

## Notes on the apomorphic characters diagnosing

*Simpsonichthys flagellatus*

Marco Endruweit

Qingdao City, Licangqu, Shandong Province, China

The phenotypes of *Simpsonichthys flagellatus* and *S. flavicaudatus* are rather similar. At the first glance one might be tempted to state they are conspecific. *S. flagellatus* has been misidentified as *S. flavicaudatus* for long time (COSTA, 1995). Nowadays Brazilian ichthyologist Wilson J. E. M. Costa, the leading expert on rivulid cyprinodontiform fishes, distinguishes these two taxa by apomorphic characters in chronological order as follows:

In 2003 he analyzed a clade denominated the *S. flavicaudatus* group. Including the herein new described species *S. flagellatus*, *S. delucaii* and *S. brunoi* this group contained ten nominal species at this time. According to a displayed cladogram Costa ranked *S. flagellatus* as a sister taxon of *S. flavicaudatus*. He refers to one autapomorphy of *S. flagellatus*: Iridescent dots restricted to posterior portion of anal fin, some of them coalesced to form short oblique stripes (COSTA, 2003).

In 2006 Costa revised in a comprehensive work the genus *Simpsonichthys* de Carvalho, 1959 and erected five new subgenera; *Xenurolebias* gen. nov., *Ophthalmolebias* gen. nov., *Simpsonichthys* de Carvalho, 1959, new usage, *Spectrolebias* Costa & Nielsen, 1997, new usage, and with 25 species the most speciose subgenus *Hypsolebias* gen. nov., with *S. flavicaudatus* as the type species. A cladogram shows again the same constellation; *S. flagellatus* as a sister taxon of *S. flavicaudatus* featuring two synapomorphies; 5-10 second pharyngobranchial teeth, and oblique broken stripes as a iridescent color pattern of the anal fin (COSTA, 2006a).

Later in 2006 Costa published the initial description of three new species of the same clade analyzed in 2003 (COSTA, 2003) renaming it into *S. antenori* group. The new species are *S. mediopapillatus*, *S. macaubensis* and another species very similar to *S. flagellatus* and *S. flavicaudatus*; *S. janaubensis*. The author mentions that the three latter species are closely related and belonging to a clade within the *S. antenori* group diagnosed by synapomorphies as follows;

1. Anal fin; anterior portion pink, posterior portion yellow and with bright blue or white dots.
2. Anal fin; light gray submarginal stripe (COSTA, 2006c).

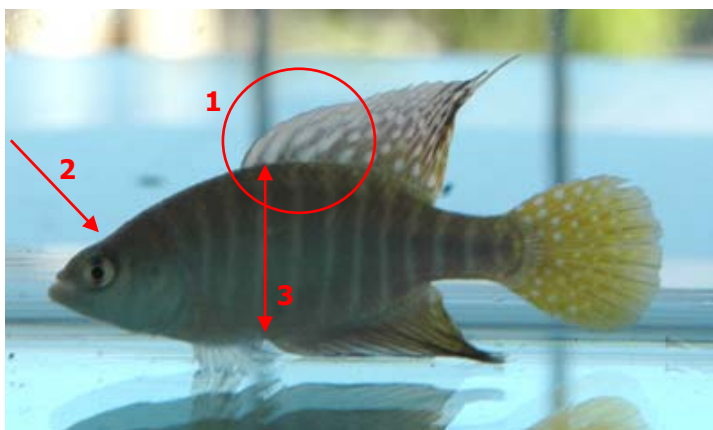
The key to the species of the above mentioned clade (COSTA, 2006c, 2007c, modified):

1. (2) Minute contact organs on inner surface of three uppermost rays of pectoral fin in males, straight dorsal profile of head, anterobasal portion of dorsal fin with light spots, sometimes elongated.....*Simpsonichthys flavicaudatus*
2. (3) Pronounced contact organs on inner surface of three uppermost rays of pectoral fin in males, conspicuously concave dorsal head profile, elongated light spots alternating with dark gray to

- black areas in anterobasal portion of dorsal fin in males, anal fin base in males long (39.0-45.2% SL), body depth in both sexes high (37.0 – 42.7% SL), caudal peduncle thick (13.4-16.6% SL).....*Simpsonichthys flagellatus*
3. (2) Elongated light spots along the entire dorsal fin base, anal fin base in males short (34.4-38.4% SL), body depth in both sexes low (30.7-38.4% SL), caudal peduncle thin (11.7-14.3% SL).....*Simpsonichthys janaubensis*

I was able to obtain wild caught specimen of *Simpsonichthys flagellatus* originating from its type locality located 12 km west of Bom Jesus da Lapa, Estado do Bahia, Brazil (internally coded E-BR38-08). The bulk of the fishes possessed the characters used by COSTA (2006c, 2007c) to distinguish *S. flagellatus* from *S. flavicaudatus* and *S. janaubensis*. Visible characters without dissecting a specimen are:

- Character 1: Anterobasal portion of dorsal fin with light blue to white spots coalesced to short stripes in males
- Character 2: Dorsal head profile with a conspicuous concave
- Character 3: Body comparatively high



**Figure 1:** Wild caught male from the type locality of *Simpsonichthys flagellatus*. The specimen shows typical specific characters.



**Figure 2:** Wild caught female from the type locality of *Simpsonichthys flagellatus*. Also this specimen shows typical specific characters.

All fishes of the F1 aquarium generation of the wild caught fishes possess character 2 (head profile concave) and 3 (body comparatively high). For character 3 there are deviations; specimen of the F1 aquarium generation display dorsal color pattern different from the wild caught specimen; the frequency of spots is lower, in addition the spots are less colorful. This indicates that the dorsal color pattern is depending on biotic (for e.g food sources) and abiotic factors (for e.g. chemical composition of the water) of the environment. Even some males of the wild caught fishes did show elongated stripes over the entire dorsal fin base (not restricted to the anterobasal portion) and, hence, differ from the key erected by Costa for species identification (COSTA, 2006c, 2007c).

Conclusion: Spots and coalesced spots to form stripes in the color pattern of the dorsal fin in males of *Simpsonichthys flagellatus* (Character 1) seems not to be suited for species diagnosis. This character seems to be depending on biotic and abiotic environmental factors.



**Figure 3:** *Simpsonichthys flagellatus*, wild caught male from the type locality. This specimen shows elongated spots along the entire dorsal fin base.



**Figure 4:** *Simpsonichthys flagellatus*, F1 aquarium generation, dominant male. Just few spots but no elongated stripes in the anterobasal portion of



**Figure 5:** *Simpsonichthys flagellatus*, F1 aquarium generation, subdominant male. Some more spots than the dominant male but much fewer spots than wild caught specimens.

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