Spawning My Johnny Darters (*Etheostoma nigrum*)

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Darters are a fascinating group of fish. Generally diminutive fishes, these members of the perch family are often colorful and always interesting. Freshwater fishes, they can often be seen "darting" in the shallow waters of a lake or stream if disturbed. They "dart" because, as a group, most species lack or have a reduced swim bladder.

Darters are strictly a North American group of fishes. They are found from the Arctic drainages in Canada to the north to the mountain streams of northern Mexico in the south (Kuehne and Barbour, 1983). East to west, they are found from the Atlantic coast inland, but not in the Pacific drainage. One species has been introduced in California, though (Page and Burr, 2000).

One of the less colorful, but nonetheless hardy, unique and interesting darters is the Johnny Darter (*Etheostoma nigrum*). In my home state of Wisconsin, it is the most abundant darter (Becker, 1983). Found in most streams and lakes throughout Wisconsin, this darter prefers small creeks with sand or mixed sand and gravel substrates. It tolerates a wide range of water turbidity conditions. In the wild, it feeds on small crustaceans and insect larvae. In the aquarium, it thrives on live foods, frozen foods, and occasionally freeze-dried foods. There are also reports of them taking flakes.

Generally small in size, the average length of both male and female Johnny Darters is two inches. Their coloration outside of the breeding season is brown on the back to straw yellow, with sides being paler, and the belly is whitish yellow. They have four to seven dark brown saddle marks on the back, with W-, M-, and X- shaped dark brown markings on the sides. During the breeding season, males develop a black head, black fins, and dark vertical bars on their sides (Fig. 1). Females retain their non-breeding coloration (Fig. 2).

Tank-care of Johnnies is quite simple. Goldstein (2000) suggests that a 5- to 10-gallon aquarium is suitable for one male and two or three females. The bottom should be sand, with a single large flat rock set at an angle, beneath which the male can excavate a cave. Feed for the fish should include frozen adult *Artemia*, bloodworms, live blackworms, whiteworms, and daphnia. In Goldstein (2000), it is reported that the Johnny Darters will spawn repeatedly at one to three week intervals in captivity and do not require an overwintering period.

Now we come to my involvement with the Johnny Darters. Due to my fondness for darters, I wanted to learn how to spawn them in order to learn how to breed a darter species. Also, I wanted to gain experience breeding fish, in general. Additionally, I wanted to learn how to perpetuate the species in captivity.

So what did I do first? I researched how to spawn Johnny Darters. Becker (1983) states that, in Wisconsin, Johnny Darters spawn from April to June at water temperatures ranging from 53 to 70°F (11.7 to 21.1°C). Males migrate to the spawning grounds in advance of females, staking-out a 10-inch (25cm) in diameter or larger territory, centered around an object under which eggs can be laid. The males maintain only one territory. When a female enters a male's territory, he darts out at her as he would any other intruder. Then, he returns to his nest and swims upside down under the spawning object in order to attract the female to the nest. When the female enters the nest in an inverted position, the two fish assume a side-by-side, head-to-head relationship. The female deposits one egg at a time on the spawning object and the male fertilizes the egg. This can continue for minutes or hours. Males and females are polygamous and a male can have eggs from several spawnings with many females in his nest. The male will care for his eggs, gently rubbing them with his pelvic, anal, and caudal fins to keep them clean. At

Fig. 1.
Breeding condition male Johnny Darter (*Etheostoma nigrum*).

Fig. 2.
Breeding condition female Johnny Darter (*Etheostoma nigrum*).

Fig. 3.
The spawning tank.

71.6 to 75.2°F (22-24°C), the eggs hatch in 5.5 to 8 days.

After researching the spawning methods, I needed to collect some fish. I decided to collect at a location where I found an abundance of Johnny Darters the previous year. I went out collecting at the stream in early April, 2009. I collected in pools and riffles with a 4-foot seine.

Success! I collected 50 individuals. When I got the fish home, I slowly warmed them up to room temperature. This was necessary because the water I collected them in was about 40°F (4.4°C). As I got them acclimated, I found that I had an assortment of males and females. After their acclimation period, I set them up in a 70-gallon tank (Fig. 3) with a num-

Spawning Tank Setup:

- A 70-gallon All-Glass bow-front aquarium.
- BTDarters' Natural Streambed Enriched Plant Substrate for gravel (proprietary).
- Some live plants: *Hygrophila corymbosa 'siamensis'* and *Vallisneria americana*.
- Lighted by two Coralife T5 Twin-tube double linear strip lights.
- 16-hour photoperiod.
- Filtered by two Fluval 204s and a Zoo-Med 501 Repti-Filter.
- Had many broken flowerpots facing the front of the tank so that the Johnnies could spawn in them, and so that I could see the spawning.

Fig. 4.
Male and female Johnny Darters with eggs in the "cave".

ber of other fish species. I had to set them up with the other species due to space limitations. They didn't seem to mind at all, though. As I got the fish settled in, they seemed to be doing fine. Knowing their spawning method, I set up the tank with many broken flowerpots facing the front of the tank. I placed the potsherds in that position so that I could see the Johnnies spawning in them, if indeed they were going to.

So what happened? Well, almost immediately, two males staked out flowerpots of "their own." Then, females started visiting the caves of the males and started spawning with them (Fig. 4)! I was ecstatic! At the end of the first day, each male had about 30 eggs in his cave. That night I went to bed, hoping to see more eggs in the morning.

When I woke up in the morning, each male had less eggs than the night before. I immediately thought that some of the other darters had gotten into the caves and had eaten some eggs. Later, though, I realized that the males had eaten some of their eggs to remain "fired-up." Nonetheless, I had to alter my strategy in order to save the eggs and subsequent fry. I started removing flowerpots with eggs every few hours to prevent predation and always replaced the removed flowerpots with new ones to keep the spawning going. After a few days, I had about 150 eggs! I placed the egg-covered potsherds in a fry tank to hatch out the babies. Five days later, I started to see some fry.

The fry looked like 5mm long "eyes with a tail". I didn't get a whole lot of them, though, as many eggs fungused. I tried feeding the fry that did hatch vinegar eels, microworms, and Cyclop-eeze. A few lasted for a month or so, but eventually I lost all of them. I think that perhaps I didn't change the water enough or feed the right kind of food to the fry. Why am I telling you this? So that you may have better success than I did. Next time I plan to offer more fry foods, change the water more often, and try different anti-fungal remedies to get more eggs to hatch.

In summary, I'm glad that I got the adults to spawn and I was able to learn about that part of perpetuating the species. I hope in the future to raise some Johnnies from egg to adult, and then spawn those adults. Hopefully, this will come with time and experience. Thanks for your kind attention!

Literature cited

Becker, G. C. 1983. *Fishes of Wisconsin*. University of Wisconsin Press, Madison, Wisconsin.

Goldstein, R.J.. 2000. *American Aquarium Fishes*. Texas A&M University Press, College Station.

Kuehne, R. A., and R. W. Barbour. 1983. *The American Darters*. University Press of Kentucky, Lexington, Kentucky.

Page, L. M., and B. M. Burr. 2000. *A Field Guide to Freshwater Fishes: North America North of Mexico*. Houghton Mifflin Company, New York.