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Description of two new annual fishes of the genus *Cynolebias* (Cyprinodontiformes: Rivulidae) from the Sao Francisco basin, Brazil

Wilson J. E. M. Costa * and Gilberto C. Brasil **

Two new species of *Cynolebias* from the Rio Sao Francisco basin are described. This is the first record of the genus from that basin. *Cynolebias zonatus*, new species, is closely related to *C. boitonei*, from which it is distinguished by the presence of pelvic fins, less dorsal fin rays and colour pattern. It has been found in a gallery forest environment near Garapuava, Estado de Minas Gerais. *Cynolebias flavicaudatus*, new species, is closely related to *C. antenori*, from which it differs by snout shape and colour pattern. It has been collected in the semi-arid "Caatinga" region, in the vicinities of Lagoa Grande, Estado de Pernambuco.

São descritas duas novas espécies de *Cynolebias* da bacia do Rio São Francisco. Este é o primeiro registro do gênero para tal bacia. *Cynolebias zonatus*, nova espécie, é estreitamente relacionada a *C. boitonei*, da qual distingue-se pela presença de nadadeiras pélvicas, número de raios da nadadeira dorsal e padrão de colorido. Foi encontrada num ambiente de mata de galeria próximo a Garapuava, Estado de Minas Gerais. *Cynolebias flavicaudatus*, nova espécie, é estreitamente relacionada a *C. antenori*, da qual difere pela forma do focinho e padrão de colorido. Foi coletada na região semi-árida de «Caatinga», nas vizinhanças de Lagoa Grande, Estado de Pernambuco.

Introduction

The annual fish genus *Cynolebias* Steindachner, 1876, has been rediagnosed by Costa (in press a), on the basis of five characters considered to be synapomorphies: the males have more dorsal fin rays than the females; the pre-dorsal length represents 45 to 55 % of the standard length; 16 to 25 neuromasts in the supra-orbital series; lower process of the dentary posterior portion widened; juveniles have a dark spot in the center of the flank. As now understood, the 33 recognized *Cynolebias* species are distributed in the coastal lowlands of Brazil, from Ceará to Rio de Janeiro, the upper Araguaia, upper Paranaíba, Paraguay and upper Iguaçu rivers, the lowlands surrounding the Plata river basin, the lower Paraná and lower Uruguay rivers (Costa, in press b).

We describe here two new species from the Rio Sao Francisco basin. They represent the first record of annual fishes from this basin (the third largest fluvial system in South America), and the second record of Rivulidae in the Sao Francisco basin (the first one is in Costa, in press c). Both species were found a considerable distance inland (at least 400 km).

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Table 1. Morphometric and meristic data of *Cynolebias zonatus* and *C. flavicaudatus*. Morphometric data are expressed in % SL, except eye diameter in % of head length. m: male, f: female.

	C. zonatus					*C. flavicaudatus*							
	MHNM 3250	MNRJ 11558	MZUSP 40131	MNRJ 11558	MZUSP 40132	MNRJ 11556	MHNM 3252	MZUSP 40130	MZUSP 40129	MNRJ 11556	MHNM 3252	MZUSP 40130	MZUSP 40130
	m	m	m	f	f	m	m	m	m	f	f	f	f
SL (mm)	22.0	22.4	29.4	20.0	22.3	32.7	38.6	40.9	41.1	32.1	32.5	34.2	35.9
Body depth	30.9	32.4	31.0	31.5	32.3	37.8	39.5	39.7	41.9	41.0	41.7	42.7	39.7
Head length	33.3	33.9	31.3	34.1	33.4	28.3	28.9	28.6	29.1	32.2	31.8	30.7	31.0
Head depth	27.6	28.3	26.9	28.3	28.7	27.6	28.8	30.1	30.5	30.7	30.8	29.8	31.1
Head width	21.2	22.0	21.0	22.3	24.4	20.7	20.5	20.8	20.7	22.7	22.8	22.4	21.5
Eye diameter	32.2	31.8	29.9	34.6	32.2	27.3	28.3	28.6	27.2	29.0	32.4	30.5	28.8
Predorsal length	55.4	59.6	55.5	64.7	61.4	42.5	47.3	47.0	46.2	60.1	59.2	61.7	58.7
Prepelvic length	48.5	50.2	46.7	52.1	51.6	42.6	44.0	44.2	44.0	52.6	54.3	50.1	51.7
Depth of caudal peduncle	14.1	15.4	15.3	15.3	15.9	15.7	15.5	15.8	16.6	16.0	15.8	16.4	15.2
Length of dorsal fin base	26.7	23.5	26.9	21.1	20.4	42.7	40.7	40.4	39.6	25.6	25.5	23.0	25.8
Length of anal fin base	31.7	31.2	31.2	25.6	24.0	45.2	43.4	43.0	40.8	28.7	28.3	27.0	29.8
Dorsal rays	16	15	17	13	12	24	23	23	24	16	18	16	17
Anal rays	19	19	20	18	17	23	23	23	24	19	21	20	21
Scales in longitudinal series	26	27	27	26	26	29	29	29	29	29	29	29	-
Scales in transversal series	8	8	8	8	8	13	13	13	12	13	12	12	12
Horizontal scale rows around caudal peduncle	12	12	12	12	12	18	18	18	18	18	18	18	18

Material and methods

Methods for taking measurements and counts follow Costa (1988). Measurements are presented as percentages of standard length (SL) except for eye diameter, which is expressed as a percentage of head length. Throughout the text, vertical colour marks are termed bars. Abbreviations for institutions are: MHNM Museo Nacional de Historia Natural, Montevideo, MNRJ Museu Nacional do Rio de Janeiro, MZUSP Museu de Zoologia da Universidade de Sao Paulo.

Cynolebias zonatus, new species

(Figs. 1-2)

Holotype. MZUSP 40131, male, 29.4 mm SL; Brazil, Minas Gerais, Garapuava district, County of Unaí; G.C. Brasil, 3 III 1989.

Paratypes. MZUSP 40132, 1 female, 22.3 mm SL, MNRJ 11558, 1 male, 22.0 mm SL and 1 female, 20.0 mm SL, MHNM 3250, 1 male, 22.0 mm SL; collected with the holotype.

Diagnosis. The new species is similar to *C. boitonei*; both are distinguished from the other species of the genus by the colour pattern of the males, which has four red bars on the sides of the head (the first one crossing the eye, the second one close to the posterior margin of the orbit, and two on the preopercular region) and black spots in the basal region of the dorsal fin. It differs from *C. boitonei* by the following characters: presence of pelvic fins (vs. absence), dorsal fin origin behind anal fin origin (vs. in front), anal fin base longer than dorsal fin base (vs. shorter), less rays in the dorsal fin (15-17 vs. 21-23 in males, 12-13 vs. 14 in females). The *C. zonatus* males have the anal fin base orange.

Description. Dorsal and anal fin pointed in the males, rounded in the females. Caudal fin rounded. Posterior margin of the pectoral fin reaches to the vertical of anal ray 4-6 in males and to the urogenital papilla in females. Pelvic fin reduced, its tip reaching to the urogenital papilla in males and to the anus in females. Dorsal fin origin opposite 3rd or 4th anal ray in males, opposite the 2nd in females. The meristic and morphometric data are given in Table 1.

Colouration. Males: sides of body and head

Fig. 1. *Cynolebias zonatus*, wild male, a

metallic blue with red bars, whic
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Fig. 2. *Cynolebias zonatus*, wild female, a
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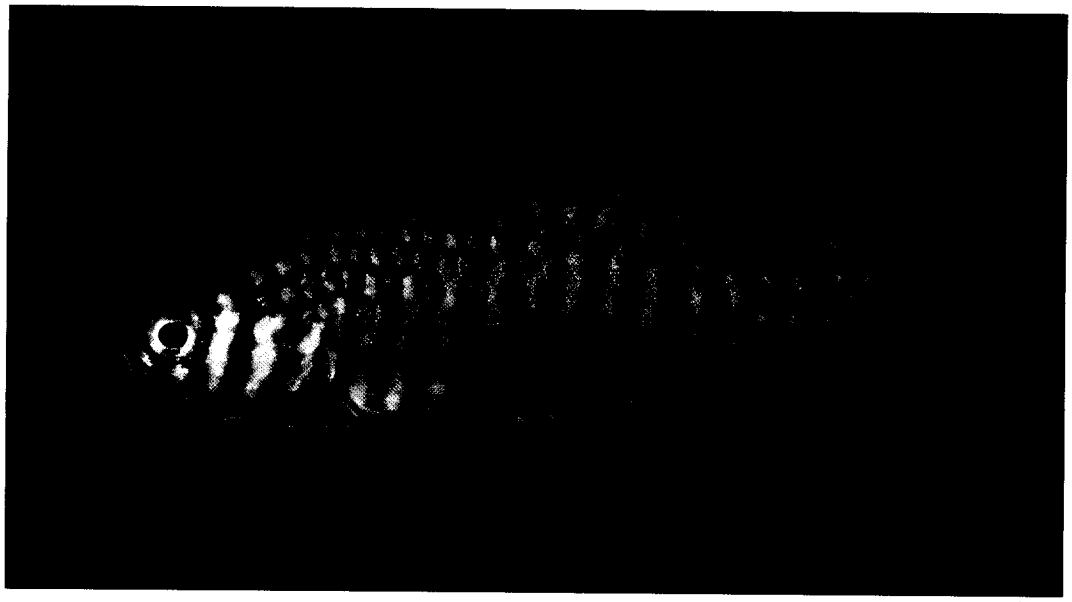


Fig. 1. *Cynolebias zonatus*, wild male, about 30 mm SL, uncatalogued.

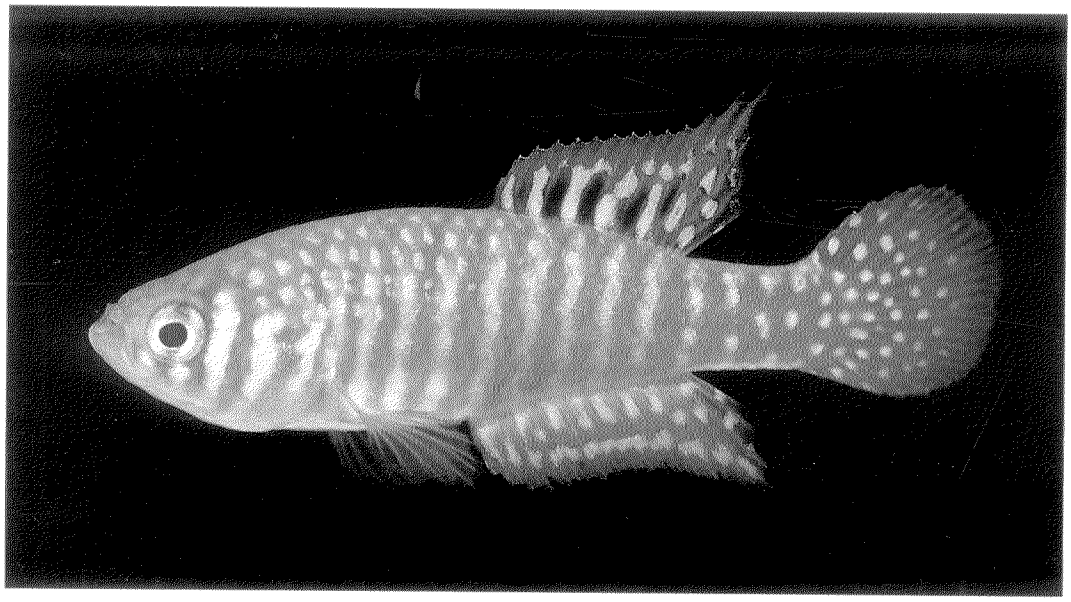
metallic blue with red bars, which are interconnected in the caudal peduncle. Iris blue. Upper margin of the dorsal fin red; anterior and middle basal region with alternate metallic blue and black vertically elongated spots; posterior basal region red with metallic blue spots. Caudal fin red, with metallic blue spots. Anal fin orange, inferior margin red, with a horizontal row of metallic blue spots along the base and another row along the red margin. Pelvic and pectoral fins reddish with blue base.

Females: sides of body and head light brown with dark brown bars and with a black spot in the center of the flank. Iris yellowish; the eye is crossed by a dark brown bar. Dorsal fin hyaline, with faint blue spots in the anterior region. Anal fin yellowish. Caudal, pectoral and pelvic fins hyaline.

Fig. 2. *Cynolebias zonatus*, wild female, about 25 mm SL, uncatalogued.

Ecological notes. The habitat of the species is a temporary puddle within remains of a gallery forest located in a farm. No other fish species were found at the site. Aquatic or marshy plants were not observed. There are in the forest a profusion of shrubby pteridophytes (Fig. 3). The region is a typical plateau (»chapada«) around 800 m above the sea level and is situated in the basin of the upper Rio Urucuia, a left bank tributary of the Rio São Francisco.

Etymology. From the Latin *zonatus* (with zones or bars), an allusion to the colour pattern of the males. An adjective.



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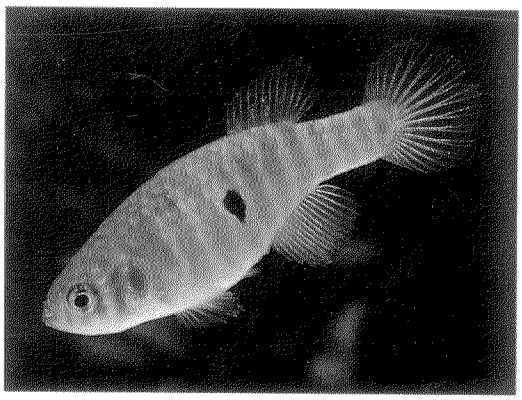

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Fig. 3. Flooded area near Garapuava, type locality of *Cynolebias zonatus*.

Cynolebias flavicaudatus, new species
(Figs. 4-5)

Holotype. MZUSP 40129, male, 41.1 mm SL; Brazil, Pernambuco, vicinities of Lagoa Grande, county of Santa Maria da Boa Vista; G.C. Brasil, 16 V 1989.

Paratypes. MZUSP 40130, 1 male, 40.9 mm SL, and 2 females, 35.9-34.2 mm SL, MNRJ 11556, 1 male, 32.7 mm SL, and 1 female, 32.1 mm SL, MHNM 3252, 1 male 38.6 mm SL and 1 female, 32.5 mm SL; collected with the holotype.

Diagnosis. The new species is similar to *C. antenori*; both are distinguished from the other species of the genus by the combination of the following characters: reduced predorsal length in the adult males (at most 51 % SL), presence of filamentous rays in the dorsal fin of adult males and presence of a orange stripe inferiorly bordered by a black margin on the lower edge of the anal fin. It differs from *C. antenori* by: a more pointed snout (lateral aspect; this difference is more marked if females are compared; see Figures 5 and 6); colour pattern of the adult males consisting in conspicuous bars, without bright blue spots, ground colour light purple, caudal fin and posterior area of anal fin with a yellow ground colour (vs. dark brown ground colour with bright blue spots and the unpaired fins with a dark brown ground colour in *C. antenori*).

Description. Dorsal and anal fins with pointed tips in the males, rounded in females. Caudal fin rounded to somewhat truncate in males, rounded in females. Posterior margin of the pectoral fin reaches to the vertical of anal ray 5-6 in males, and to the 1st or 2nd in females. Pelvic fin reaches to the base of 3rd anal ray in males, and the urogenital papilla or 1st anal ray in females. Origin of dorsal fin opposite 1st or 2nd anal ray in males, opposite 3rd to 5th in females. The meristic and

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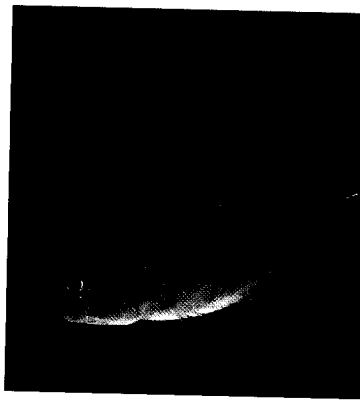

Fig. 5. *Cynolebias flavicaudatus*, wild fem
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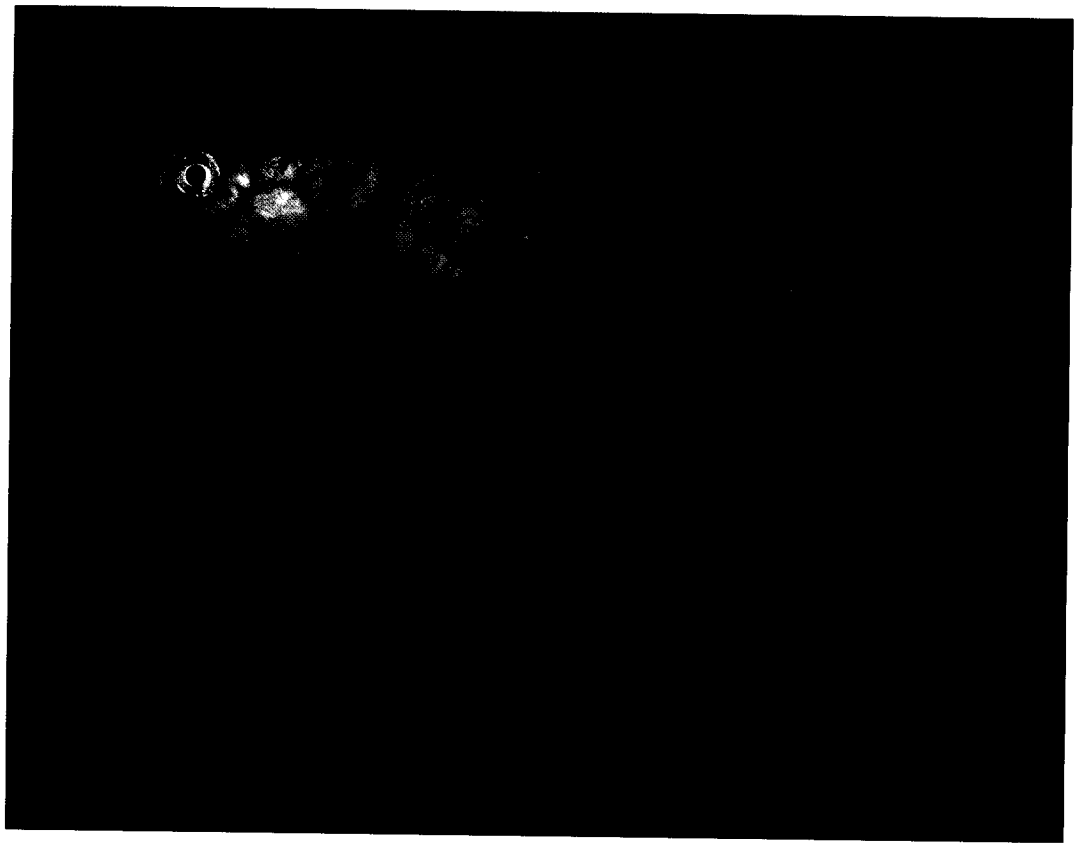


Fig. 4. *Cynolebias flavicaudatus*, wild male, about 40 mm SL, uncatalogued (colours somewhat faded in this picture).

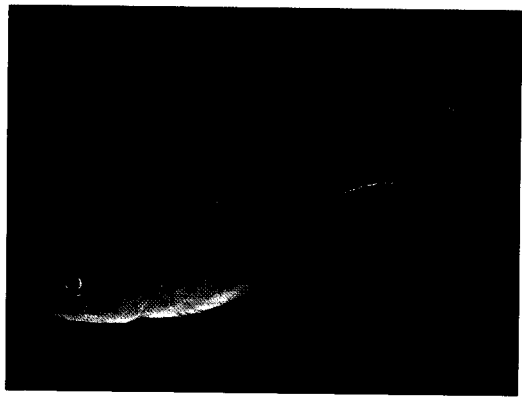


Fig. 5. *Cynolebias flavicaudatus*, wild female, about 35 mm SL, uncatalogued.

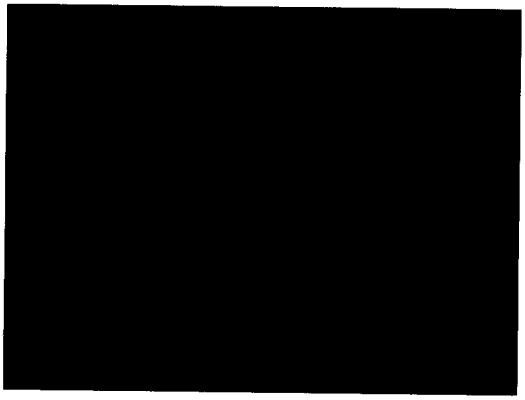
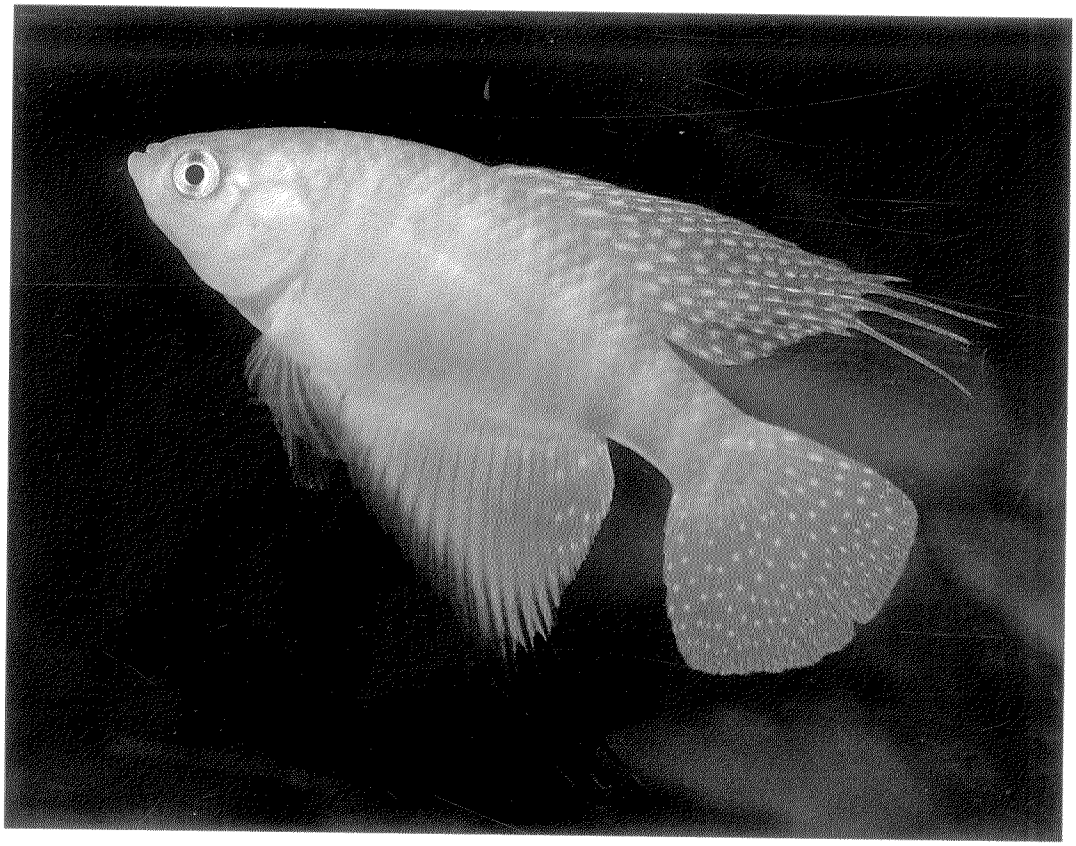


Fig. 6. *Cynolebias antenori*, wild female, about 35 mm SL, uncatalogued.



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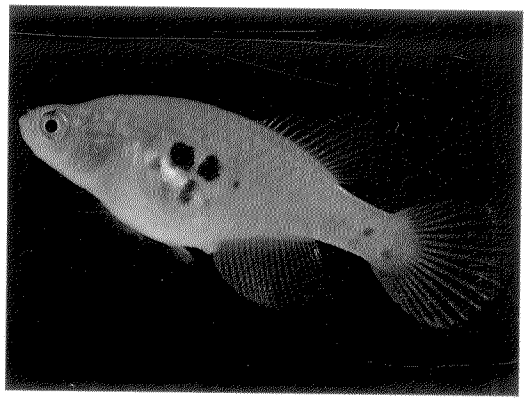

Fig. 6. *Cynolebias antenori*, wild female, about 35 mm SL, uncatalogued.

Fig. 7. Flooded area near Lagoa Grande, type locality of *Cynolebias flavicaudatus*.

morphometric data are given in Table 1.

Colouration. Males: body sides light brown purplish with grey bars. Head brown, with golden iridescent patches decreasing in intensity in the upper region. Iris yellow; a dark brown bar crosses the eye. Caudal fin and posterior areas of the dorsal and anal fins yellow; pelvic fin and anterior area of dorsal and anal fins reddish; an orange stripe inferiorly bordered by a black margin on the lower edge of the anal fin; blue spots in dorsal and anal fins, as well as in the posterior area on the anal fin. Pectoral fin hyaline.

Females: sides of body and head light brown with dark brown bars. A dark brown spot in the center of the flank, smaller spots on the posterior extremity of the caudal peduncle. Iris yellow; a dark brown bar crosses the eye. Fins hyaline.

Ecological notes. The type locality is an extensive temporary flooded area (Fig. 7) around 2000 m^2, where several pits had been excavated in the past to extract clay for manufacturing bricks and tiles. Due to recent rains, most pits were connected, making the flooded area continuous. It is worth to mention that the similar species *C. antenori* had been collected in the State of Cereá in 1972 in analogous conditions (Brasil, 1973). The kind of clay present in such sites, called "massape" in Brazil, is the reason of the slow drainage rate of the soil. The aquatic vegetation consited mainly in *Echinodorus* sp., *Nymphea* sp. and *Eleocharis* sp. The water was slightly turbid. *Cynolebias flavicaudatus* was associated at the type locality with a species of the *C. porosus* complex (Costa & Brasil, in prep.). No other fishes were found.

Etymology. From the Latin *flavus* (yellow) and *caudatus* (with caudal fin), an allusion to the colour pattern of the males. To be treated as a noun in apposition.

Discussio

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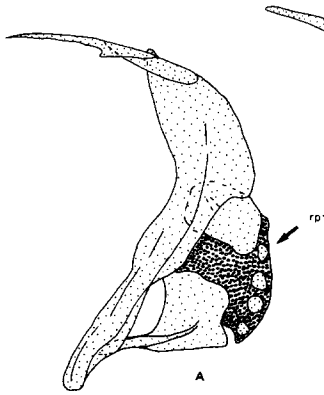

Fig. 9. Left shoulder girdle of *Cyno*
Cynolebias adloffi **(B)**; rpl: first pecto

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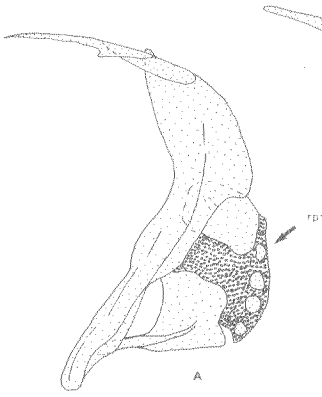

Fig. 9. Left shoulder girdle of *Cyno*
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Discussion

Cynolebias boitonei (Carvalho, 1959), endemic to Brasilia, Federal District, in the Paraná river basin (Fig. 8), seems to be the species most closely related to *C. zonatus*, as males of both species share an unique pattern of black spots in the basal region of the dorsal fin and the presence of four red bars on sides of the head. While *C. boitonei* completely lacks pelvic fins, the pelvic fins of *C. zonatus* are the most reduced among all *Cynolebias*. As both colour pattern characters and the reduction of pelvic fins are otherwise unknown among Rivulidae, they are considered synapomorphies of *C. boitonei* and *C. zonatus*.

Despite morphological and chromatic similarities between *C. boitonei* and *C. zonatus*, they occur in different habitats. *Cynolebias boitonei* lives in temporary ponds in the "Cerrado" (Bastos, 1984), while *C. zonatus* occurs in flooded areas of gallery forests.

La Corte (1982) reports the existence of a population of *C. boitonei* with pelvic fins, but no locality is mentioned. The accompanying black and white photo of a male shows differences from *C. zonatus* in the position and size of the unpaired fins, suggesting that it may be a third, related species.

Cynolebias flavicaudatus seems to be related to a group of species including *C. antenori* Tulipano, 1973 and *C. flammeus* Costa, 1989. These species are distinguished by the reduced predorsal length in the adult males (at most 51 % SL vs. more than 54 % in other closely related *Cynolebias*). This character is thought to be apomorphic, as it does not occur in the directly related genera of the Rivulidae (e.g. *Leptolebias* Myers, 1952, *Cynopoecilus* Regan, 1912, *Campellolebias* Vaz-Ferreira & Sierra, 1974 and *Plesiolebias* Costa, 1989). The same character state occurs in another group of *Cynolebias* from southern South America formed by *C. affinis* Amato, 1986, *C. alexandrii* Castello & Lopez, 1974, *C. cyaneus* Amato, 1987, *C. gymnoventris* Amato, 1986, *C. luteoflammulatus* Vaz-Ferreira, Sierra & Scaglia, 1964 and *C. nigripinnis* Regan, 1912. This character state seems to have arisen independently in both groups, as each of them is clarly more related to other *Cynolebias* species than to each other.

The group comprising *C. flavicaudatus* can be referred to a broader group composed, among other species, of *C. constanciae* Myers, 1942, *C. myersi* Carvalho, 1971, and *C. whitei* Myers, 1942,

Fig. 8. Collecting localities of *Cynolebias antenori*, *C. flavicaudatus*, *C. boitonei* and *C. zonatus*.

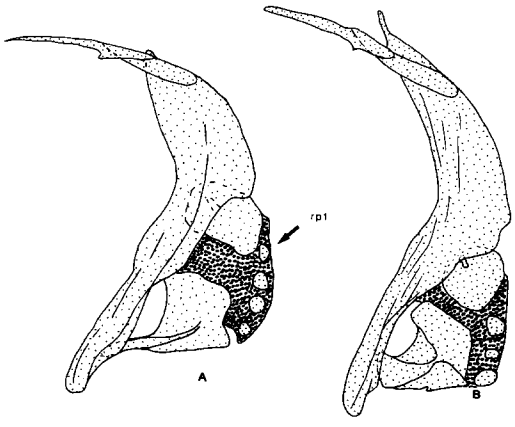

Fig. 9. Left shoulder girdle of *Cynolebias whitei* **(A)** and *Cynolebias adloffi* **(B)**; rpl: first pectoral radial.

distinguished by the presence of prolonged rays in the dorsal fin of adult males. The other group may be included in a larger group comprising, among other species, *C. adloffi* Ahl, 1922, *C. bellottii* Steindachner, 1881, *C. elongatus* Steindachner, 1881, and *C. porosus* Steindachner, 1876, easily recognized by the reduction or loss of the upper radial of the pectoral fins (Fig. 9).

Considering the great similarity of the meristic and morphometric characters and the shared presence of an orange stripe inferiorly bordered by a black margin on the lower edge of the anal fin (a combination otherwise unknown in the genus), *C. flavicaudatus* seems to be most closely related to *C. antenori*, from coastal plains of Northeastern Brasil (Fig. 8).

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Literature cited

Bastos, E.K. 1984. *Cynolebias boitonei*, in Zentral-Brasilien beobachtet. Das Aquarium, 18: 119-123.

Brasil, G. C. 1973. A new *Cynolebias* from northeastern Brazil. Aquarium Digest Intern., 2(2): 3-4.

Costa, W. J. E. M. 1988. Sistemática e distribuição do complexo de espécies *Cynolebias minimus* (Cyprinodontiformes, Rivulidae), com a descrição de duas espécias novas. Rev. Brasil Zool., 5: 557-570.

-- (In press a). Análise filogenética da família Rivulidae (Cyprinodontiformes, Aplocheiloidei). Rev. Brasil Biol.

-- (In press b). Classifição e distribuição da família Rivulidae (Cyprinodontiformes, Aplocheiloidei). Rev. Brasil Biol.

-- (In press c). Descrição de cinco novas espécies de *Rivulus* das bacias dos rios Paraná e São Francisco (Cyprinodontiformes, Rivulidae). Rev. Brasil Zool.

La Corte, R. S. 1982. Natural history notes on some *Cynolebias* species. J. Amer. Killifish Ass., 15: 215-227.

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