

THE GENUS *LEPTAGONIATES* (PISCES: CHARACOIDEI)  
WITH A DESCRIPTION OF A NEW SPECIES FROM BOLIVIA

Richard P. Vari

*Abstract.*—A new species of the genus *Leptagoniates* having a highly modified swimbladder is described and the type-species of the genus, *L. steindachneri*, is redescribed.

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Introduction

Boulenger (1887) established the genus *Leptagoniates* to contain one species, *L. steindachneri*, briefly described from a single Ecuadorian specimen. Since Boulenger the species appears to have only been collected twice and all systematic references to the genus and species have been based on the original description. During examination of characoid material from Peru and Bolivia in the collection of the American Museum of Natural History, further specimens of *L. steindachneri* were uncovered and a distinctive cheirodontine characoid with a peculiarly shaped swimbladder was found. Within the subfamily Cheirodontinae (Eigenmann, 1915) the tricuspidate teeth, elongate body and long anal fin of this species place it in the assemblage formed by the genera *Leptagoniates*, *Phanagoniates*, *Xenagoniates* and *Paragoniates* (see Eigenmann, 1915 and Myers, 1942). In this assemblage its possession of a complete lateral line and an adipose fin along with a lack of ectopterygoid teeth place it in the genus *Leptagoniates*. However, the monophyletic nature of the genus defined by the above characters, which occur in various combinations in other cheirodontine genera, is open to question. Furthermore, as pointed out by Fink and Weitzman (1974) the Cheirodontinae may not constitute a monophyletic group in the Hennigian sense of the term. Until the relationships within the subfamily Cheirodontinae are resolved on the basis of shared derived characters, this species is assigned to *Leptagoniates* following the traditional limits of the genus.

*Leptagoniates*, Boulenger 1887

*Leptagoniates* Boulenger, 1887:291 (type-species *L. steindachneri* Boulenger by monotypy).

*Leptagoniates* (error): Jordan, 1920:437.

*Leptagoniatus* (error): Fowler, 1943:353.

*Etymology.*—The generic name, *Leptagoniates*, from λεπτός, thin, and *Agoniates*, a genus of South American characoids, refers to the laterally flattened body form of the members of the genus.

*Diagnosis.*—The genus *Leptagoniates* is distinguished from all other cheirodontine characoids by its elongate anal fin with 48–70 rays (in contrast to 40 or fewer for all other genera except *Paragoniates*, *Phanagoniates* and *Xenagoniates*), a complete lateral line (in contrast to an incomplete lateral line in *Paragoniates* and *Phanagoniates*), the presence of an adipose fin (in contrast to its absence in *Phanagoniates*) and an edentulous ectopterygoid (in contrast to a cuspidate ectopterygoid in *Xenagoniates*).

*Included species.*—Two species are included in the genus, *Leptagoniates pi*, a new species described from the Río Mamoré of Bolivia, and *L. steindachneri* from the Marañón and Napo drainages of Ecuador and the Ucayali drainage of Peru.

#### Key to the Species of *Leptagoniates*

1. Species markedly elongate; anal with iii,64–67 rays; lateral line scales 44–49 *Leptagoniates steindachneri* Boulenger
- Species only slightly elongate; anal with iii,45–48 rays; lateral line scales 33–38 *Leptagoniates pi* new species

#### *Leptagoniates pi*, new species

Fig. 1

*Holotype.*—American Museum of Natural History (AMNH) 35952 (29.2 mm SL), Bolivia, Río Mamoré, 10 km west of San Pedro, lagoons communicating with river, September 17, 1965, S. Anderson.

*Paratypes (collected with holotype).*—AMNH 35953 (3 specimens, 27.2–31.0 mm SL); British Museum (Natural History) (BMNH) 1977.6.9.138 (1, 28.0).

*Etymology.*—The trivial name, *pi*, refers to the shape of the swimbladder which has the form of the Greek letter  $\pi$ .

*Diagnosis.*—As previously noted, although the question of interrelationships of cheirodontine characoids is not satisfactorily resolved, within the framework of traditional diagnostic characters this species is assignable to *Leptagoniates* on the basis of its possession of the characters diagnostic for the genus (see generic diagnosis). Within the genus, *Leptagoniates pi* is distinguished by its anal fin-ray count (iii,45–48 in contrast to iii,64–67 in *L. steindachneri*), lateral line count (33–38 in contrast to 44–49), number of maxillary teeth (5 in contrast to 11 or 12), and body depth (2.77–3.08 in SL in contrast to 3.9–4.1). Finally it possesses a distinctive form of swimbladder (see description below) which from available information appears to be unique to this species among characoids.

*Description.*—Body moderately deep, very compressed, elongate; greatest depth just anterior to dorsal-fin origin, 2.77–3.08 in SL; dorsal profile of

head distinctly convex at snout, slightly concave behind orbit, then straight to dorsal-fin origin; dorsal-fin base straight, distinctly slanted posteroventrally; dorsal body profile from rear of dorsal-fin base to caudal peduncle straight; distance from snout to dorsal-fin origin 2.12–2.19 in SL; ventral profile gently convex from tip of lower jaw to anal-fin origin; distance from tip of lower jaw to anal-fin origin 2.15–2.24 in SL; base of anal fin straight; length of anal-fin base 1.76–2.08 in SL; head length 5.17–5.44 in SL; eye width 1.95–2.3 in HL; interorbital convex, 2.5–2.75 in HL; nostrils separated by a fold of skin; anterior nostril small, round; posterior nostril crescent shaped, twice size of and folding around anterior nostril; mouth small; maxillary strongly posteroventrally slanted, non-tooth-bearing section gently convex; posterior edge of maxillary reaching to vertical through anterior edge of eye and to horizontal through ventral border of eye; third infraorbital in contact with preopercle ventrally, leaving slight naked area posteriorly; infraorbitals above this narrow, forming a tube for sensory canal; frontal fontanel triangular; parietal fontanel elongate, continuing as a median groove on supraoccipital; overall body form angular.

Dorsal fin pointed, long, when fin depressed anterior rays reach one-half distance to adipose fin which is small; pectoral fins pointed, reaching well beyond origin of pelvic fins which are pointed, short, reaching only one-half distance to anal-fin origin; anal fin long, first three rays originating from a single proximal pterygiophore which is slightly enlarged basally; anal-fin base straight; third to sixth anal-fin rays slightly elongate, otherwise anal-fin margin straight; caudal fin emarginate; about 12 weak procurrent rays present dorsally and 7 ventrally.

Scales cycloid, thin; lateral line complete, with 33–38 scales; 7 or 8 scales above lateral line to dorsal-fin origin; 4 scales below lateral line to anal-fin origin; scales not extending onto fins; dorsal fin ii, 7 or 8; pectoral fins i, 11 or 12; pelvic fins i, 4 or 5; anal fin iii, 45–48; no indication of sexual dimorphism in fins; 15 abdominal vertebrae including those of Weberian apparatus and 25 or 26 caudal vertebrae including first fused preural and ural centrum as one element (vertebral counts from radiographs).

Teeth in a single row in each jaw, tricuspidate with small lateral cusps; premaxillary small, triangular, with 8 teeth; maxillary with 5 teeth; dentary with 10 teeth; replacement teeth of varying degrees of development present internal to functional rows on premaxillary and dentary.

Slight pigmentation present behind orbits; interorbital region heavily pigmented; scattered dark chromatophores on dorsal, caudal and anal fins and on body above anal fin.

*Remarks.*—On the basis of present knowledge of characoid swimbladder morphology the form of the posterior chamber of the swimbladder in this species would appear to be unique. Rather than the globular or tubular posterior swimbladder chamber that characterizes most characoids, the posterior



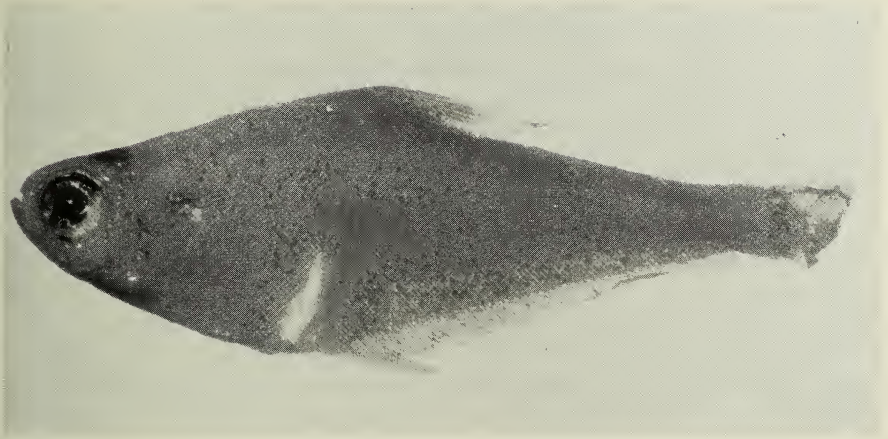


Fig. 1. *Leptagoniates pi*, holotype, AMNH 35952, 29.2 mm SL.

chamber of the swimbladder in this species is vertically subdivided (Fig. 2). This results in two independent, vertically elongate subchambers completely separated except at their dorsal point of contact, but in free communication with each other at that point. Lateral to the posterior swimbladder chamber the myotomes are reduced, with this thinning most pronounced lateral to the posterior subchamber which is overlain solely by a thin layer of muscle and skin. This reduction of the body wall is visible in Fig. 1 as the translucent vertical band anterior and dorsal to the anal-fin origin.

*Distribution.*—Known only from the type-locality in the Río Mamoré, Bolivia.

*Leptagoniates steindachneri*, Boulenger 1887

*Leptagoniates steindachneri* Boulenger, 1887:282, pl. 23, fig. 3 (original description, Sarayacu, Ecuador); Eigenmann and Eigenmann, 1891:57 (citation); Eigenmann, 1910:441 (citation), 1915:42, pl. 4, fig. 3 (on Boulenger); Fowler, 1940:287 (citation); Eigenmann and Allen, 1942:270 (citation); Schultz, 1949:310 (citation); Fowler, 1948:188 (compiled); Sterba, 1962:165, fig. 225 (on Boulenger); Ovchynnyk, 1968:247 (citation); Saul, 1975:108 (Santa Cecilia, Ecuador).

*Leptagoniates steindachneri* (error): Jordan, 1920:437 (citation).

*Leptagoniatus steindachneri* (error): Fowler, 1943:353 (citation), 1945:134 (citation).

*Material examined.*—BMNH 1880.12.5.252 (76 mm SL) holotype, Sarayacu, Ecuador; AMNH 25699 (2 specimens, 64–73.5) Río Ucayali, Pucallpa, Peru;

Academy of Natural Sciences, Philadelphia (ANSP) 130577 (1, 65) Santa Cecilia, Ecuador.

*Diagnosis.*—*Leptagoniates steindachneri* is distinguished by its anal fin-ray counts (iii,64–67 in contrast to iii,45–48 in *Leptagoniates pi*), lateral line count (44–49 in contrast to 33–38), number of maxillary teeth (11 or 12 in contrast to 5), and body depth (3.9–4.1 in SL in contrast to 2.77–3.08).

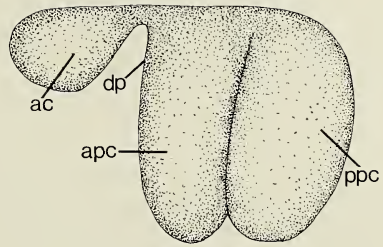
*Description.*—Body slender, very compressed, elongate; greatest depth at vertical through anal-fin origin, contained 3.9–4.1 in SL; dorsal profile slightly concave between tip of snout and end of supraoccipital process, concave from there to dorsal-fin origin; dorsal-fin base distinctly slanted posteroventrally; dorsal-body profile straight from rear of dorsal-fin base to caudal peduncle; distance from tip of snout to dorsal-fin origin 1.83–1.97 in SL; ventral profile rounded to anal-fin origin; region from point below vertical through pectoral-fin origin to anal-fin origin with a slight median keel; distance from tip of lower jaw to anal-fin origin 2.9–3.0 in SL; base of anal fin straight; length of base of anal fin 1.49–1.6 in SL; head length 5.6–6.0 in SL; snout short, 3.95–4.2 in HL; eye width 3.0–3.3 in HL; upper jaw 3.0–3.8 in HL; nostrils separated by a distinct flap; nostrils located above vertical through dorsal border of eye; mouth small; maxillary strongly slanted posteroventrally, denticulate along upper three-quarters of anterior border; posterior border of maxillary falling short of vertical through anterior of eye and of horizontal through lower border of eye; infraorbital series completely covering cheek; third infraorbital large, fourth and fifth smaller, fourth about two-thirds size of fifth; frontal fontanel short, triangular; parietal fontanel long, extending medially onto supraoccipital.

Dorsal fin obtusely pointed, second ray longest; dorsal-fin origin about equidistant from snout tip and hypural joint, above 22nd to 24th anal ray; adipose fin small, distinctly closer to hypural joint than to rear of dorsal-fin base; pectoral fins long, extending to pelvic-fin tips and anal-fin origin; anal-fin origin far in advance of vertical through dorsal-fin origin; anal fin very long, base straight, third to sixth rays slightly elongate, otherwise anal-fin margin straight. First to third anal-fin rays originating from a single enlarged proximal pterygiophore; caudal deeply emarginate, about 11 weak procurent rays along dorsal border of peduncle and 5 ventrally.

Scales cycloid, thin; lateral line complete; 44–49 scales in lateral line; 6 or 7 scales above lateral line to dorsal-fin origin; 6 or 7 scales below lateral line to anal-fin origin; a row of scales overlying base of anal fin; scales extending a short distance onto caudal-fin base; dorsal fin ii,7 or 8; pectoral fins i,10 or 11; pelvic fins i,6 or 7; anal fin iii,64–67; no indication of sexual dimorphism in fins; 12 abdominal vertebrae including those of Weberian apparatus and 35 or 36 caudal vertebrae including first fused preural and ural centrum as one element (vertebral counts from radiographs).

Teeth in a single row in each jaw, distinctly tricuspidate, with central

Fig. 2. Semidiagrammatic drawing showing the swimbladder form in *Leptagoniates pi*. ac—anterior chamber of swimbladder, apc—anterior section of posterior chamber of swimbladder, dp—point of exit of ductus pneumaticus, ppc—posterior section of posterior section of swimbladder.



cusps larger; teeth of lower jaw fitting posterior to those of upper jaw when mouth closed; premaxillaries with 7 or 8 teeth; maxillary with 11 or 12 teeth; dentary with 7 or 8 teeth; dorsalmost teeth on maxillary and anterior teeth on dentary with side cusps more developed.

Overall coloration in alcohol pale yellow; in holotype a somewhat silvery stripe runs from rear of skull to caudal-fin base, stripe underlain by dark chromatophores; other specimens with a dark stripe beginning above 10th anal-fin ray and increasing in intensity to caudal peduncle; interorbital region dark; lateral margin of pectoral fin pigmented; dorsal fin with spots of pigment on anterior rays; anal fin with pigmentation along length of second ray and scattered on rest of fin; caudal fin with ventral lobes slightly pigmented; maxillary and lateral border of dentary pigmented.

*Distribution.*—Known from the Marañón and Napo drainages of Ecuador and the Ucayali River of Peru. The latter locality is the first record of the species from that country and is about a 750 km range extension southward. Earlier citations of this species from Peru, starting with Eigenmann (1910) have been based on the belief that Sarayacu, the type-locality for the species, was in Peru (see Eigenmann, 1915:42). However, the locality was and is in Ecuador.

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Dept. of Ichthyology, American Museum of Natural History, New York, N.Y. 10024.