Spawning of Southern and Northern Redbelly Dace Compared

by James G. Sternburg, Urbana, Illinois

Phoxinus erythrogaster (Southern Redbelly Dace) and *P. eos* (Northern Redbelly Dace) are closely related (Starnes and Starnes 1979), and may sometimes even be difficult to distinguish from one another (Stasiak 1977). Nevertheless, their spawning behaviors are quite different; Northern Redbelly Dace spawn in masses of algae (see Atlas of North American Fishes), whereas Southern Redbelly Dace are riffle spawners. Reports of these differences are mostly based on field observations, and are certainly accurate descriptions of the behavior of the two species. But what would happen if the two species were presented with identical conditions?

I decided to test these differences by spawning each species, in sequence and not together, in the same aquarium, keeping all environmental conditions as alike as possible. The Northern Redbelly Dace came from a pond near Fredonia, New York. They were received several years prior to my spawning them. In preparation for spawning, they were kept cold during the winter (45-50°F), and allowed to warm gradually as spring came. The Southern Redbelly Dace were caught by me in a small tributary of the St. Francis River near Lodi, Missouri in September 1991.

They were all adults. They were kept cold (50°F) during the winter and allowed to warm gradually during the spring months. Both species were fed Tetramin Staple Flakes, frozen brine shrimp, and frozen glass worms. I used a 40-gal.-long aquarium with 10" deep water, and red flint sand over the entire bottom. A 6"x18" drift of marbles and small pebbles was present. I placed a small submersed water pump to direct a current towards one end of the bed of pebbles and marbles. The intent was to simulate the nest of a chub. A pot with a mass of Giant Valisneria was at the other end of the aquarium and a mass of Java Moss was anchored to the sand by means of a rock, out of the current and near the valisneria.

The temperature was allowed to fluctuate with ambient changes from 65 to 75°F. I did not determine pH; however, because the water was regular city water adjusted with "Novaqua" water-conditioner, it was likely between 7 and 7.5. A large sponge filter was in use at all times. Two 20-watt cool white fluorescent lights furnished illumination from 8 a.m. to 10 p.m.

The Northern Redbelly Dace were spawned first, in early May, 1992. Twelve adults were placed in the aquarium. There were no other fish in the tank. The fish were left undisturbed except for feeding several times per day. Only two of the males showed red color at any time. None of the females colored. After several days together, a change in behavior became apparent. One, two, or even three males drove a single female in a vigorous

chase up and down the length of the tank. The procedure seemed to be like that of goldfish at spawning time. Most of the chases broke off with no spawning. The active fish would then join the loose school of other fish, usually under the floating valisneria foliage.

After several days of activity, I observed some of the chases ending with a female and one or two attending males swimming into the mass of Java Moss. Once inside, they stopped their headlong movement and stayed side-by-side with quivering motions. This action would last for 30 to 60 seconds, after which the fish bored their way out of the Java Moss and separated.

When not actively chasing or spawning, the Northern Redbelly Dace tended to remain away from the water current. They had no interest in the bed of pebbles, nor in the current of water directed at the pebbles. At no time did I see them spawn among the pebbles or over the sand substrate. Spawning was repeated at intervals by other dace over the next three days, at which time I removed all the adults.

Six days later, the first fry were seen swimming in the quieter parts of the aquarium. By the following day, over 100 were present. These were fed commercial fry food at first (an egg preparation, "Liquifry"), and after several days given live, newly hatched brine shrimp nauplii. The stomachs, bulging with an orange color, were evidence that the brine shrimp were being eaten. The fry were removed to another aquarium for rearing two weeks later.

In contrast, the spawning behavior of the Southern Redbelly Dace, placed in the same aquarium with all conditions the same, was very different. They actively sought out the current and hovered above the bed of pebbles by swimming constantly into the current. At times they did retreat to quieter regions of the aquarium. Several days after being placed in the aquarium, the six males and six females became brilliantly colored. The males had red extending over the entire underside, and the fins were yellow. Females also developed the red color, though not quite as extensively as the males, and some white showed just below the lower dark lateral stripe. The fins were not yellow.

The males congregated over the upstream end of the pebble bed, staying in fairly tight formation. From time to time, a female would enter the group and one or two males would drive her down to the bottom, where spawning took place. Spawning was observed at irregular intervals during the day. In the evening, I removed the adults to reduce predation on their eggs. Six days later, the first fry were seen. They were fed very fine powdered flake food at first, and, after several days, live, newly hatched brine shrimp nauplii. I selected about 30 of the 100 or more present to rear.

By November the young of both species reached about 1.25"-1.5" in length. There has been little mortality. Late in

November, I transferred them to aquariums which will be allowed to become cold during the winter months.

The very different spawning behaviors of Southern and Northern Redbelly Dace are perhaps adaptations to differences in habitat. Southern Dace occur in small flowing streams, often in wooded areas where submerged aquatic vegetation is sparse. Riffle spawning is frequent in such habitats. The Northern Redbelly Dace is found in ponds and pools of creeks, near vegetation (Page and Burr 1991); such conditions favor spawning among plant thickets.

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References

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