BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

ZOOLOGICAL MUSEUM OF THE UNIVERSITY OF AMSTERDAM

No. 234 Volume 18 November 18, 1970

Lepidarchus adonis signifer, a new subspecies of characoid fish from Liberia (Pisces, Cypriniformes, Characidae)

I. J. H. ISBRÜCKER

ABSTRACT

Description of a new subspecies of *Lepidarchus adonis, L. a. signifer,* from Liberia, differing mainly in its colour pattern from the nominal subspecies from Ghana.

Lepidarchus Roberts

Lepidarchus Roberts, 1966: 209—210 (original diagnosis; type species, by original designation, *Lepidarchus adonis* Roberts); Poll, 1967: 14 (in key).

A remarkable genus of tiny African characoid fishes, outstanding from its relatives in having only one cycloid scale on either side at the anterior part of anal fin base, and two or three modified scales forming a short bony canal for the lateral line, lying immediately in front of the pseudotympanum, whereas it is otherwise scaleless. The premaxillary and dentary each have a single row of conical teeth; the maxillary is toothless. (Modified after, and abstracted from, Roberts, 1966: 209).

Lepidarchus adonis adonis Roberts (figs. 1, 2, 5)

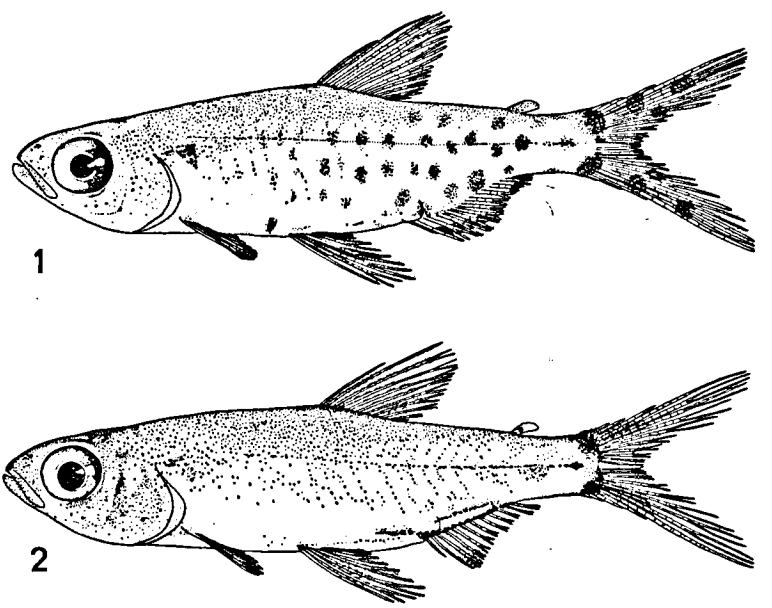
Lepidarchus adonis Roberts, 1966: 210—211, figs. 10—11 (original description; type locality: Ghana: a small stream a mile and a half east of Mpataba on the road to Half-Assini, at approximately 05°05′ N, 02°35′ W. Holotype at Stanford University, Palo Alto, SU 63546. Other localities: Ghana: Ewiafutu stream at Esasetre village; a small stream on the road to Tarkwa; a shaded creek or backwater of the Unvaiye Lagoon at Miller's Landing, near Half-Assini; Ankasa River, near its confluence with the Tano River; and the Tano River); 212—216, figs. 1—9 (osteology).

Poll, 1967: 132—133, fig. 29 (description; 2 topotypical paratypes in Musée royal de l'Afrique centrale; figures after Roberts).

Received: April 22, 1970

Material examined. — Collection Géry, N°. 0626 AFR, 1 ♂, 1 ♀, 18.6 and 17.8 mm standard length respectively, topotypes, from a small stream a mile and a half east of Mpataba on the road to Half-Assini, Ghana, at approximately 05°05′ N, 02°35′ W, collected by T. R. Roberts, 28-II-1964.

Description. — Morphometric data, obtained from the two topotypes listed above, of the male and of the female, respectively: total length 23.2, 23.7 mm; greatest body depth, in standard length 4.0, 4.0; depth caudal peduncle, in standard length 10.3, 9.9; head length, in standard length 3.2, 3.4; eye, in head length 2.9, 2.7; interorbital, in head length 3.9, 3.8; snout, in head length 4.5, 4.4; dorsal fin origin from head, in standard length 1.8, 1.8; dorsal fin origin from caudal base, in standard length 2.1, 2.1; dorsal fin height, in standard length 4.2, 3.9; length anal fin base, in standard length 6.4, 6.1; anal fin height, in standard length 8.1, 9.9; length pelvic fin, in standard length —.— (damaged), 4.6; length pectoral fin, in standard length —.— (damaged), 6.6; length lower caudal fin lobe, in standard length 3.1, 2.9.



Figs. 1—2. Reproduction of Roberts' (1966) figures of *Lepidarchus adonis adonis*. 1, holotype, ♂, 21.0 mm SL; 2, paratype, ♀, 20.1 mm SL.

Colouration. — Roberts' original figures of the (male) holotype and a female paratype (SU 63462) are reproduced by kind permission in this paper (figs. 1 and 2). The male specimen examined by me agrees in almost every detail with the colour pattern of the holotype, except for (1) the presence of some pigmentation along the anal fin base, forming a narrow line, and (2) fewer spots on the body.

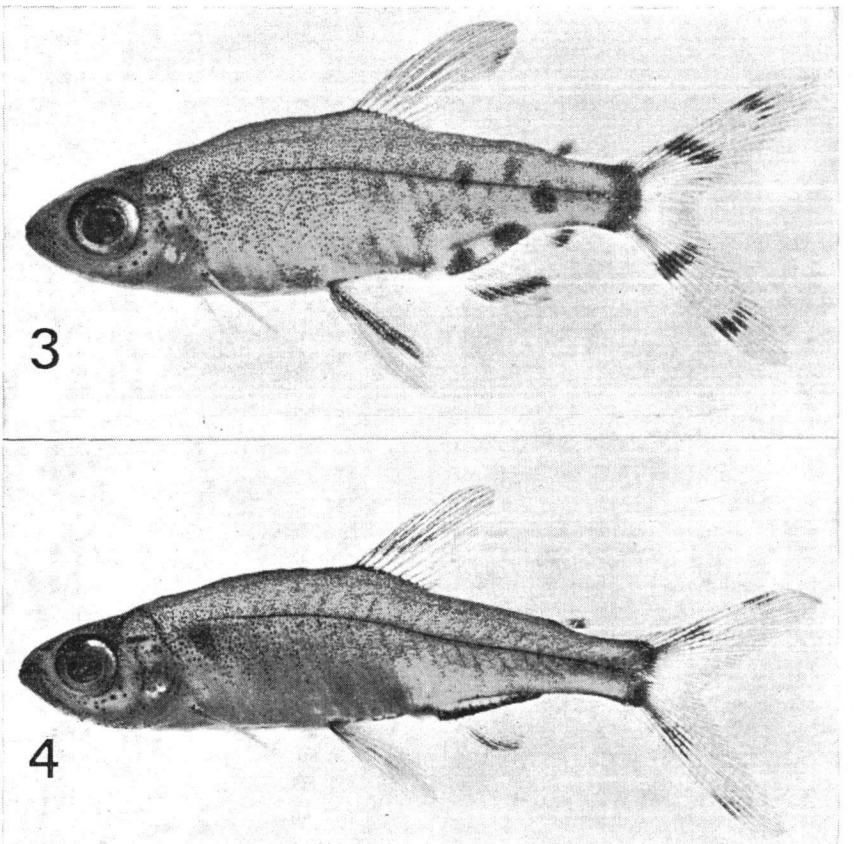
Lepidarchus adonis signifer new subspecies (figs. 3, 4, 5)

Material examined. — Instituut voor Taxonomische Zoölogie (Zoölogisch Museum Amsterdam), ZMA 110.208, holotype, ♂, 19.0 mm standard length. Africa, Liberia: about 50 miles southeast of Monrovia, southeast of Robertsfield airfield, in a small creek in a swampy area, at approximately 06°12′ N, 10°20′ W, collected by P. J. Busink, 1-IX-1969. — ZMA 110.210, allotype, ♀, 23.2 mm standard length; same data as holotype. — ZMA 110.209, paratypes, 3 ♂♂ and 8 ♀♀, 14.9-21.6 mm standard length; same data as holotype. The largest paratype of ZMA 110.209 was provided by Mr. F. de Graaf, who obtained it from its collector. — Museum of Comparative Zoology, Harvard University, MCZ 46682, 1 paratype, ♂, 15.8 mm standard length; same data as holotype. — Collection Géry N°. 0627 AFR, 1 paratype, ♂, 15.4 mm standard length; same data as holotype.

Description. — Morphometric and meristic data, for the holotype (♂), allotype (♀), and largest paratype (♂), respectively: standard length 19.0, 23.2, 21.6 mm; total length 23.8, 29.0, 26.9 mm; greatest body depth 5.4, 5.9, 6.1 mm (3.5, 3.9, 3.5 in standard length); depth caudal peduncle 2.0, 2.0, 2.4 mm (9.5, 11.6, 9.0 in standard length); head length 5.5, 6.1, 6.1 mm (3.5, 3.8, 3.5 in standard length); eye 2.1, 2.3, 2.0 mm (2.6, 2.7, 3.0 in head length); interorbital 1.6, 1.6, 1.6 mm (3.4, 3.8, 3.8 in head length); snout 1.4, 1.7, 1.5 mm (3.9, 3.6, 4.1 in head length); dorsal fin origin from head 10.8, 12.7, 11.6 mm (1.8, 1.8, 1.9 in standard length); dorsal fin origin from caudal base 9.3, 11.8, 10.6 mm (2.0, 2.0, 2.0 in standard length); dorsal fin height 5.4, 5.6, 5.3 mm (3.5, 4.1, 4.1 in standard length); length anal fin base 3.1, 3.8, 3.5 mm (6.1, 6.1, 6.2 in standard length); anal fin height 3.1, 2.9, 2.5 mm (6.1, 8.0, 8.6 in standard length); length pelvic fin 4.6, 4.9, 4.2 mm (4.1, 4.7, 5.1 in standard length); length pectoral fin 3.0, 3.1, 3.1 mm (6.3, 7.5, 7.0 in standard length); length lower caudal fin lobe 6.4, 7.2, 6.3 mm (3.0, 3.2, 3.4 in standard length); dorsal fin rays ii,8½, ii,8½, ii,8½; visible procurrent caudal rays, dorsally vi, vii, vi, ventrally v, v, v; caudal fin rays i,9/8,i (in the three specimens); anal fin rays ii,9½, ii,10½, ii,9½; pelvic fin rays i,7,i, i,6, i,6; pectoral fin rays i,9, i,9, i,10; teeth in dentary 11, 13, 10, another paratype 10; teeth in premaxillary 9, 8, 8, another paratype 7.

Colouration (in alcohol) of the holotype. — Ground colour tan. Head and snout black dorsally. A small grey, triangular humeral spot. A thin black lateral stripe, from about halfway eye/origin dorsal fin, to caudal base. Numerous small, dark brown spots over body and head; some cloudy concentrations anterior to pelvic fin insertion and, in an irregular pattern, on caudal peduncle, forming five spots different in size: two spots on and just dorsal to lateral stripe, a third well-defined spot just below lateral stripe, and a fourth and fifth spot anterior and posterior at anal fin base. A curved, thin brown line along anal fin base, connecting the last two spots with each other. A vertical, broad dark brown bar at end of caudal peduncle. Dorsal fin membrane save between last three rays, with dense brownish pigmentation. Adipose fin almost entirely dark brown. Both caudal fin lobes with two conspicuous oblique bars, the one nearest to fin base the longest, not reaching the end of the rays. In both fin lobes the largest oblique bar is connected

with the vertical bar at the end of the caudal peduncle by a less conspicuous, thin stripe. Anal fin with a horizontal, straight, dark brown bar from the middle of the first to sixth ray. A dark brown spot of indefinite shape at the end of the last anal fin rays. Pelvic fin with an oblique stripe, not covering the lower anterior of the first rays, and the upper posterior of the last rays. Pectoral fins colourless, except for some greyish pigmentation on the first few rays.



Figs. 3—4. *Lepidarchus adonis signifer* n. ssp. 3, holotype, ♂, ZMA 110.208; 4, allotype, ♀, ZMA 110.210.

Colouration of the holotype after one day preservation in formaldehyde 4%: On the dorsal part of body, dorsal fin, anterior part of pelvic fin, between the bars on caudal fin, and ventral to the bar on the anal fin appeared a distinct yellow ground colour. This yellow colour disappeared after a few days of preservation in alcohol 70%.

Colouration (in alcohol) of the allotype (differences with the holotype): Less numerous dark brown spots on the belly and on the ventral part of caudal peduncle. Humeral spot about three times larger than in the holotype, and more conspicuous. The thin black lateral stripe somewhat longer, begin-

ning a little behind the origin of the pectoral fins. A cloudy concentration of pigment around the lateral stripe on caudal peduncle. The edge of the caudal peduncle, between the adipose fin and last anal fin ray, with a thin black streak, and spots curved along the end of the caudal peduncle. A conspicuous black stripe along the anal fin base. A thin black line obliquely from the end of the occipital process to and along the dorsal part of the opercle. A small and thin, horizontal black line in the pterotic region. Pigmentation on the dorsal fin membrane denser than in the holotype, but lacking between the sixth and last rays and just above the fin base. Both caudal fin lobes with two small spots, replacing the caudal fin bars of the male. Distal ends of the first three or four anal fin rays with greyish pigmentation. Inconspicuous pigmentation on the pelvic fin.

Colouration of the allotype after one day preservation in formaldehyde 4%: The appearance (and disappearance afterwards) of a distinct yellow colour as in the holotype, save on the anterior part of the pelvic fin which remained almost colourless. Between the caudal spots appeared an orange colour.

Variability in colouration.—

(a) Preserved specimens (13 paratypes). In the males the caudal bars may extend nearer to the distal ends of the rays. The spots on the body and especially on the caudal peduncle are more numerous in some specimens, but are nearly absent in other male specimens. The spots along the anal fin base are mostly very distinctly present, but sometimes there is a fainter pattern; in some specimens the two spots are connected by an additional curved stripe dorsally, together with the stripe along the anal fin base suggesting a "safety pin" pattern. The stripe on the pelvic fin rays is variable in intensity.

In the females the first caudal spots are sometimes replaced by an indistinct line parallel with the rays, reaching the spots at the edge of the caudal peduncle. As a rule, the humeral spot is larger and more distinct in females than in males.

(b) Living specimens. I was in a position to observe some forty or fifty live specimens of *Lepidarchus adonis signifer*, originating from the type locality, in a tank at the collector's place. From this series the type specimens, except one paratype, were selected.

Ground colour transparent yellow. Lateral stripe and humeral spot entirely lacking (these appear only after preservation). Dorsal fin, especially in males, brownish red. Adipose fin dark brown. Colour pattern as in preserved specimens, very intense brown in males, more or less greyish brown in females. Anal fin tipped with clear white below the horizontal bar. The stripe in the pelvic fin sometimes very dark brown, and the bars on the caudal fin lobes accentuated by surrounding white patches. Peritoneum silvery. Eye silvery, pupil black. Some of the living females showed a caudal fin pattern quite approaching to that figured for the (male) holotype of *Lepidarchus adonis adonis*.

Etymology. — The subspecific name *signifer* (Latin) alludes to the peculiar colour pattern in the males of this subspecies.

Relationships. — *Lepidarchus adonis signifer* differs from *Lepidarchus adonis adonis* mainly in colouration. Morphometrically the two subspecies cannot be separated clearly, though there seems to be a tendency towards a shorter head (and, as a result, a broader interorbital and a longer snout) in *L. a. signifer:* 3.5—3.8 against 3.0—3.5 in *L. a. adonis.* A review of the morphometric data is given in table I; it should be added that the data presented in the first column are based on an unknown number of specimens, those in the second column are based on two specimens, and those in the third column on three specimens. *L. a. signifer* shows the same type of secondary sexual dimorphism (next to that in the colour pattern) as *L. a. adonis,* viz., in the shape of the anal fin. In *L. a. signifer,* however, the anal fin margin in adult males is more strongly convex than in *L. a. adonis.*

Table I. Morphometric data of the two subspecies of *Lepidarchus adonis.*

	L. a. adonis		*L. a. signifer*
	after Roberts	original	original
standard length/mm	-.- —21.0	17.8 —18.6	19.0 —23.2
greatest body depth/sl	3.5 — 4.2	4.0 — 4.0	3.5 — 3.9
depth caudal peduncle/sl	8.9 —10.7	9.9 —10.3	9.0 —11.6
head length/sl	3.0 — 3.5	3.2 — 3.4	3.5 — 3.8
eye/hl	2.7 — 3.1	2.7 — 2.9	2.6 — 3.0
interorbital/hl	3.8 — 4.9	3.8 — 3.9	3.4 — 3.8
snout/hl	4.1 — 5.1	4.4 — 4.5	3.6 — 4.1
dorsal fin origin from head/sl	-.- — -.-	1.8 — 1.8	1.8 — 1.9
dorsal fin origin from caudal base/sl	-.- — -.-	2.1 — 2.1	2.0 — 2.0
dorsal fin height/sl	3.2 — 4.3	3.9 — 4.2	3.5 — 4.1
length anal fin base/sl	5.9 — 6.9	6.1 — 6.4	6.1 — 6.2
anal fin height/sl	-.- — -.-	8.1 — 9.9	6.1 — 8.6
length pelvic fin/sl	3.9 — 4.7	-.- — 4.6	4.1 — 5.1
length pectoral fin/sl	5.6 — 7.2	-.- — 6.6	6.3 — 7.5
length lower caudal fin lobe/sl	-.- — -.-	2.9 — 3.1	3.0 — 3.4

The distance of some 800 km in a direct line between the type localities of both subspecies is shown in fig. 5. It is to be expected that the distribution of the species is larger than these two records suggest.

Swimming behaviour. — The most obvious movements during the swimming and during the many short stationary periods are made with the pelvic fins and the caudal fin, both making "scissor" like movements. The caudal fin also moves lateralward with the tips. The same number of moves are made by the dorsal and pectoral fins. Swimming and direction changes are not made fluently, but through many short strokes. When changing direction, *L. a. signifer* is able to turn over about 160° at a time, although usually less important turns are made. *L. a. signifer* clearly forms schools, in which the

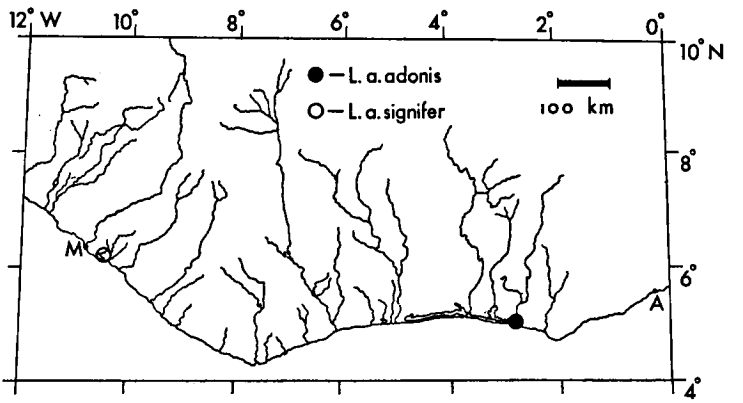


Fig. 5. Sketch map of West Africa, showing the type localities of the two subspecies of *Lepidarchus adonis*. M = Monrovia, A = Accra.

male colour pattern is functional. The specimens do not swim very quick, not even when captured.

Ecology. — The following additional notes on the locality were provided by the collector, Mr. Busink. Two days before collecting, on August 30, 1969, there had been much rain. Biotope: an entirely swampy area, with many small drainage creeks; bottom with dead trees, branches, leaves; heavy shadow caused by vegetation along the banks. Much dirt whirling up when wading through the water. The water had a slight brownish colour, but was clear enough to see the bottom; water very soft, temperature at noon 25° C; estimated stream velocity about 3 to 4 km/h in the middle of the 60 cm deep creek; width variable. No submerged plants, but a number of species of swamp plants were emerging from the water along the banks.

Other fishes at this locality: *Epiplatys* species (*E.* cf. *barmoiensis*, *E. dageti monroviae*, and *E.* [or *Pseudepiplatys*] *annulatus*); *Aplocheilichthys* species (*A.* cf. *manni*); *Aphyosemion* species; *Roloffia* species; juvenile *Bryconalestes* species (*B.* cf. *longipinnis*); and a characoid fish that at first glance looks like a *Ladigesia*. Of course, these indications are far from complete, but give an impression.

ACKNOWLEDGEMENTS

I would like to express my thanks to Mr. P. J. Busink (Amstelveen, The Netherlands), for kindly putting at my disposal 14 out of the 15 type specimens on which *Lepidarchus adonis signifer* is based, along with valuable data on the type locality. Furthermore, thanks are due to Dr. J. R. Géry (St.-Geniès, France), for the loan of the two topotypes of *L. a. adonis* in his possession; to Mr. F. de Graaf (Aquarium of the Amsterdam Zoo „Natura Artis Magistra"), who provided one of the paratypes of *L. a. signifer*; to Mr. Hans Honing (Amsterdam), for making a series of photographs of *L. a. signifer* shortly after preservation; to Dr. H. Nijssen (Institute of Taxonomic Zoology, Zoological Museum of the University of Amsterdam) for access to the Department of Ichthyology; figures 3 and 4 were produced by Mr. A. L. van der Laan, the photographer of that institute. Dr. T. R. Roberts (Museum of Comparative Zoology, Harvard University, Cambridge, U.S.A.) helped me with some valuable remarks (in litt.).

LITERATURE

POLL, M.
1967 Révision des Characidae nains africains. — Ann. Mus. roy. Afr. centr., (8°) Sci. zool. **162**: 1—158, figs. 1—32, maps 1—20.

ROBERTS, T. R.
1966 Description and osteology of Lepidarchus adonis, a remarkable new characid fish from West Africa. — Stanford ichth. Bull., **8** (3): 209—227, figs. 1—11.

I. J. H. ISBRÜCKER,
Dotterbloemstraat 5
Amsterdam N 1019 — The Netherlands

For sale at the Administration of the Zoological Museum of the
University of Amsterdam
Price Hfl. 2.25 (Dutch Florins)