

Diseases of Fish

A general overview. Part 1

by John Shawn Prescott

Fish in the environment, stress, & more.

This article, is the first of a series of 15, and will try and concentrate on the practical considerations relating to the health of your fish, in the real world of aquarium keeping.

Although one may think otherwise, the problems that we face as aquarists, are not exactly the same, as similar fish will face in their natural habitat, although the actual parasites, bacteria, etc. will in so many cases be those, that do sometimes create problems in the wild.

Similarly, in the ever growing field of Aquaculture , there are differences, between this method of keeping fish and maintaining them in the average aquarium. Only by being aware of these differences, and the distinct possibilities that each form can manifest in possible problems , can we begin to both understand the potential difficulties, and take sensible steps to minimize the kinds of diseases or problems that may arise, or hopefully avoid them altogether.

Fish disease in the Natural state.

The first and major difference between fish in Aquaculture, and the same fish living in Nature, is the sheer volume of water that each fish has access to. This means that although many fish can asymptotically harbour a parasite, for extended periods e.g. subepithelially , when the parasite is stimulated into a reproductive mode, which typically results in it multiplying itself by hundreds or even thousands of times, the chances of each new spore or Trophont etc, finding a new host, in the wild, is many hundreds of times less , than in an Aquarium or an Aquaculture situation.

Even when we allow that typically about half the species of fish shoal , the bodies of water are so large, & other forms of predation so prevalent, that only a minute percentage of the parasites, new spores etc, will have the chance to re-infect another fish.

In large part the same logic applies to bacterial & viral diseases in Nature.



A fish "kill" due to pollution in a Natural Lake

However when man or natural events interfere with the Lakes or Rivers, or the Reef environment, which is unfortunately in contemporary times an everyday event, we hear concomitant reports of *fish kills* with alarming frequency. The correlation to ecological damage cannot be refuted.

Pathogenic bacteria are everywhere. When we are healthy, your natural body resistance keeps these pathogens at bay. However if for any reason we become weakened, for example by , exposure to excessive cold, or damp sleeping conditions, these same pathogens often flare up, causing us to become mildly or even seriously ill.

Similar consequences can happen to fish in their home of rivers, lakes, and oceans.

In Nature when any of the *normal* background parameters, e.g. temperature of the water, pH, alkalinity, *purity* (freedom from pollutants), oxygen values, & more are suddenly changed, from the preferred habitat in which the fish has evolved over eons of time, then the same *background* pathogens, or parasites, will become very active as the fishes immune system becomes weakened, & unable to provide the amount of suppression to keep these undesirable forms in check. This weakened condition and lowered resistance to disease results from environmental stress.

Stress : The single greatest cause of fish disease.

Thus a result of environmental stress large numbers of fish are lost as *fish kills* in rivers, lakes, and other natural bodies of water , & most of you will have read about same in your local press, or even seen it at first hand. Today this happens with monotonous regularity.

In Nature when the prevailing conditions are ideal , only the occasional fish, usually an older one, will become ill. Natural selection usually takes care of such fish, as they are less able to avoid becoming food, for the predators that are omnipresent. This is part of Nature's checks & balances. These weakest had they survived, may have passed on infections to their peer group, but by this process of Natural elimination, this ecobalance keeps down the pool of infection potential, to manageable proportions.

For this survival of the fittest rule applies to the entire natural world, and has the practical effect to ensure that only healthy or relatively robust fish survive to reproduce their kind, or sometimes be captured for the benefit of man, either as food, or as Aquarium specimens. Later in these articles I will compare the drastic changes that take place, both before we ever see the fish, and after it reaches it's new home.

All scuba divers who have the interest and understanding of ecology, report it is rare indeed, to find fish in Nature showing disease signs, such as we often observe in the Aquarium.

Although essentially fish in the wild have a built in awareness of possible dangers, they are also relatively calm, most of the time because they have either many of their own kind around them, as well as a normal habitat . These factors prevent the kind of stress related adrenalin surge , which is the precursor to a weakening of their immune system , in the Aquarium. All too often they have either none, or only one or two of their own kind. Alternatively sometimes in the case of fish that are natural loners, we place 2 of them in an Aquarium, and they display aggression or worse to each other. Either of these unnatural conditions can cause tremendous stress.

The ability to recreate a environmental conditions which minimize stress is of vital importance in maintaining good fish health.

Furthermore, in Nature fish have typically available to them, a large range of organisms, to serve as food, or at the least such organisms as they have evolved to find suitable, as a complete food for their growth, reproduction and good health.

Compare this to the typical diet we give in an Aquarium, which has on average some 10 or more different species of fish, each of which in nature will predate upon different organisms to grow and become healthy, &

we feed them *one size fits all* the same packet of food, day in and day out, with little regard to their individual requirements.

Is it any wonder that the combination of these factors result in high levels of stress ? This, given other factors to be discussed, can and does result in the fatal outbreaks of disease that are the cause of so many Aquarists eventually giving up the art of successful Aquarium keeping.

Natural Normality , in Nature.

Although this may appear to be a redundant play on words, it is worth emphasizing that in the natural world, the photoperiod is natural. When the sun comes up it gets light. In Spring, when most fish start to sexually mature it is in response to the natural increase in photoperiod, & with the accompanying rise in temperature in many parts of the world. When dawn arrives it is a slow process, & the same at dusk.

The salient point is that any subtle changes in the quality of the water, is usually caused by other natural changes, e.g. such as the rush of melting snows, which can bring about a normal and useful stimuli to the fish

Compare this to what is typical in the Aquarium.

We configure the lighting to come on at times often to *suit* our preferred observation times. It is most typically the same all year round, and bears no relationship in many cases, to what is the natural day for the fish. The light comes on suddenly usually within a few seconds, the same when it goes off.

Temperature is controlled by *clever* thermostats, which keep the water, at what our books & *specialists* advise us, the same number of degrees from Jan-Dec. No diurnal change as happens however modestly even in the Tropics.

In Nature in Rivers, in most Lakes, and on the Oceans, moving water, renewed constantly, changed & buffeted by wind, rain, tide, & run off from the mountains, keeps a constant purification going. This helps to overcome the natural pollution which would otherwise occur. Furthermore the myriad of natural organisms, utilize so much of the biota that is created along with the excretory products of the Fauna, so as to ecologically prevent in most cases, any excess becoming a cause of fatality to the world surrounding any one species.

Compare this to the typical Aquarium. Some of us do change a percentage of the water in the Aquarium, usually about 10% (if we do) weekly. Many do not even do this.

Instead of a natural ecosystem to manage the various subtle changes that are bound to occur, when we keep our specimens in an artificial habitat, we rely upon filters, often changed infrequently, UV's to kill off as much as can, Ozone to purify, chemicals to supplement what we think needs to be replaced, (the evidence for such replacement is too often questionable).

It's rather like asking us to feel good in the rather aseptic environment of a hospital ward. Probably alright, (some today even question that), but it hardly leaves the average person feeling that they would like to go there as they *felt so good* in that atmosphere.

In both freshwater & marine environments there are many forms of natural plant life . Many of these act as part of the food chain either directly for the fish, or indirectly by contributing to other forms of life which eventually are eaten by the fish.

I know of no "plastic" forms of plant that exist in nature, but far too many of our Aquarists seem to think that this artificial media, looks nice and is useful. I personally would seek to disagree.

Furthermore in many of revered Public Aquariums, I have seen the same plastic rubbish replace the real thing, as evidently the professionals who are employed to run these Mecca's of entertainment are not provided with the means by their money masters, to achieve what should be for so many good reasons an essential educational tool.

If one talks "off the record" to many of the Curators of too many Public Aquariums, you may be horrified to hear just how often they have to replace their fish etc. In some cases the record is as bad as Aquarists who have little or no experience. So much for conservation of Nature.

Again the reason is in many cases, that to create a stress free environment is one that requires a great deal of expertise, planning & the funds & personnel to make it work, on a long time basis. When this is absent, whether it be in a Public Aquarium or one in our home, then stress is a typical consequence, & fatalities are to be expected, as disease manifest itself.

Once again the major reason is the stress factor put upon the fish, which is not in accord with their experience in Nature.

Finally in Nature, because as I have said above, natural selection sorts out the weak leaving the best to reproduce, one tends to have stronger specimens.

In many Fish Farms for the Hobby, (primarily now speaking of freshwater species), the selection of a limited number of parents, with a restricted diverse gene pool, can sometimes create specimens that can be more susceptible to a particular disease or problem. This occurs even though they are in many cases better adapted to the environment they will ultimately arrive to, i.e. an Aquarium. This aspect of breeding from selected stock, whilst an imperative in Agriculture, and becoming so in Aquaculture, has the effect of reducing to a dangerous degree the various heritable factors that in Nature are so diverse. Nature has given the natural world an ability to overcome all kinds of Natural disasters, including disease. Much more has to be done to both understand, & provide realistic answers to the kinds of problems here outlined, so we will return to this subject later on in the series, in some more detail.

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