Management of Salt Water Fish

by
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Salt water fish have become increasingly popular. This is probably due to recent technical developments which have brought the keeping of coral fish within the price range and caretaking ability of the average fish owner. Fish have always been very popular as pets since they don't take up much room in a small apartment, they don't need to be walked or trained, and they are relatively easy to care for. Tanks now come in all sizes and shapes, and can really add a lot to a drab room, especially with brightly colored coral fish.

When their fish get sick, most people either let them recover alone or throw them out when they die. This might work for five cent guppies, but salt water fish start at about five dollars apiece and many are twenty to sixty dollars. So the above method of treatment has definite drawbacks when dealing with marine fish. Also, if one fish is sick, chances are good that it will spread throughout the tank. An owner can easily lose one hundred dollars due to one epidemic. So who does the owner turn to when he has a problem? The general public sees the veterinarian as an expert on all animals, whether they have hair, feathers, or scales. If you are working in a large city, you will probably get some calls about fish problems from private owners or dealers who have a very large investment in fish.

Most fish problems fall into two categories—poor management or diseases. In this article, I am going to discuss some management problems peculiar to marine fish. In the next issue, I will discuss some specific diseases.

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Equipment is very important to a stable marine environment. Recent developments in aquarium sealers have resulted in the all-glass aquarium. Older aquariums had heavy metal frames to support the sides and prevent leaks. The size of the tank was also very limited because of the tremendous water pressure. The salt water and metal reacted to form oxides which are toxic to the fish, so all the metal had to be coated. The all-glass aquarium has eliminated this problem. Once an aquarium is purchased, it should be thoroughly cleaned and rinsed. Never pick up an aquarium with water in it because it will cause leaks. Fill the tank and let it sit somewhere so you can see if there is any seepage. Most pet shops sell tubes of sealant to repair small leaks. The aquarium must be completely dry when applying this sealer.

The hood is also important. Don't get a metal one or oxides will form when the water condenses on the hood, and these will drip back into the tank. Clear glass ones are good because you can set the light on top of them, and they will keep the salt from corroding the electrical connections.

New filter systems have also been developed. Filtration and aeration are important in a marine tank because salt water holds twenty percent less oxygen than fresh water. Undergravel filters work very well. A slatted floor which is covered by the gravel and two air tubes which lead to the air pump pull all the debris down into the gravel. Periodically the top layers should be stirred up, and the debris siphoned off using a diatom filter, which can be rented from many fish dealers. This is also done when you clean the tank. If you turn off the pump for any reason, be sure and raise it above the water line first, or

water may siphon out and go into the pump itself. An out-of-the tank filter is a very good supplement to the undergravel one and is much easier to clean. It should have three layers, *i.e.* nylon floss, two inches of one-eighth inch grade limestone or calcite, and then one inch of fine gravel on top. Don't use glass wool because it can cause irritation of the gills. The filter should handle 100-150 gallons per hour for every twenty-five gallons of water. Activated charcoal is bad in salt water filters because it removes ions and causes a change in pH. Air stones are used to bubble oxygen into the water. Many are made of light wood but they will deteriorate and must be replaced regularly.

The temperature is controlled by a heater. It is best to buy one with a double thermostat or two separate heaters in case one wears out. Don't cover the heater with rock and be sure there is no exposed metal or rubber because the salt will cause it to degenerate.

The gravel is very important for filtration and buffering. Sand is too fine because it will be sucked through the holes of the underground filter. Gravel should be at least one-eighth inch grade. Don't use any of the colored rock found in pet stores because the salt will leach toxic dye into the water, unless specially coated for salt water. A very good, cheap type of gravel is crushed oyster shell, which is also very good buffering material.

Growlux® bulbs are excellent for marine aquariums because they stimulate algae growth. Stable marine tanks need a good growth of algae in contrast to fresh water tanks where algae is undesirable. Two watts of bulb per gallon of water are required. Some people buy timers and keep the light on for twelve to fourteen hours on a cyclic basis. The algae is a good food and oxygen source. Unlike fresh water, there are very few marine plants that will survive in an aquarium. The algae will grow on the front glass, so when scraping it off, use a sponge so the dead algae is removed from the tank and not allowed to rot on the bottom.

Coral is used for decoration, buffering, and protection in marine aquariums. It can't be used in fresh water because it will dissolve. It is also important to provide caves for the more timid fish to hide in and to set up his own territory. The coral should be cleaned before putting it in the aquarium; use one cup of Chlorox® in one gallon of water and soak the coral for an hour. Then soak and rinse it in fresh water for one or two days until the bleach is no longer detectable. Don't feed the fish over any coral or the uneaten food will fall into the fingers of the coral and rot. Dyed coral is bad because the dye may leach into the water. Some do have a protective coating but the color will be obscured anyway when the algae grows on it. Most coral is white except organ pipe coral which is bright red. All kinds should be carefully bleached. Rock can also be used. Igneous rocks are good, but sedimentary rocks will dissolve in salt water. Slate may have iron deposits in it which can be toxic to fish. Shells are very dangerous because of their many tiny curls which can contain dead organisms or bacteria. When bleaching one, be sure to roll it over several times so all the air is replaced by bleach. Clam shells are the safest. Sea fans can be used if they are boiled first. If you buy artificial plastic plants, be sure they aren't held together by wires.

The water should be carefully prepared and monitored. Synthetic sea salts with the trace elements in a separate bottle (so they aren't broken down by the salt while on the shelf) are mixed with regular tap water. The chlorine is eliminated by letting it sit twenty-four hours or by adding sodium thiosulfate until it quits bubbling.

The specific gravity of the salt water is also important. It is closely related to salinity which is measured in parts per thousand (ppt). The specific gravity is measured by a hydrometer, and should range between 1.016 to 1.030. Salinity measurement is not normally done by most individual owners but it should be around 34.5ppt, which equals 1.027 specific gravity. In general, small fish like a higher specific gravity while large fish like a specific gravity of about 1.020. A good average specific gravity is 1.025. The primary sign of a salt excess is fish making frequent trips to the surface to gulp air. This is because the concentrated water holds less oxygen. Fresh water should be added slowly, but don't pour it directly on

any of the fish. Rarely, more salt may be needed. A sign of this is pale coloring of the fish. When mixing salt water, allow it to sit twenty-four hours before reading the specific gravity because it takes this long for the salt to completely dissolve. Soft water is best, so most tap water is alright. It shouldn't be more than fifteen degrees of hardness.

Temperature should be around seventy-five degrees Fahrenheit, but the most important thing is to avoid temperature fluctuations. Seventy-five degrees is a good temperature because oxygenation is adequate, evaporation is minimum, and the temperature can be increased in case of disease. Sometimes when you are adding new fish, it helps to increase the temperature; because they are cold-blooded animals, this will increase their metabolic rate and stimulate feeding. During the summer, the temperature can increase into the eighties. Don't let it fall at night. Just run the heater temperature up to eighty degrees. The fish will survive at this temperature and there are no fluctuations. Just be sure to make any changes gradually.

pH can be monitored by an inexpensive colorimetric test kit, but be sure it is a salt water kit. pH should be maintained at about 8.3 ± 0.5, but may decrease due to wastes. If the pH is too low, the fish will be pale, anorectic, and exhibit rapid respiration. This can be corrected by changing water or adding sodium bicarbonate to effect. Rarely the pH becomes too alkaline and can be corrected by adding sodium biphosphate.

Nitrates can also be measured by a colorimetric test kit for salt water. They should be less than five parts per million and should be closely monitored. Nitrates are metabolized in a balanced tank by establishing denitrifying bacteria. If the nitrates get much above 15-20 ppm, the fish will start dying. The toxic element isn't the nitrate, but the nitrites. Nitrates are directly related, and are easier to measure. To correct a nitrate problem, the water must be changed immediately to dilute the toxic nitrites. Salt water fish urinate more nitrogenous waste than fresh water fish because they must drink more water to maintain hydration in their concentrated medium.

To start a salt water tank, set up the tank just as you want it, and let it aerate for about a week. Get a handful of gravel from an established, well-balanced tank for bacteria; get some algae from the same tank, on a rock or loose. Add one hermit crab to the tank. These invertebrates are very resistant to nitrite toxicity. Measure the nitrates every day, until they reach a level of 10-15 ppm, then remove the crab. This level is optimum for the growth of denitrifying bacteria. Continue to monitor the nitrates. In several days, there will be a sudden drop in nitrate levels, and a few fish can be added. The tank is marginally balanced, but it will take several months to get a good growth of algae and become stable. The first fish should be hardy and relatively inexpensive. Damsels are very brightly colored and adapt well, but tend to be aggressive fish and may cause problems when you add new fish. Try to have some sort of scavenger invertebrates to clean up excess food and debris.

Buying fish and invertebrates is the next important step. They arrive at the pet shop in a very stressed condition, and some may be diseased. There is a high death loss, so when selecting fish be very cautious. If there is a lot of algae in the tank it is probably well-balanced. The dealer should have an isolation tank for all his new arrivals. Observe the behavior of the fish for activity and feeding. Color should be bright and respiration should be slow and regular. Look for tumors, spots, or cuts. Don't buy fish of the same size or color. This just creates problems because the fish are constantly fighting to establish dominance. Very shy fish should also be avoided because they won't fight for food and will eventually starve to death. Purchase fish that eat the same types of food. Sea horses and lion fish eat only live food. Sea horses are also very slow moving and cannot get food when there are faster fish in the same tank. Find out about the particular feeding habits before you buy.

When you introduce your new fish, do it gradually. Feed the other fish first. There may be some squabbling at first until new territories are established. If one fish is exceptionally aggressive, get rid of it. Do not overstock the tank. Two gallons of water per fish or two inches of fish per gallon are

good averages, but this varies according to the filters and type of fish.

When feeding fish, don't just drop food on the surface. Dunk it so it floats to the bottom where the fish are likely to see it. Vary the diet to prevent imbalances. Many dried foods are convenient and cheap. If the fish are meat eaters, feed organ meats, shrimp, or beef. Avoid oily fish such as halibut or cod. Spinach is a good supplement for algae-eating fish. Live foods are harder to raise. Brine shrimp eggs are available at most fish stores. Guppies and mollies are also a good source of live food. Marines tend to eat more than fresh water fish so feed as much as they clean up, but don't let excess food pile up on the bottom. Stubborn eaters may need live food to get them started, or it may help to increase the temperature. If there is a good eater in the tank, that fish may stimulate the new ones to eat.

Maintenance of the tank is fairly easy once it is balanced. As water evaporates, the wastes are concentrated. Twenty percent of the water should be changed every month. A complete change of water should be done every eight months.

This should give you, the veterinarian, some idea of what is involved in the keeping of marine fish. A stable environment is very important to their health and well-being. Poor management is often the cause of fish illness. By using the information in this article, you should be able to help the client correct some of his management problems.

REFERENCES

Chlupaty, Peter *Guide to Marine Aquarium Keeping,* T.F.H. Publications, 1965.

Dutta, Reginald *Tropical Fish,* Octopus Books Ltd., 1972.

Ravensdale, T. *Coral Fishes,* Hope Printers Ltd., 1967.

Valenti, Robert *Salt Water Aquarium Manual,* Aquarium Stock Co., 1968.

Fibrosarcoma in Urinary Bladder Wall

by
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History: A two-year-old spayed female St. Bernard was admitted to Stange Memorial Clinic, Iowa State University, 1-14-'76, with a primary complaint of hematuria. Owners reported that the dog had been having difficulty urinating for several months, though food and water consumption had remained near normal.

Clinical pathology: Urinalysis revealed brown cloudy urine, specific gravity 1.040, large amount blood or hemoglobin, protein 4+, WBC— full field, RBC 10-20, bacteria 4+, and many epithelial cells. Bilirubin, ketones and glucose were negative. Urine culture revealed *Staph. aureus* and *Strep. equisimilis.*

Scout film radiographs revealed ill defined opaque densities within the shadow of the bladder area. A pneumocystogram showed one large calculus within the bladder shadow. Thickening of the bladder walls with some roughening of outline were also present.

A cystotomy was scheduled for the removal of the large calculus. On entering the bladder, however, a mass approximately 5 x 4 x 3 cm. was found. Many calculi were embedded in the mass. A partial cystectomy was performed.

The mass grossly resembled granulation tissue with associated calculi. Histologic examination revealed a fibrosarcoma.

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