

# Oodinium (Amlyoodinium)

There are two basic forms that attach aquarium fish, one that causes the freshwater infestation (and has more than variant), and the other which attacks saltwater fish. We will discuss both here starting with the freshwater 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 be aware that there are also at least a couple of other very similar freshwater forms.

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 vastator*. These can measure more than 100 microns although the 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 be lost and 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. Another favorite site of attack are the gills of the fish, 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, and destroy them in the process. After the parasite has matured it falls off the fish much in the manner of white spot (Ich) in both fresh & salt water, and here 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 color, and 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, which causes tremendous damage leading to death once the fish is heavily parasitized. On the fish the dinoflagellate form grows in size about 5-6 times, before falling off and replicating itself in the free swimming form.

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. The relatively short life cycle & massive reproductive capacity ensure that if an outbreak occurs and it is not treated, heavy losses will follow. 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, and these usually 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, and in this respect *Oodinium* is no exception. However the primary reason for its introduction is usually to be found elsewhere in this instance.

**Behavior.** Gasping for air, with very rapid respiration, most typically on the floor of the Aquarium, but sometimes at the surface, is 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 cast of gold/yellow or rust color, 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, and shines off the fish, when it can easily be seen. This advanced phase of infestation is however almost always fatal, and the hobbyist should try to become aware of the earlier signs if he/she wishes to be able to take meaningful action.

**Gills.** Excessive mucous will be a sign that the parasite is attacking the gills, and a smear should easily confirm this.

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

**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.**

There are several treatment options that can be employed including raising the temperature or the addition of Copper Sulphate.

Raising the temperature by some 8 - 10 degrees Fahrenheit, to about 86°F can be effective BUT is also dangerous. The higher the temperature, the lower the dissolved oxygen content; not an ideal situation for an already stressed fish.

Copper Sulphate 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, Copper levels tend to drop and must be monitored frequently if good results are to be expected. 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 used in combination with other chemicals. This combination gives excellent results (Our

products, [Revive](#) and [Aqua Pro-Cure](#), are just such a combination treatment). Do not use any carbon during treatment & subdued lighting is recommended. We have found over many years of experience, that while no drug is perfect, Acriflavine or some of its close relatives give an excellent result with minimal effect on the fish. After treatment carbon should be used in the filter to remove any residual "green/yellow" cast to the water.

### ***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.

So that the salt water Hobbyist should be take into the account the differences and not make an error in diagnosis let's discuss 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 & may then spread to the skin.

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. The parasites damage the gills, causing hemorrhaging, 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 77-86 F., and salinity of 1.012-1.021.

**Behavior.** 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, and a smear 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 hemorrhaging may also become evident.

**Prognosis.** The disease as with its freshwater counterpart, usually comes to the attention 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 and 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 and 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, and 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 and its use should be confined to a separate quarantine tank only.

**Acriflavine** and related compounds have proven very effective and have given the most consistent results over the years. (Our products, [Revive](#) and [Aqua Pro-Cure](#) have been formulated incorporating Acriflavine and other compounds to yield excellent results). These products can be used in both fish only and/or reef aquariums, and will not adversely impact corals or other invertebrates. Carbon and Protein

skimmers should not be used during the treatment period, as they pull the compounds out of the water, but should 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.

**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.*