

# Ways to Protect the Environments of the Itaúnas Cloud Fish - *Xenurolebias Myersi* (Carvalho, 1971) – Inhabitant of the Restinga Swamps, Conceição Da Barra, Northern Espírito Santo, Southeastern Brazil

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## Abstract

Itaúnas is a locality of rare scenic beauty, with white sand dunes in the middle of the savanna coastal environments, known as restinga, and many flooded pools, forming a unique landscape. In these ponds of dark water, matte tea colored, lives a fish, *Xenurolebias myersi*, an endemic inhabitant of Itaúnas. The survival of this unique little fish is worrisome. The living environments of the Itaúnas cloud fish are under pressure, and it is threatened with extinction as well. As inhabiting temporary, almost isolated environments, this fish is almost unknown. Locally, the population is unaware that the region is inhabited by an endangered fish, which only exists there in Itaúnas. A form of protection comes through the awareness of their presence among the population of the village. The present contribution aims to shed light on the knowledge of *Xenurolebias myersi*, in order to turn the fish better known locally, and point out the urgency to protect the Velha Antonia stream, a river drainage closer to the village of Itaúnas, where the fish was caught for the first time.

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## Introduction

In the floodable regions of northern Espírito Santo, lives a fish that has developed a differentiated survival strategy. Its life cycle unfolds in the rainy season, when it mates and lays the eggs on the substrate that will soon dry out. As soon as the rainy season comes, even if years pass, the eggs will hatch and the cycle will repeat itself in accelerated time, to ensure this ideal circumstance. For its rapid appearance in a previous dry area, they are known as the "cloud fish"- as comes with the rains. Its life cycle is annual, reaching sexual maturity in the summer period when there is a lot of water in the marshes and dying during the dry period in the winter, when the puddles that are its habitat dry up. Because of their sudden appearance in a previously dry environment, they are called cloud fish, as they were believed to fall along with rainwater. The present contribution aims to shed light on the knowledge of *Xenurolebias myersi*, in order to turn the fish better known locally, and point out the urgency to protect the Velha Antonia stream, a river drainage closer to the village of Itaúnas.



**Fig. 1.** *Xenurolebias myersi*, adult male with lanceolate dorsal and anal fins and contrasting vertical bars on flanks. Image: Rodrigo Damasio.



**Fig. 2.** *Xenurolebias myersi*, adult female with translucent fins and dark dots on flanks. Image: Frederico Pereira.

## Habitat notes

Due to documentation, population registration and monitoring of the species by the local community, it was possible to properly map the species distribution. The cloud fish inhabits the sub-basins of the Velha Antônia stream, Moças stream, in the Itaúnas river basin and additionally in the Limo stream, a tributary of Doce creek basin (Sarmiento-Soares et al., 2022). These bright colored fishes are sexually dimorphic (Fig 1, Fig. 2). Lives in peculiar environments, where water is transparent, translucent, in an yellowish or dark orange tone, without turbidity. The species inhabits seasonal swamps in open areas of taboal (*Typha* spp.) or in restinga forests. They are found in temporary freshwater floods, of varying size, from small defined puddles with tens of meters to very extensive swamp areas, with a few square kilometers. Such environments are in the floodplain of the rivers, some very close to the sea, just over a hundred meters from the beach. The puddles are shallow, between 20 and 70 cm deep. The bed of the marsh is composed of a triple layer of substract: leaf litter, red mud, which occupies about 20 centimeters or more deep, and then sand underneath. On the trail of the Butterflies, within the State Park of Itaúnas-PEI, the flooded pools are located in open areas. But in the stream of Limo the swamp is on the edge of the forest. The vegetation in the marshes consists of hydrophyte plants such as Nymphaeaceae (*Nymphaea ampla*) and Salviniaceae (*Salvinia biloba*) that may be present. Most often the cloud fish is the only one in its environment, but the habitat can be shared by non-annual species such as the belly (*Poecilia vivipara*), the tamboatá (*Callichthys callichthys*), the piaba (*Hyphessobrycon bifasciatus*) and even baby piscivorous fish such as the traíra (*Hoplias malabaricus*) and the morobá (*Hoplerythrinus unitaeniatus*). The marshes where *Xenurolebias myersi* lives dry out once a year, in late winter, but we observed that larger wetlands do not dry out every year. In this sense, some populations experience a longer life cycle, according to the rainfall regime. The hatching of the eggs happens at the

beginning of the rainy season, in November and December, which is when the fry appears.

But it is a silence presence.



**Fig. 3.** Velha Antônia stream, near village of Itaúnas. Type locality of *Xenurolebias myersi*. Potential area of conservation action and environmental education.

## The Velha Antonia stream

Until 2004, *Xenurolebias myersi* was known only from point records in the Itaúnas River basin, most of them were from the Velha Antonia stream (Fig. 3). The Velha Antônia stream corresponds to the type locality of the fish of the clouds of Itaúnas, that is, the place where the species was first observed in the 1960s, by a team of researchers who were there to collect amphibians (Carvalho, 1971). Due to proximity of Itaúnas village, the Velha Antônia stream corresponds to a potential area of conservation action and environmental education. More recently, this peculiar little fish gained the charisma of the local community of the village of Itaunas, today involved in the partnership in its conservation, in local schools and environmental education (Sarmiento-Soares et al., 2022). The fish became a symbol of the village as the "Little Fish of the Clouds of Itaúnas".

But nowadays we are concerned about the situation of the Velha Antônia. The arrival of asphalt in the village of Itaúnas has brought a very aggressive and dynamic occupation, particularly along the river valleys closer to the Itaúnas village, as is the case of the Velha Antônia. The Velha Antonia stream has been the scene of disputes between social movements, the timber sector and speculation for construction. The drastic transformations recorded in the floodplains give way to urbanization, being the wetlands easily drained and grounded. Actions of recovery and conservation of the Velha Antonia stream now more than ever are necessary and urgent.

## Discussion

Although conservation actions are in course since 2013 (MMA, 2013), the cloud fish remains as Endangered (EN) in the Red Lists (MMA, 2018; Hostim-Silva et al., 2019). Otherwise, *Xenurolebias myersi* is focus within the Brazilian action plan to conservation of rivulid fishes according to MMA ordinance No. 148, of June 7, 2022 as included in the National Action Plan for the Conservation of Endangered Rivulid Fish – PAN Rivulidae (MMA, 2022). The National Action Plan for the conservation of endangered rivulid fish - PAN Rivulids highlights in its specific objective 3 the action of popularization of the species, through "*disseminating knowledge about the focal species of rivulids, sensitizing society about the importance of wetlands for their conservation*" (MMA, 2013). Additionally, in Espírito Santo state it is a species benefited in the Capixaba-Gerais Territorial Action Plan – PAT Capixaba- Gerais (IEMA, 2021).

Now we need more attention towards conservation of the cloud fish territory. We keep what we love, what is precious to us. With everyone's help, celebrating the life of this little fish is something that deeply moves us. The protagonism of Itaúnas community towards fish conservation potentiates actions of restoration of its living environments, through the involvement of local actors. The climate has already begun to change. Socio-economic losses associated with climate change can be avoided if local people act now. Together we will protect the environments from the Itaúnas waters.

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