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Pterolebias luelingi (MEINKEN, 1969), a valid species of annual killifish from Bolivia (Teleostei: Rivulidae)

Pterolebias luelingi (MEINKEN, 1969), eine valide annuelle Killifischart aus Bolivien (Teleostei: Rivulidae)

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Summary: *Rivulichthys luelingi* MEINKEN, 1969 is recognized and diagnosed as a valid taxon within the genus *Pterolebias*. *Pterolebias luelingi* (MEINKEN, 1969) is a member of the *P. longipinnis*-complex and differs from the other species of this complex by the presence of only seven pelvic fin rays and a less scaled dorsal and anal fin base. *Gnatholebias* is treated as a junior synonym of *Pterolebias*. A key for the species of the genus *Pterolebias* is given.

Key words: *Rivulichthys luelingi*, *Pterolebias*, Rio Mamoré, *Gnatholebias*.

Zusammenfassung: *Rivulichthys luelingi* MEINKEN, 1969 wird als valides Taxon innerhalb der Gattung *Pterolebias* anerkannt und diagnostiziert. *Pterolebias luelingi* (MEINKEN, 1969) gehört dem *P. longipinnis*-Komplex an und unterscheidet sich von den übrigen Arten dieses Artenkomplexes durch nur sieben Strahlen in der Ventralis und eine geringer beschuppten Rücken- und Afterflossenbasis. *Gnatholebias* wird als jüngeres Synonym von *Pterolebias* behandelt. Ein Bestimmungsschlüssel für die Arten der Gattung *Pterolebias* wird gegeben.

Schlüsselwörter: *Rivulichthys luelingi*, *Pterolebias*, Rio Mamoré, *Gnatholebias*.

1. Introduction

In 1969 MEINKEN described the rivulid killifish *Rivulichthys luelingi* from Todos Santos, Rio Mamoré drainage, in Bolivia. PARENTI (1981) synonymized *Rivulichthys* with *Trigonectes*. THOMERSON (1984) examined the type specimens of *Rivulichthys luelingi* and *Pterolebias longipinnis* GARMAN, 1895 and considered both as identic. SCHINDLER & STAECK (1993b) found differences in the number of pelvic fin rays (7 in *P. luelingi* vs. 8 in *P. longipinnis*), added the less scaled anal fin base in Rio Mamoré drainage specimens as a further diagnostic character, and separated the specimens of *P. longipinnis* from the Bolivian Mamoré drainage as *P. longipinnis* forma *luelingi*, to emphasize the peculiarity and possible taxonomic identity of this population. Furthermore, they diagnosed *P. longipinnis* forma *bokermanni* from the Rio Guaporé and Rio Paraguay drainages as an additional form which should probably be taxonomically separated (SCHINDLER & STAECK 1993b). Recently, COSTA (2003) treated *P. bokermanni* TRAVASSOS, 1955 as a valid species with *Rivulichthys luelingi* as a synonym. However, COSTA (2003) did not mention any particular reason for this view.

2. Material and Methods

Measurements and counts follow COSTA (1988). Measurements are presented as percentages of standard length (SL). Measurements were made with a digital caliper reading down to 0.1 mm. Counts were made using a microscope. The nomenclature for colour pattern and shape follows HUBER (1992).

The examined material of *P. longipinnis*, *P. bokermanni*, *P. luelingi* and *P. phasianus* is listed in SCHINDLER & STAECK (1993a, 1993b). In addition, *P. zonatus* ZMB 32239 and *P. hoignei* ZMB 32238 were examined and data from the descriptions of MEINKEN (1969), THOMERSON (1974), COSTA (1988) and the redescriptions of SCHINDLER & STAECK (1993a), SCHINDLER & STAECK

(1993b) and THOMERSON (1974) were used for comparison.

ZMB = Zentralinstitut Museum für Naturkunde der Humboldt-Universität zu Berlin.

3. Results

3.1. *Pterolebias luelingi* (MEINKEN, 1969)

3.1.1. Diagnosis

Differs from the closely related species *P. longipinnis* and *P. bokermanni* by the combination of seven pelvic fin rays, only up to two rows of scales along the anal fin base of males (usually four or more in *P. bokermanni*) and usually no scales on the dorsal fin base (one or two rows of scales in *P. bokermanni*). It is distinguished from the other members of the genus by 18 to 20 anal fin rays (vs. more than 21 in *P. zonatus* and *P. boignei* and less than 18 in *P. phasianus*).

3.1.2. Description

For general appearance of body shape and colour pattern refer to Fig. 1 and to SCHINDLER & STAECK (1993b). Measurements are in percentages of SL, with the lowest and the highest values (n=6). Body depth 22-24, depth of caudal peduncle 13-15, predorsal length 75-80, prepelvic length 61-65, length of dorsal-fin base 8-11, length of anal-fin base 22-27, head length 27-30, head depth 17-20, head width 18-20, orbital diameter 10-11. Dorsal and anal fins pointed in males, rounded in females. Caudal fin in males elongated (much longer than deep) with filaments supported by some middle caudal fin lepidotrichia; in females caudal fin more rounded, only slightly longer than deep. Pectoral fins round. Pelvic fins elongated (in males longer than in females) and pointed. Dorsal fin rays 8-10, anal fin rays 18-21, pectoral fin rays 14-16, pelvic fin rays 7. Scales in longitudinal series 30-33, horizontal scale rows 8-10.

3.1.3. Colouration in males

Body side light brown to olive, with metallically reflecting dots arranged in longitudinal rows particularly on the ventral part. Some males with a dark humeral spot. Belly yellowish. Ventral parts of head and cheeks whitish. Iris light metallic with a dark bar crossing the eye. Dorsal fin olive to light brown, with dark brown dots. Anal fin brown, in the middle part brown to orange, in

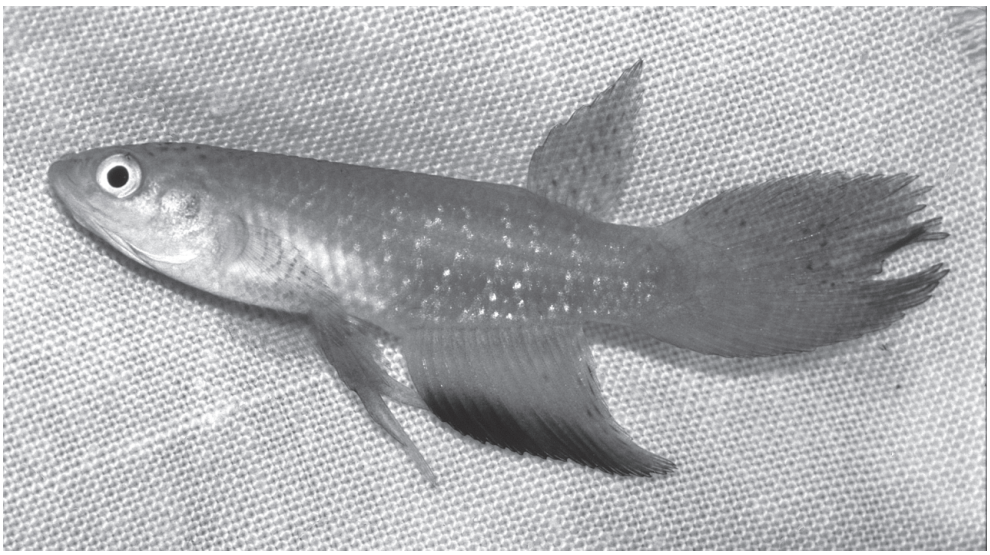

Fig. 1: Male of *Pterolebias luelingi* (approximate 40 mm SL), Puerto Chuelo (Bolivia).
Abb. 1: Männchen von *Pterolebias luelingi* (ungefähr 40 mm SL), Puerto Chuelo (Bolivien).

Fig. 2: Map of South America, showing sites of occurrence of *Pterolebias luelingi* (dots; circle = type locality), the type locality of *P. bokermanni* (star) and the type locality of *P. longipinnis* (square).
Abb. 2: Karte von Südamerika. Eingetragen sind das Vorkommen von *Pterolebias luelingi* (Punkte; Kreis = Typuslokalität), der Typusfundort von *P. bokermanni* (Stern) und der Typusfundort von *P. longipinnis* (Quadrat).

the distal marginal region dark. Relatively large dark brown dots on anal fin base and on caudal margin. Caudal fin olive in the dorsal part, lower part brown to slightly orange with dark brown dots in the upper and middle region. Pelvic fins brown, tips light orange. Pectoral fins with black vertical bars.

3.1.4. Distribution

The species is distributed in the Rio Mamoré-drainage in Bolivia (Fig. 2).

4. Discussion

Since THOMERSON (1984), *P. luelingi* (MEINKEN, 1969) was treated as a synonym of *P. longipinnis*, although THOMERSON found differences in the number of pelvic fin rays (7 in *P. luelingi* vs. 8 in *P. longipinnis*). However, he ignored the differences, because of the variability of 6 to 8 pelvic fin rays in *P. hoignei* (see THOMERSON 1974). But there is an invariable number of eight pelvic fin rays (except in a few specimens without pelvic fin girdle) in all the other members of the *P. longipinnis* complex with the exception of *P. luelingi*. Furthermore, *P. luelingi* is distinguished from *P. bokermanni* by a less scaled dorsal and anal fin base (SCHINDLER & STAECK 1993b).

According to the evolutionary species concept (ESC) that an evolutionary species is an entity of organism that maintains its identity from other such entities over space and has its own independent evolutionary fate (WILEY & MAYDEN 2000), *P. luelingi* can be treated as a valid species within the *P. longipinnis* complex, because it is diagnosed by invariable characters (see diagnosis), a definite distribution and keeps identity against closely related species.

The membership of *P. luelingi* in *Pterolebias* Garman, 1895 is without doubt, because the most closely related *P. longipinnis* is the type species of this genus. As a result of a phylogenetic analysis Costa (1998) described new genera for several species usually regarded as members of *Pterolebias* (see e. g. Seegers 1987, Costa 1988, Costa et al. 1996). However, Costa's proposed nomenclature is not without inconsistency (cf. Costa 1990, Costa 1998, Garcia et al. 2002). A trend is seen in Costa's (1998) classification to assign each species generic status, each genus a subtribe, each subtribe a tribe and so on. Insofar it would be better to adopt a more conservative nomenclature than to change the systematic categories after every new analysis or to assign a name to all clades. This would also reflect the phylogenetic relations within these fishes and lead to a better overview whether the genera developed in monophyly. This is why *Gnatholebias* Costa 1998, a proposed genus for the sibling species *P. zonatus* and *P. hoignei*, is treated here as a junior synonym of *Pterolebias*. *Pterolebias* (including *Gnatholebias*) is a monophyletic, easily identifiable genus (see Costa 1998). In similar taxonomic cases nominate genera for single species or subclade within a well diagnosed genus are also treated as synonyms (e. g. van Oijen 1996, Chockler & Armbruster 2002, Axenrot & Kullander 2003). Thus, the diagnosis of Pterolebiatini given by Costa (1998) is valid for the genus *Pterolebias* as used herein. Within the genus *Pterolebias* it is possible to recognize two species groups. The *P. longipinnis* complex with the *P. longipinnis* superspecies (*P. longipinnis* Garman 1895, *P. bokermanni* Travassos, 1955 and *P. luelingi* Meinken, 1969) and *P. phasianus* Costa, 1988 differ from the *P. zonatus* complex (with *P. zonatus* Myers, 1935 and *P. hoignei* Thomerson, 1974) by the characters considered as differences (see key to the species) between the two genera *Pterolebias* and *Gnatholebias* by Costa (1998).

5. Key to the species of *Pterolebias*

1a) Anal fin base scaled (at least in males); dark vertical bars on the pectoral fin in males; up to 20 (rarely 21) anal-fin rays … 2

1b) Anal fin base without scales; no dark vertical bars on pectoral fin; 22 (rarely 21) or more anal-fin rays … 5

2a) three prominent dark stripes along the body sides; 7 dorsal-fin rays; usually 15 anal fin rays … *P. phasianus*

2b) no dark stripes on body sides; 8 or more dorsal-fin rays; 18 or more anal fin rays … 3

3a) 4 or more rows of scales at anal fin base in males and usually 2 or 3 rows in females … *P. bokermanni*

3b) only 2 or 3 rows of scales at anal fin base in males and 1 or rarely 2 in females … 4

4a) pelvic fin with 7 rays … *P. luelingi*

4b) pelvic fin with 8 rays … *P. longipinnis*

5a) distinct vertical bars on body sides; 21 to 23 anal fin rays… *P. zonatus*

5b) no distinct vertical bars; 24 to 26 anal fin rays … *P. hoignei*

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