

# News on the taxonomy and distribution of *Macropodus* species

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There is some interesting news to report on the taxonomy of the genus *Macropodus*. First, a book published in Vietnam (Nguyen 2005) in 2005, which was „overseen“ until recently, contains the description of four new species. Furthermore, recently, an analysis of morphometric data (Winstanley & Clements 2008) appeared, which also has an effect on the taxonomy of the species. The main results of these two publications will be briefly summarized below and discussed. I would also like to take this opportunity to complement my previous comments on the dissemination of the species.

## Four new species

In Volume 3 of the „Freshwater fishes of Vietnam“ (Nguyen 2005) Vietnamese scientists have described four new species. The initial descriptions contain no further information how these taxa differ from those already described. Only some directions are given on how to distinguish between these new species. This may be sufficient for the nomenclature rules, but is not very helpful when it comes to check on the validity of the taxa. Since the text is written in Vietnamese, it was not easy to identify the essential items. Despite careful examination the possibility of translation errors from this exotic language can not totally be excluded. Vietnamese scientists use their first names for the identification of authorship. Here however, - as is common in other languages - the family name of the relevant authors were used.

The first species *Macropodus phongnhaensis* Vo, Nguyen & Nguyen in Nguyen 2005 is described from four samples, whose standard length was between 37 and 53 mm. The Taxon has been named after the Phong Nha National park (Province

Quang Binh, Northern central-Vietnam). According to Vo et al. in Nguyen (2005) the dorsal fin in this species starts, similar to *M. lineatus* before the start of the anal fin. From *M. lineatus* it is distinguished by less anal fin spines (XVI-XVIII as opposed to XIX-XXII in *M. lineatus*), less scales on the Linea lateralis (24-26 as opposed to 27-29 in *M. lineatus*) and eight transverse bands (absent in *M. lineatus*). The second species *Macropodus lineatus* Nguyen, Vo & Nguyen in Nguyen 2005 also originates from the province Quang Binh and can be distinguished according to Nguyen et al. (2005) from *M. phongnhaensis* by 5 to 6 longitudinal lines and the above indicated characteristics. The species name refers to the longitudinal pattern. The standard lengths of the type specimens are between 55 and 69 mm. The next species is *Macropodus oligolepis* Nguyen, Vo & Nguyen in Nguyen 2005. Standard length of the type specimens is between 30-48 mm. The type specimen habitat is Trach Phong Nha-Ke Bang, which is also in the province Quang Binh. In the species diagnose this taxon is only distinguished from *M. baviensis*. *M. oligolepis* (according to Nguyen et al. 2005) differs from the latter by fewer scales in the lateral line (23-24 versus 30-31) and that the dorsal fin starts before the anal fin. Besides that it is indicated that the anal fin is connected to the caudal fin. The species name is derived from the unusually low number of scales in the lateral line. The last taxon is *Macropodus baviensis* Nguyen & Nguyen in Nguyen 2005. The Holotype of this species has a standard length of 36,9 mm. Type locality is Suoi Hai (North-West of Hanoi) in the District Ba Vi in the province Ha Tay (North-Vietnam). By Nguyen & Nguyen (in Nguyen

2005) only differences to *M. oligolepis* are given in the species diagnose (see there). Next to that it is briefly stated that *M. baviensis* as opposed to *M. oligolepis* has wider transverse bands on the sides of the body. The name of the species relates to the type locality in the district Ba Vi. Even though the discovery of new species cannot be ruled out, in this particular case it should be noted that despite intensive collection efforts in the North-West-Vietnam region by Freyhof & Herder (2002) and Winstanley & Clements (2008), only fish identified by them as *M. erythropterus* (= *M. spechti*, see below) and *M. opercularis* could be found. The same goes for North-Vietnam (Habitat of *M. baviensis*). Kottelat (2001) identified the fish found there as *M. opercularis*. That does not mean, that by studying known data and reevaluation of the available material, or applying different species concepts, new taxa can be identified in an ichthyologically well researched area. New methods to catch fish or targeted investigation of special microhabitats can also lead to the discovery of new species in well researched areas. Failing indications of how these new taxa differ from the well known, make it hard to check them. On top of that the frequently used distinguishing mark of the relative position of the anal fin by Nguyen et al. (2005) is very variable within the species and more gender specific and less usable in distinguishing taxa (Paepke 1994). The remarkably low number of 23-24 scales in the lateral line in *M. oligolepis* (as opposed to >25 in the other species) and the in *Macropodus*-species until now undescribed longitudinal pattern of *M. lineatus* (on the illustrating picture this sadly cannot be seen) make it possible that the species

could actually be valid ones. When reviewing the available data, and without further evidence, it could very well be that in the case of *M. phongnhaensis* it concerns a synonym for *M. erythropterus* (= *M. spechti*, see below) and in *M. baviensis* for *M. opercularis*.

### New analysis of morphological data

Winstanley & Clements (2008) analyzed morphometric features (measurement and count values and color characteristics) in newly collected specimens as well as in previously examined specimens with statistical methods. They have shown that based on numbers and measurements only *M. ocellatus* can be clearly distinguished from the others. This confirms the results which have already been discussed in the Makropode (Schindler 2004a). Based on color four species can be classified according to their investigations, *M. opercularis*, *M. ocellatus*, *M. spechti* and *M. hongkongensis*. The by Freyhof & Herder (2002) indicated color differences between the “Redback” and the Black-Paradise fish could not be confirmed. *Macropodus erythropterus* cannot be distinguished from *M. spechti* objectively. The few color differences between the two species have already been pointed out in the Makropode (Schaller 2004, Schindler 2004b). Winstanley & Clements (2008) therefore propose to consider *M. erythropterus* as a synonym of *M. spechti* (*M. erythropterus* = *M. spechti*). Because of the large distribution area of *M. opercularis*, Freyhof & Herder (2002) and Schaller (2004) speculated, whether under this taxon several species are hiding. Winstanley & Clements (2008) calculated this as a possibility and treated the Vietnamese and Chinese Paradise fish (*M. opercularis*) as separate operating groups. There was actually evidence to suggest that that these two groups can be distinguished potentially as morphospecies. However, the phenotypic variability should not be underestimated. In addition, *M. opercularis* inhabits shallower areas along the coast and as such

has higher population dynamics, which makes an exchange between populations more likely. This combined with the uniformity of phenotypic appearance of the Paradise fish suggest that *M. opercularis* consists of a single species (see Schindler 2004b). If, however, by reviewing other features, it can be confirmed that the Vietnamese “opercularis” can be distinguished of the Central-China species, the above taxon “*baviensis*” might have a crucial new significance.

### About the distribution of *Macropodus*-species

Because of the intensive research by Winstanley and taking into account the taxonomic changes the current information on the dissemination of the species can be both corrected and/or clarified. The northernmost natural habitats of *M. opercularis* are likely located in the area of the Yangtze (around 33rd degree latitude). Habitats in Korea are likely to be introduced animals (Paepke 1994). The southern border has been shown by Freyhof & Herder (2002), the river system of the Dong Nai (South Vietnam). The Black Makropode (*M. spechti* [until the decision by the Nomenclature Commission in 2006 the species was known as *M. concolor*]) inhabits the rivers of Dong Hoi (17 ° 30 ‘N), Quang Binh province in the north and Hoi At (15 ° 50 ‘N), Quang Nam province (south of Heaven’s peak), in the south (Freyhof & Herder 2002, Winstanley & Clements 2008). Contrary to the empirical data it has been claimed various times in The Makropode that *M. spechti* can only be found in the immediate vicinity of the city of Hue, and in no case occurs in the vicinity or south of Heaven’s peak (see Bachmann, 2005a, b). The repeated references to habitats south of heaven’s peak in the Makropode (for example, Schaller 2004, Schindler 2004b), have been overlooked. Bachmann (2005a, b) justified his view with the fact that he was unable to catch Black Paradise fish in the region. The fact that a search for a species in the region traveled was not collected,

does not necessarily mean that it does not occur there. Rather, it depends on the season and the technical skill, stamina and knowledge of the collector preferred micro-habitats, whether a particular species can be caught. The habitats in the western outskirts of Da Nang (south of Heaven’s Peak) have been described repeatedly the Makropoden (Schindler 2004a, Topfer 2006, Kühne 2008). At one locality, I could even collect *M. spechti* and *M. opercularis* together. (Schindler 2004a). In the beginning *M. hongkongensis* was only known from Hong Kong (Freyhof & Herder 2002). Meanwhile however numerous sites on the Chinese mainland have been recorded in Guangdong province (Zhou 2008). Winstanley & Clements (2008) could on top of that add Fujian province (north-west of Hong Kong) to the distribution of the HongKong Paradise fish.

Previous indications according to which *M. ocellatus* could be found south of Hong Kong or even in Vietnam are likely to be caused by mix-ups with other species because despite extensive collecting neither in North Vietnam (Kottelat 2001) nor in the vicinity of Hong Kong (Winstanley & Clements 2008) Round-tailed Paradise fish have been found. The southern and the northern boundaries, for which the Amur river system is named (Paepke 1994), must therefore be explored in more detail.

### Effects on the differentiation of Paradise fish in the aquarium hobby

The species is the most important unit, when it comes to communicating, for example when we discuss experiences in fishkeeping or organize the exchange of animals. Still it is not the smallest unit used in the hobby. However, it is not the smallest unit in the aquarium is used. Now that it is known that opinions which populations can be recognized as separate species are very different from one author to another (for reasons which lead to that see Schindler 2009), special types with separate

names, added to the Species name in quotes occur. This is mostly related to the habitat of the population concerned. This procedure is particularly important for new discoveries, which taxonomically have not yet been studied, or in groups who's classification are subject to discussion or change. In relation to the above this results, when regarding the combination of the two taxa *M. erythropterus* and *M. spechti* to a single species, in a certain "need". How should the currently separately identified and cultivated aquarium specimens be treated in the future? In my opinion we should think about whether the "separation" in the aquarium hobby can be maintained insofar as that the "formerly" known *M. erythropterus* at least temporarily can be labelled *M. spechti* "Redback". This approach does not limit the Synonymisation of the two taxa by Winstanley & Clements (2008), and enables us to maintain different populations. Schaller (2004) also distinguishes between a Southern(= *M. spechti* south of Heaven's peak, Bach Ma mountain range) and a northern- Black paradise fish (= *M. spechti* north of Heaven's peak) as well as a so labelled Tiger Paradise fish form from the area north of the Bach Ma mountain range. Again, this classification makes sense from an aquarium point of view, if we consider the differences between those populations (see photos of Seehaus in The Makropode 3 / 08; Kühne 2008). Nonetheless, the "post-investigation" of the four new taxa (see above) has to be

awaited before we can establish how many species will be distinguished in the genus.

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