

***Apistogramma* sp. “Maulbrüter”, the one and only....**

by Mark Breeze

In recent years I have become increasingly drawn towards the captive maintenance and breeding of the dwarf cichlids of South America and in particular those species within the genus *Apistogramma* (Regan 1913). To date (June 2007) I have bred 35 species/colour morphs of *Apistogramma* and at any one time I regularly house in excess of 25 *Apistogramma* species in a fish house dedicated to South American dwarfs. However few have filled me with as much enthusiasm and excitement as the undescribed *Apistogramma* termed *Apistogramma* sp. “Maulbrüter” by Koslowski (2000). The German name translates as “mouthbrooder” and this species is sometimes seen as *A.* sp. “Mouthbrooder” in English texts.

At the time of writing this article there are 68 scientifically described species of *Apistogramma* and a further 180 species/forms that have been discovered and are awaiting scientific description. In recent years we have witnessed an explosion of new forms entering the hobby, but despite this *Apistogramma* sp “Maulbrüter” remains the only species within the genus in which primitive larvophilic mouthbrooding has been recognised.

Or is it.....?

The species and its habitat

The first few individual specimens of “Mouthbrooder” made their way into Germany in the autumn of 1999 before larger numbers were imported as *Apistogramma* sp. “Red Face” by Aquarium Dietzenbach and Aquarium Glaser in the spring of 2000. Later in the same year Dr Uwe Römer introduced the same species as *Apistogramma* sp. “Brustband” or “breastband” (Römer, 2000).

Ingo Koslowski was the first to report that this was in fact a mouthbrooding species and accordingly named it *Apistogramma* sp. “Maulbrüter” (Koslowski 2000), a name that has become firmly established within the hobby and is the one most commonly used today. In 2005 the species was assigned the DATZ *Apistogramma* number A174* for identification purposes.

Studies of the phylogenetic relationships within the *Apistogramma* genus identify Mouthbrooder as a member of the species-rich *cacatuoides* group.

Apistogramma sp “Maulbrüter” is native to the Peruvian Amazon and is primarily a clearwater species that inhabits small creeks (*igarapés*) and streams that enter the tributaries of the lower Rio Ampiyacu system, north-west of Pebas. To date this system in the north of Peru is the only confirmed location for Mouthbrooder but there is also a preserved specimen from a collection near the mouth of the Rio Jurua that resembles this species but its identification cannot be confirmed.

The natural biotope of Mouthbrooder within these rainforest habitats is generally shallow, slow-flowing, streams that are described as “Amazon clearwater” and are only very slightly tinted by organics such as humic acids and tannins. On a recent trip into the area in October/November 2006 Tom Christofferson of Larvik, Norway (pers. comm.), collected the red form of *Apistogramma* sp “Maulbrüter” (see below) in a small stream less than 1 metre wide and approximately 30 cm in depth (see biotope photo,). The substrate was composed of fine white sand covered in places with a thick layer of leaf litter, twigs, and brush. There was a distinct absence of rocks and submerged vegetation within this Amazonian forest stream, however terrestrial vegetation on the bank provided shade to the water along the shoreline.

The water was extremely soft, acidic, and warm with analysis at the location showing values of pH 4.81, electrical conductivity 26 μ /cm and temperature at 28.9 °C (84 °F). These parameters were measured towards the end of the dry season and it is envisaged that they will change somewhat during the wet season, becoming less acidic and much cooler.

Other species that were collected alongside Mouthbrooder within this forest stream included *Nannostomus marginatus*, a *Pyrrhulina* species that was possibly *Pyrrhulina eleanorae*, freshwater shrimps, and also *Apistogramma cf agassizii* “Ampiyacu” (A241), a stunning red tailed *agassizii* colour morph that has also found its way into my aquaria.

Coloration, form, and sexual dimorphism.

There are two distinct colour variants of *Apistogramma* sp. “Maulbrüter” (see photos) and both the red and the white colour morphs can be located in isolated, non-overlapping, geographical areas within the same region of the Rio Ampiyacu drainage. Although these forms are allopatric in nature, it is the opinion of many ichthyologists that these geographical colour morphs cannot be considered separate species based upon colour variation alone. Many *Apistogramma* can and will migrate during the wet season and it is possible for these colour morphs to interbreed, which is generally not the case with distinct and geographically separate species.

The red colour morph has been named “Rojo”* by the collectors and has the trade name *Apistogramma* sp. “Glaser” while the white form is called “Blanco”* and is often shown on import and trade lists as *Apistogramma* sp. “Hauswell”.

Apistogramma sp. “Maulbrüter” is a beautifully coloured fish that has been noted for its unusual body proportions and the rather unique size of its head, which takes up nearly 35% of the fish’s standard length. It is believed that a large head has evolved to assist with the species’ mouthbrooding tendencies because this species has not yet developed a buccal pouch as seen in the vast majority of mouthbrooders. The body is therefore extremely short (in relative terms) in comparison to that of other *Apistogramma* species.

Males show quite stunning coloration which can change remarkably dependent upon mood. In neutral mood, the body has a base of creamy grey with each scale overlain and edged with an iridescent steel blue. There is no caudal spot evident but a wide longitudinal lateral band extends from behind the eye to the base of the caudal fin and gives the impression of a caudal spot. The head, throat, lips, and cheeks of the red morph show a golden honey red hue that is not as evident in the white form, with numerous black markings that stand out on aggressive fish. The finnage is particularly colourful, with the dorsal fin bearing visibly enlarged dorsal spines that are predominantly red with blue streaks that create a serrated effect to the fin. The caudal is bi-coloured and lyrate, with extended filaments top and bottom. The fin is often clearly divided, colour-wise, the lower half being a deep golden yellow with no visible markings and the top a beautiful iridescent blue with vertical red spotting. The ventrals are iridescent blue with slightly extended filaments tipped with a rich golden brown.

Apistogramma sp. “Maulbrüter” exhibits pronounced sexual dimorphism and clear dichromatism as the markings and coloration of the female are very different to those of the male, to the point where you could quite easily mistake them for separate species. The body colour in females is a somewhat paler honey yellow with a unique pattern of black markings similar to those on females of *A. nijsseni* and *A. panduro*. A square lateral spot is visible in most moods and the lateral band extends into the caudal fin. In addition to these markings there is a broad black band that extends vertically from the base of the ventral fins, behind the pectoral-fin base, and up to the lateral band. This pattern led Dr Uwe Römer to call this species *Apistogramma* sp. “Brustband” or “breastband” (Romer, 2000).

When Mouthbrooder are maintained for any length of time in unsuitably alkaline water conditions they frequently develop black markings and spots that are thought to be the result of environmental disturbance of the calcium metabolism.

Maintenance in captivity

The first time that I actually saw Mouthbrooder imported and offered for sale in the UK was in the early summer of 2005, and I managed to acquire a wild-caught adult pair of the white form. They were mature, well-developed specimens showing stunning coloration and form, and it was with haste that I set up a 28” x 15” x 8” deep (70 x 40 x 20 cm) species breeding tank to accommodate the pair. I had read in various literature that Mouthbrooder is a relatively unproblematic aquarium fish as regards its basic maintenance and requirements.

The tank was decorated to recreate the natural conditions within an Amazonian clearwater biotope. Very fine, almost white, sand to a depth of approximately $\frac{3}{4}$ ” (2 cm) was utilised as a substrate; beech twigs and a thick layer of leaf litter (oak/beech leaves and alder cones) were added in places to provide cover and also to help condition the water, thus imitating the fishes natural environment.

The tank was filled with peat-filtered reverse osmosis water in order to create the clearwater conditions required for this species. A small amount of extract of alder, which is rich in humic acids and possesses anti-bacterial properties, was also added to further condition the water. The pH was adjusted slightly using phosphoric acid and set at a relatively stable 5.5 – 5.8; both general and carbonate hardness were measured at almost undetectable levels; and the temperature was set at 79 °F (26 °C). Terracotta pots were incorporated to act as prospective spawning sites for the female to form a territory in and around. Simple air-powered sponge filtration, set at a slow to medium turnover, was utilised to provide both mechanical and biological filtration. Weekly 20% water changes with pre-conditioned, peat- filtered, reverse osmosis water were carried out both to maintain stability within the aquarium and to keep the bacterial loading at minimum levels.

In these conditions these reputedly lively and unproblematical fishes should thrive, display good health, and be at ease with their surroundings as they lack the shyness often associated with and typical of the vast majority of South American dwarf cichlids.

The fishes were introduced to their new surroundings after a period of acclimatisation and were immediately treated with Levamisole hydrochloride*, which I routinely administer to all newly imported wild *Apistogramma* as they are often host to nematode infections.

It soon became clear that some form of target fish would also be required as the male almost immediately began to show high levels of aggression towards the female, who became increasingly withdrawn as a result of the male's almost constant displaying, chasing, and biting attacks, behaviour that can rapidly lead to losses in smaller aquaria. Male Mouthbrooder generally hold large territories in which they will tolerate only ripe females that are prepared to breed with them. With this in mind a group of six *Nannostomus beckfordii* (Beckford's pencilfish) were introduced. This did give the female some respite, but she still spent the majority of her time amongst the leaf litter, coming out only very occasionally to feed. It was decided to remove the male to separate quarters in order to allow the female time to recover, form a territory, and regard the tank as her own, prior to the male's reintroduction after three days. The pair were then able to share the tank without any further serious problems with aggression.

The Mouthbrooder were well conditioned upon a diet that consisted primarily of live foods such as Grindal worm, *Daphnia*, brine shrimp (*Artemia*) nauplii, and whiteworm. These live foods were offered twice daily and eagerly accepted, along with occasional offerings of dry granulated foods.

Breeding

It has been written that despite its ease of maintenance Mouthbrooder is an extremely difficult species to breed and can be recommended to those aquarists experienced in the breeding of particularly "difficult" *Apistogramma* species. Breeding requires a large element of intuition and perseverance on the part of the breeder (Römer, 2006).

From my experience I have found that it is often the male that is the problem in obtaining a spawn, but once conditions are to his liking and he actually accepts the gravid female, the pair bond is formed and breeding soon commences. Very fine sand is also very often the key to successful breeding.

The courtship is initiated by the female, once ripe; she takes on an off-yellow coloration that at times can be quite intense as she takes on the dominant role. Displaying laterally, the female swims parallel to the male, spreading her fins and shaking both her head and caudal fin with jerky, aggressive movements in the direction of her partner. The male responds in similar fashion, while also opening his mouth and dropping his lower jaw, greatly increasing the apparent size of his head and displaying his unique mouth structure. The chewing and excavating of sand is also part of the spawning ritual, with the sand being expelled via the gills.

In the case of my pair this courtship display continued over a two-day period and both the female and the male became quite territorial. They are cave-spawners and the female seemed to spend hours continually cleaning the "ceiling" of the chosen terracotta pot and excavating sand in and around the "door" of the proposed spawning site. The male defended the territory and drove the *Nannostomus* away from the site with some vigour.

The actual spawning took place early in the morning in typical *Apistogramma* fashion, with the female laying a very small clutch of approximately 20 eggs on the roof of the cave. The eggs were immediately fertilised by the male who, after being prompted by gentle flank nipping by the female, entered the pot no more than five times throughout the whole process. The size of the eggs of *Apistogramma* sp. “Maulbrüter” seemed (and in fact is) much larger than that in other *Apistogramma* species, as is typical of many fishes with mouthbrooding tendencies. When the act of spawning was complete the female spent some time excavating more sand and almost completely blocking up the entrance to the cave, with just enough room left open at the top for her to exit and enter the cave by swimming horizontally, on her side.

The eggs started to hatch after 36-40 hours at 79 °F (26 °C), with the female almost trying to assist in the process by mouthing the larvae free from their shells. At first the larvae were deposited by the female on the floor of the spawning cave, where I expected them to be cared for in the manner associated with the majority of cave-brooders, but soon the wriggling movement of the larvae seemed to stimulate the female into collecting the larvae into the protection of her mouth. The larvae stayed in the female’s mouth almost constantly until they had developed to the free-swimming fry stage, seven days later. During this seven-day period the larvae are spat out by the mouthbrooding female only very occasionally and only for very short periods of time, to permit feeding, etc. The larvae are deposited either into a small pits/depression in the substrate or back into the cave while the female feeds, after which she soon returns to pick up the larvae and continue mouthbrooding.

At no point did I witness any intervention from the male and it was the female who practised the broodcare alone. At this point the female also tolerated the male and there was no aggression shown.

At day 8 the fry were released, free-swimming and actively looking for food. A small syringe was utilised to deposit a cloud of microworm into the brood, and this food was accepted with gusto. The fry were large enough to also accept brine shrimp nauplii as a first food, and this was fed in conjunction with the microworm. A regime of feeding three times daily, along with 25% water changes using pre-conditioned water, allowed the fry to sustain rapid growth. During this period the female practised excellent brood care in a fashion similar to the majority of *Apistogramma* species but still very occasionally took the fry into her mouth for protection when she thought they were vulnerable to predation, etc.

Within four weeks the fry were large enough to accept Grindal worm and very small, dry granulated foods, which were accepted without too many problems. The young Mouthbrooder initially grew rapidly and at approximately eight weeks the juveniles were removed to a separate 16” x 8” x 8”(40 x 20 x 20 cm) growing-on tank when the female started to get slightly aggressive as the urge to spawn again overshadowed any remaining brood-caring tendencies.

The young continued to do well on a diet of Grindal worm, brine shrimp nauplii, granulated foods, and the occasional offering of whiteworm, and at seven months they could be sexed and had matured to be in excellent breeding condition and of saleable size.

Despite the fact that I had witnessed delayed larvophilic mouthbrooding of this brood I noted quite different reproductive behaviour when the F₁ tank-bred offspring had their first brood. They did not mouthbrood the larvae but raised the young in typical *Apistogramma* cave-brooding fashion, and it is for this reason that *Apistogramma* sp. “Maulbrüter” should be considered a primitive larvophilic mouthbrooder – the behaviour is not obligatory as in advanced mouthbrooders.

Conclusion

There is no doubt that further behavioural studies need to be initiated on this truly unique species as there is some uncertainty amongst both the scientific community and the serious *Apistogramma* hobbyists as to whether we are dealing with a single species or two distinct taxa. If the latter is the case, then according to Römer (2006) they should be classified as *Apistogramma* sp “breastband”, which is a typical cave spawner that does not partake in mouthbrooding and *Apistogramma* sp. “Maulbrüter”, a larvophilic mouthbrooder

My own personal observations during multiple breeding of this species (related and non-related specimens) plus extensive communication with other serious *Apistogramma* hobbyist/breeders lead me to believe that we are probably dealing with a single species that is at the initial evolutionary stages of becoming a true larvophilic mouthbrooder. At this moment in time the species may care for the brood in either way and the method of brood care employed is influenced by

a number of environmental factors such as substrate, decoration, and hiding places, population density, predation pressure, etc. For instance, mouthbrooding occurs almost exclusively over fine sand, but over coarse sand or gravel where the larvae are easily hidden the fishes tend to be traditional non-mouthbrooding cave-spawners.

Recently I was lucky enough to receive another group of Mouthbrooder from Uwe Römer, who very kindly shipped them over to me from Germany, along with six other Peruvian *Apistogramma* species. I have since witnessed both methods of brood care from females within this group of wild fishes.

I am looking forward to continuing breeding and observing the reproductive behaviour of *Apistogramma* sp. "Maulbrüter", and I personally believe that the serious *Apistogramma* hobbyist has a lot to offer the scientific community in their work on this and other unusual dwarf cichlid species.

There may also be other mouthbrooding *Apistogramma* species yet to be discovered. I'm sure all will be revealed in due course.....

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References

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