

## Rediscovery and redescription of *Cynolebias carvalhoi* (Cyprinodontiformes: Rivulidae)

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Fifty-three years after the only previous collection of *Cynolebias carvalhoi*, this species was rediscovered near its type-locality, in União da Vitória, Estado de Santa Catarina, southern Brazil, Iguacú river basin. *Cynolebias carvalhoi* is redescribed based on both type specimens and newly collected material. This population is strongly threatened with extinction.

Cinquenta e três anos depois da única coleta de *Cynolebias carvalhoi* esta espécie foi redescoberta perto de sua localidade-tipo, em União da Vitória, Estado de Santa Catarina, sul do Brasil, bacia do rio Iguacú. *Cynolebias carvalhoi* é redescrita com base tanto em espécimens da série-tipo como material recentemente coletado. Esta população está fortemente ameaçada de extinção.

### Introduction

In a general paper about Amazonian fishes of interest to aquarists, Myers (1947) first published the name *Cynolebias carvalhoi*. Discussing the possibility of finding fishes related to *Cynolebias* Steindachner in the Amazon, Myers wrote: "Yet when Mr. Antenor L. de Carvalho, of the Nacional Museum in Rio, and I were fishing in the highlands of the Rio Iguassu we discovered a *Cynolebias* near Porto Uniao. This species, *Cynolebias carvalhoi*, is a small one of the deep-bodied type, dull in color, the male with numerous vertical bands wider than those of *addloffii*". This brief and inaccurate statement on this species was sufficient to make *C. carvalhoi* an available and valid species name.

Subsequently, Myers (1952) superficially described *C. carvalhoi* again as a "dwarf deep-bodied species, about 1.5 inches total length", without providing any new morphological data, but revealing that *C. carvalhoi* was collected in a "clear, reed-grown, mud-bottom pond, on high ground just above the river, a mile or so east of Porto União, on the Rio Iguassu, April 22-25, 1944". According to A. Carvalho (pers. comm.) the type locality was in the state of Paraná, therefore closer to the city of União da Vitória, than to Porto União, on the other side of the rio Iguacú, in Santa Catarina state. No mention to type specimens was made in either Myers' papers.

Almost 20 years later, Vaz-Ferreira & Sierra (1971) reported *C. carvalhoi* in Departamento de Colonia, Uruguay, and presented a putative re-

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Fig. 1. *Cynolebias carvalhoi*, 37.3 mm SL, UFRJ 4444, one week after collection.



Fig. 2. *Cynolebias carvalhoi*, male (left), 24.3 mm SL, and female (right), 21.6 mm SL, UFRJ 4445, immediately after collection.



Fig. 3. Temporary pool at União da Vitória of *Cynolebias carvalhoi*.

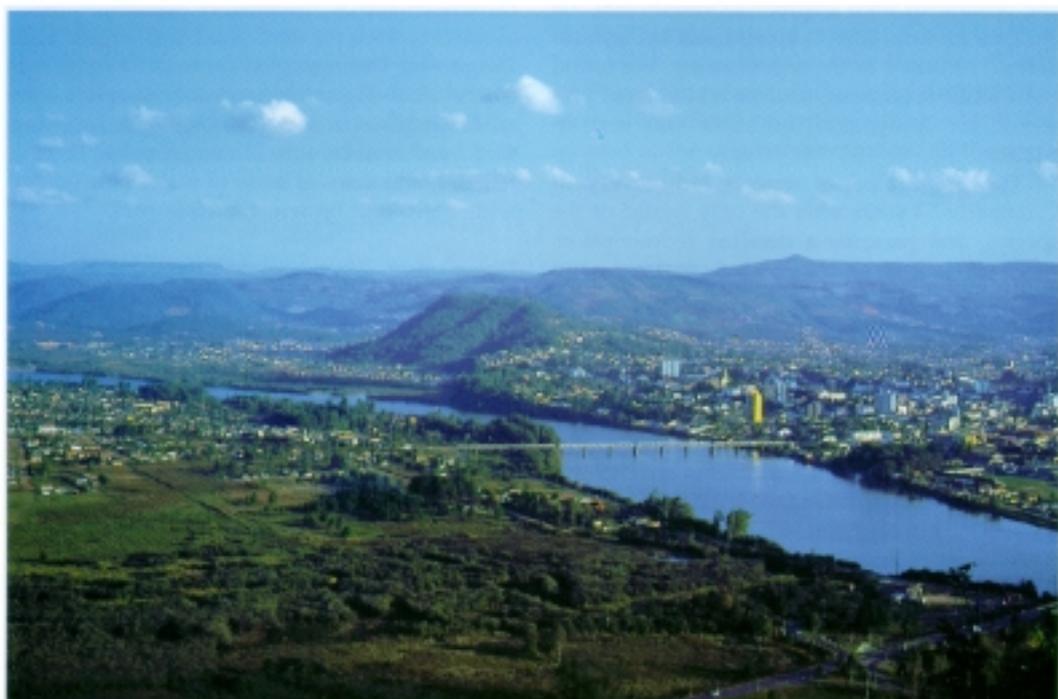


Fig. 4. Upper Iguaçu river at the area of the type locality of *Cynolebias carvalhoi*: Porto União, Estado de Santa Catarina, above, right, and União da Vitória, Estado do Paraná, below, left.

description based on Uruguayan material. However, Amato (1986) demonstrated that the *Cynolebias* from Colonia was, in fact, an undescribed and very distinct species, which he described as *C. cinereus*. Despite the equivocal new record for *C. carvalhoi*, Vaz-Ferreira & Sierra (1971), for the first time, mentioned that holotype and six paratypes are deposited in Museu Nacional, Rio de Janeiro, and four paratypes in Stanford University, California. The Museu Nacional types (in fact syntypes) were the basis for a short redescription of the species (Costa, 1995), including its first published illustration.

No further collections were made, although during the last 15 years, several ichthyologists and aquarists tried to collect *C. carvalhoi* from its type-locality and neighboring areas. Because the Iguacu valley has been greatly impacted by agriculture, and Porto Uniao has become a large city, extinction was strongly expected (Costa, 1995).

During a recent expedition to southern Brazil (July 1997), we stayed a short time in the rio Iguacu basin to collect annual fishes. The third day, we found *C. carvalhoi* in a single temporary pool, probably the type-locality or very close to it. However, all individuals were juveniles, about one centimeter total length.

Two months later, accompanied by my students, I returned to the same locality. We found eight adult specimens, four of which were preserved for study, and the other four kept in aquaria.

The present paper reports rediscovery of *C. carvalhoi* 53 years after the only record of the species, and presents a detailed redescription, based on both recently collected specimens and the type material.

### Material and methods

Methods for taking measurements and counts follow Costa (1988). Measurements are presented as percentages of standard length (SL), except for subunits of the head, which are presented as percentages of head length. The compound caudal centrum was counted as a single element in vertebrae numbers, which were taken only from cleared and stained material, prepared according to Taylor & Van Dyke (1985). Nomenclature for cephalic neuromasts follows Gosline's (1949) nomenclature for head sensory canals. Supraorbital neuromasts counts do not include trans-

verse neuromasts over rostral region. Institutional acronyms are: MNRJ, Museu Nacional, Rio de Janeiro, and UFRJ, Universidade Federal do Rio de Janeiro, Rio de Janeiro.

### *Cynolebias carvalhoi* Myers

(Figs. 1-2)

*Cynolebias carvalhoi* Myers, 1947: 19 (original description, highlands of the rio Iguassu [Iguaçu] near Porto Uniao [Uniao], Brazil).

**Material examined.** MNRJ 5759, lectotype, male, 26.2 mm SL; Brazil: Estado do Paraná, pond close to rio Iguacu, about one mile from Porto Uniao; G. S. Myers & A. L. Carvalho, 21-25 April 1944. - MNRJ 5760, paralectotypes, two males, 21.9 and 25.6 mm SL, and two females, 18.4 and 18.5 mm SL; all collected with the lectotype. - UFRJ 4444, one male, 37.3 mm SL, and one female, 38.1 mm SL; UFRJ 4445, one male, 24.3 mm SL, and one female, 21.6 mm SL (cleared and stained for bone and cartilage); Brazil: Estado do Parana, temporary pool close to rio Iguacu, Uniao da Vitória; W. J. E. M. Costa, D. Belote, R. D'Arrigo, D. Nielsen and A. Carletto, 11 September 1997.

**Diagnosis.** Distinguished from all its congeners by the following combination of characters: dorsal-fin origin in front of anal-fin origin, both dorsal fin and anal fin with 21 rays in males, 17-18 in females, and sides of body of males pale golden with transverse brownish-purple bars.

**Description.** Morphometric data are given in Table 1. Dorsal profile of the head slightly concave in males, approximately straight in females. Dorsal profile from nape to posterior dorsal-fin base gently convex. Dorsal and ventral profiles of caudal peduncle slightly concave. Ventral profile from lower jaw to posterior anal-fin base weakly convex.

Dorsal and anal fins rounded in both sexes, anteromedian portion of anal fin of females slightly expanded distally. No filamentous rays on fins. Caudal fin rounded. Pectoral fin elliptical. Tip of the pectoral fin reaches anal-fin origin in males and anus in females. Tip of pelvic fin reaches base of second anal-fin ray in males and urogenital papilla in females; pelvic fin absent in two specimens examined (UFRJ 4445). Anal-fin origin in a vertical through base of the third

dorsal-fin ray in both sexes; second dorsal proximal radial between neural spines of vertebrae 10 and 11 in male, 11 and 12 in female; second anal proximal radial between pleural ribs of vertebrae 9 and 10 in male, 10 and 11 in female. Small papillae on the upper portion of the inner surface of pectoral fin of males. Dorsal-fin rays 21-22 in males, 16-18 in females; anal-fin rays 21-22 in males, 16-18 in females; total caudal-fin rays 25-26, principal rays 13; pectoral-fin rays 13; pelvic-fin rays five. Precaudal vertebrae 12, caudal vertebrae 16-17.

Branchiostegal rays six. Gill-rakers in the first branchial arch 4+9.

Neuromasts on the supraorbital series 9+9 in the largest male, 8+7 in the largest female (both in UFRJ 4444). Scales of the longitudinal series 27-29, scales of the transverse series 13, series of scales around caudal peduncle 22.

**Coloration in life.** Males: Sides of body pale golden, with eight brownish-purple vertical bars. Dorsum pale brown. Sides of head pale greenish golden, with a dark gray, vertical suborbital stripe. Iris light brown; a dark gray vertical bar through the eye. Pelvic and unpaired fins dark gray, with bluish white dots. Pectoral fin light gray. In juveniles, the vertical body bars are dark brown.

Females: Sides of body pale orangish-brown with irregularly arranged, small dark brown spots; spots on the anteroventral portion of body darker. Dorsum pale brown. Sides of head pale

golden, with a faint dark gray, vertical suborbital stripe. Iris light brown; a faint dark gray vertical bar through the eye. Fins hyaline.

**Distribution and habitat notes.** The new collections of *C. carvalhoi* were made in a temporary pool very close to or identical with the type-locality of the species. The temporary pool (Fig. 3) is small (an area of about 100 m x 20 m) and shallow (to about 50 cm deep). The water was dark colored and aquatic vegetation was abundant. No other fishes were found in either collection (July and September). The two cleared and stained specimens had many Ostracoda, some Copepoda, and larvae of Diptera in their stomach and gut. The pool is today within the city of União da Vitória (Estado do Paraná), which forms a continuous large urban area with Porto União (Estado de Santa Catarina) on the other side of rio Iguaçu (Fig. 4). Therefore, this population of *C. carvalhoi* is highly threatened with extinction. However, there is a large, but not sampled, unaltered area of the floodplains of rio Iguaçu where *C. carvalhoi* may be found in the future.

**Remarks.** Vaz-Ferreira & Sierra (1971) recorded six, and Amato (1986) five paratypes deposited in MNRJ under catalog number 5760. However, both when preparing the first diagnosis (Costa, 1995) and the present study, only four paratypes were found. Since no type specimens were designated in the original description, all the speci-

Table 1. Morphometric data of *Cynolebias carvalhoi* H: holotype; P: paratypes.

	males				females		
	H		P		UFRJ 4444	UFRJ 4445	P MNRJ 5760
	UFRJ 4444	MNRJ 5759	MNRJ 5760	UFRJ 4445			
SL(mm)	37.3	26.2	25.6	24.3	38.1	21.6	18.4
<b>In percents of standard length</b>							
Body depth	34.8	35.4	36.1	34.0	34.2	31.3	32.6
Depth of caudal peduncle	16.4	16.2	15.7	15.6	15.3	14.1	16.2
Predorsal length	52.9	55.9	52.5	56.3	58.9	59.2	59.1
Prepelvic length	52.7	53.2	52.0	--	55.5	--	53.9
Length of dorsal-fin base	37.2	38.0	38.5	33.0	28.4	28.8	29.1
Length of anal-fin base	35.1	34.5	34.5	31.4	22.0	24.3	26.6
Head length	30.7	33.4	34.5	32.9	30.8	30.7	33.6
<b>In percents of head length</b>							
Head depth	98.0	88.9	88.2	91.3	97.8	93.8	83.2
Headwidth	76.5	61.7	58.1	71.9	73.8	72.1	63.4
Eye diameter	27.0	28.2	27.4	27.7	25.9	32.3	29.3

mens studied by Myers are syntypes and there cannot be a holotype and paratypes. The specimen MNRJ 5759 erroneously labelled as holotype and considered so by earlier authors is here designated as lectotype.

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