

3.3.2 Making Saltwater Mollies

Overview

Many people engage in the hobby of keeping aquariums. They enjoy the restful entertainment of watching fish swim and learn about ecosystems and caring for another organism. Responsible aquarium care requires work and planning and some knowledge of the needs of the fish. In the case of a fish called a molly, questions arise about its most healthy habitat. Should the fish live in a freshwater tank or a saltwater tank? The answer is unclear. However, most fish enthusiasts agree that a range of salinity from a brackish tank (halfway between fresh and salt water) to a full saltwater tank creates the most natural environment for mollies. Because most pet store mollies are raised in fresh water, aquarium owners cannot merely dump them into a saltwater tank; such an action would be stressful and perhaps life-threatening to the mollies. There are specific acclimation techniques that people who want to raise mollies should follow, based on ethical animal care practices and what scientists understand about how fish live in salt water.

Learning Objectives

- Marine fish have specific body functions that allow them to live in salty water.
- Freshwater mollies can adapt to salty water if they are given the opportunity to acclimate slowly.

Student Activity: Making Saltwater Mollies

Materials

Reading from lesson

Optional: Aquarium set up

Advance Preparation

Optional: Decide if you would like to follow the instructions for acclimating and raising saltwater mollies and collect the necessary equipment. Learn about aquarium care and familiarize yourself with the tools and practices that you will need to be a successful aquarium keeper.

Process and Procedures

1. Read the instructions for acclimating mollies from fresh water to salty water.

Instructions for Acclimating Your Freshwater Mollies to Salt Water



Wild molly fish live in coastal regions where they inhabit tidal estuaries. The salinity of this water varies widely, from full fresh water to brackish to full salt water. Many people keep freshwater mollies they have purchased in a pet store in an aquarium in their home because they are undemanding pets and have interesting personalities. Though they are often put into a freshwater tank, these fish actually need some salt in their water or they will be prone to illness such as fin rot or white fungus on their bodies. Sometimes mollies get the “shimmies”, an erratic swimming behavior that signals illness. Mollies living in water without salt can die.

To convert the freshwater molly you buy in a pet store into a fish that lives in salt water is a simple, but important, process. Don't be in a hurry to do this; it can take at least 6-8 hours and sometimes 2 weeks to acclimate a freshwater molly to salt water. Start by setting up a freshwater acclimation tank with only sand on the bottom (salt can harm plants). Be sure to include a heater because brackish fish crave heat. Keep your water circulating, but set the powerheads to low. The major risk factor in acclimating mollies to salty water is stress, and fighting powerheads to swim is a source of stress.

Prepare your destination tank. You might be planning to add your mollies to an existing saltwater aquarium or to build a new brackish environment in which to place your mollies. Measure the salinity of your destination tank and plan to calibrate your acclimation tank to match. (Note: Marine water has a salinity between 32 and 35 parts per thousand, which is approximately 1.025 SG (specific gravity). Brackish water has a lower salinity than the lowest marine water, or a range from 1.002 to 1.022 SG when the water is 77 degrees Fahrenheit. A 50/50 mix of marine and fresh water can make a good salinity for a brackish aquarium. Use a hydrometer to make your measurements.) Set up your fish environment with an open sand bed, live rock, and some caves or

hangovers, which mollies like to use as hiding places.

Prepare a mixture of salt water. Use $\frac{1}{2}$ cup of salt for every gallon of salt water you will need. You can use canning salt in place of pricier aquarium salt because it is chemical free. Do not use regular table salt; it contains added chemicals. Mix the salt with distilled water, stir, and let sit overnight. Test its salinity with a hydrometer; it should be close to 1.025 SG.

Once your salt water, destination tank, and freshwater acclimation tank are ready, prepare your fish. Take your mollies and dip them in a dose of stress coating, which you can get at your pet store. Then carefully add them to your acclimation tank. Keep the lights down low as bright lights are stressful on fish.

At regular intervals, remove one cup of fresh water and replace it with one cup of the saltwater mixture. Continue this process until you have replaced at least half of the volume of your tank with salt water and the specific gravity matches that of your destination tank. Specialists suggest that water replacements can be made from every 30 minutes to every few hours. Regardless of your timetable, be sure to care for your mollies as you would do regularly.

Once your acclimation tank has the same salinity as your destination tank (close is good; it will be hard to get it perfect), you can begin to transfer your mollies to the destination tank. Keep your lights off and air circulation low (but not off) to prevent stress. Once your fish have been in their new home for 24 hours, their acclimation should be complete.

2. Meet with a partner. Answer the following questions and be ready to discuss them with the whole class.
- What makes fresh water and salt water different for fish?
 - What functions do the mollies need to perform in order to live successfully in salty water?
 - Why would transferring mollies from fresh to salt water be stressful?
 - In the wild, why would the molly's ability to adjust to the salinity of the water be advantageous?

Assessment

Acclimation is the adjustments that organisms make in their behavioral, physiological, and biochemical responses that help them live in changing environments. As you learned in this lesson's reading, some wild fish can acclimate to changing salinity. If you decided to set up an aquarium as a result of this lesson, you probably learned that you can help aquarium fish acclimate to new water temperatures by gradually introducing them to their new tank while inside a plastic bag of their original water.

Humans can acclimate, too. Climbers acclimate to high altitude if they do not ascend too quickly. Research the process of acclimation used by climbers of Mt. Everest. Find out what can go wrong if climbers do not take the time to acclimate. Write a report that includes the biological responses that result as climbers adjust to the stress of high altitude.

-OR-

Divers are exposed to environmental changes when they make dives. Cold water can cause hypothermia and warm water can cause hyperthermia. Acclimation by making short dives can increase a diver's tolerance. Descending too quickly may cause pressure injuries. Also, if divers ascend too quickly, their bodies do not have time to acclimate to the changes and they suffer decompression sickness. Write a report that includes the biological responses that result as divers adjust to the change in pressure as they descend and ascend during a deep dive.

Expected Outcomes

What's the take-away?

Living things have specific body systems that allow them to deal with certain environmental conditions. Changes in environmental conditions can trigger biological responses in living things. Living things with the ability to adapt to fluctuating environmental conditions, such as salinity levels in the water, have an advantage over other species that are more sensitive to such changes.

What does the student work product look like?

When meeting with partners to discuss the article, look for conversations to include a realization that an adaptability to changing environmental conditions can be advantageous for a living thing.

Assessment

Individual student responses should apply what was learned about how environmental conditions can trigger biological responses in living things. Just like other living things, humans have body systems that are accustomed to certain environmental conditions. When these conditions change, our bodies react. Responses should specifically identify the environmental conditions that changed by climbing or diving and the particular biological responses that were triggered.