

**A new reef system in a retail shop: Long-term success in keeping fishes and invertebrates healthy starts with the deceptively simple-sounding term, “Water Quality” — maintaining all key water parameters within safe bounds.**

tures mostly range between 74 and 82°F (23–28°C).

Because fish and invertebrates are cold-blooded, it takes a long time for them to equalize internal body temperature with that of their surroundings (sometimes more than 24 hours). The temperature of a fish’s environment affects various activities—feeding, immune system, and other metabolic functions. Too-low temperatures slow the animal’s activity, which reduces uptake of nutrients and can lead to reduced growth rate or death. Higher than normal temperature actually results in a greater than normal need for food, which generates more waste and leads to a higher pollution level.

Dissolved gases are also affected by temperature. Cool water contains more dissolved oxygen than warm water, which directly affects the respiratory rate of the animals. Equipment like trickle filters, which have a very good air flow through their packing media, will cool the water temperature by one or two degrees by producing a higher than normal evaporation rate. This phenomenon is known as evaporative cooling.

For very short-term high temperature problems, placing ice in a plastic bag and floating it in the aquarium may temporarily resolve the problem, although it is not the ideal solution to an ongoing temperature problem. At higher temperatures, hypoxia can occur, reducing the amount of oxygen available to the fish. This condition can cause fish to die prematurely, and often does.

The long-term solution for high temperature problems is either air conditioning for the room or a chiller for the aquarium. A chiller is initially more expensive than a window A/C and does not provide the same benefits to the aquarium viewer. Electrical costs will be lower for a chiller than for a room air conditioner because there is less area to cool, and temperature control for the aquarium will be more effective.

Over the years, we have noted that when fish experience a rapid or immediate change in temperature of more



than 4°F (2.2°C) in either direction, they often develop a disease of some sort (marine ich, or a swim bladder problem) shortly thereafter. There is no doubt that there is a metabolic rate change when the animal experiences a temperature shock, but exactly what internal processes are initiated is unclear.

It should go without saying that one needs to monitor and control temperature. Extreme excursions from the normal range of temperatures, in fact, can lead to the loss of an entire collection of fishes and other livestock. Having an easy-to-read digital aquarium thermometer that allows a quick water temperature check whenever you pass by the aquarium is very good insurance in case a heater or