Reproduction of *Mikrogeophagus ramirezi* (Myers & Harry, 1948) in aquarium

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Introduction. *Mikrogeophagus ramirezi* (Myers & Harry, 1948), or the ram cichlid, is a freshwater, benthopelagic, non-migratory fish species from South America (Orinoco River basin, in the llanos of Venezuela and Colombia) (Froese & Pauly 2023). Water parameters in the wild: pH range 5.0-6.0, dH range 5-12, temperature 27-30°C (Schliewen 1992). Maximum length: 3.4 cm standard length male/unsexed (Kullander 2003). It has been used in ethology as research model (Robins et al 1991). Not suitable for aquaculture/human consumption due to its small size, but it is a commercial species for aquarium market. Aquarium keeping: in one or more pairs; minimum aquarium size 60 cm (Froese & Pauly 2023). This paper is a brief synthesis of the captive breeding in aquarium of the ram cichlid (Figure 1).

Figure 1. *Mikrogeophagus ramirezi* (Myers & Harry, 1948), imported from Columbia. Source: Frank M Greco - http://www.fishbase.tw/Photos/ThumbnailsSummary.php?ID=12305

Pair selection. Start by selecting a healthy pair of *M. ramirezi*. Choose two mature and healthy specimens, one male and one female. As with many species of cichlids (see *Pterophyllum scalare* (Schultze, 1823)), the ram cichlid prefers to choose its own mates for reproduction in a 1 male to 1 female ratio.

Create an adequate environment. It is recommended to use a glass container of approx. 40-50 L. A few floating plants, such as *Ceratopteris* spp., and a substantial tuft of Java moos (*Taxiphyllum barbieri*) are introduced into the glass container, as the latter develops an abundant microfauna that will serve as the fry's first meal. Two flat dark stones can be used as a spawning substrate.

Maintain water parameters. *M. ramirezi* requires a water temperature between 26-30°C (79-86°F), preferably 28°C, a pH between 6.5 and 7.0, and water hardness between 1 and 8 dGH. Proper filtration and aeration are essential to maintain good water quality (Petrescu-Mag 2007b).

Feed and nutrition. A varied and balanced diet is crucial for the health and fertility of *M. ramirezi*. Provide live, frozen, and dry food, including insect larvae, daphnia, cyclops, nematodes, and quality flakes.

Stimulate reproduction. *M. ramirezi* can be stimulated to breed by adjusting water temperature, increasing food intake, and providing suitable substrate for egg deposition. Additionally, males may display vibrant colors and expand their territory during the breeding season.

Courtship and egg deposition. The male will court the female by displaying vibrant colors and dancing around her. After this, the female will begin to deposit eggs on the chosen substrate, and the male will fertilize them. This process may be repeated several times, resulting in the deposition of up to several hundred eggs.

Incubate eggs. After egg deposition, *M. ramirezi* will continue to care for the eggs. Monitor the eggs to prevent fungal infestation and ensure good water quality during incubation. To avoid the eggs being attacked by *Saprolegnia* fungi, it is good to add 2 mL of H_2O_2 to every 10 L of water 2-3 times a day after spawning and after removing the parents. After approximately 2-3 days, the eggs will hatch, and the larvae will start swimming freely after other 4 days.

Care for the fry. After hatching, the larvae will initially feed on their yolk sac. After a few days, they will begin to consume live food such as infusoria or artemia nauplii. The partial water exchange will be done at least once or twice a day, in the proportion of about 25% of the capacity of the glass container. These water changes help the fry develop faster. When the fry reach two weeks, the temperature in the aquarium can be gradually reduced to 24-26°C. At this moment, the fry should already have doubled the length they had at hatching. After 15-18 days of life, well-fed fry take the form of adult fish, although they are still almost transparent. At 3 weeks, the young should already be about 8 mm and they feed on a wider palette of components: dry flakes, *Daphnia* spp., *Cyclops* spp., and *Artemia* spp. (Petrescu-Mag 2007a).

Separate the juveniles. Once the fry have grown larger, it is advisable to separate them into another aquarium to prevent possible aggressive behaviors from adults and to provide them with enough space to grow safely. Most aquarists separate the parents from the fry as soon as the fry begin to swim, because in this species the parents do not excel at being good parents when bred in the aquarium.

Continue to monitor and care. Breeding *M. ramirezi* can be a wonderful and educational experience for any aquarium enthusiast. Continued monitoring and proper care are essential to ensure success. Maintain stable water parameters, provide a

suitable diet, and regularly clean the aquarium to maintain a healthy environment for the fish. The ram cichlid spawn every two weeks.

Conclusion. Reproducing *M. ramirezi* in an aquarium can be a beautiful experience, showcasing the complete life cycle of these amazing fish, from courtship to raising juveniles.

Conflict of interest. The author declares no conflict of interest.

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