Observations of EcoSystem and HLLE

by Robert Hildreth, D.V.M.

Head and lateral line erosion (HLLE) is a horribly disfiguring disease of marine tropical fishes that causes ulcerations of the lateral line and head pores of fishes. Although many species of fish have been observed to have this condition, surgeon fish and angelfish are most often affected, and within these families particular species seem to be more susceptible. This disease has yet to be reported in fishes in the wild, but seems commonplace in both home and public aquariums.

My own interest in HLLE began more than 12 years ago when an Emperor angel fish developed the condition in one of my home aquariums. Many people had suggestions on why this disease may have occurred, but no reproducible scientific studies on this disease had been done. Blasiola (1985) suggested a dietary etiology, possibly vitamin C. However, may years of supplementing with various forms of vitamin C has not led to reversal of the disease. Some authors suggested bacteria, but treating with a myriad of antibiotics has yielded no cure. Still other authors have suggested stray electrical voltages, lack of sunlight or viral infection, but none were supported by reproducible scientific investigation.

While in veterinary school, I had an opportunity to investigate HLLE at the U.C. Davis fish pathology lab. In our observations we were unable to isolate the suspected virus, thus suggesting the virus was not significant in at least some cases of HLLE. Necropsies of the fish showed that the HLLE lesions were essentially sterile, with no bacteria or parasites noted upon microscopic examination. In my opinion, the most significant and consistent finding suggests a goiter-like condition, one that in mammals is due to low iodine in the diet or its improper metabolism.

In the Fall of 1994, I met Leng Sy at his retail store, where a 600-gallon tank loaded with fish and invertebrates was thriving. The fish were in excellent body condition. Many species of tangs and angels were in brilliant color, and none had HLLE despite being in captivity for over a year. The Ecosystem filter system included live rock, a few BioBalls, and a large macro-algal culture growing on a bed of mud.

Needless to say, I was very skeptical, but intrigued. Over the next six months I watched the success of this aquarium. The fish remained very healthy and colorful (diet of brine shrimp and lettuce everyday) New additions included Purple tangs, Sailfin tangs and several angels. None of these fish developed HLLE.

This system was successful at preventing HLLE, but could it clear the disease? Several blue tangs (P.hepatus) and one purple tang, all with severe HLLE, were introduced as a subjective test. These fish not only had their lesions resolve, but the lesions healed I a matter of four to six weeks! The color on these fish also improved greatly, looking like newly imported specimens. The next step was to figure out what component of the system played the most significant role in healing these lesions. Many “Berlin” method supporters suggested it was the live rock. However, we have seen HLLE appear with this type of system, and in the Berlin systems in which a cure was claimed, the results took much longer to heal. (many months to years).

A second group of fish (Purple tangs) was placed in a system that had neither live rock nor algae

growing in the Ecosystem. The fish were fed a diet of brine shrimp and romaine lettuce only. The lesions resolved in three to four months on all the fish in this group. Admittedly, this was slower than the live rock/algae combination, but the lesions did indeed resolve in a timely manner.

The most recent study consisted of placing six purple tangs with HLLE in separate aquariums that were plumbed to a common Ecosystem filter. All six fish were obtained from a single wholesaler who had held these fish since their importation. The fish are all about the same size, all had been collected in the same area and the lesions were all severe. We photo recorded each fish before placement in our tanks, and began the following experiment.

The fish are divided into three groups of two. Group A fish, the control, were housed in bare-bottom tanks with no direct lighting, and wee fed only brine shrimp. Group B fish are housed in live rock tanks with fluorescent lighting and were fed brine shrimp only, much like the fish in previous trials. Group C fish were housed in bare-bottom tanks with no direct lighting, and were fed a commercially available fish food that claims it is for algae eating fish. All fish were serially photographed over the next four months.

The results were: Group A fish and Group C fish improved over the four months, but still had minor lesions. Group B fish, housed in conditions that most closely simulated the conditions of a complete Ecosystem Filtration System, showed the best improvement, with the lesions almost completely resolving in four to six weeks.

Currently, we are continuing the research into why the improvement is so rapid. We suspect that micro-algae, almost invisible to the naked eye, may provide a food source for these algae eating fish, much as it is provided in the natural environment. Stay tuned for more experiments!