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A NEW SPECIES OF *JENYNSIA* (CYPRINODONTIFORMES: ANABLEPIDAE) FROM BRAZIL WITH COMMENTS ON THE COMPOSITION AND TAXONOMY OF THE GENUS

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ABSTRACT A new species of fish in the genus *Jenynsia*, *Jenynsia sanctaecatarinae*, is described from Santa Catarina in Brazil. The taxon previously known as *J. lineata alternimaculata*, which occurs in areas above 1000 m in elevation in southern Bolivia and northwestern Argentina, is elevated to specific rank. *Jenynsia multidentata* is removed from the synonymy of *J. lineata* and is redescribed from specimens from coastal Argentina and Uruguay. *Jenynsia multidentata* is the most widely distributed species of *Jenynsia*. *Jenynsia lineata*, the type species of the genus, is redescribed from specimens from the Río Cebollati drainage in eastern Uruguay. Nine species of *Jenynsia* currently are considered valid. A key to the genus is provided.

Key words: Anablepidae; *Jenynsia sanctaecatarinae*; *Jenynsia alternimaculata*; *Jenynsia multidentata*; *Jenynsia lineata*; Argentina; Bolivia; Brazil; Uruguay.

RESUMO Uma nova espécie de peixe do gênero *Jenynsia*, *Jenynsia sanctaecatarinae*, é descrita de Santa Catarina, Brasil. O taxon previamente conhecida como *J. lineata alternimaculata* que ocorre em áreas acima de mil metros em elevação no sul da Bolívia e noroeste da Argentina é elevado a categoria de espécie. *Jenynsia multidentata* é removida da sinonímia de *J. lineata* é redescrita com base em espécimes das costas da Argentina e do Uruguai. Esta espécie é uma espécie de *Jenynsia* com mais ampla distribuição geográfica. *Jenynsia lineata*, a espécie tipo do gênero, é redescrita com base em espécimens da drenagem do Río Cebollati no leste do Uruguai. Nove espécie de *Jenynsia* são consideradas válidas. Uma chave para o gênero é apresentada.

Palavras claves: Anablepidae; *Jenynsia sanctaecatrinae*; *Jenynsia alternimaculata*; *Jenynsia multidentata*; *Jenynsia lineata*; Argentina; Bolivia; Brasil; Uruguai.

The viviparous South American fishes of the genus *Jenynsia* occur in the La Plata Basin and in Atlantic Coastal drainages from Río Negro Province, Argentina, north to the city of Rio de Janeiro, Brazil. Günther (1866) described two monotypic genera, *Jenynsia* and *Fitzroyia*, based on the species *Lebias lineata* Jenyns, 1842, and *Lebias multidentata* Jenyns, 1842 respectively. The type specimens for both of these species were collected in Uruguay during the voyage of the H. M. S. Beagle by C. R. Darwin. In 1897, Garman synonymized *Fitzroyia multidentata* with *Jenynsia lineata*, and according to the Principle of the First Revisor (International Commission of Zoological Nomenclature, 1985), fixed *Jenynsia* as the generic name. Subsequently, *J. pygogramma* Boulenger, 1902, *J. maculata* Regan, 1906, and *J. eigenmanni* (Haseman, 1911) were described and placed in *Jenynsia* or its junior synonym *Fitzroyia*. However, Regan (1913) synonymized *J. maculata* and *J. eigenmanni* with *J. lineata* because he thought the variation in color pattern among these species and an undescribed population sample from Bolivia represented clinal variation. Henn (1916) rejected or was unaware of this synonymy, but almost all authors in the mid-1900's recognized only *J. lineata* and *J. pygogramma* (e.g., Ihering, 1931; MacDonagh, 1934; Fowler, 1940, 1943).

Ihering (1931) first recognized the two species synonymized with *J. lineata* by Regan (1913) as subspecies, *J. l. maculata* and *J. l. eigenmanni*. Fowler (1940) described the Bolivian form mentioned by Regan (1913) as another subspecies of *J. lineata*, *J. l. alternimaculata*. This left *Jenynsia* composed of *J. pygogramma* and the four subspecies of *J. lineata*. Some authors have placed *J. pygogramma* into the synonymy of *J. lineata*, thereby recognizing a monotypic *Jenynsia* (Muzlera, 1935; Jacobs, 1971; Dawes, 1991; Baensch and Riehl, 1993).

After examining type specimens of *J. lineata*, *J. maculata*, and *J. pygogramma*, Parenti (1981) removed *J. maculata*, *J. eigenmanni*, and *J. pygogramma* from the synonymy of *J. lineata* and listed four species in the genus. Ghedotti and Weitzman (1995) described two new species, *Jenynsia eirmostigma* and *J. unitaenia*, and suggested that *J. lineata alternimaculata* should be recognized formally as a species. *Jenynsia* presently contains six species—*J. lineata* with two subspecies (*J. l. lineata* and *J. l. alternimaculata*), *J. pygogramma*, *J. maculata*, *J. eigenmanni*, *J. eirmostigma*, and *J. unitaenia*.

In the past, most authors were able to examine specimens from only a few localities. Our recent examination of *Jenynsia* specimens from institutions in North and South America has revealed that the genus contains many more species than previously were recognized, and that the taxonomy

of *Jenymsia* has been confused by the acceptance of Regan's conclusions regarding clinal variation. Herein we (1) describe a new species, (2) elevate *J. lineata alternimaculata* to specific rank, (3) remove *J. multidentata* from the synonymy of *J. lineata*, and (4) redescribe the type species of the genus, *J. lineata*.

METHODS

The methods for counts and measures follow those of Hubbs and Lagler (1947). The last two rays in the dorsal fin of all *Jenymsia* specimens and in the anal fin of females are counted separately (contra Ghedotti and Weitzman, 1995). Anal-fin rays in males are counted only on cleared-and-stained specimens. All anal rays in males except for the most posterior two are incorporated into the fleshy, tubular gonopodium and are not distinguishable from each other in alcohol-preserved specimens. The caudal-fin rays are counted as the number of principal rays (branched rays + 2). The gill-raker count is for gill rakers on the ventral limb of the first gill arch including any gill rakers in the angle of the gill arch. Head length was measured as bony head length, and interorbital width is taken as the least bony width. Measurements were made using dial calipers to the nearest 0.1 mm and are expressed as a percentage of standard length (SL). Color transparencies and X-rays of type specimens in the British Museum were studied, and standard counts and measures were obtained by correspondence. Nomenclature of the sensory canal system and squamation pattern of the head follows the standards of Gosline (1949) and Hoedeman (1958), respectively. In the species description, meristic data for the holotype are presented first; the range of data for the all type specimens, the mean for all type specimens, and the sample size for each count follow in parentheses. In the redescrptions, meristic data for the holotype are presented first and are followed in parentheses by the range of data, the mean, and the sample size for all type and nontype specimens examined. When male anal-ray counts are presented, the mean value is given first and the range and sample size follow in parentheses. Institutional codes are as listed in Leviton et al. (1985).

SYSTEMATIC ACCOUNTS

Jenymsia sanctaecatarinae sp. nov.

Figure 1

Holotype.—MZUSP 26511, adult female, from Rio Pique off road between Meleiro and Aranaqua, Morro Cortado, Santa Catarina, Brazil, collected on 22 September 1977 by H. Britski, N. A. Menezes, R. LaCorte, M. Weitzman, and S. H. Weitzman.

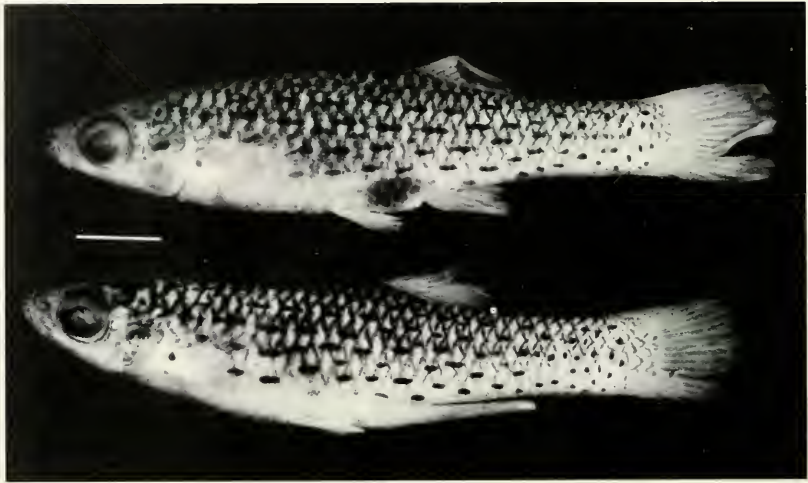


Fig. 1. *Jenynsia sanctaecatrinae* sp. nov. Top: MZUSP 26511, holotype, female, 37.3 mm SL. Bottom: USNM 300398, paratype, male, 37.0 mm SL. Scale bar = 5 mm.

Paratopotypes.—MZUSP 50059–60 (3); USNM 300398 (2); all with same locality data as holotype.

Diagnosis.—A species of *Jenynsia* diagnosed by the following combination of characters: (1) distinct, horizontal, dash-shaped markings on sides, one to three scales in length, forming four or five irregular rows; (2) distinct, rounded spot on dorsal pectoral-fin base; (3) absence of distinct swelling between urogenital opening and anterior base of anal fin in females (Fig. 2).

Jenynsia sanctaecatrinae is distinguished from all other *Jenynsia*, except *J. lineata* and *J. multidentata*, by the round or dash-shaped lateral markings that form multiple, irregular rows. *Jenynsia sanctaecatrinae* differs from *J. multidentata* by having a distinct, dark, rounded spot on the dorsal pectoral base, and differs from both *J. lineata* and *J. multidentata* by lacking a swelling between the urogenital opening and the anterior base of the anal fin.

Description of type specimens.—Body elongate, slightly compressed laterally; greatest body depth at vertical between anal and pelvic fins; mouth slightly oblique; dorsal-fin origin at vertical above anal-fin origin; sexual dimorphism pronounced, with largest male specimen smaller than smallest female specimen. Females lacking distinct swelling between urogenital opening and anterior base of anal fin and urogenital opening medial. In males, posterior two anal-fin rays not forming part of tubular intromittent organ and extending approximately two-thirds posterior length of intromittent organ; intromittent organ greater than half length of caudal

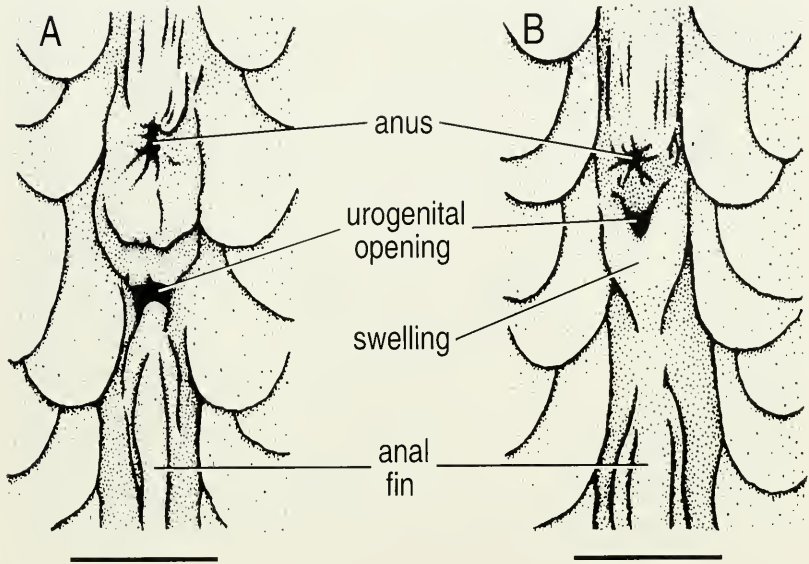


Fig. 2. Ventral view of urogenital region. (A) *Jenynsia sanctaecatarinae* MZUSP 26511, holotype. (B) *Jenynsia lineata* FMNH 105429. Scale bars = 1 mm.

peduncle and directed laterally to right or left. Head squamation Pattern-E type in all specimens. Female supraorbital pore pattern represented by four disjunct canals (1, 2a; 2b, 3, 4a; 4b, 5; 6, 7), with canal open and forming trough between Pores 5 and 6; male supraorbital pore pattern represented by two or three disjunct canals (1, 2a; 2b, 3, 4a; 6, 7 or 2b, 3, 4a; 6, 7), with canal open in areas where pores absent. Preopercular canal continuous with seven pores. Mandibular canal discontinuous represented by two canals in females and largest male; largest female with most complete mandibular canals having six pores (W, Xa; Xb, Ya, Yb, Z); holotype, other female and largest male with four pores (W, Xa; Xb, Ya) with canal anterior to Pore Ya open; two smaller males lacking closed mandibular canal. Infraorbital canal continuous with four pores. Jaw teeth on dentary and premaxilla tricuspid and in many rows.

Morphometric data in Table 1. Meristic data as follow: Dorsal-fin rays 9 (8–10; $\bar{x} = 8.8$, $n = 6$); anal-fin rays in females 10 (10; $\bar{x} = 10$, $n = 3$); anal-fin rays in males 10 ($n = 1$); pelvic-fin rays 6 (6; $\bar{x} = 6$, $n = 6$); pectoral-fin rays 16 (15–16; $\bar{x} = 15.7$, $n = 6$); principal caudal-fin rays 17 (15–17; $\bar{x} = 16.2$, $n = 6$); predorsal scales 15 (15–17; $\bar{x} = 15.8$, $n = 6$); lateral-series scales 32 (30–33; $\bar{x} = 32$, $n = 6$); scales around caudal peduncle 16 (16; $\bar{x} = 16.0$, $n = 6$); gill rakers on ventral arm of first gill arch 12 (12–13; $\bar{x} = 12.2$, $n = 6$).

Table 1. Morphometric data expressed as percent standard length for type series of *Jenynsia sanctaecatarinae*. * = holotype.

Morphometric measures	Females			Males		
	MZUSP 26511*	MZUSP 50059	USNM 300398	MZUSP 50060	MZUSP 50059	USNM 300398
Standard Length (mm)	37.3	39.5	41.8	22.5	25.8	37.0
Head length	26.0	24.6	25.1	25.3	26.4	25.9
Snout length	7.2	7.6	7.2	7.6	8.5	7.0
Postorbital length	9.4	9.9	9.6	10.2	10.1	10.8
Eye diameter	8.8	7.8	8.1	11.1	9.3	8.9
Interorbital width	10.7	10.9	10.5	11.6	10.5	10.3
Predorsal length	62.2	59.2	61.7	56.9	59.7	59.2
Snout to pectoral fin	31.9	28.1	29.2	32.0	29.8	30.0
Snout to pelvic fin	49.3	51.1	48.6	48.9	48.8	48.1
Caudal-peduncle length	33.8	34.4	32.3	36.9	37.2	38.1

Coloration in alcohol: Body ground color grading from brown dorsally to cream ventrally; scales with concentration of dark chromatophores marginally dorsal to Scale Row 7 producing prominent reticulate pattern dorsally; distinct, dark, predorsal dash present on two middorsal scales anterior to dorsal-fin origin; dash-shaped markings forming four or five irregular rows associated with transverse Scale Rows 3–7; markings rounded on posterior caudal peduncle; most dorsal row of markings least distinct; belly unpigmented; dark peritoneal pigment visible through body wall along ventral midline; mature females with large, rounded, genital spot; isthmus unpigmented; distinct rounded spot on dorsal pectoral-fin base; subdermal stripe present ventrally from posterior insertion of anal fin to end of caudal peduncle; fins unpigmented except for scattered dark chromatophores bordering rays of dorsal fin, caudal fin, and dorsal part of pectoral fin; intromittent organ in males with scattered dark chromatophores to tip.

Head brown dorsally grading to cream ventrally; dorsal head scales uniform brown except most anterior G and H scales; G and H scales lighter, with dark chromatophores concentrated near margins; short, dark dashes visible dorsally above anterior nares; lacrimal region brown; cheek cream with scattered dark chromatophores more concentrated near eye than ventrally; premaxilla uniform brown; lower jaw with dark chromatophores extending posteriorly to first preopercular-canal pore; opercular series uniform brown dorsally grading through scattered dark chromatophores to cream ventrally; branchiostegal membranes unpigmented.

Distribution and ecology.—Currently, *Jenynsia sanctaecatarinae* is known only from the type locality in southern Santa Catarina, Brazil (Fig.

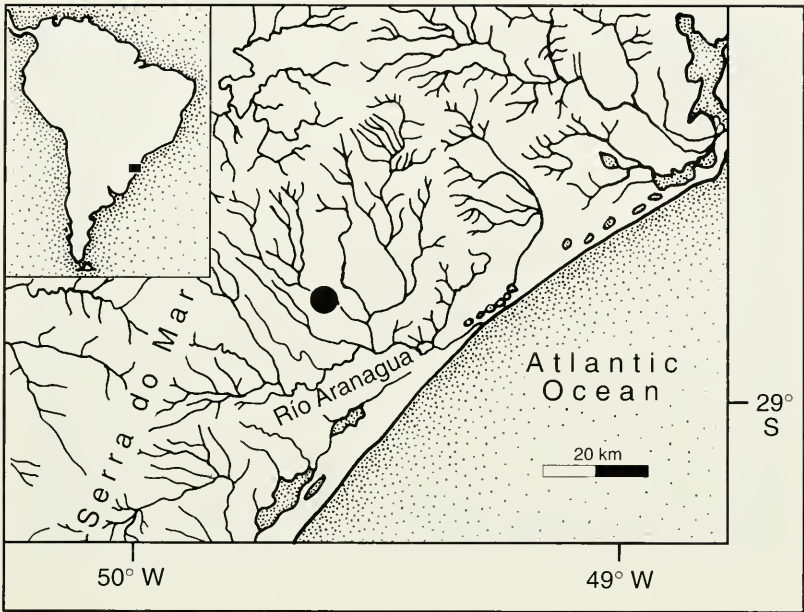


Fig. 3. Type locality of *Jenynsia sanctaecatarinae* in southern Santa Catarina, Brazil represented by closed circle.

3). At the site of collection, the Rio Pique had moderately fast-moving water and ranged in width from, 30 m in quiet areas to about 3 or 4 m in the narrowest riffle or rapids areas. The stream depth varied from about 20 cm in the riffles and rapids to an estimated 2–3 m in quiet pools. The substrate was sand and stream-worn rocks and boulders. The water temperature was about 25°C. At the time of collection the stream contained clear water flowing from the steeply rising Serra do Mar a few kilometers to the west. At flood stage the stream bed which was about 2 m below the surrounding countryside, could contain a much larger flow before flooding the surrounding area. The collection site was at the base of the lower elevations of the partly forested Serra do Mar where it met the flood plain to the east. The forest along the stream border had been mostly removed so that the stream was in full sun. Little emergent vegetation was present, and the shoreline vegetation consisted mostly of herbaceous plants and woody shrubs from 1–3 m high.

Etymology.—The specific epithet is the latinized name for Santa Catarina, the Brazilian state in which the type locality occurs.

Remarks.—The type specimens of *Jenynsia sanctaecatarinae* were caught with two specimens of *J. unitaenia* (USNM 300731).

Jenynsia alternimaculata (Fowler)

Figure 4

Jenynsia lineata—Regan, 1913:234.

Jenynsia lineata—Muzlera, 1934:51.

Fitzroyia lineata alternimaculata Fowler, 1940: 57.—Holotype: ANSP 68833, an adult female, Monte Bello, Provincia Tarija, Bolivia, obtained in August 1936 by M. A. Carriker.

Jenynsia alternimaculata—Ghedotti and Weitzman, 1995:939–948.

Referred specimens.—See Appendix.

Diagnosis.—A species of *Jenynsia* diagnosed by two (occasionally 3) rows of dorsoventrally elongate markings on the lateral surface of the body. No other species within the genus possesses these distinctive markings.

Jenynsia alternimaculata is further distinguished from *J. lineata* (the species to which *J. alternimaculata* was previously thought to belong), by the absence of (1) a swelling between the urogenital opening and the anterior base of the anal fin in females and (2) a mandibular canal Pore W.

Description.—Body stout, slightly compressed laterally; greatest body depth at vertical between pectoral and pelvic fins; mouth slightly oblique; dorsal-fin origin at vertical above anal-fin origin; sexual dimorphism pronounced, with most males much smaller than most females. Females lacking distinct swelling between urogenital opening and anterior base of anal fin and urogenital opening medial. In males, posterior two anal-fin rays not forming part of tubular intromittent organ and extending approximately two-thirds posterior length of intromittent organ; intromittent organ approximately half length of caudal peduncle and directed laterally directed to right or left. Head squamation pattern in all individuals E type. Supraorbital pore pattern variably represented by three disjunct canals (1, 2a; 2b, 3, 4a; 6, 7); supraorbital Pores 3 and 4a absent in some adults; supraorbital Pores 4b and 5 absent with canal open and forming trough in most adults; in large females supraorbital Pores 4b and 5 present and connected by canal to Pores 6 and 7. Preopercular canal continuous with seven pores. Mandibular canal variably continuous with four pores (X, Ya, Yb, Z) often open in small individuals; W pore and associated canal absent in all individuals. Infraorbital canal usually continuous with four pores but often open in small individuals. Jaw teeth tricuspid on dentary and premaxilla and in many rows.

Morphometric data in Table 2. Meristic data as follow: dorsal-fin rays 8 (7–9; \bar{x} = 8.1, n = 75); anal-fin rays in females 10 (9–10; \bar{x} = 9.9, n = 48); anal-fin rays in males 10 (n = 3); pelvic-fin rays 6 (6; \bar{x} = 6, n = 75); pectoral-fin rays 16 (15–18; \bar{x} = 16.4, n = 75); principal caudal-fin rays damaged on holotype (15–18; \bar{x} = 17.2, n = 69); predorsal scales 16 (15–18; \bar{x} = 15.8, n = 74); lateral-series scales 32 (27–33; \bar{x} = 29.8, n = 72); scales

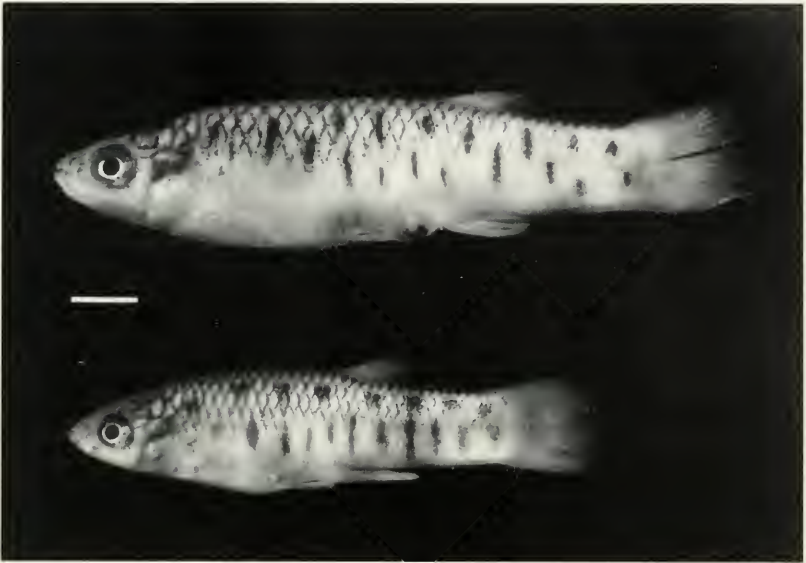


Fig. 4. *Jenynsia alternimaculata*. Top: USNM 325265, female, 44.9 mm SL. Bottom: USNM 325265, male, 32.8 mm SL. Scale bar = 5 mm.

around caudal peduncle 16 (15–16; \bar{x} = 16.0, n = 75); gill rakers on ventral arm of first gill arch 12 (9–12; \bar{x} = 10.2, n = 25).

Coloration in alcohol: Body ground color grading from brown dorsally to cream ventrally; scattered dark chromatophores on ventral caudal peduncle; scales with marginal concentration of dark chromatophores dorsal to Scale Row 5 anterior to caudal peduncle and dorsal to Scale Row 4 on caudal peduncle producing prominent reticulate pattern dorsally; diffuse brown stripe present along middorsal scale row interrupted by dorsal fin; distinct, dark, predorsal dash present on two middorsal scales anterior to dorsal-fin origin; rounded or vertical blotches present laterally forming two or three irregular rows; dorsal row of blotches present approximately on Scale Row 3 as rounded or vertical blotches; dorsal blotches usually alternating with ventral blotches but confluent with ventral blotches on caudal peduncle thereby forming elongate vertical bars in some specimens; ventral row of blotches present approximately on Scale Row 6 as rounded or vertical blotches; some specimens with rounded or vertical blotches on Scale Rows 4 or 5 forming a third row; belly unpigmented; dark peritoneal pigment visible through body wall along ventral midline; mature females with small, oblong, genital spot; isthmus unpigmented; dorsal half of pectoral-fin base with scattered dark chromatophores; subdermal stripe present ventrally from posterior insertion of anal fin to end of caudal peduncle; fins unpigmented except for scattered dark chromatophores bor

Table 2. Morphometric data expressed as percent standard length for *Jenynsia alternimaculata*, *J. multidentata*, and *J. lineata*.

Morphometric measures	Females			Males		
	Range	\bar{x}	95% conf. interval	Range	\bar{x}	95% conf. interval
<i>Jenynsia alternimaculata</i>						
Standard Length (mm)	24.6 - 53.1	39.6	37.9 - 41.2	18.9 - 38.3	26.5	24.9 - 28.2
Head length	24.2 - 28.7	26.3	26.1 - 26.6	25.6 - 30.4	28.0	27.5 - 28.4
Snout length	6.6 - 9.0	7.8	7.6 - 8.0	6.3 - 9.5	7.6	7.3 - 8.0
Post orbital length	10.7 - 14.0	12.3	12.1 - 12.5	11.0 - 15.1	12.7	12.3 - 13.0
Eye diameter	5.5 - 8.5	6.9	6.7 - 7.1	6.7 - 10.6	8.4	7.9 - 8.8
Interorbital width	11.1 - 13.7	12.3	12.1 - 12.5	11.1 - 15.5	12.7	12.3 - 13.1
Predorsal length	63.0 - 68.0	65.8	65.4 - 66.2	57.1 - 65.6	62.0	61.1 - 62.9
Snout to pectoral fin	28.1 - 35.6	30.0	29.6 - 30.4	29.6 - 39.6	31.8	31.2 - 32.3
Snout to pelvic fin	30.0 - 57.8	51.0	49.9 - 52.2	43.9 - 53.3	48.5	47.5 - 49.5
Caudal-peduncle length	25.1 - 34.0	28.9	28.3 - 29.6	28.8 - 39.8	33.9	32.8 - 35.0
<i>Jenynsia multidentata</i>						
Standard Length (mm)	16.7 - 63.3	39.5	35.4 - 443.6	17.5 - 31.3	26.5	24.8 - 28.2
Head length	25.8 - 30.7	28.1	27.5 - 28.7	26.0 - 31.2	28.2	27.6 - 29.0
Snout length	6.6 - 10.2	7.8	7.6 - 8.1	5.8 - 8.6	7.4	7.1 - 7.8
Post orbital length	11.5 - 14.1	12.8	12.5 - 13.1	10.5 - 14.0	12.4	11.9 - 12.8
Eye diameter	5.8 - 9.3	7.9	7.6 - 8.3	7.5 - 9.7	8.9	8.6 - 9.2
Interorbital width	10.8 - 12.7	11.6	11.4 - 11.8	9.8 - 12.6	11.2	10.7 - 11.6
Predorsal length	56.9 - 63.5	60.4	59.8 - 60.9	55.0 - 60.6	57.9	57.1 - 58.6
Snout to pectoral fin	28.9 - 34.8	31.4	30.9 - 32.0	26.9 - 34.7	31.0	30.1 - 31.9
Snout to pelvic fin	46.8 - 53.1	50.7	50.0 - 51.4	45.7 - 52.7	48.7	47.7 - 49.7
Caudal-peduncle length	28.7 - 36.2	32.2	31.6 - 32.9	32.1 - 38.9	36.0	35.2 - 36.8

Table 2. Continued.

Morphometric measures	Females			Males		
	Range	\bar{x}	95% conf. interval	Range	\bar{x}	95% conf. interval
<i>Jenynsia lineata</i>						
Standard Length (mm)	16.4 - 54.6	32.2	29.4 - 35.1	19.3 - 30.3	$n = 8$ 24.5	21.1 - 27.9
Head length	26.0 - 31.2	28.4	27.9 - 28.8	26.4 - 28.1	27.6	27.1 - 28.1
Snout length	6.4 - 8.9	7.6	7.4 - 7.8	6.2 - 8.8	7.6	6.9 - 8.3
Post orbital length	9.7 - 15.1	13.1	12.7 - 13.4	11.5 - 13.3	12.0	11.5 - 12.6
Eye diameter	7.2 - 10.8	8.7	8.4 - 9.0	8.9 - 10.8	9.7	9.1 - 10.3
Interorbital width	10.6 - 13.3	11.9	11.7 - 12.1	10.3 - 12.5	11.4	10.8 - 12.0
Predorsal length	56.2 - 67.0	62.4	61.6 - 63.2	55.4 - 62.0	59.2	57.4 - 60.9
Snout to pectoral fin	28.6 - 36.4	31.3	30.7 - 31.8	29.4 - 33.9	31.2	29.7 - 32.8
Snout to pelvic fin	48.2 - 56.8	51.8	51.2 - 52.4	44.1 - 52.3	48.3	45.8 - 50.7
Caudal-peduncle length	26.4 - 35.7	30.5	29.9 - 31.2	31.9 - 39.5	35.7	33.2 - 38.2

dering rays of dorsal fin, caudal fin, and dorsal part of pectoral fin; intromittent organ in males with scattered dark chromatophores to tip.

Head brown dorsally grading to cream ventrally; dorsal head scales with dark chromatophores concentrated at margins; short, dark dashes visible dorsally above anterior nares; lacrimal region brown; cheek cream with scattered dark chromatophores more concentrated near eye than ventrally; premaxilla uniform brown; lower jaw with dark chromatophores extending posteriorly to first preopercular-canal pore; opercular series uniform brown dorsally grading through scattered dark chromatophores to cream ventrally; branchiostegal membranes unpigmented.

Distribution.—*Jenynsia alternimaculata* occurs along the eastern slope of the Andes, usually above 1000 m, from northern Argentina in the province of Salta to southern Bolivia in the province of Chuquisaca (Fig. 5). Specimens from Argentina were not examined; records are taken from Ringuélet et al. (1967), Ringuélet (1975), Arratia et al. (1983), and

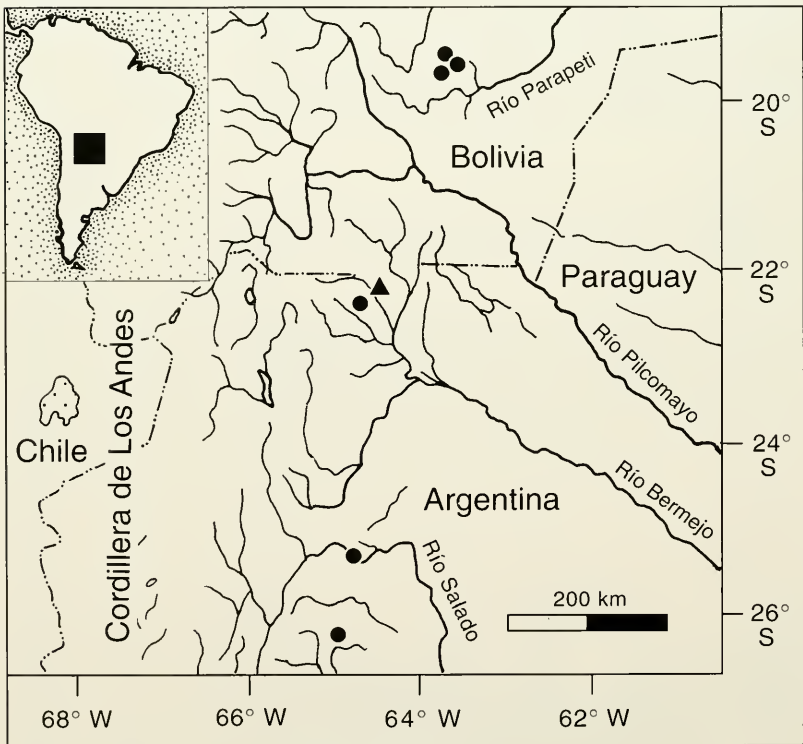


Fig. 5. Known distribution of *Jenynsia alternimaculata*. The closed triangle represents the type locality. Each symbol may represent more than one cataloged lot.

Miquelarena et al. (1990).

Remarks.—*Jenynsia alternimaculata* was first referred to as a “Bolivian Chaco variety” of *J. lineata* (Regan, 1913). Regan (1913) arranged the color patterns of the five forms of *Jenynsia* known to him into a clinal series, without considering any of the ambiguous geographic data that were available. Two individuals of *J. alternimaculata* (labeled “Bolivian Chaco variety” by Regan, 1913:234) were illustrated at one end of his cline and one individual of *Jenynsia multidentata* (labeled *J. lineata* by Regan, 1913:234) was illustrated at the other end. The color patterns of these two extremes were supposed to grade into each other through *J. eigenmanni* and *Jenynsia lineata* (labeled *J. maculata* by Regan, 1913:234). However, the distributions of these four species are not consistent with a single, clinal species hypothesis. *Jenynsia alternimaculata* occurs in northwestern Argentina and southern Bolivia; *J. eigenmanni* occurs in the upper Rio Iguazu in eastern Brazil, and *J. lineata* is restricted to the Río Cebollati Drainage in Uruguay. These species have a strongly disjunct distribution with respect to each other. Although *Jenynsia multidentata* is found in the lowlands between the ranges of the other three species, it was illustrated at one of the clinal extremes by Regan (1913). Clinal variation in color pattern within a species should show one pattern grading into another over a continuous range. Geographic variation in color pattern in *Jenynsia*, as described above, does not. Therefore, clinal variation is an unlikely explanation for the color pattern variation in the genus and provides no evidence for maintaining *J. alternimaculata* as a clinally derived subspecies.

Jenynsia multidentata (Jenyns)

Figure 6

Lebias multidentata—Jenyns, 1842:117.—BMNH 1917.7.14:24, an adult female, Montevideo, Uruguay, obtained between 1832 and 1833 by C. R. Darwin on the voyage of the H. M. S. Beagle.

Poecilia punctata—Valenciennes in Cuvier and Valenciennes, 1846:133.

Fitzroyia multidentata—Günther, 1866:307.

Jenynsia lineata—Regan 1913:234.

Fitzroyia lineata—Henn 1916:140.

Fitzroyia lineata lineata—Fowler 1943:323.

Referred Specimens.—See Appendix.

Diagnosis.—A species of *Jenynsia* diagnosed by the following combination of characters: (1) round or short, horizontal dash-shaped markings on sides that form approximately five to seven rows and also lines that extend for more than four scales in length on ventral caudal peduncle in adult females and large males; (2) presence of a distinct swelling between urogenital opening and anterior base of anal fin in females.

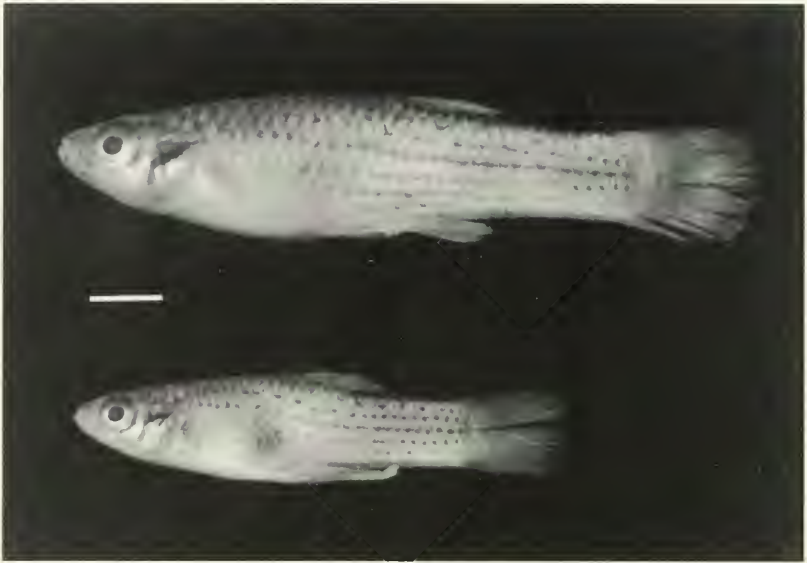


Fig. 6. *Jenynsia multidentata*. Top: KU 23873, female, 41.3 mm SL. Bottom: KU 23873, male, 28.4 mm SL. Scale bar = 5 mm.

Jenynsia multidentata is distinguished from all other *Jenynsia* except *J. sanctaecatarinae* and *J. lineata* by the round or dash-shaped lateral markings that form multiple irregular rows. *Jenynsia multidentata* differs from *J. lineata* and *J. sanctaecatarinae* by lacking a distinct rounded spot on the dorsal pectoral base and from *J. sanctaecatarinae* by possessing a swelling between the urogenital opening and the anterior base of the anal fin in females.

Description.—Body elongate, slightly compressed laterally; greatest body depth at vertical between anal and pelvic fins; mouth slightly oblique; dorsal-fin origin at vertical above anal-fin origin; sexual dimorphism pronounced, with most males much smaller than most females. Females with distinct swelling between urogenital opening and anterior base of anal fin causing anus and urogenital opening to face each other; urogenital opening medial. In males, posterior two anal-fin rays not forming part of tubular intromittent organ and extending approximately two-thirds posterior length of intromittent organ; intromittent organ greater than half length of caudal peduncle and laterally directed to right or left. Head squamation pattern in all individuals E type. Supraorbital pore pattern represented by four disjunct canals in large females (1, 2a; 2b, 3, 4a; 4b, 5; 6, 7) with canal open forming a trough between Pores 5 and 6. Supraorbital pore pattern represented by three disjunct canals in smaller individuals (1, 2a; 2b, 3, 4a; 6, 7)

with canals open between missing Pores 4a, 5, and 6. Preopercular canal continuous with seven pores. Mandibular canal discontinuous represented by two canals in large females (W, Xa; Xb, Ya, Yb, Z); smaller individuals with two mandibular pores (W, Xa) and anterior canal open. Infraorbital canal continuous with four pores. Jaw teeth on dentary and premaxilla tricuspid and in many rows.

Morphometric data in Table 2. Meristic data as follow: Dorsal-fin rays 9 (8–9; \bar{x} = 8.8, n = 50); anal-fin rays in females 10 (10; \bar{x} = 10, n = 31); anal-fin rays in males 10 (n = 5); pelvic-fin rays 6 (6; \bar{x} = 6, n = 50); pectoral-fin rays 16 (13–16; \bar{x} = 14.9, n = 50); principal caudal-fin rays damaged on holotype (17–20; \bar{x} = 18.8, n = 49); predorsal scales 14 (11–14; \bar{x} = 12.9, n = 50); lateral-series scales 30 (26–30; \bar{x} = 28.1, n = 50); scales around caudal peduncle 16 (16; \bar{x} = 16, n = 50); gill rakers on ventral arm of first gill arch 11 (10–12; \bar{x} = 10.8, n = 50).

Coloration in alcohol: Body ground color grading from brown dorsally to cream ventrally; scales with concentration of dark chromatophores marginally dorsal to Scale Rows 5 or 6 producing prominent reticulate pattern dorsally; distinct, dark, predorsal dash present on two middorsal scales anterior to dorsal-fin origin; short dash-shaped and approximately circular markings forming four to seven irregular rows approximately associated with transverse Scale Rows 2–7; markings rounded on posterior caudal peduncle in small individuals; mature females and large males with markings forming continuous lines; Lines most distinct on ventral area of caudal peduncle; lines, spots, and dashes indistinct on very large females; belly unpigmented; dark peritoneal pigment visible through body wall along ventral midline; mature females lacking distinct genital spot; isthmus unpigmented; diffuse dark chromatophores on dorsal pectoral-fin base; subdermal stripe present ventrally from posterior insertion of anal fin to end of caudal peduncle; fins unpigmented except for scattered dark chromatophores bordering rays of dorsal fin, caudal fin, and dorsal part of pectoral fin; intromittent organ in males with scattered dark chromatophores to tip.

Head brown dorsally grading to cream ventrally; dorsal head scales uniform brown; short, dark dashes visible dorsally above anterior nares; lacrimal region brown; cheek cream with scattered dark chromatophores more concentrated near eye than ventrally; premaxilla uniform brown; lower jaw with dark chromatophores extending posteriorly to first preopercular-canal pore; opercular series uniform brown dorsally grading through scattered dark chromatophores to cream ventrally; branchiostegal membranes unpigmented.

Distribution.—*Jenyssia multidentata* occurs in lowland areas around the Río de La Plata, Argentina, and southern Rio Grande do Sul Province, Brazil. This species may also be native in coastal Brazil from northern Rio Grande do Sul to the city of Rio de Janeiro, as well as in the inland

provinces of La Rioja, Catamarca, Tucuman, Cordoba, Mendoza, and La Pampa in Argentina. Closer study of all these populations may result in the discovery of more species. However, the frequent use of *J. multidentata* as bait has resulted in introductions of this species outside of its native range (Arratia et al., 1983); thus, some populations outside of the Río de La Plata area may be the result of bait-bucket introductions. Because of the uncertainty concerning the composition and native range and of this species, only specimens from coastal areas on the Río de La Plata (Fig. 7) were used to redescribe *J. multidentata*.

Remarks.—After having been placed into the synonymy of *Jenynsia lineata* by Garman (1898), *J. multidentata* was not used as a valid species name. Our examination of the original descriptions of both species (Jenyns, 1842), more recently collected specimens, and data taken from the type specimens suggests that both *J. lineata* and *J. multidentata* are valid. The holotype of *J. multidentata* figured in the original description (Jenyns, 1842:fig. 3, pl. 22) is a large female, 65.6 mm SL, that lacks distinct markings. This lack of patterning is typical of large females (>60 mm SL) of the more coastally distributed *Jenynsia* in the Río de La Plata area, including the type locality of *J. multidentata*, Montevideo. The type locality of *J. lineata* also is listed as a coastal city in Uruguay, Maldonado

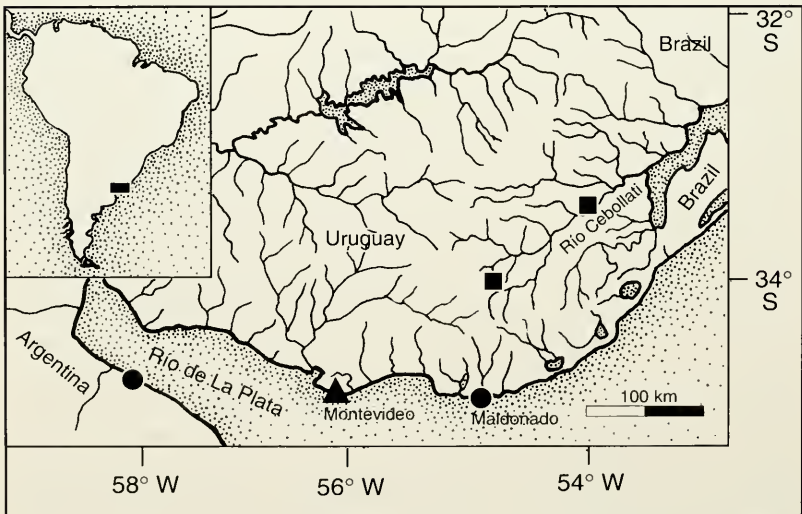


Fig. 7. The localities for specimens used in the redescription of *Jenynsia multidentata* shown as circles. Type locality of *J. multidentata* shown as closed triangle. Known distribution of *J. lineata* shown as squares. The type locality of *J. lineata* is not shown owing to ambiguity about its exact location. (See text.) Each symbol may represent more than one cataloged lot.

(Jenyns, 1842). It is likely, however, that Darwin collected the type specimens of this species further inland in the Río Cebollatí Drainage north of Maldonado. In the figure of the 38.5-mm-SL holotype of *J. lineata* (Jenyns, 1842:fig. 2, pl. 22) there are distinct, dash-shaped markings resembling those of specimens from more recent collections of *Jenynsia* from the Río Cebollatí Drainage. Also, there is no indication of elongate lines on the ventral caudal peduncle in the figure of the holotype of *J. lineata* (Jenyns, 1842:fig. 2, pl. 22). These lines are almost always found in adult female specimens from coastal Uruguay that have not grown large enough for their patterning to fade. Large recently collected females (>60 mm SL) from the Río Cebollatí Drainage also retain their distinct patterning, unlike those from coastal areas. Darwin did conduct a 10-day survey and collecting trip from Maldonado north into the Río Cebollatí Drainage as far as Arroyo Polanco (Keyes, 1988). Based on these color-pattern differences and the fact that Darwin visited the appropriate drainage where he might have collected the type specimens of *J. lineata*, we apply the name *J. multidentata* to the widely distributed coastal taxon and apply the name *J. lineata* to the species presently known only from the Río Cebollatí Drainage.

The standardized common name in North America of *J. lineata*, onesided livebearer (Robins et al., 1991; Griffiths and Langhammer, 1992), refers to *J. multidentata*, because this is the species encountered in the aquarium hobby, not *J. lineata*. All other species of *Jenynsia* lack common names.

Jenynsia lineata (Jenyns)

Figure 8

Lebias lineata—Jenyns, 1842:116.—Holotype: BMNH 1917.7.14:24, an adult female, Maldonado, Uruguay, obtained in May 1833 by C. R. Darwin during the voyage of the H. M. S. Beagle.

Jenynsia lineata—Günther, 1866:331.

Jenynsia maculata—Regan 1913:234.

Fitzroyia lineata maculata—Fowler 1943:323.

Referred specimens.—See Appendix.

Diagnosis.—A species of *Jenynsia* diagnosed by the following combination of characters: (1) elongate, horizontal, dash-shaped markings on side one to three scales in length forming approximately five to seven rows; (2) distinct spot on dorsal, pectoral-fin base; (3) presence of a distinct swelling between urogenital opening and anterior base of anal fin in females (Fig. 2).

Jenynsia lineata is distinguished from all other *Jenynsia* except *J. sanctaecatarinae* and *J. multidentata* by the dash-shaped lateral markings that form multiple, irregular rows. *Jenynsia lineata* differs from *J. multidentata* by having a distinct, rounded spot on the dorsal pectoral base

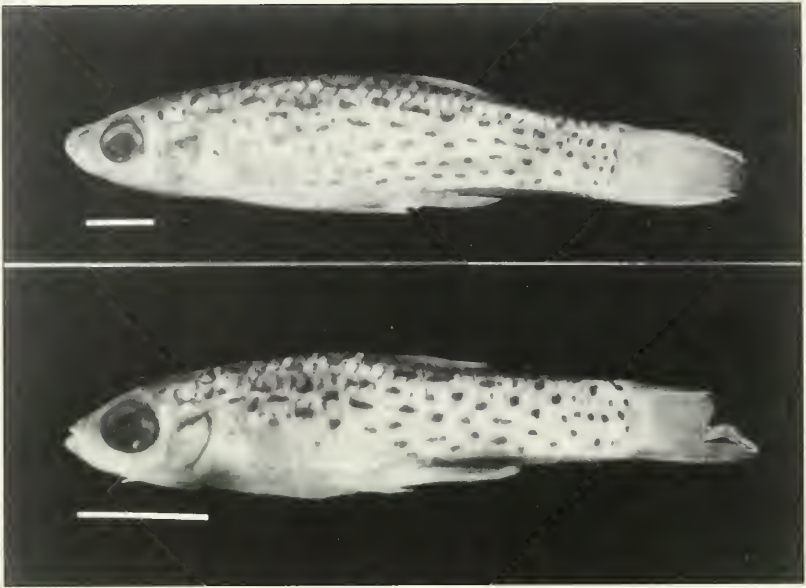


Fig. 8. *Jenynsia lineata*. Top: FMNH 105429, female, 42.2 mm SL. Bottom: FMNH 105429, male, 22.3 mm SL. Photo of male (bottom) enlarged with respect to female (top). Scale bars = 5 mm.

and from *J. sanctaecatarinae* by possessing a swelling between the urogenital opening and the anterior base of the anal fin.

Description.—Body elongate, slightly compressed laterally; greatest body depth at vertical between anal and pelvic fins; dorsal-fin origin at vertical above anal-fin origin; sexual dimorphism pronounced, with most males much smaller than most females measured. Females with distinct swelling between urogenital opening and anterior base of anal fin causing anus and urogenital opening to face each other; urogenital opening medial. In males, posterior two anal-fin rays not forming part of tubular intromittent organ and extending approximately two-thirds posterior length of intromittent organ; intromittent organ greater than half length of caudal peduncle, and directed laterally to right or left. Head squamation pattern in all individuals E type. Supraorbital pore pattern represented by four disjunct canals in large females (1, 2a; 2b, 3, 4a; 4b, 5; 6, 7) with canal open forming trough between Pores 5 and 6. Supraorbital pore pattern represented by three disjunct canals in smaller individuals (1, 2a; 2b, 3, 4a; 6, 7) with canals open between missing Pores 4a, 5, and 6. Preopercular canal continuous with seven pores. Mandibular canal discontinuous represented by two canals in large females (W, Xa; Xb, Ya, Yb, Z); smaller individuals with two mandibular pores (W, Xa) and anterior canal open. Infraorbital

canal continuous with four pores. Jaw teeth on dentary and premaxilla tricuspid and in many rows.

Morphometric data in Table 2. Meristic data as follow: Dorsal-fin rays 9 (7–9; \bar{x} = 8.4, n = 49); anal-fin rays in females 10 (9–10; \bar{x} = 9.9, n = 40); anal-fin rays in males 10 (10; n = 2); pelvic-fin rays 6 (6; \bar{x} = 6, n = 50); pectoral-fin rays 16 (14–16; \bar{x} = 15.1, n = 50); principal caudal-fin rays damaged on holotype (16–20; \bar{x} = 17.6, n = 33); predorsal scales 14 (12–15; \bar{x} = 13.7, n = 50); lateral-series scales 29 (25–29; \bar{x} = 27.4, n = 50); scales around caudal peduncle 16 (16–17; \bar{x} = 16.0, n = 50); gill rakers on ventral arm of first gill arch 11 (9–12; \bar{x} = 10.1, n = 50).

Coloration in alcohol: Body ground color grading from brown dorsally to cream ventrally; scales with concentration of dark chromatophores marginally dorsal to the Scale Rows 5 or 6 producing prominent reticulate pattern dorsally; distinct, dark, predorsal dash present on two middorsal scales anterior to dorsal-fin origin; dash-shaped markings forming five to seven irregular rows approximately associated with transverse Scale Rows 1–7; markings occasionally running together forming longer line-shaped markings on side; dorsal-most row least distinct; Markings rounded on posterior caudal peduncle; belly unpigmented; dark peritoneal pigment visible through body wall along ventral midline; mature females lacking distinct genital spot; isthmus unpigmented; distinct rounded spot on dorsal pectoral-fin base; subdermal stripe present ventrally from posterior insertion of anal fin to end of caudal peduncle; fins unpigmented except for dark chromatophores bordering rays of dorsal fin, caudal fin, and dorsal part of pectoral fin; intromittent organ in males with scattered dark chromatophores to tip.

Head brown dorsally grading to cream ventrally; dorsal head scales uniform brown; short, dark dashes visible dorsally above anterior nares; lacrimal region brown; cheek cream with scattered, dark chromatophores more concentrated near eye than ventrally; premaxilla brown; lower jaw with dark chromatophores extending posteriorly to first preopercular-canal pore; opercular series uniform brown dorsally grading through scattered dark chromatophores to cream ventrally; branchiostegal membranes unpigmented.

Distribution.—*Jenynsia lineata* is known from eastern Uruguay in the Río Cebollatí Drainage (Fig. 7).

Remarks.—The name *Jenynsia lineata* has been applied to the widest-ranging species, which occasionally is encountered by aquarists. However, this species is limited to the Río Cebollatí Drainage. The exact type locality is questionable and is probably not Maldonado as it is cited in the original description (Jenyns, 1842). Darwin probably collected the type specimens during an inland excursion from Maldonado north into the Río Cebollatí Drainage. (See Remarks in the previous account for a more detailed expla-

nation of the status of *J. lineata*.) Regan (1913) and Fowler (1943) called this species *J. maculata* because it possesses distinct, separate markings that usually do not form long lines; however, *Jenynsia maculata* has more rounded markings and occurs at high elevations in western Argentina.

A KEY TO SPECIES OF *JENYNSIA*

1. Predorsal scales 19 or more *J. pygogramma*
 Predorsal scales fewer than 19 2
2. Distinct midlateral stripe or a discontinuous midlateral stripe formed by a series of blotches on body; free anal-fin rays on mature male intromittent organ extending more than two-thirds the posterior length of the intromittent organ; body terete in adults 3
 Series of vertical bars or many dashes or spots on body arranged either in an irregular pattern or forming 4–8 irregular horizontal lines, or consistent midlateral pattern absent; free anal-fin rays on mature male intromittent organ extending less than two-thirds posterior length of the intromittent organ; body stout in adults 5
3. Single midlateral stripe on body; 13 or more relatively long, slender gill rakers on ventral limb of first gill arch; mandibular canal Pore W present; slightly subterminal mouth *J. unitaenia*
 Discontinuous midlateral, dorsolateral, and ventrolateral stripes formed by a series of blotches on body; fewer than 13 relatively short and robust gill rakers on the ventral limb of first gill arch; mandibular canal Pore W absent; mouth nearly terminal or slightly oblique 4
4. Midlateral stripe mostly continuous anterior to dorsal-fin origin; mouth nearly terminal; dorsal-fin rays usually fewer than 10
 *J. eigenmanni*
 Midlateral stripe discontinuous anterior to dorsal-fin origin; mouth slightly oblique; dorsal-fin rays usually more than 10
 *J. eirmostigma*
5. Vertical bars on body *J. alternimaculata*
 Dashes or spots on body arranged in either an irregular pattern or forming 4–8 irregular, horizontal rows or lines on body 6
6. Spots on body approximately circular on both flank and caudal peduncle and irregularly distributed, never forming continuous lines on body *J. maculata*

Dashes or spots on body arranged in approximately 4–8 irregular, horizontal rows forming continuous lines on body; pattern possibly faint or absent in large females 7

7. Dashes or spots on body arranged in four or five irregular, horizontal rows, never forming continuous lines; no swelling between urogenital opening and anterior base of anal fin in females
..... *J. sanctaecatrinae*

Dashes or spots on body arranged in five to eight irregular, horizontal rows, usually forming lines in large individuals; swelling present between urogenital opening and anterior base of anal fin in females ... 8

8. No distinct spot in dorsal base of pectoral fin, although some pigment may be present; lines on body in large individuals most prominent on caudal peduncle; large females (>60 mm SL) lacking or bearing faint lines and spots *J. multidentata*

Distinct spot in dorsal base of pectoral fin; lines on body in large individuals rarely on caudal peduncle and most prominent dorsal to anal fin; large females (>60 mm SL) with color pattern prominent as in other adults *J. lineata*

CONCLUDING REMARKS

Our examination of many specimens of *Jenynsia* has revealed that there is a widely held misconception concerning the reproductive biology of these fishes. In many scientific and popular articles, the female urogenital opening has been described as being directed laterally or protected on one side by a large scale (e.g., Arnold and Ahl, 1936; Breder and Rosen, 1966; Dawes, 1991; Nelson, 1994). Although this is true in the closely related genus *Anableps*, all female *Jenynsia* lack morphological structures associated with laterality of the urogenital opening (Fig. 2). Although male *Jenynsia* exhibit sexual laterality, females do not.

The number of species in the genus *Jenynsia* has been unclear and many authors have considered the genus to be monotypic (Muzlera, 1935; Jacobs, 1971; Dawes, 1991). Based on our study of museum specimens, we recognize nine species—*J. lineata*, *J. multidentata*, *J. pygogramma*, *J. maculata*, *J. eigenmanni*, *J. alternimaculata*, *J. eirmostigma*, *J. unitaenia*, and *J. sanctaecatrinae*. Future collections of fishes in southern South America and a detailed study of variation in the species *J. multidentata* likely will result in descriptions of additional species.

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APPENDIX—SPECIMENS EXAMINED

Additional specimens examined and their locality data are presented. Holotypes and paratypes listed in descriptions and redescriptions are not included herein.

Anableps anableps.— MCZ 6559 (4): Brazil: Pará: Lagoa Saracá at Silves.

Anableps dowi.— KU 18689 (14): Nicaragua: Chinandega: Río Estero Real. UMMZ 191725 (12 of 15): Mexico: Oaxaca: Río Tehuantepec.

Anableps microlepis.— FMNH 53732 (10): Guyana: Georgetown market.

Jenynsia alternimaculata.— ANSP 68834 (1) paratype: same locality data as holotype. ANSP 68835–36 (2): same locality data as holotype. USNM 320754 (45): Bolivia: Chuquisaca: Río Zapallar ca. 2 air km SE Monteagudo. USNM 320755 (6): Bolivia: Chuquisaca: Río Candua tributary ca. 15 air km NW Monteagudo. USNM 325265 (57): Bolivia: Chuquisaca: Río Timboypampa tributary ca. 10 air km E Monteagudo.

Jenynsia eigenmanni.— FMNH 2866 (holotype): Brazil: Paraná: Serrinha ca. 25°43' S, 49°44' W. CAS 78946 (2): same locality data as FMNH 2866. FMNH 2867 (10): same locality data as FMNH 2866. MHNCI 7362 (4 of 22): Brazil: Paraná. Universidade Federal de São Carlos uncat. (1): Brazil: Paraná: Río Butia ca. 26°5' S, 52°7' W.

Jenynsia eirmostigma.— MZUSP 47625 (holotype): Brazil: Rio Grande do Sul: Município de Cambara do Sul: Rio Manoel Leão near São José dos Ausentes. KU 23867 (4) paratypes: Brazil: Rio Grande do Sul: Município de Bom Jesus: Rio dos Touros tributary on road between Silveira and Rondinha. MCP 17425 (2) paratypes: same locality data as MZUSP 47625. USNM 300249 (3) paratypes: same locality data as MZUSP 47625. USNM 320291 (16) paratypes: same locality data as KU 23867. USNM 320292 (3) paratypes: Brazil: Rio Grande do Sul: Município de Bom Jesus: Rio Pelotas tributary on road between Silveira and São José dos Ausentes. USNM 320293 (10) paratypes: Brazil: Santa Catarina: Rio Caveiras tributary at Páinel on road between São Joaquim and Lages.

Jenynsia lineata.— AMNH 73235 (2): Uruguay: Florida: Arroyo Molles. BMNH 1917.7.14:20–23, (2) paratypes: same locality data as holotype; BMNH 1843.2.8:43, (1) paratype: same locality data as holotype. FMNH 71514 (9): Uruguay: Rocha y Minas: Río Cebollati. FMNH 71515 (8): Uruguay: Minas: Arroyo Polanco. FMNH 105427–8 (10): Uruguay: Rocha y Minas: Río Cebollati: Passo de Averias. FMNH 105429 (42): Uruguay: Minas: Arroyo Polanco.

Jenynsia maculata.— BMNH 1906.5.31:62–71 (9) paratypes: Argentina: Salta: Cachi at 2500 m elevation.

Jenynsia multidentata.— KU 22416 (49): Uruguay: Montevideo: Santiago Vasquez at the mouth of Río Santa Lucia. KU 23873 (17): Argentina: Buenos Aires: Río de La Plata at Punta Lara near Berisso. MZUSP uncat. (8): Uruguay: Maldonado: mouth of Arroyo Maldonado at Punta del Este. USNM 300246 (8): same locality data as MZUSP uncat.

Jenynsia pygogramma.— BMNH 1902.5.22:7281 (4) paratypes: Argentina: Cordova: Río Cruz del Eje. CAS 78532 (1): Argentina: Cordova: Río Cruz del Eje. MLP uncat. (2): Argentina: La Rioja: Río Salado near Bazaan.

Jenynsia unitaenia.— MZUSP 47615 (holotype): Brazil: Santa Catarina: Município de Praia Grande: Rio Faxinalzinho at Mãe dos Homens. KU 23865 (10) paratypes: Brazil: Santa Catarina: Rio Jordão in Jordão Alto. KU 23866 (15) paratypes: same locality data as MZUSP 47615. MCP 17419–21, 17425 (54) paratypes: same locality data as MZUSP 47615. MCP 17422–24 (91) paratypes: same locality data as KU 23865. MZUSP 47616–20 (66) paratypes: same locality data as MZUSP 47615. MZUSP 47621–24 (124) paratypes: same locality data as KU 23865. USNM 300232 (50): same locality data as MZUSP 47615. USNM 300243–44, 300250, 300297–98 (63) paratypes: same locality data as MZUSP 47615. USNM 300238, 300241, 300245, 300299 (161) paratypes: same locality data as KU 23865. USNM 300731 (2): Brazil: Santa Catarina: Rio Pique: Morro Cortado: on road between Meleiro and Ararangua. USNM 326070 (5) paratypes: Brazil: Santa Catarina: Município de Praia Grande: Rio Canoas approx. 8 km from Praia Grande in the direction of Mãe dos Homens. USNM 326104 (3) paratypes: Brazil: Rio Grande do Sul: Município de Terra de Areira: Rio Tres Pinheiros on BR 101.

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