

Basic Information and Husbandry Guidelines
for *Ptychochromis insolitus*,
Mangarahara Cichlid





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1. Characterisation

Scientific name: *Ptychochromis insolitus* (STIASSNY & SPARKS, 2006)

Vernacular names: Mangarahara Cichlid (Englisch), Mangarahara-Buntbarsch (Deutsch), Joba Mena (Madagassisch)

Length: Males up to 15 cm

Citizen Conservation#Fish category: I

Threat status according to IUCN Red List: Critically Endangered (CR)

Accomodation: Adult fish should be kept in group sizes of about 10-12 specimens, if possible with more females than males, in an aquarium at least 1.5 m long with at least 500 l water volume. A group of 10-20 semi-adults can be kept in an aquarium with a base area of about 100-120 cm x 40-60 cm (about 160-360 l). Juvenile schools of up to 50 individuals can be raised in aquariums with an edge length of 70 cm or more and a water volume of about 200 l.

Equipment required: Aquarium, lighting, heater, filter, water thermometer, test kit for water parameters, mulm extractor, large stones and bogwood roots for structure and protection, planting, sand or gravel as substrate.

Feeding: Commercial flake food; frozen food (white, black and red mosquito larvae and brown shrimps); live food (artemia, white mosquito larvae)





2. Why is *Ptychochromis insolitus* a Citizen-Conservation species?

The Mangarahara cichlid, *Ptychochromis insolitus*, is acutely threatened with extinction. The species is now found only in a few tributaries of the Sofia River, primarily the Amboaboa River, in north-eastern Madagascar (STIASSNY & SPARKS 2006; RAVELOMANANA et al. 2016; ZIEGLER et al. 2020). In contrast, a small population in the namesake Mangarahara River now appears extinct. Overall, the species appears to be extremely rare within its restricted range (RAVELOMANANA et al. 2016).

The main threats to *Ptychochromis insolitus* are habitat loss, capture for human consumption, invasive species competing for habitat or acting as predators, and temporary drying of large sections of the river due to dam projects (RAVELOMANANA et al. 2016).

The survival of *Ptychochromis insolitus* in its natural habitat is highly uncertain due to the above-mentioned threat factors. Therefore, coordinated ex situ conservation breeding networks may be an appropriate measure to save the species from extinction.



View of the Amboaboa valley, the last known occurrence of *Ptychochromis insolitus* | Photo: Charles Fusari



3. Biology and Conservation

3.1 Taxonomy

Ptychochromis insolitus belongs to the species-rich family of cichlids (Cichlidae) within the order Cichliformes. The species was scientifically described as *Ptychochromis insolitus* in 2006 by Melanie L. J. STIASSNY and John S. SPARKS.

Order: Cichliformes
Family: Cichlidae
Genus: *Ptychochromis* (STEINDACHER, 1880)
Species: *Ptychochromis insolitus* (STIASSNY & SPARKS, 2006)



Ptychochromis loisellei, another endangered Malagasy cichlid also cared for in Citizen Conservation. | Thomas Ziegler



3.2 Description

The body shape is laterally flattened and, as typical for many cichlids, high-backed.

The body coloration of *Ptychochromis insolitus* is gray-silver to silver-gold with scattered dark spots of various sizes. From other *Ptychochromis* species, *Ptychochromis insolitus* is most easily distinguished by a suggested mid-lateral stripe. *P. insolitus* is distinguished from its closest relative, *P. inornatus*, by the reddish coloration of the fin margins of adult males (DE RHAM & NOURISSAT 2004; STIASSNY & SPARKS, 2006; ZIEGLER et al. 2020). Because of this red coloration, the animals are called „joba mena” in Malagasy - meaning „red girl”.

In fact, it is exclusively the males that show this red coloration of the fins. The males of *P. insolitus* reach 15 cm total length (DE RHAM & NOURISSAT 2004).



Adult male of *P. insolitus* where the red colored fin edges can be seen. | Foto: Thomas Ziegler



A group of female *P. insolitus* | Piotr Korzeniowski



3.3 Occurrence and habitat

Ptychochromis insolitus has been recorded in only a few tributaries of the Sofia River. According to current knowledge, occurrences were limited to the Mangarahara and Amboaboa Rivers. Occurrence in the Mangarahara River now appears extinct (RAVELOMANANA et al. 2016).

Habitat at the species' original location is characterized by extensive shallow water areas with clear water and swift current. Calmer areas and deeper pools are present.

The bottom substrate consists of sandy-stony material (STIASSNY & SPARKS 2006).



Range of *P. insolitus* – Source: IUCN Red List
| Jonas Lieberknecht



The remaining habitat of the Mangarahara cichlid at Amboaboa. | Brian Zimmermann (left), Charles Fusari (right)



3.4 Threats

Ptychochromis insolitus was already considered acutely endangered when it was first scientifically described in 2006. After the disappearance of the last known wild population, it was assumed in the meantime that the species was extinct in the wild. It was not until 2013 that it was rediscovered.

The species is endemic to Madagascar, i.e. occurs exclusively there. The total currently known range is extremely small, far less than 100 km² (RAVELOMANANA et al. 2016). The only currently known population occurs in the Amboaboa River.



The deforestation of Madagascar leads to a strong soil erosion and an input of suspended matter into the rivers and lakes in which *P. insolitus* lives. Since the species prefers clear water this is a real problem for the animals.

| gemmmm/Unsplash



The factors threatening the species are manifold. In hardly any other country in the world has deforestation progressed as far as in Madagascar. The formerly green island has since become a red island, with over 90 percent of the original forest area destroyed. This leads to severe soil erosion and an input of suspended matter into the rivers. Because *Ptychochromis insolitus* prefers clear water, the erosion impacts are a direct threat factor (BENSTEAD et al. 2003).

Water demand for agriculture, especially rice cultivation, is high. To meet it, dams are built that divert water and alter the natural flow regime of rivers. In some places, they dry up completely; the population in the Mangarahara River was probably wiped out in this way.

Local fishing with fine-mesh nets and sometimes illegal use of poisons also poses a threat to the survival of the species (RAVELOMANANA et al. 2016)

Introduced alien species are a general problem for Madagascar's fish fauna because they compete for habitat and food or act as predators of native species (BENSTEAD et al. 2003).



Dam projects to secure water for agriculture lead to the drying out of large sections of rivers, especially in dry years. Whole populations of fish are wiped out in this way.

| Charles Fusari



Overfishing of stocks is also a threat factor for Malagasy cichlids in general. | Nazim Zafri/Unsplash



3.5 Conservation efforts

The species was sporadically maintained in human care in the past. However, populations in zoological institutions amounted to only a sobering four specimens in 2012: two males at the London Zoo and a pair at the Berlin Aquarium. The Berlin female was killed by the male shortly thereafter during a mating attempt. It was the last female of its species in human care worldwide. Around the same time, the Mangarahara River in Madagascar dried up extensively and the last known wild population became extinct. Thus, only three males remained, and the extinction of the species seemed only a matter of time.

Calls with the aim to find a female somewhere remained unsuccessful at first. Until Madagascar-based fish enthusiast Guy Tam Hyock came forward, claiming to know of a small pond where a handful of the animals were said to have survived. A team of experts from the Zoological Society of London (ZSL), the Toronto Zoo and the University of Antananarivo launched a search operation, which eventually led to success in 2013 - 18 animals, including some females, were collected and subsequently propagated at a private facility in Andapa, Madagascar. The Toronto Zoo took over some specimens in September 2014 and was subsequently able to propagate the species as well.



In such a residual water body the 18 specimens were found that form the basis of today's ex-situ population. | Charles Fusari



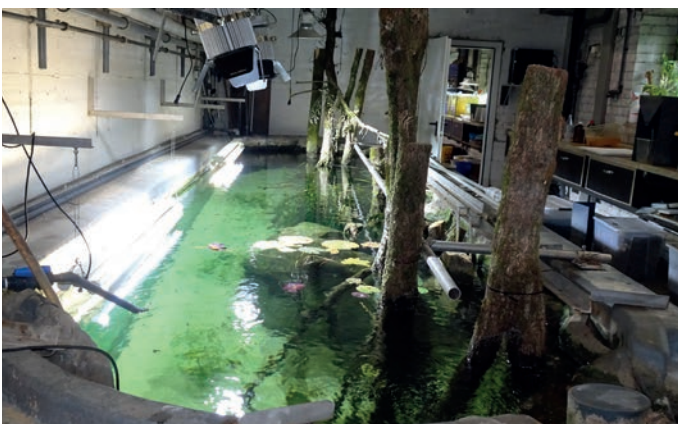
In 2019, the Cologne Zoo took over 30 specimens of the Mangarahara cichlid (ZIEGLER et al. 2020). The captive breeding efforts of the team around aquarium director Thomas Ziegler were subsequently very successful, and offspring have already been transferred to various zoological institutions. Together with Citizen Conservation, a conservation breeding network was established in 2020 to build up a long-term stable reserve population of this endangered species in captivity with the involvement of private enthusiasts.



A juvenile of *P. insolitus*. The rediscovery of the species thought to be extinct was a real sensation. | Brian Zimmermann



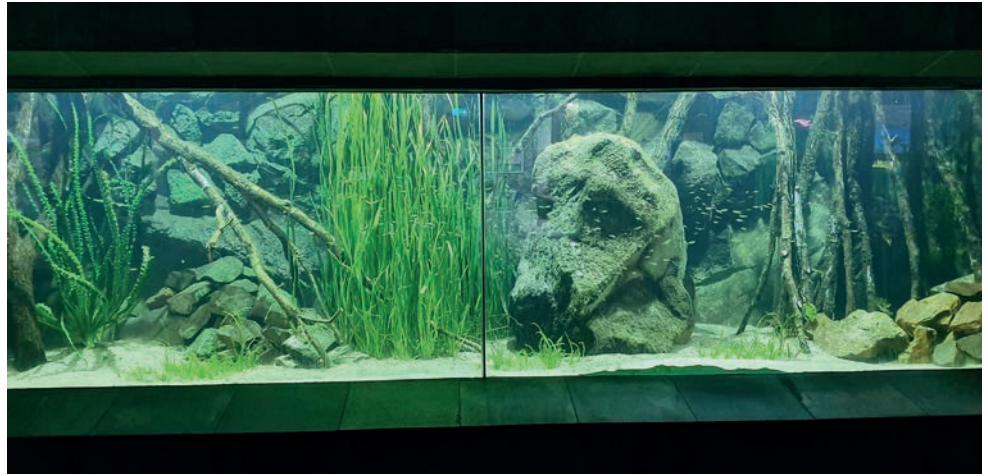
The Madagascar Fauna and Flora Group is an NGO that works on conservation measures for endangered species on the island together with the Madagascar government. At the Cologne Zoo the development of a conservation breeding network for Malagasy freshwater fish has started. | Zoo Cologne



View from the keeper's walkway of the 20,000-liter show aquarium for Mangarahara cichlids at the Cologne Zoo. | Thomas Ziegler



One out of 30 for the establishment of a new population: a male that was transferred from Toronto Zoo to the Cologne Zoo; the animals were initially housed behind the scenes. | Thomas Ziegler



20,000-liter display aquarium for Mangarahara cichlids and Madagascan rainbowfish at the Cologne Zoo | Thomas Ziegler

4. Husbandry

The information on husbandry is based on the experiences at the Cologne Zoo (contributed by Thomas Ziegler) and the Vienna Zoo Schönbrunn (contributed by Anton Weissenbacher).

With the general conditions given here *Ptychochromis insolitus* can be kept and propagated successfully. Furthermore, procedures deviating from these husbandry conditions are possible. In case of major deviations, please discuss them with the CC office beforehand. Please inform the CC-office about additional experiences as well. In this way the knowledge about the keeping and breeding of this species shall always be supplemented and updated.

4.1 Documentation Requirements

CC collects the current population figures twice a year in order to document the population development and to manage the population.

The keepers submit their current population figures to the CC office on 1.3. and 1.9. each year. Generally, reporting offspring to the CC office can occur at approximately six months of age when the number of juveniles expected to reach adulthood becomes manageable. Spawn and very small juveniles do not yet need to be reported.

In general, however, knowledge generation is a stated goal of CC and keepers are encouraged to informally (e.g. by mail) forward data on husbandry and observations of the animals (such as spawning or hatching of juveniles) to the CC office so that such information can be collected centrally. If an adult animal dies, please inform the CC office immediately and informally about the loss, so that a necropsy can be arranged if necessary (in this case CC bears the costs).

Losses of spawn or juveniles do not have to be reported unless there is suspicion that, for example, a disease is the reason for unusually high mortality rates. In case of doubt, consult the CC office.



4.2 Transport

If a change of location is imminent, no more feeding should be done one to two days before transport. Catching and transferring is done with a standard aquarium landing net.

For transport, juveniles can be packed in small groups, for adults it is recommended to pack them individually. Fish bags of appropriate size are used for this purpose. These are filled one-third with water and two-thirds with ambient air or pure oxygen (do not „inflate“ the bag with your mouth) and tightly closed with a rubber band. Water must be used from the aquarium in which the animals were previously kept so that water values and temperature remain stable.

The bags are packed in a thermostable box (Styrofoam or similar) and, if the bags do not fill the interior, fixed with filling material (e.g. bubble wrap, paper) so that they cannot slip around.



Offspring of the Mangarahara cichlid waiting at Cologne Zoo to be transferred to another participant in the conservation breeding network for this highly endangered species. | Thomas Ziegler



Male *Ptychochromis insolitus* at Cologne Zoo.
| Thomas Ziegler

4.3 Aquarium

The species is moderately shy, among themselves the animals can behave quite aggressively. Especially when kept in pairs for mating, there have been losses at various zoological institutions in the past. It is therefore recommended to keep the animals together in groups. At the Cologne Zoo, two groups of 11 and 18 semi-adult animals, respectively, are maintained.

When setting up an aquarium for *Ptychochromis insolitus*, large stones are suitable to provide structure, privacy and hiding places, as well as being used for egg laying. Roots and robust aquatic plants (e.g. *Echinodorus* and *Anubias*) can be added to the aquarium and accents can be set according to personal taste. Commercial aquarium gravel and fine sand are suitable as substrate, which the animals like to „chew through“ in their search for food.

The lighting of the aquarium can be done with commercial LED lights of medium brightness, *P. insolitus* has no special requirements to the lighting.

The filter equipment of the aquarium should be amply dimensioned and ensured with external or mat filters. All the aquarium water should pass through the filter at least four times per hour to ensure a permanently good water quality.

4.4 Water Chemistry and Temperatures

The species has proven to be tolerant of various water values. However, before stocking fish, the aquarium should be „run-in“ long enough so that stable water values and natural bacteria cultures could develop.

Good experiences in keeping and breeding have been made so far with the following water values:

Temperature: 24–25 °C
Carbonate hardness: 3° dH (KH)
Hydrotimetric concentration 5
230 Microsiemens
7,5 pH

A water change of 30-50% should be done once a week.



4.5 Feeding

Ptychochromis insolitus is not very choosy when it comes to food, the diet is trouble-free. The animals can be fed, depending on the size, with commercial flake food, frozen food (white, black and red mosquito larvae, Artemia and brown shrimps) and with live food (Artemia, Artemia nauplii, white mosquito larvae).

The amount of food should be adapted to the stocking of the aquarium. Juveniles can be fed several times a day. Adult animals are also fed daily, with a fasting day once a week.

4.6 Propagation and raising juveniles

The species is an open-breeder, in which the females take over the brood care. During the spawning season, the females are conspicuously brightly marked, while the eyes are deep black (ZIEGLER et al. 2020).

Clutches comprise 100-250 eggs and are preferentially deposited on stones. At the Cologne Zoo, no substrate is used in behind-the-scenes husbandry. Here, females also laid their eggs on the aquarium floor.

The male defends the common territory, but does not participate directly in brood care.

At the Cologne Zoo, it has proven effective to remove the clutches, since clutches left in the parent aquarium became fungal or were eaten.

Several days pass until the larvae hatch. The hatched larvae and fry are maintained at identical water values as the adults. Juvenile schools of several dozen individuals are possible. Further rearing usually proceeds without problems.



The sex differences can easily be seen in the Mangarahara cichlid. On the left a male with the typical red fin margins, on the right the female | Charles Fusari



Female spawning



Female guarding the clutch laid on a stone



Larvae 5 days after eggs were laid



three week old larvae feed on artemia



two month old juveniles



seven month old juvenile | Thomas Ziegler



4.7 Husbandry Challenges

Various reports mention the intraspecific aggressiveness of Mangarahara cichlids (DE RHAM & NOURISSAT 2004; ZIMMERMANN 2014; ZIEGLER et al. 2020). Especially when kept in groups that are too small or in pairs, aggression can occur. To prevent this, it is recommended to keep the species in larger groups and to equip the aquarium sparingly with furnishings. This way the animals are in constant social interaction and even dominant specimens have to defend their small territories permanently. Such a group dynamic prevents that single individuals are suppressed too much and thus allows a successful group keeping of *P. insolitus*.

Orientations for proven group sizes are: 10-12 individuals for adults; 10-20 individuals for semi-adults; juvenile schools of up to 50 individuals.



Schools of juveniles can consist of up to 50 animals.
| Kidan Patanant



Adult fish should be kept in groups as well, to reduce the aggressive behaviour | Kidan Patanant



5. Further reading

BENSTEAD, J. P., P. H. DE RHAM, J.-L. GATTOLLIAT, F.-M. GIBON, P. V. LOISELLE, M. SARTORI, J. S. SPARKS & M. L. J. STIASSNY (2003): Conserving Madagascar's Freshwater Biodiversity. – *BioScience* 53(11): 1101–1111.

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ZIMMERMANN, B. (2014): In search of the Mangarahara cichlid. – *Newsletter of the IUCN SSC/WI Freshwater Fish Specialist Group* 4: 17–22.



Mangarahara-Buntbarsche leben in einem Schauaquarium des Kölner Zoos zusammen mit Madagaskar-Ährenfischen (*Bedotia madagascariensis*) | Thomas Ziegler