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## *Cyprinodon nichollsi*, a New Pupfish from Hispaniola, and Species Characteristics of *C. bondi* Myers (Teleostei: Cyprinodontiformes)

MICHAEL LEONARD SMITH<sup>1</sup>

### ABSTRACT

The Jaragua pupfish, *Cyprinodon nichollsi* n. sp., is described from a hypersaline coastal lake, Laguna de Oviedo, Jaragua National Park, Dominican Republic. It is distinguished by its large size, deep body, small cleithral scale, and small cleithral process. *Cyprinodon bondi* Myers, also from His-

paniola, is redescribed and characterized on the basis of its tapered caudal peduncle, presence of a toothplate in the position of the first pharyngobranchial bone, and high number of circumduncular scales.

### INTRODUCTION

The cyprinodontid genus *Cyprinodon* Lacépède comprises about 30 pupfishes distributed in arid regions of northern Mexico and southwestern United States and in Atlantic coastal habitats of North and Middle America (Turner and Liu, 1977). The diversity of pupfishes in mainland habitats of North America is well documented (Miller, 1981; Humphries and Miller, 1981; Humphries, 1984; Minckley and Minckley, 1986), but the number and systematic status of forms in the Caribbean region have not been established.

Recent collecting shows that there are several pupfishes in nonmarine habitats of the Caribbean island of Hispaniola, in addition to the long-described, but poorly known, *C. bondi* Myers. The systematics and variation of forms from Lake Enriquillo, southwestern Hispaniola, are topics of a separate study. The species characteristics of an additional pupfish from Laguna de Oviedo, western Dominican Republic, are reported here, and the new species is compared to other Antillean species of *Cyprinodon*.

<sup>1</sup> Kalbfleisch Assistant Curator, Department of Herpetology and Ichthyology, American Museum of Natural History.

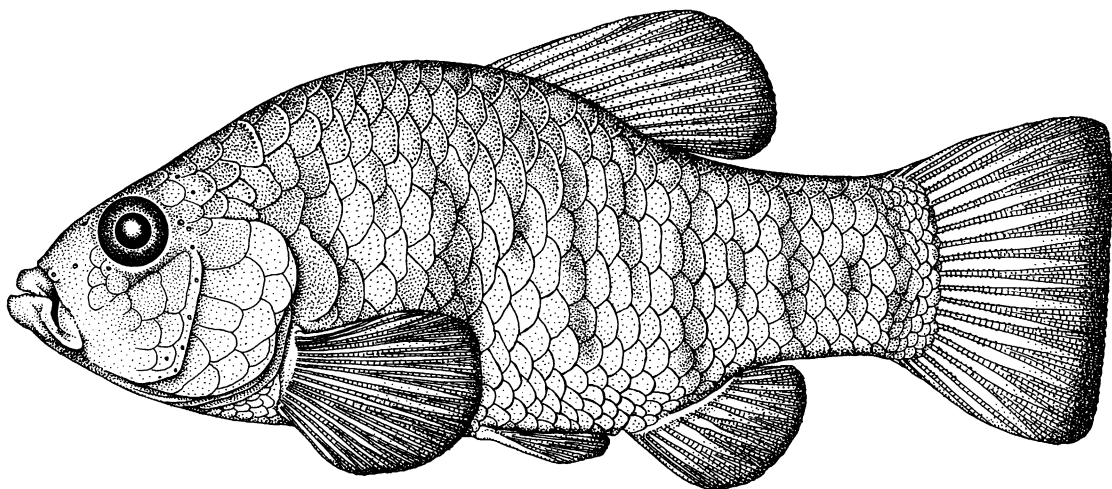


Fig. 1. *Cyprinodon nichollsi*. AMNH 58278, holotype, male, 75.3 mm standard length. Patricia J. Wynne, del.

Myers (1935) described as new the species *C. bondi* on the basis of three specimens collected in Etang Saumâtre, Haiti. An anticipated, fuller description never appeared, and the species has seldom been mentioned since, except to note that it appears to stand out sharply from the "*C. variegatus* complex" (Miller, 1962). The collection of additional material shows that it is indeed one of the most distinctive species of *Cyprinodon*, characterized by a number of features that are inferred to be derived.

#### ACKNOWLEDGMENTS

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#### METHODS

Measurements were taken as described by Miller (1948) and Humphries (1984) with exceptions as follows. Body depth was taken at the dorsal-fin origin. Depth of the caudal peduncle is the distance between the first dorsal and ventral procurent rays of the caudal fin. Mouth width is the greatest distance across the dental arcade of the lower jaw (the lips are disregarded).

Every ray in the dorsal and anal fins is counted as one (i.e., the last two are not combined). Vertebrae are counted from radiographs and cleared-and-stained specimens and include the hypural plate as one vertebra; the first precaudal vertebra is taken to be that which bears the first complete hemal arch, detected in radiographs by a white spot where the hemal processes fuse. Gill rakers were counted on the first gill arch of the right side and include all rudiments on both upper and lower limbs. All counts and measurements are taken from the left side. For meristic characters, the value for the holotype is indicated in boldface.

Referred material is deposited in the Academy of Natural Sciences, Philadelphia (ANSP), American Museum of Natural History (AMNH), Florida Museum of Natural History (UF), and University of Michigan Museum of Zoology (UMMZ).

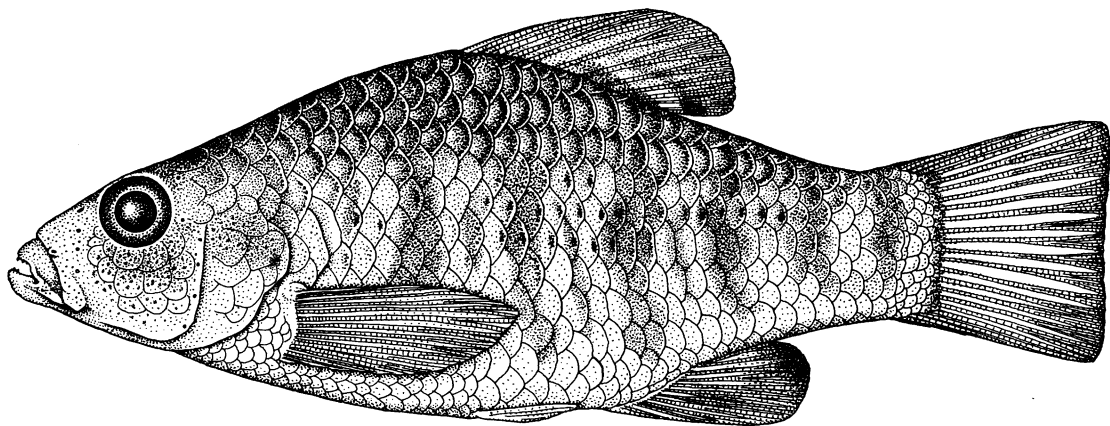


Fig. 2. *Cyprinodon bondi*. UF 45043, male, 46.8 mm standard length. Patricia J. Wynne, del.

### SYSTEMATICS

***Cyprinodon nichollsi*, new species**  
Jaragua pupfish

Figures 1, 3; tables 1–3

**HOLOTYPE:** AMNH 58278, male, 75.3 mm SL, sandy beach at Laguna de Oviedo, 4 km east of Oviedo on Hwy. 44, Jaragua National Park, Dominican Republic; W. C. McNiff, K. J. Lazara, and M. L. Smith, 9 Sept. 1987.

**PARATYPES:** AMNH 58279, 135 juveniles, males and females, including 10 cleared-and-stained, 19.8–69.1 mm SL; USNM 300935, 10 males and females, 24.6–46.0 mm SL; collected with the holotype. AMNH 58280, 10 males and females, 25.0–55.1 mm SL; UMMZ 214865, 107 juveniles, males and females, 14.3–66.7 mm SL; UF 79181, 10 males and females, 22.3–49.5 mm SL; beach at Laguna de Oviedo, 4 km east of Oviedo, Jaragua National Park, Dominican Republic; G. R. Smith and M. L. Smith, 8 Jan. 1988.

**DIAGNOSIS:** A large *Cyprinodon* (to 75 mm SL) with a long head and snout, wide mouth, strongly convex predorsal profile, first pharyngobranchial toothplate absent, caudal fin truncate, pectoral fin round, not reaching origin of pelvic fins, 14–16 circumpeduncular scales, 23–26 lateral-series scales, scales entire or slightly crenate, never laciniate. Large size and small pectoral fin are derived. Comparisons to particular congeners are given in discussion.

**DESCRIPTION:** General morphology and pigmentation of preserved specimens are

shown in figure 1 and proportional measurements are given in table 1. Body deep, strongly compressed. Predorsal profile usually indented at occiput, but strongly convex from occiput to dorsal-fin origin. Dorsal-fin origin behind midbody, slightly in advance of pelvic-fin origin. Mouth wide, terminal.

First dorsal-fin ray slender and short, never spinelike as in some populations of *C. variegatus*. Dorsal-fin rays 11(23 counts), 12(21), 13(6). Anal-fin rays 10(11), 11(37), 12(2). Pectoral-fin rays 15(6), 16(28), 17(16). Pelvic-fin rays 5(1), 6(10), 7(38), 8(1). Branched caudal-fin rays 11(3), 12(39), 13(6), 15(1). Branchiostegal rays, from alizarin preparations, 6(10). Gill rakers 19(2), 20(8), 21(20), 22(12), 23(7), 24(1). Scales between dorsal and anal fins 11(1), 12(26), 13(21), 14(2). Other meristic characters are given in tables 2 and 3.

Pectoral fin round and short in adults, failing to reach pelvic-fin origin in specimens greater than 30 mm in standard length. Abdomen usually fully scaled, but elliptical scaleless areas sometimes occur on either side of the ventral midline near bases of pectoral fins. Exposed scale margins entire or slightly crenate, never laciniate as in *C. lacinatus* and some populations of *C. variegatus*. Scales between pelvic fins imbricate, not developed as a lingulate interpelvic process as in *C. bondi* and *Floridichthys carpio*. Scapular scale not notably enlarged relative to first scales in lateral series; underlying cleithral process broad, expanded posteriorly beyond the pectoral-fin

TABLE 1  
Proportional Measurements in Two Species of Hispaniolan *Cyprinodon*  
(Expressed as thousandths of standard length)

	<i>C. nichollsi</i> <sup>a</sup>						<i>C. bondi</i> <sup>b</sup>					
	10 Males			10 Females			10 Males			10 Females		
	Holo- type	Range	Mean	Range	Mean		Range	Mean		Range	Mean	
Standard length, mm	75.3	24.4-75.3	43.8	25.6-69.1	47.1		32.6-60.0	48.6		32.7-62.7	47.9	
Predorsal length	594	582-625	599	593-632	611		559-601	581		582-622	600	
Prepelvic length	575	574-609	591	589-642	614		558-621	579		561-625	585	
Body depth	437	365-481	432	346-434	398		402-512	462		409-493	462	
Dorsal origin-anal insertion	428	372-468	409	359-398	376		405-486	445		396-453	433	
Pectoral origin-dorsal insertion	471	426-521	467	408-469	444		425-511	477		423-508	478	
Dorsal-fin length	305	292-347	322	260-283	272		292-341	322		269-304	285	
Pectoral-fin length	212	212-268	245	207-267	243		269-325	287		255-313	287	
Anal-fin length	207	207-332	250	188-238	209		210-280	242		176-256	207	
Pelvic-fin length	120	112-151	131	117-136	124		130-161	141		128-157	140	
Caudal-peduncle length	244	237-279	248	204-234	218		246-279	263		240-280	257	
Caudal-peduncle depth	194	170-198	184	160-182	172		176-196	183		176-188	182	
Head length	339	321-367	348	349-370	360		322-350	338		320-357	333	
Head width	246	223-246	236	235-276	255		201-235	220		205-241	225	
End maxilla to orbit	106	84-106	93	86-106	97		91-104	97		87-109	100	
Upper-jaw length	116	107-132	116	115-129	122		103-122	113		109-124	116	
Postorbital length	162	136-162	150	152-169	162		136-154	143		117-148	131	
Orbit length	81	81-112	96	80-105	94		92-117	103		85-119	99	
Interorbital width	127	88-127	100	96-123	107		96-113	102		98-118	105	
Snout length	120	91-120	106	113-124	117		102-116	110		96-125	112	
Mouth width	106	76-105	87	78-104	89		73-87	78		81-96	85	

<sup>a</sup> AMNH 58278, 58279.

<sup>b</sup> AMNH 58281; UF 45043, 45045; USNM 100960.

TABLE 2  
Frequency Distribution of Vertebrae in Antillean Species of *Cyprinodon*

Species Locality	Precaudal				Caudal				Total			
	10	11	12	13	13	14	15	16	24	25	26	27
<i>bondi</i> <sup>a</sup>												
E. Saumâtre	1	60	11			2	27	43			20	52
<i>laciniatus</i> <sup>b</sup>												
Bahamas			14	1		3	12				2	13
<i>nichollsi</i> <sup>c</sup>												
L. Oviedo	1	44	11		8	37	11		5	35	16	
<i>variegatus</i> <sup>d</sup>												
Great Inagua		24	6		7	19	4		3	21	6	

<sup>a</sup> AMNH 37341, 58281; UF 45043, 45045; UMMZ 214866; USNM 100960, 100961.

<sup>b</sup> ANSP 110366.

<sup>c</sup> AMNH 58278, 58279.

<sup>d</sup> AMNH 43282.

radials, not greatly enlarged as in *C. nazas* and *C. variegatus*.

Acoustico-lateralis system on head consists of combination of pit organs, canals, and pores as follows (data from left side of head): mandibular 2(50); preopercular 6(1), 7(42), 8(6), 9(1); preorbital 2(1), 3(2), 4(47). Supraorbital canal uninterrupted, opening to the surface through seven pores (N = 50).

SEXUAL DIMORPHISM: *Cyprinodon nichollsi* is strongly dimorphic, a feature that distinguishes it from *C. bondi*. The fins of males, especially the dorsal fin, are longer than in females. With increasing size, males become very compressed and deep-bodied (fig. 1), developing a high, convex predorsal crest, and the caudal peduncle is longer in males than in females. In breeding males, scales on the head and sides of the body become ciliate,

and contact organs develop as lateral bony projections from the first seven anal-fin rays. The fifth and sixth rays of the anal fin are swollen in males. Coloration (below) also distinguishes the sexes.

COLORATION: Live individuals at the type locality are milky white over the entire body and fins. Milky coloration, which obscures the patterns described below, is apparently induced by turbidity which is high at Laguna de Oviedo, and it quickly disappears when the fish are transferred to clear seawater. The life coloration given below is based on fish held one hour in seawater; the same coloration is shown by stocks from the type locality maintained in aquaria for several months.

Live adult males are silver on the back and sides. The breast, periproct, and lower sides

TABLE 3  
Frequency Distribution of Circumpeduncular and Lateral Scales in Antillean Species of *Cyprinodon*<sup>a</sup>

Species	Around peduncle										In lateral series						
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
<i>bondi</i>																	
E. Saumâtre					5	2	41					1	13	20	11	2	
<i>laciniatus</i>																	
Bahamas				6	1	7		1				1	5	7	2		
<i>nichollsi</i>																	
L. Oviedo	3	3	46							3	26	18	3				
<i>variegatus</i>																	
Great Inagua		1	29							4	21	5					

<sup>a</sup> Material as in table 2.

of the head are white, but the pectoral fins sometimes become light yellow in dominant males. A terminal black margin is prominent on all fins; width of the terminal caudal-fin band is about equal to the diameter of the pupil. Interradial membranes of the median fins are hyaline, but melanophores are scattered across the dorsal fin giving it a dusky color. The sides of breeding males are sometimes marked by 7–16 indistinct vertical bars, although bars are often absent. The nape is marked by an iridescent blue sheen that becomes intense in dominant males. In ethanol, silver and blue colors are replaced by buff. Lateral bars and the black borders of fins become prominent, and isolated melanophores produce a pattern of fine speckles over all parts of the body and fins. Pigmentation shown in figure 1 is based on a specimen in ethanol.

Live adult females are also silver on the sides and back. Fins are hyaline except for a prominent ocellus, about as large as the eye, in the trailing corner of the dorsal fin. The ocellus consists of a central patch of white surrounded by an irregular black margin. Lateral bars are more conspicuous than in males; 6–19 irregular vertical bars span the middle third of the body in a series from the gill cleft to the caudal base. Dots in lateral series, as seen in *C. bondi*, are absent. Cheeks are marked by a patch of large melanophores below the eye. Markings are similar in spirits except that silver is reduced and white in the dorsal-fin ocellus disappears.

**HABITAT:** *Cyprinodon nichollsi* is reported only from Laguna de Oviedo, a hypersaline coastal lagoon on the southern coast of Hispaniola. The lagoon is separated from the sea by a narrow barrier which, according to local account, is sometimes breached allowing marine fishes to enter. On 9 Sept. 1987, salinity was estimated to be 69 ppt using a YSI conductivity meter. *Cyprinodon nichollsi* is abundant in shallow water (to 1.5 m) over sand, mud, and mats of filamentous algae where it was taken by seine.

**DISCUSSION:** The new species is assigned to the genus *Cyprinodon* with which it shares a terminal black band on the male caudal fin and thickened rays 5 and 6 in the male anal fin. *Cyprinodon nichollsi* is distinguished from most pupfishes by its greater size (to 75 mm

SL; to 18.6 g, fixed in ethanol). Only *C. maya*, an elongate but less deep-bodied species, surpasses it in length (to 85 mm SL; Humphries and Miller, 1981). The two species further resemble each other in sharing a large head, wide mouth, and heavy lower jaw which are characters associated with greater size in pupfishes (Humphries and Miller, 1981; Humphries, 1984). *Cyprinodon nichollsi* differs from *C. maya* in its deeper body (34–48 vs. 27–39% SL, respectively), greater degree of lateral compression, and presence of two pairs of mandibular pores in all material examined. Mandibular pores are always absent in *C. maya* (Humphries and Miller, 1981).

*Cyprinodon variegatus* Lacépède, the most widespread and variable member of the genus, is usually understood to include six subspecies distributed along the coast of North America from Massachusetts to the Yucatan Peninsula and in the Caribbean islands from the Florida Keys to the Bahamas and Cuba (Miller, 1962; Humphries and Miller, 1981). *Cyprinodon nichollsi* is distinguished from this complex of forms by its smaller cleithral scale, smaller cleithral process, larger head, and wider mouth. In all populations currently classified in *C. variegatus*, the head is small and wedge-shaped in lateral view, and the mouth is small and narrow, thereby contrasting to those of both *C. nichollsi* and *C. bondi* (fig. 3). The Antillean populations of *C. variegatus* are usually characterized by a weak to moderate lappet covering the dorsal margin of the iris and by the presence of strongly crenate or laciniate scales on the crests of the caudal peduncle; both features are lacking in *C. nichollsi*.

*Cyprinodon nichollsi* resembles *C. bondi* in its large size, large head, and wide mouth. It differs in having fewer circumpeduncular and lateral-series scales (table 3), strongly convex (rather than straight) predorsal profile, round pectoral fin (rather than narrow and elongate, figs. 1 and 2), truncate caudal fin, and no toothplate on the first pharyngobranchial (N = 10).

*Cyprinodon nichollsi* differs from *C. lacinatus* Hubbs and Miller (New Providence Island, Bahamas) in having a round pectoral fin that fails to reach the pelvic-fin origin, fewer vertebrae (table 2), fewer scales around the caudal peduncle and in lateral series (table

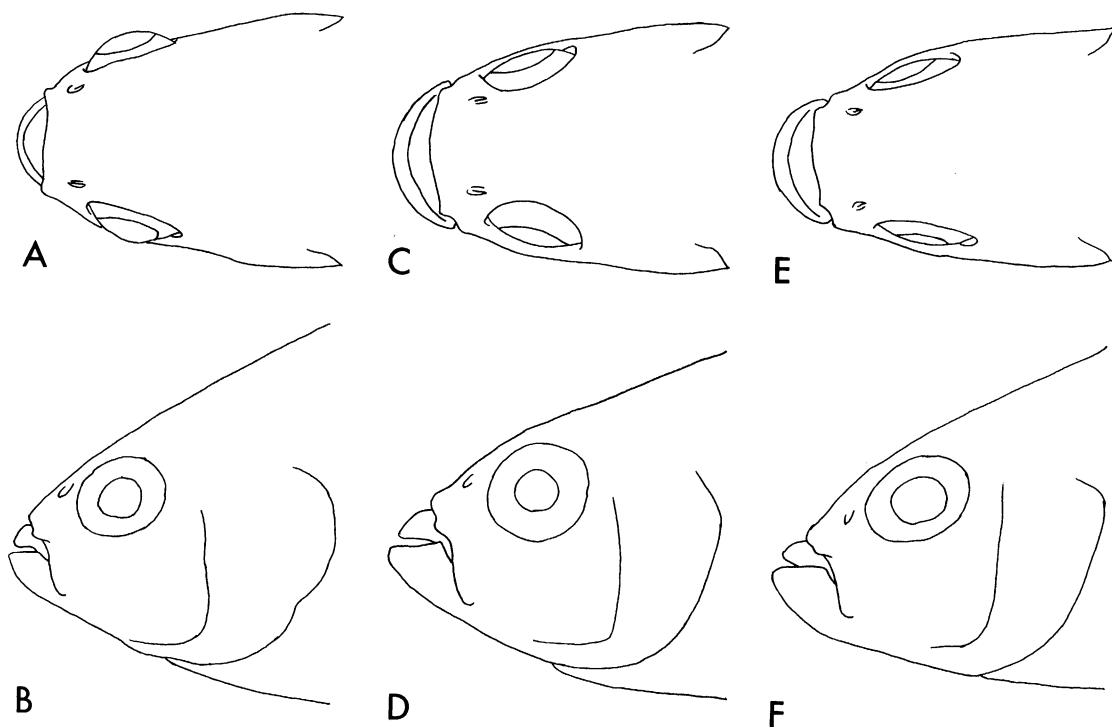


Fig. 3. Dorsal and lateral views of heads of (A, B) *Cyprinodon variegatus*, AMNH 76600, male, 34.3 mm SL (Fort Johnson, S.C.); (C, D) *C. nichollsi*, AMNH 58279, male, 35.1 mm SL (Oviedo, Dominican Republic); (E, F) *C. bondi*, AMNH 58281, male, 36.2 mm SL (Lago El Fondo, Dominican Republic). All drawn to same scale.

3), larger size (*C. laciniatus* reaches 50.7 mm SL; ANSP 110366), and in lacking lacinate scales.

**ETYMOLOGY:** The new species is named for Kenneth W. Nicholls.

*Cyprinodon bondi* Myers  
Hispaniolan pupfish  
Figures 2, 3; tables 1–3

*Cyprinodon bondi* Myers, 1935 (original description, Etang Saumâtre, Haiti). Hubbs and Miller, 1942 (listed). Miller, 1962 (listed). Turner and Liu, 1977 (distribution in map). Miller, 1981 (distribution in map). Burgess, 1983 (in part, Etang Saumâtre only). Lazara, 1984 (synonymy). Thorbjarnarson, 1988 (Etang Saumâtre).

**HOLOTYPE:** USNM 100960, female, 62.7 mm SL, Etang Saumâtre, Haiti; R. M. Bond, 20 Feb. 1933.

**PARATYPES:** USNM 100961, 10 juveniles and females, 18.7–34.9 mm SL; collected with the holotype.

**ADDITIONAL SPECIMENS:** AMNH 37341, 12 males and females including one cleared-and-stained, 37.4–62.7 mm SL, Etang Saumâtre, Haiti; W. Beebe and J. Tee-Van, 27 April 1927. AMNH 58281, 50 juveniles, males, and females, 12.2–38.4 mm SL; UMMZ 214866, 67 juveniles, males, and females, 13.5–49.5 mm SL; Lago El Fondo (=Etang Saumâtre) 1 km east of Haitian border at Jimaní, Dominican Republic; G. R. Smith and M. L. Smith, 10 Jan. 1988. UF 45045, 6 males including one cleared-and-stained, 49.0–61.0 mm SL, south shore Etang Saumâtre, 3 km W Malpasse, Haiti; J. B. Thorbjarnarson, 18 Aug. 1983. ANSP 159201, 2 males and 1 female, 46.0–62.5 mm SL, Etang Saumâtre, 2.5 km W Malpasse, Haiti; W. C. McNiff, K. J. Lazara, and D. Fromm, 11 Jan. 1986.

**DIAGNOSIS:** A large *Cyprinodon* (to 63 mm SL) distinguished by the following characters: 18–20 scales around the caudal peduncle; caudal peduncle strongly tapered posteriad,

constricted at base of caudal fin; median scales between pelvic fins elongate or lingulate, free at their distal end; caudal fin slightly emarginate; sides marked by a lateral series of dots on 3–4 longitudinal rows of scales at midbody; toothplate and well-developed teeth present in the position of the first pharyngobranchial bone.

**DESCRIPTION:** Proportional measurements are given in table 1. Body strongly compressed and rhomboidal in lateral view (fig. 2); predorsal profile straight, no indentation at occiput; caudal peduncle strongly tapered with its narrowest point at insertion of the procurent caudal-fin rays. Dorsal-fin insertion at midbody opposite pelvic-fin insertion. Lower jaw oblique to nearly vertical; cleft of mouth oblique. Dorsal margin of iris entire, not bearing a process or lappet.

First dorsal-fin ray slender and short, never spinelike. Dorsal-fin rays 11(22), 12(26), 13(2). Anal-fin rays 10(3), 11(43), 12(6). Pectoral-fin rays 15(4), 16(19), 17(25), 18(2). Pelvic-fin rays 6(7), 7(41). Branched caudal-fin rays 10(1), 11(3), 12(34), 13(7), 14(4). Branchiostegal rays 6(10). Gill rakers 18(2), 19(3), 20(5), 21(9), 22(4), 23(3). Vertebral counts are given in table 2 and scale counts in table 3.

Pectoral fins narrow and long, surpassing pelvic-fin insertion in individuals of all sizes. Breast and prepelvic area fully scaled. Exposed scale margins mostly entire, becoming crenate in large specimens, particularly on crests of caudal peduncle. Inter-pelvic appendage composed of several median lingulate scales covering inner margins of pelvic fins. Scapular scale not noticeably enlarged compared to first scales in lateral series; cleithral process among the least developed in the genus.

Number of pores of cephalic acoustico-lateralis system: mandibular 0(3), 1(1), 2(43); preopercular 6(1), 7(44), 8(2); preorbital 2(1), 3(4), 4(40), 5(1), 6(1). Supraorbital canal uninterrupted, opening to surface through seven pores.

**SEXUAL DIMORPHISM AND COLORATION:** External differences between the sexes are less marked in *C. bondi* than in most *Cyprinodon*. The dorsal and anal fins tend to be longer in males than in females. Ciliate scales are present on the cheeks of males, and contact or-

gans develop as bony lateral projections of fin rays in the male anal fin. As in all *Cyprinodon*, the fifth and sixth anal-fin rays of males are swollen compared to those that follow.

Live adults are olivaceous on the back and silver on the lower sides, belly, and underside of the head. The sides are crossed by 7–18 irregular vertical bars that are narrower than the silver interspaces. Scales on the upper back are outlined by dark melanophores resulting in a reticulated pattern. The species is distinguished from other *Cyprinodon* by three or four series of dots (one per scale) in midlateral series.

The fins of juveniles and females are mostly clear except for a white-and-black ocellus in the posterior corner of the dorsal fin. In other *Cyprinodon*, the dorsal-fin ocellus disappears as males reach maturity, but in *C. bondi* it is retained in mature males as large as 45 mm SL. The terminal black margin of the male caudal fin is narrower than the pupil.

**HABITAT:** Etang Saumâtre, the only known habitat of *C. bondi*, is one of a series of lakes in a graben that extends across Hispaniola from Port-au-Prince Bay, Haiti, to Barahona Bay, Dominican Republic (Woodring et al., 1924). The lake lacks a surface outlet and fluctuates in volume and salinity (8–10 ppt) in response to rainfall (Woodring et al., 1924; Bond, 1935). Aquatic plants are abundant near freshwater springs and in bays with freshwater input, but vegetation in open water is limited to a few halophytic algae and vascular plants (Thorbjarnarson, 1988). The shoreline is bare or fringed with buttonwood mangrove, *Conocarpus erectus*.

Adults of *C. bondi* occur in open water over gravel, sand, or mud; juveniles and young adults are abundant in vegetation where they are the dominant fish in terms of number. Native fishes collected with *C. bondi* are *Cichlasoma haitiensis* (Cichlidae), *Dormitator maculatus* (Eleotridae), *Gobionellus* sp. (Gobiidae), *Limia melanotata*, *L. tridens*, and *Gambusia hispaniolae* (Poeciliidae). A native belonid, *Strongylura timucu*, has also been collected in the lake (ANSP 163387).

**DISCUSSION:** Several of the characters given in the diagnosis above appear to be derived. Myers (1935) referred to the slender or tapered caudal peduncle of the species of *Cy-*



*prinodon* as a feature that distinguishes the genus from *Floridichthys*, in which the peduncle is deep throughout its length. The shape of the peduncle is actually variable in *Cyprinodon* (closely resembling that of *Floridichthys* in inland pupfishes such as *C. alvarezi* and *C. fontinalis*), but it is more strongly tapered in *C. bondi* than in any other cyprinodontine and is therefore inferred to be autapomorphic.

The presence of a toothed dermal plate in the position of the first pharyngobranchial bone is an unusual feature of *C. bondi*. A similar toothplate, though much larger, has been reported in *Floridichthys carpio* in which it was interpreted as an autapomorphy (Humphries, 1981). A toothed plate in this position also occurs in *Garmanella pulchra* (ANSP 140554, UMMZ 184668, 196534) but otherwise seems to be unreported among euteleosts. It may therefore be a derived feature indicating close relationships. *C. bondi* further resembles *F. carpio* and *G. pulchra* in lacking both an enlarged scapular scale and an expanded cleithral process, but the lack of these characters is probably primitive among cyprinodontines and, if so, would be uninformative as an indicator of relationships.

In other cyprinodontines including outgroups such as *Cualac*, *Jordanella*, and the Old World genus *Aphanius*, the scales around the caudal peduncle number 16 or fewer; *C. bondi* and *C. laciniatus* have more circum-peduncular scales (modally 20, table 3), a feature that is therefore likely to be apomorphic. These two species also share vertebral numbers and lateral-scale counts that are high for Antillean *Cyprinodon* (tables 2, 3), but these characters are more general among cyprinodontines and, therefore, probably are not evidence of a close relationship. *Cyprinodon bondi* is readily distinguished from *C. laciniatus* by its color pattern, rhomboid rather than elongate shape, lack of lacinate scales, and presence of a first pharyngobranchial toothplate.

As here construed, *C. bondi* is restricted to a brackish lake on the border between Haiti, where the lake is called Etang Saumâtre, and the Dominican Republic, where it is known as Lago El Fondo. Pupfishes from a nearby Dominican lake, Lago Enriquillo, were referred to *C. bondi* by Burgess (1983). How-

ever, these pupfishes can be excluded from *C. bondi* because they lack the high circum-peduncular scale count, tapered caudal peduncle, and lingulate interpelvic scales.

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