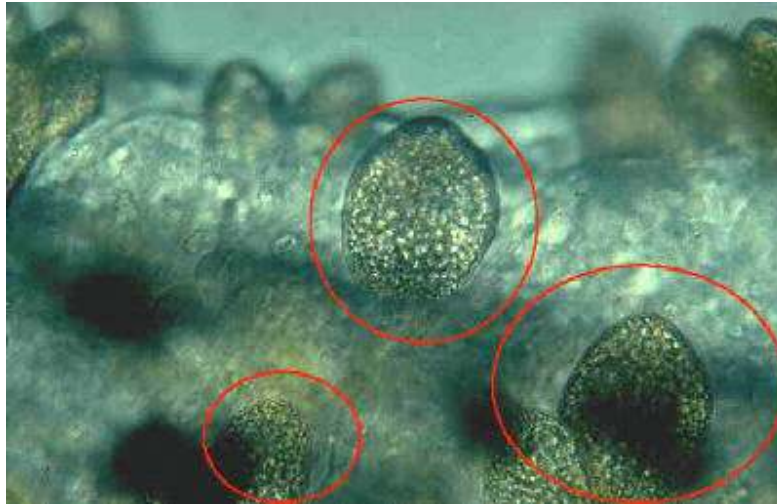
The infestation is caused by a parasitic dinoflagellate that is variable in size, as the variants differ somewhat in their measurements. . Other forms that cause very similar signs are *Oodinium limneticum* and *Oodinium vastotor* They can measure in some instances more than 100 microns. Though more typical sizes are 50-70 microns.

One of the greatest problems with this parasite in both the freshwater & the saltwater form, is that most typically the Hobbyist will observe the infestation only when he sees a fish, sometimes more than one, gasping for air, and in the last stages before death.

Usually this is when the fish is laying on its side on the bottom of the Aquarium, as it tries desperately to get air by attempting to breathe at the surface.

At this advanced stage of infection it is rare indeed to save the fish, however if prompt action is taken it is possible to save other fish, as without doubt if such remedial measures are not applied then virtually all the fish will succumb, usually within a very short space of time.

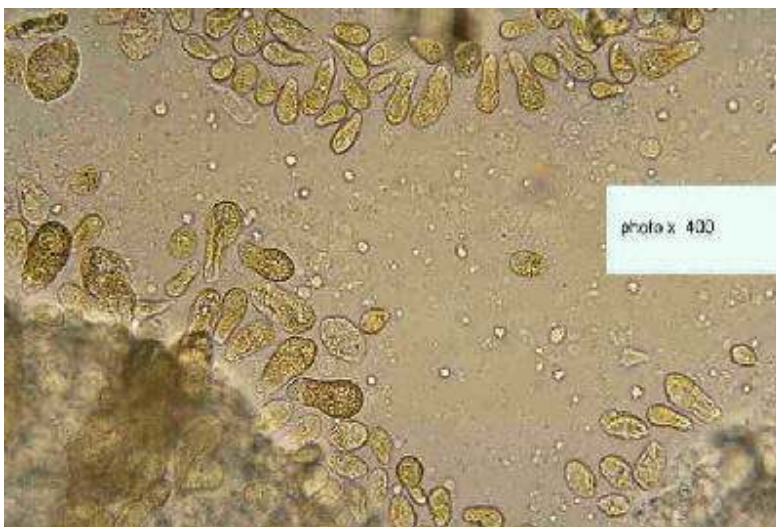
The parasite attacks the skin of the fish & inserts "roots" which can easily be seen under microscopic examination (see illustrations). Another favourite site of attack are the gills of the fish,



Oodinium pilluris in the skin mucous x 630

which so typically then cause the most observed sign, that of "panting" for breath as mentioned. These parasites eat into the cells of the epithelial layer, or the sensitive tissue of the gills, destroying them in the process, After the parasite has matured it falls off the fish much in the manner of white spot in both fresh and salt water. Then having fallen off the fish it begins several stages of mitotic division, ending up with some dozens or even more of cells which are flagellated.

In both the free swimming flagellated stage as well as the parasitic stage when attached to the fish, the organism contains a form of chlorophyll. This gives the parasite its typical gold or rust colour, which also enables it to obtain food, as do plants by the process known as photosynthesis. However when in the parasitic form almost all of its nourishment is obtained at the expense of the host, and this causes tremendous damage which leads to death, once the fish is heavily parasitized. On the fish the dinoflagellate form grows in size about 5-6 times, before falling of and replicating itself in the free swimming form



Oodinium sp. in skin mucous x 400

These flagellated free swimming forms are in fact dinoflagellates, which must within the space of one day find another fish to infect or they will die. Their relatively short life cycle along with massive reproductive capacity ensure that if an outbreak occurs and it is left uncontrolled heavy mortalities will ensue. Thus the Hobbyist should be most careful and always be prepared to treat any sign of this obnoxious pest. Fortunately it is not too common, but has no equal in the speed in which it can cause havoc in any Aquarium unfortunate enough to have an outbreak. Sometimes a few fish will survive an outbreak for reasons that are not entirely clear, these fish often have developed an immunity of some form to the parasite.

Younger fish appear to be much more susceptible to the parasite, perhaps because they have a less well developed immune system. If young fish become exposed the casualties will almost invariably be much higher. However if untreated, even adult fish will succumb

Typical signs of infection. *Oodinium pillularis* & related species.

Water .

Without any doubt less than ideal water quality is one sure way, to help in the outbreak of any parasitic infection, & in this respect *Oodinium* is no exception. However the primary reason for its introduction is usually to be found elsewhere in this instance.

Behaviour .

Gasping for air, with very rapid respiration, most typically on the floor of the Aquarium, but sometimes at the surface, are nearly always observed. In the early stages of an infection, "flashing" or rubbing & scratching are often indications, as the fish tries without success to rub off the irritating organisms.

Fins .

Fins can become clamped and folded.

Body .

The most observed feature of this infestation, is a salt & pepper effect of hundreds of small dots, usually with a pall or colour of gold/yellow or rust , which give the appearance that the fish has been covered with a special form of talcum powder. It is sometimes difficult to see this unless the light is coming from the back, & glances off the fish, when it can easily be seen. This advanced phase of infestation is however almost invariably fatal, & the Hobbyist should try to become aware of the earlier signs if he/she wishes to be able to take meaningful prophylactic action.

Gills

. Excessive mucous will be a sign that the parasite is attacking the gills, & a smear as often described previously should easily confirm this.

Skin .

The skin, becomes "dusted" with hundreds of small raised parasites, giving a colour which according to the variant of the form encountered will be from a yellow gold colour to an almost red shade.

Histo-Pathology .

A scraping of the skin, or gills will invariably show signs of the dinospores, which have a very easily recognized outline. Once the infestation has been confirmed remedial action should take place right away.

Prognosis .

As already stated, if the problem is only discovered when the parasite has made large inroads into many fish, then severe casualties are to be anticipated. Older fish of certain species often will resist the infection, though they will also succumb in many instances if no action is taken. Young fish typically will die like flies, if they are not helped with appropriate action by the Aquarist. However if a suitable remedial regimen is introduced, excellent results can be expected.

Treatment

Several forms of treatment have given good results. Among them are:-

Heat treatment (by raising the temperature by some 4-6 degrees C, to about 86F or 30C.). . At the same time illumination can be employed for the full 24 hour cycle, as this can disrupt the life cycle of the parasite helping to cause it to "burn itself out".

This often works, but in a mixed tank, however with species such as White Clouds as well as several others which will not tolerate the higher temperatures it is a risky procedure

Use of Quinine hydrochloride at 1 gm to 100 Litres of water as a continuous bath for about 3 days. Reports are variable but mostly good . When the treatment is finished which if possible should be done in a quarantine tank, the water should be either thrown away, or filtered over charcoal.

Use of Copper sulphate at 320 mg of Copper Sulphate in 1 Litre of pure water (distilled). Use this solution to treat the tank water at 1 ml per 1 gal (US Gal) . This treatment is widely referred to in the literature, but has to be used with extreme care, as many fish are highly susceptible to Copper, and vary species by species in the toleration of it. Furthermore the hardness or otherwise of the water plays a critical role in the effect of the Copper. If it is not hard enough then no benefit will ensue. In addition as Copper tends to fall away, in the treatment of a new tank, that has not been previously exposed to Copper, the Copper level must be monitored frequently if good results are to be expected, and this is often just not practical for the average Hobbyist who has to work during the day.

The treatment of choice is an Acriflavine drug, (Fish-Vet makes a combination drug *Revive*, using this in combination with other chemicals that gives excellent results). To make up your own Acriflavine you should obtain the neutral form & use it at 3mg of the Acriflavine in a stock solution of 330 ml. Then use this stock solution at 10 ml to treat a Gal or 4.5 litres. Do not use any charcoal during treatment, note that subdued lighting is recommended.

We have found over many years of experience, that whilst no drug is perfect, Acriflavine or some of its close relatives give an excellent result with minimal effect on the fish. After treatment charcoal should be used in the filter to remove any residual "green/yellow" cast to the water.

Other reported treatments include the use of Permanganate of Potash, sometimes used with rock salt, but these treatments have little back up documentation, so the reader is advised to proceed with caution in any such experiment.

Salt Water Coral Fish Disease.

Amyloodinium ocellatum aka *Oodinium ocellatum*.

This is the form of the parasite that gives rise to the disease known as Coral Fish Disease.

There are many similarities between this marine variant of the parasite and the fresh water forms.

The salt water Hobbyist should take into the account the differences and not make an error in diagnosis. I will now define some of the special features of the salt water form .

In the fresh water forms *O. pillularis* & *O. limneticum* , the organism's primarily attack the skin, & then spread to the gills. In the saltwater form *O. ocellatum* the parasite seeks out the gills and may then spread to the skin.



Oodinium ocellatum

Slide shows parasite attached to the gills of a fish, this interferes in oxygen transpiration causing suffocation.

By the time the latter takes place however, the gill damage is almost invariably so severe, that the typical "first alert" I have already mentioned of seeing a fish "gasping" on the bottom of the tank, is unfortunately all too common. They damage to the gills, causing haemorrhaging, swelling, and intense necrosis, which lead to an inability of the fishes gills to pass sufficient oxygen, which leads to suffocation & death.

The reproductive phase of the free swimming dinoflagellate takes place optimally in water of a pH of 8.0- 8.2 with a density of 1.012- 1.021 and with a higher than desirable organic load, especially of Nitrate.

Typical signs of infection. *Oodinium ocellatum*

Water.

High organic load, with less than optimum water conditions, can often serve as the precursor for an outbreak. It thrives in Temperatures of 25-30 C , & salinity of 1.012-1.021.

Behaviour.

Gasping for air, with very rapid respiration, most typically on the floor of the Aquarium, but sometimes at the surface, are nearly always observed. In the early stages of an infection, "flashing" or rubbing & scratching are often indications as the fish tries without success to rub off the irritating organism. If the Hobbyist can pick up this "flashing" action at an early enough stage there is a chance he /she can prevent mortality

Gills .

Excessive mucous will be a sign that the parasite is attacking the gills, & a smear as often described previously should easily confirm this. Heavy necrotic damage is easily observed even with a good hand magnifier.

Skin .

The skin will show "gray" patches which if examined closely will manifest a "dust like" appearance, giving the skin a "velvet" look, which has given rise to an alternative name for the disease. Some haemorrhaging may also become evident.

Histo-Pathology

A scraping of the skin, or gills will invariably show signs of the dinospores , which have a very easily recognized outline. Once the infestation has been confirmed remedial action should take place right away.

Prognosis.

The disease as with its freshwater counterpart, usually springs itself upon the awareness of the Hobbyist, with the first fish or more, giving their last gasps as said on the bottom of the tank. At this stage seldom can such fish be saved, so the outlook for them is very poor. If however there are still large numbers of uninfected fish, or some only lightly infested, then if prompt & suitable action is taken, it should be possible to save the others.

Treatment.

The remedy for the saltwater form is rather difficult. Copper has often been indicated as a drug of choice, but has many problems in its use, as well as been dangerous to the fish in even small overdoses, especially if even minor damage has already occurred to the gills of the fish. In Reef tanks it cannot even be considered.

Methylene blue , has been used with some success, as it has the advantage of been an excellent oxygen transporter, which aids the transpiration of oxygen to the fishes gills. Methylene blue however is highly toxic to Nitrifying bacteria, & its use, should be confined to a separate quarantine tank only. If used a 1% stock solution should be made (1 grm in 1 Litre of pure water). Use 1ml of this stock solution for each 4.5 litres of water to be treated.

Acriflavine & related compounds have proven very effective, & this as in salt water has given the writer & his co-workers the best consistent results over the years. (Fish-Vet makes a product called *Revive* based on this experience, which has an excellent track record.) This product can be used in a fish only and /or a reef tank, and will not impact adversely the Corals etc. Carbon & Protein skimmers should not be used during the treatment period, as they pull out of the water, much of the useful active ingredients, but may be used to clear the tank once treatment is completed. Lighting should be subdued during the treatment period.

In both the fresh-water & saltwater form of the disease, the reproduction and hence the eventual intensity of the infestation is closely related to the temperature. Lower temperatures will slow down the reproduction of the parasite, and thus possibly give the Hobbyist a little more time to take effective remedial action. The Hobbyist must evaluate however the species he/she has in their tank, and the tolerance for a lower temperature that their collection of fish, is likely to withstand.

Some freshwater species such as white clouds will thrive in lower temperatures, others such as Discus, will emphatically not.

The reverse use of temperature may also be employed, by increasing the Temperature by quite a number of degrees as indicated above. This has the effect of speeding up the parasite's life cycle, combined with the use of a suitable treatment as well as employing a prolonged photoperiod, often causes the parasite to burn itself out. If such a technique is employed then the lowered oxygen level of the water must be compensated for, by increasing the aeration substantially.

Authors note to readers: -

I am very gratified, by the increasing numbers of inquiries coming from readers of these articles. I will continue to answer queries that are sent to my E Mail address (john@aquarium-gardening.com). However as like all of us, I have other work to do, to earn a living, it would help if you could make your inquiries as specific as possible, as sometimes I have to read through a great amount of non relevant material before I am able to discern the question.

John *Shawn* Prescott john@aquarium-gardening.com

Refs .

Diseases of Fish C.van Duijn Jr. P 52-56. Iliffe Books UK

Handbook of Fish diseases Ed. Dieter Untergasser p. 89-90 TFH Publications.

Papperna I. (1980) *Amyloodinium ocellatum* (Brown 1931) (Dinoflagellida) infestations in cultured marine fishes in Eilat , Red Sea: epizootiology and pathology J.Fish Dis 3: 363-372

Noga E. (1987) Propagation in cell culture of the dinoflagellate *Amyloodinium* , an ectoparasite of marine fishes Science 236. 1302-1305.

Cheung P.J., Ruggieri G.D., and Nigrelli R.F. (1978) Effects of temperature & salinity on the developmental cycle of *Oodinium ocellatum* Brown (Mastigophore: Phytomastogophoresa: Dinoflagellida)(abstract) The Fourth International Congress of Parasitology in Poland.

Negrelli R.F. (1936) The morphology, cytology, and life-history of *Oodinium ocellatum*, a dinoflagellate parasite on marine fishes. Zool N.Y. 21: 129-164.