



Photo credit: Florida Medical Entomology Lab.

KEY INFORMATION

Areas of Concern

Western Atlantic: Florida.

Year Identified as “Species of Concern”
1997

Factors for Decline

- Habitat alteration and fragmentation
- Development
- Mosquito control

Conservation Designations

IUCN: Least Concern
American Fisheries Society: Vulnerable
Species of Greatest Conservation Need: FL

Current Status:

Demographic and Genetic Diversity Concerns:

No direct estimates of abundance are available for mangrove rivulus, partly because of the diverse habitat use of this fish and the difficulty of sampling some of these habitats. Nevertheless, habitat loss can be seen as a proxy for abundance. The great loss of mangroves in recent decades suggests large declines for the species (Taylor 1999).

Existing Protections and Conservation Actions:

The protective listings for this species in Florida provide protections against take, possession, or transport and offer attention to the species declining status.

Factors for Decline:

This species is extremely vulnerable to habitat modification and fragmentation, environmental alteration, and human development/encroachment. Much of the suitable habitat has been isolated and

fragmented as a result of the destruction of mangroves through removal and practices such as mangrove “trimming” and impounding of high marshes for mosquito control. Although it is obvious that this species has been dramatically reduced, it is difficult to evaluate distribution and status because of natural rarity and its cryptic tendencies. Because of its preference for land crab (*Cardisoma*) burrows, the mangrove rivulus may have decreased habitat availability with decreasing



Species of Concern

NOAA National Marine Fisheries Service

numbers of *Cardisoma*. More information needs to be gathered regarding the relationship between these two species.

Brief Species Description:

The mangrove rivulus is a small mangrove forest species. It has a long slender, dorsally flattened body and a rounded caudal fin. It is dark brown to green in coloration. The body may be mottled with small black dots and there may be a little orange coloration on the body and fins. The maximum length is 2.4 inches (60 mm), although the average is about 1 inch (25 mm). Mangrove rivulus is one of a few known self-fertilizing hermaphrodites (both the eggs and the sperm are produced by one parent, and the young are genetically identical to the parent); although there are some populations that are non-hermaphroditic in Belize. It is the **only** vertebrate animal with this form of reproduction. Eggs hatch in 2 to 4 weeks and only require dampness, not standing water (Taylor 1999). Males are rare and have larger anal fins; both females and hermaphroditic individuals usually have a distinct ocellus or eyespot on the caudal peduncle. The mangrove rivulus can be found from south-central Florida south through the West Indies to coastal areas of South America. It can also be found throughout the waters of the Bahamas and the Yucatan Peninsula. There is large morphological variation among populations from different areas of their range.

Diet includes terrestrial and aquatic invertebrates (such as mosquito larvae, polychaete worms, and copepods), and the mangrove rivulus is known for its cannibalistic tendencies (e.g., eating its own eggs when in captivity). They forage infrequently, but usually during mangrove forest flooding. Mangrove rivulus have been collected within microhabitats within the mangal (a forest of mangrove trees) including: crab burrows, stagnant pools, sloughs or ditches (often intermittently dry) and some fossorial (burrow) niches (inside or under logs, debris, leaf litter, etc.). On the east coast of Florida, the preferred micro-habitat is in the land crab (*Cardisoma* sp.) burrow. In south Florida, and on the west coast, the preference is for stagnant pools and old mosquito control ditches in mangrove forests. In mangrove ecosystems, rivulus has been collected in salinities ranging from 0 to 68 ppt, and in the laboratory juveniles remained viable at 70 to 80 ppt (Taylor 1999). The species can also be found in a large range of temperatures, from 45 to 100°F (7-38°C) and can survive in temperatures as low as 41°F (5°C). They are known to be very tolerant to exposure to air for periods up to 30 days (Litwiller et al. 2006). Mangrove rivulus have also been reported from cave systems and solution holes adjacent to mangroves in the Bahamas.

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