Clownfish Husbandry Spawns Success At Westminster High School

Carroll County Public Schools Grow Science Research Course

At Westminster High School in Carroll County, Maryland, a greenhouse is full of more than plants or veggies being readied for a spring fundraiser -- it is full of discovery and ideas. The interior of the six-year old greenhouse is humming with the sounds of pumps, compressed air, and other life support systems that enable students in Science Research courses to design experiments, ask questions, and get into science in a way that is all too often out of reach.

Photo 1. A 3 week-old clownfish *(Amphiprion ocellaris)* at Westminster High School will become one of the broodstock to produce other clowns for CCPS schools involved in Science Research courses.

The students, with the help of their teacher, Mr. Don Adams, have designed and now operate aqauculture systems that simulate aquatic environments. Their goal is to study local species like blue crabs and seahorses. They are also breeding a more-exotic species, clownfish, an activity that teaches them about both science and commerce.-- those ornamental tropical fish are sought-after to display in aquariums, and a goal of the project is to raise and sell clownfish for pet stores.

The Westminster students found out, though, that successfully mating and hatching clownfish involves more than placing a mating pair of adult clowns in a tank and hoping for the best. Mr. Adams and the students traveled to the University of Maryland's Horn Point Laboratory in Cambridge, Maryland, where they learned that the right conditions for breeding include a spartan but functional tank environment. The tank needed a substrate (PVC pipe or piece of tile) where the fish eggs could attach. The students also learned they needed to pay attention to other conditions like the right combination of temperature, food, and a compatible mating pair.

Back at Westminster, the students delved further into husbandry and rearing. The students needed to prepare for hatchlings by readying small tanks for housing them. The students developed a supply of algae, which they fed to another live organism (rotifers); these in turn could be fed to the hatchling clowns when they arrived.

The students watched the tanks, waited – and were rewarded when about 100 baby clownfish hatched in April.

Mr. Adams and student Emily De Lara wrote a description of how the students midwifed this result; here are excerpts:

Once a pair of Amphiprion ocellaris become mates, they begin to show signs of laying eggs. The male will start to clean the area that the eggs will be adhered to whether it be a clay tile or a PVC pipe. Once the area is ready the female will lay the eggs during the day and then the gestation period is around 7-10 days. The eggs on the first day are bright orange and

progressively become darker. Once the silver eyes show, then the eggs will hatch after dark. We have collected the eggs by allowing them to overflow out of the main tank to the sump where they are captured by a mesh bag. The next day we take them out of the mesh and place them into our separate tank.

We made the tank set up for the babies as simple as possible with an airstone for circulation and a heater to maintain the temperature at 75-80° F. To save from having to do a water change everyday we set up a simple bio filter with sectioning off part of the tank, adding the airstone and heater then placing bio-beads from the adults' biofilter into the section. With the new set up we only need to do major water changes every two or 3 days however water must be replaced everyday to remove old Artemia, or brine shrimp, to give the babies new enriched Artemia. To remove the old Artemia we siphon out three fourths of the water from the biofilter side and the actual tank. We then take the water from the adult clownfish tanks and add it to the babies' tanks using a beaker. Once the level of the water is restored with the new adult clownfish tank water we put the old water into the biofilter of the adult's tank.

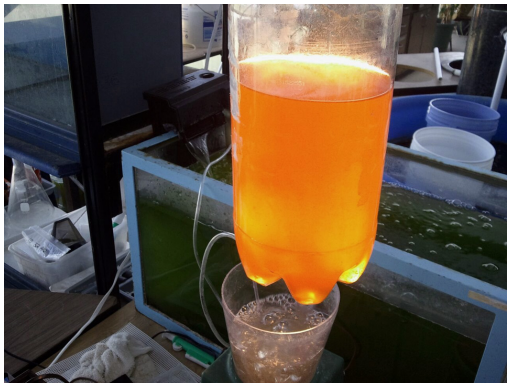

Photo 2. An algae culture provides food for rotifers and will provide needed live food for juvenile clownfish survival.

Next comes the food for the babies. For the first eight days the babies are fed cultured rotifers that are enriched with algae. On the 9th to 12th day newly hatched Artemia are added in with the rotifers as food. Also on the 9th day we started to see the side fins develop with the babies using them to move. We also discovered a distinct white stripe along the top of the head. After a couple more days they developed a second white line towards the back fin. They are now moving like the adults and are starting to develop their third white stripe.

Then from the 13th to the 20th the clownfish are only fed with the enriched newly hatched Artemia. By this time, the clownfish are ready for solid food. After 3 months they will no longer be juvenile fish and are ready to start pairing up and making babies of their own. In time their bodies will grow and become a dominant female, a dominant male, or a neuter, depending on the makeup of their social group.

The Carroll County Public Schools (CCPS) Science Research courses have achieved successes like these thanks to their collaboration with the Maryland Sea Grant Extension Program and the University of Maryland's Institute of Marine and Environmental Technology (IMET) in Baltimore, Maryland, housed in the Columbus Center. This continued collaboration enriches the ideas and the processes of science demonstrated in the Science Research courses and continues to produce new avenues for teacher professional development. Currently IMET scientists Drs. Odi Zamora and Allen Place have provided rotifers as a source of live food and new feed that should enhance the health and development of the juvenile clowns. In the next academic year, the program hopes to produce enough pairs of clownfish for each of the nine high schools in CCPS to produce clownfish.

Written by

Mr. J. Adam Frederick

Maryland Sea Grant Extension Program

Mr. Don Adams
Teacher, Science Research
Westminster High School

Ms. Emily De Lara
Student, Science Research
Westminster High School

Mr. Frederick serves as the coordinator of the Aquaculture in Action program and has been a long-time collaborator and advisor in the CCPS Science Research program.