SUCCESSFULLY SPAWNING AND RAISING THE BANDED SUNFISH (*Enneacanthus obesus*)

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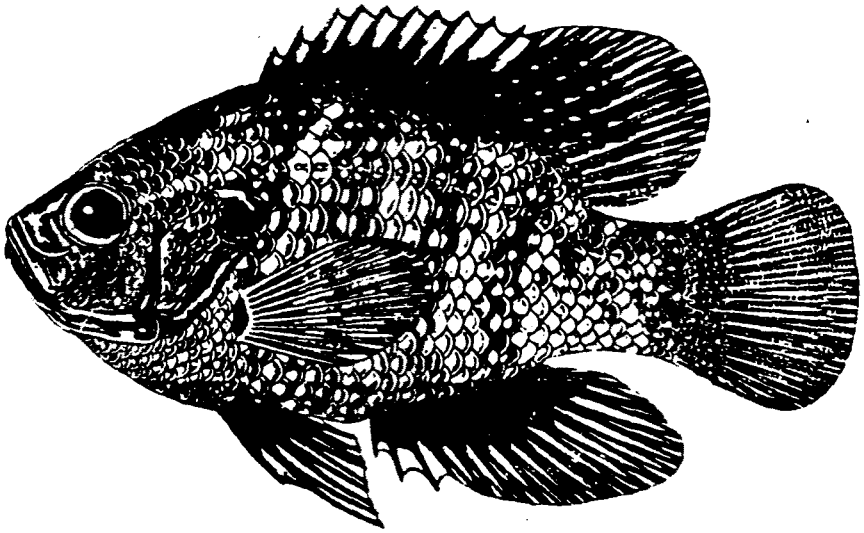
One July, I collected ten adult Banded Sunfish in Southern New Jersey from the a body of water also containing Blackbanded Sunfish. The water conditions at the time were zero measurable hardness, pH 6.0 and a temperature of 75°F.

I housed them in a 20-gallon high aquarium and they spent their summer in my shed. It is equipped with a thermostatically controlled exhaust fan to prevent heat buildups. Filtration is provided by an internal power head attached to a sponge filter and an air-driven corner box filter. Lighting is provided by a fluorescent tube on top of the tank. Pushing the light to the front or back of the tank allows adjustment of light intensity.

An inch-and-a-half of gravel was provided along with a flowerpot turned on its side. There were no plants. To aid in the wintering process and to insulate the tank from the summer heat, the tank is enclosed in a plywood box with a removable lid insulated with styrofoam. An air space of about 4" surrounds the sides and top of the tank. In the winter, minimal heating is provided, using a voltage-regulator connected to heat tape. The heat given off by the heat tape warms the air space. This warm air is pumped into the tank by the air pump and effectively prevents freezing or major temperature drops. The heat is manually controlled and used only when excessively cold.

Initially, I tried to acclimate the Banded Sunfish to my tap water, which is hard and has a pH of about 6.8. They started off doing well, but, within two weeks, their health started to decline. Their appetites decreased and, most noticeably, they lost most of their color. Since it was clear that they would not thrive on my terms, I went to work turning their tank water into a close duplicate of their natural habitat. The first problem to solve was how to soften the water with the least effort. I decided to place a rechargeable ion-exchange softening pillow in the filter box. Using a five-gallon container and an extra power filter, I softened the water to levels that my test kit could not measure. I also added "Blackwater Extract" to the softened water. The softening process takes about one-and-a-half to two hours per five gallons. Prepared water is stored in five-gallon bottled-water containers with lids.

When I had prepared enough water, I changed tank water and looked for any changes. Within 48 hours, the fishes' natural color returned and they became active and hungry again. Softening the water appears to be a very important factor for maintenance of healthy fish.



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The next problem was how to acidify the water. While softening it, I added "pH Down" to the water till I reached a pH of 6.0 to 6.2. The fish were slowly acclimated to this new water. Once they were completely acclimated, I sampled the tank-water pH and found it to be 6.8 instead of 6.0. I had neglected to consider that my tap water has high buffering capacity; the pH will rebound to higher levels unless the buffering capacity of the water is exhausted. The next time I adjusted the pH to 6.0, I waited several hours and rechecked it. It had rebounded as it had in the tank. I readjusted the pH and allowed the water to sit overnight. This time the pH remained the same.

As an aid to the acidification and conditioning process, I also filtered the water through peat for 24 hours prior to storage or use. The completed water is tea-colored, as it is in the native habitat. It takes a day to make five gallons of water, but the results have been worth the trouble.

In the summer, I feed sunfish moderately every other day, and in the winter, they are fed sparingly every three or four days whenever the water temperature rises above 50°F. I try to recreate their natural environment, and minimal feeding in the winter is part of it. Foods offered in the summer include frozen and freeze-dried bloodworms; frozen glassworms; small, live crickets; small, live, cut-up garden worms; live daphnia; frozen shrimp; live mosquito larvae; live blackworms; and any other small insect I can catch. Winter diet for these fish will be the same, except for live foods that cannot be cultured indoors, caught, or bought. As with my experiences in breeding Green Sunfish (AC, Spring '94), the Bandeds endured an average summer temperature of about 80°F and average winter temperatures of about 40°F.

Thirty-three-percent water changes are made once a week spring, summer, and fall. Twenty-five-percent water changes

are made about once a month in the winter (when water temperatures are consistently below 55°F). Don't be lax with water changes. These fish may be small, but they have big appetites and produce large amounts of waste.

By early November, all was going well. I noticed that some of the Bandeds appeared heavier than normal, but thought it a result of regular feedings. Several days later at about 10 a.m., I noticed that one fish, with colors more intense than normal, was hovering over a small depression in the gravel and keeping other fish away from it. Upon closer examination, I noticed another fish in the act of spawning with the hovering fish. I was not lucky enough to witness the entire spawning sequence, but I imagine that their spawning ritual is similar to that of the Blackbanded Sunfish. Apparently the dominant male had spawned with all ripe females and was guarding the eggs. All fish that had appeared heavy the day before were now thin. The fertilized eggs were adhesive, perfectly round, colorless, and 1/32"-1/16" in diameter.

The male had constructed a shallow circular nest typical of sunfish. I quickly removed all the fish and put them in a reserve tank I had set up in the house. The spawning females were somewhat ragged, with torn fins, but apparently in good shape otherwise. The power sponge filter and corner box filter were removed and replaced with an air-driven sponge filter to ensure that none of the eggs or fry would be sucked into the filters. Air flow was high enough to cause a light current in the aquarium; the current prevents any harmful material from settling on the eggs and wigglers. I also made a 25-percent water change.

I anxiously waited for the eggs to hatch. No chemicals were added for egg protection. Clean, well filtered, aerated water is sufficient. Based on my reference books, the eggs of the Banded Sunfish hatch in 3-5 days depending on temperature, but it only took mine three days at a water temperature of 65°F and a pH of 6.0. There were no apparent problems with bacterial or fungal infestations of the eggs, as evidenced by the number of eggs that hatched. The wigglers were entirely clear; no markings were visible. Within 24 hours, eye spots became apparent and the wigglers started to take the form of fish 24 hours after that.

I continued to make 25-percent water changes every week. As to how long it takes for the wigglers to become free-swimming, my references estimate a few days to about one week, depending on water temperature. Three days after hatching, I noticed a few fry making their first attempts at swimming on their own. By the fifth day after hatching, all were free-swimming.

I offered a very small quantity of brine shrimp but none were taken. Two days after all fry were free-swimming, brine

shrimp were re-offered and this time accepted. Generally, one to two days after the fish are free-swimming, the fry will accept newly hatched brine shrimp.

Feedings began twice a day, once in the morning and once in the evening. The feedings require that the aeration and filtration be turned down to a minimum or turned off. This prevents the shrimp from being sucked into the filtration system and aids the somewhat uncoordinated fry in catching their food. The young fry cannot successfully capture the moving shrimp in moving water. Even in still water, they have to make several attempts before they can capture the shrimp. This stage will quickly pass as the fish grow and become proficient swimmers. It is easy to determine which fry are feeding; since their bodies are still transparent, consumed shrimp give the fry orange bellies. For variety, I also feed the fry microworms.

I estimate that I raised about 50 Banded Sunfish fry. Once the adult fish were transferred to their winter quarters, any chance of additional spawnings were eliminated as the water temperature dropped. Frankly, it was a welcome relief, because all my available tank space was taken up for the rearing of the Banded Sunfish and Blackbanded Sunfish fry at various stages of development.

After several months, the fry were about 1/2" in length. They were still dependent on brine shrimp and microworms. They were weaned off the live foods when large enough. As they aged, the young sunfish began to show physical attributes of adult fish. They developed clear fins and a golden, straw body color.

With Green Sunfish, the larger fry began to eat the smaller ones at about this stage. This never occurred with the Bandeds. My feeling is that their mouths are too small to cause any damage at this age, let alone swallow their smaller tankmates. The Green Sunfish were much more aggressive and equipped with large mouths capable of easily swallowing their smaller tankmates.

REFERENCES

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