

AQUARIUM SPAWNING OF THE MOUNTAIN REDBELLY DACE  
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The various species of Phoxinus include some of the more colorful fishes of North America. Of the six species found in the United States, the Mountain Redbelly Dace (Phoxinus oreas) is certainly the most ornate of the genus. Breeding males and females rival many of the exotic aquarium fish commonly kept by aquarists. The more widespread Southern Redbelly Dace (P. erythrogaster) is almost as colorful but not as intricately marked.

I received Mountain Redbelly Dace from Bruce Gebhardt. I made repeated attempts to spawn six of them during the spring and summer of 1990, but without success. During these attempts, six adults maintained brilliant coloration at room temperature from May through most of the following fall until transferred to colder water. The fish tended to stay in the current, most of the time below a large piece of driftwood about 6" from the bottom. The bottom substrate consisted of sand and scattered pebbles. The fish interacted occasionally by chasing one another, but no signs of spawning were seen. I could detect no sexual differences and believe now that all were males. Repeated attempts to spawn them were without success.

During the months from November 1990 to April 1991, I kept the surviving adults and nine additional fish received in 1990 in unheated aquariums placed in a cool greenhouse. The water temperature was from 45° to 50°F during most of December, January, and February. The fish were fed sparingly with Tetramin Staple Flakes and frozen brine shrimp and glass worms. There were no electric lights; the fish experienced only a natural day-night sequence. Sponge filters and airstones were used. Plants consisted of Valisneria, Java Fern, and Hornwort. The few times I checked pH, it was near 7. Water temperature gradually increased as spring progressed.

On May 31, 1991, I placed five large and five small fish in a 4'-long 40-gallon aquarium. A submerged water pump (Hagen AquaClear Powerhead 201) produced a fairly strong current, with flow directed over a bed of glass marbles and 1" rounded pebbles covering an area 20" long and 6" wide. The purpose of the marble-and-pebble bed was to trap and protect eggs from being eaten after spawning. The temperature was near 70°-74°F, the pH about 7; a large sponge filter and a grove of potted Valisneria completed the decor.

At first the fish hid among the plants and under the filter for several days, but then they began to swim suspended in the current. The five adult fish began to color on June 2. There were two males and three females. Both males and one female had red undersides. The other two females had

relatively little red. The small fish did not develop color at any time, and did not participate in the subsequent spawning. Raney (1947) reports that most spawning females are not red, but that some are as brilliant as the males.

The five adults grouped in tight formation headed into the current over the marbles. On June 4, I observed the fish in a tight, rolling, swirling mass immediately above the start of the bed of marbles. All but one were brightly colored. The activity was intense, and lasted for many minutes. After this, the fish returned to their previous positions above the marbles, swimming into the current. This behavior recurred again and again.

Although I did not see eggs discharged during the rolling activity, I felt they must have spawned, so the next day I removed all the adults and the subadults. The velocity of the current over the bed of marbles and stones was reduced. Each day I carefully checked the aquarium for free-swimming fry, and the first ones appeared June 11, seven days after spawning, swimming a few inches below the surface. One was present by 1 p.m.; by 3 p.m., there were six fry, and at 8 p.m., over 50. The next day, June 12, I could observe approximately 200. They were very slender, almost transparent, and about 7 or 8 mm. long. I provided Tetramin Baby Fish Food "E", which they took, and the next day I gave them live, newly-hatched brine shrimp nauplii. They were taking the brine shrimp; their abdomens became pinkish.

Growth was gradual over the summer, with no losses. By the end of October, the largest young were about 1" long, though the average length was closer to 3/4". The young have an uninterrupted lateral dark band. As the fish grow, the band bows slightly downward. Even when the fish are 1" long, there is still no break in the band, as seen in adult fish. The young differ from Southern Redbelly Dace of the same size by having the band bowed downward; the band is straight in the Southern species, not bowed. There is only one band in the Mountain species at 1" length, whereas two bands are developed by this size in the Southern species. There is, of course, no red at this size.

The procedure I used was the same as reported for the Southern Redbelly Dace in the October 1986 issue of AMERICAN CURRENTS. Since then, I have successfully spawned the latter species every year, including 1991. With the Southern Redbelly Dace, there was never a swirling mass activity, and spawning was performed by pairs or sometimes trios of two males and one female. Whether or not this difference is real must be determined by further observations of spawning Mountain Redbelly Dace.

Raney observed P. oreas spawning over the nests of Nocomis species. Association with Nocomis is apparently not obligatory, as shown by the successful aquarium spawning in the absence of any other species. It is possible that the drift of marbles and pebbles simulated the appearance of Nocomis nests and triggered spawning. Hambrick (1977) states that both Notropis cerasinus (Crescent Shiner) and P. oreas spawn by preference in the upstream boundary of the nest. The choice of similar spawning sites is probably the cause of hybridization. My observations agree with the choice of spawning site in relation to the bed of marbles and pebbles: the fish spawned at the upstream boundary. The intense swirling activity was most likely a combination of spawning action and the non-spawning participants feeding on eggs. Flanking of the female by one or two or even three males was observed by both Raney and Hambrick.

#### References

- Hambrick, P.S. 1977. The intergeneric hybrid Notropis cerasinus x Phoxinus oreas (Pisces, Cyprinidae) in the upper Roanoke River drainage, Virginia U.S.A. American Midland Naturalist 98 (1): 238-242.
- Raney, E.C. 1947. Nocomis nests used by other breeding cyprinid fishes in Virginia. Zoologica 32:125-132.
- Sternburg, James G. 1986. Aquarium spawning and rearing of the Southern Redbelly Dace. AMERICAN CURRENTS October 1986:7-9.