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# *Chriolepis atrimelum* (Gobiidae) a new species of gobiid fish from Isla del Coco, Costa Rica

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**Abstract:** A new species of seven-spined goby is described from the Pacific in deep water off Isla del Coco. The species displays characteristics intermediate between amphiamerican species of the genus *Chriolepis* and species of the Atlantic genus *Varicus*, both of which also lack head pores. The holotype and only known specimen of *Chriolepis atrimelum* is distinguished from its congeners by the completely scaled body, including chest and belly; the greatly extended first three dorsal-fin spines of the male; the long dorsal and anal fins; and the large black opercular blotch.

**Key words:** New species, *Chriolepis*, *Varicus*, Gobiidae, Pisces, Isla del Coco, Costa Rica.

The seven-spined gobies which lack cephalic sensory pores comprise six genera: *Chriolepis* Gilbert, 1892, *Gobulus* Ginsburg, 1933a, *Nes* Ginsburg, 1933b, *Psilotris* Ginsburg, 1953, *Varicus* Robins & Böhlke, 1961, and *Robinsichthys* Birdsong, 1988. The relationships between members of these genera are poorly understood, although the first five genera are included in the Tribe Gobiosomini by Birdsong (1975). Unlike the others, the genus *Robinsichthys* is of uncertain affinities, because of the lack of fusion of hypurals 1-2 with 3-4 and the terminal vertebral element and its unique reduced neural arches (Birdsong, 1988).

The five species of *Psilotris* (Greenfield *et al.* 1993; Greenfield 1981), the three species of *Gobulus* (Ginsburg 1933a, 1938 and 1939) and single species of *Nes* are distinguished from *Chriolepis*, *Varicus* and *Robinsichthys* by the total lack of scales. *Gobulus* and *Nes* also differ from the *Chriolepis-Varicus* complex in their united pelvic fins.

In their key to genera of seven-spined gobies, Böhlke & Robins (1968) distinguished *Varicus* from *Chriolepis* by the former's unbranched pelvic-fin rays, the first four with expanded tips; a low fleshy membrane connecting the inner pelvic rays basally and bilobed tongue tip (not rounded or emarginate). In his generic key, Hoese (1971) also included the rudimentary fifth pelvic ray and ctenoid vs cycloid scales under the first dorsal fin of *Varicus*. With the description of additional species in *Varicus* (Gilmore 1979: Greenfield 1981) and numerous species of *Chriolepis* (*cf.* Findley 1983), these distinctions have gradually broken down. The present goby from Isla del Coco, the first fully-scaled representative of this complex from the Pacific, appears to further reduce the differences separating the genera *Chriolepis* and *Varicus*.

## MATERIAL AND METHODS

Counts and measurements follow Böhlke & Robins (1968). Predorsal distance is snout-tip to origin of first dorsal fin; preanal distance, to origin of anal fin. Head width is greatest dis-

tance between opercula. Head depth is taken at a vertical passing through posterior edge of opercular membrane. Pterygiophore formulae follow Birdsong *et al.*(1988). All measurements of length in mm refer to standard length (SL).

Rows of cutaneous head papillae are referred to as longitudinal, transverse or oblique with respect to the long (horizontal) axis of the fish.

*Chriolepis atrimelum*, new species
(Figs. 1 and 2)

**Holotype:** LACM 32264-10, male, 45.4 mm, collected at Isla del Coco, 2.6 km WNW of Punta Gissler (05°33'30"N, 87°05'50"W). Collected with 30 ft. otter trawl between 137 and 146 m depth on 3 April 1972 by R.J. Lavenberg and W.A. Bussing aboard R/V *Searcher* (Cruise 72-4, Sta. 521).

**Diagnosis:** A large species of *Chriolepis* with a depressed head, body completely scaled and three long filamentous dorsal-fin spines on the male holotype. Dorsal fin VII-12; anal fin 11; pectoral fin 20/20; total gill rakers 9. Only distinctive marking a vertically oval black blotch on opercle; median fins dusky distally without other markings and pelvic fins black.

**Description:** Body slender, wider than deep anteriorly, tapering to compressed at caudal peduncle. Body depth at origin of first dorsal fin, 6.0 times in SL (Table 1); body depth at origin of anal fin 5.8 times in SL. Dorsal head and body profile slightly convex; ventral profile somewhat straighter. Least depth of caudal peduncle 8.7 times in SL.

Head depressed, length 3.2 times in SL, depth 6.4 times in SL, width 4.5 times in SL; postorbital head length 5.5 times in SL. Eyes not extending above head profile, horizontal eye diameter 4.7 times in head length (HL); fleshy interorbital distance 8.8 times in HL. Snout length slightly greater than eye diameter, length 4.4 times in HL.

Mouth oblique; upper jaw reaching to a vertical through middle of pupil, 2.5 times in HL; a fleshy fold from lower jaw enclosing and hiding posterior extremity of premaxillary. Lower jaw in advance of upper jaw. Premaxillaries with outer row teeth anteriorly of well-spaced canines, much enlarged and recurved; three intermediate rows (two rows posteriorly) of small pointed teeth; an inner row of slightly enlarged pointed teeth. Dentary similar, with five rows of teeth medially; an anterior outer row of several well-spaced canines; three intermediate, irregular rows anteriorly and an inner row of widely-spaced fang-like canines progressively larger posteriorly. Tongue broad and indented anteriorly. Gill rakers on right side 2 + 7 = 9; pseudobranchiae on right side 6. Anterior nostril tubular; posterior nostril with slightly raised margin.

TABLE 1

*Proportional measurements in percent of SL for holotype (LACM 32264-10) of* Chriolepis atrimelum, *new species*

| | |
|---|---|
| SL (mm) | 45.4 |
| Head length | 30.8 |
| Head depth | 15.6 |
| Head width | 22.0 |
| Postorbital length | 18.0 |
| Horizontal eye diameter | 6.6 |
| Fleshy interorbital distance | 3.5 |
| Snout length | 7.1 |
| Upper jaw length | 9.0 |
| Body depth at dorsal-fin origin | 16.5 |
| Body depth at anal-fin origin | 17.2 |
| Least depth of caudal peduncle | 11.5 |
| Predorsal distance | 35.7 |
| Preanal distance | 60.6 |
| Pectoral-fin length | 31.9 |
| Pelvic-fin length | 26.2 |
| Caudal-fin length | 33.3 |

First dorsal fin with seven flexible spines, the last two spines much more widely separated; first three spines greatly produced (the first nearly reaching base of fourth soft dorsal ray, the second and third of similar length and reaching base of penultimate soft dorsal ray). Second dorsal-fin elements 12, the first a short flexible spine, the last rays elongate, reaching beyond caudal-fin base (Fig. 1), the last ray branching from its base. Predorsal distance 2.8 times in SL. Eleven anal-fin elements, the first a short flexible spine, the last divided to the base. Preanal distance 1.7 times in SL. Pectoral-fin rays 20 on each side. Pectoral fins slightly longer than head length, 3.1 times in SL; when appressed reaching to vertical through first branched anal-fin ray. Pelvic fins separate, without frenum; one flexible spine and five soft rays, first four branched, tips not expanded and interradial membranes not reduced; tips not reaching anus. Pelvic spine

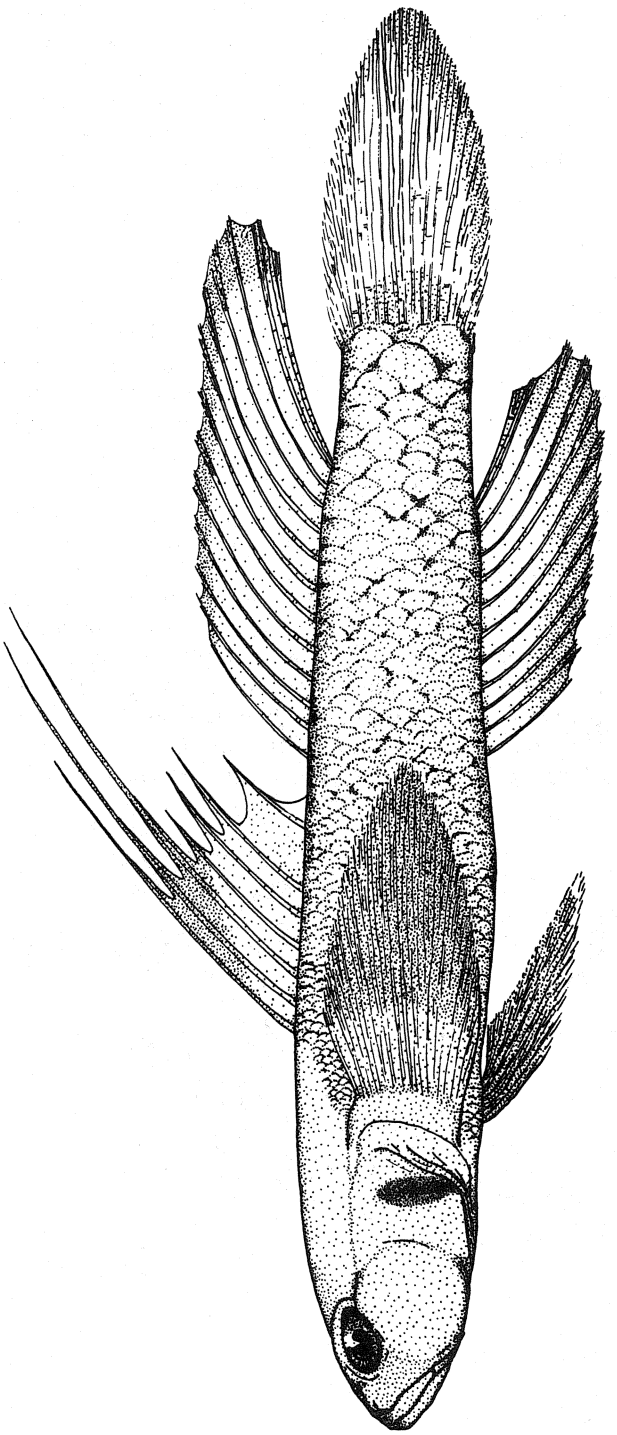

Fig. 1. *Chriolepis atrimelum* n. sp., LACM 32264-10, male holotype, 45.4 mm from Isla del Coco, Costa Rica. Scale placement estimated from scale pockets.

3.6 mm long; length of soft rays increasing to longest (fourth), 10.1 mm long (3.8 times in SL); last ray unbranched, 3.6 mm long. Caudal fin long and acutely rounded, segmented rays 16, branched rays 14; length of fin 3.0 in SL; procurrent rays 6/6.

Body of holotype and only known specimen mostly devoid of scales, but scale pockets reveal intact fish was fully scaled to level of or slightly surpassing dorsal fin origin, but nape appears naked; lateral scales reach to base of pectoral fin; entire belly, chest and mid-ventral line between inner bases of pelvic fins covered with minute scale pockets. The only remaining scales, which are below the pectoral fin, are ctenoid. Longitudinal scale rows (from count of pockets) estimated at 41; transverse scale rows estimated at 17. Apparently two large basicaudal scales were present; scales progressively smaller anteriorly. *Chriolepis atrimelum* conforms to the "*Gobiosoma* Group" of Birdsong *et al.* (1988): vertebral formula of holotype 27 (11 trunk + 16 caudal); dorsal pterygiophore formula 3-221110; one epural, and two anal pterygiophores anterior to first haemal spine.

Cephalic cutaneous papillae mostly large and elevated (Fig. 2). *Suborbital series* - Four transverse rows on cheek: a row of four below anterior margin of pupil, near angle of mouth; a row of six below mid-eye; an oblique row of about 12 papillae with a longitudinal branch of five papillae posteriorly and another of three papillae below posteroventral border of eye. Three longitudinal rows: a row of four papillae behind angle of mouth; a double curving row on the lower preopercular arm, 19 small papillae with a parallel row of five widely-spaced larger papillae below. *Postorbital series* - An oblique row of four papillae on nape behind posterodorsal margin of eye. *Interorbital series* (not visible on lateral view) - Six papillae crossing the mid interorbital space; one isolated papilla on anterodorsal margin of eye and another on posterodorsal margin of eye. *Preorbital series* - An oblique row of 15 papillae on side of snout below posterior nostril, curving down to maxilla; two larger isolated papillae closely anterior to oblique row. *Mandibular series* - A double series of a row of 11 small papillae above a parallel row of five larger papillae; a longitudinal row of five papillae on each side of isthmus (not visible on lateral view of Fig. 2). *Oculoscapular series* - Five papillary tracts of diverse orientation along oculoscapular sulcus; an oblique row of 6 papillae immediately below sulcus near posterodorsal corner of preopercle. *Opercular series* - An oblique curved row of five papillae on mid-opercle and a transverse row of 21 papillae near anterior margin of opercle.

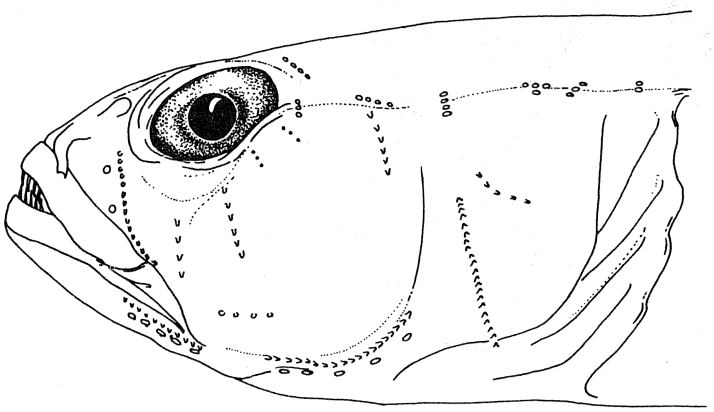

Fig. 2. *Chriolepis atrimelum* n. sp., LACM 32264-10, male holotype, 45.4 mm from Isla del Coco, Costa Rica. Detail of head to show cephalic papillary tracts (based on a composite of both sides of head).

Ethyl alcohol-preserved holotype with a vertically-oriented black oval on opercle (Fig. 1). Median fins dusky distally; pelvic fins black. Pigmentation at time of collection not noted, but probably drab as unlikely that any bright colors would have been overlooked.

**Ecology:** Nine other epibenthic or demersal species were taken at the same station including the holotype and only known specimen of another goby, *Lythrypnus lavenbergi* Bussing. The most common species were *Pronotogrammus multifasciatus* Gill (31 specimens) and *Hippoglossina bollmani* Gilbert (8 specimens). Two other recently described (Bussing 1990) Isla del Coco endemic gobies, *Lythrypnus alphigena* and *L. cobalus*, have also only been taken in deep water between 30 and 93 m on the shelf surrounding the island. Another Isla del Coco endemic, *Chriolepis dialepta* Bussing, is a shallow-water species found between 2 and 31 m.

**Etymology:** From the Latin *ater* meaning black and the Greek *melon* meaning cheek, to be treated as a noun in apposition.

**Distribution:** Known only from the holotype collected about 2.3 km off the northwest corner of Isla del Coco, at a depth between 137 and 146 m.

## REMARKS

The distinctions between the genus *Varicus*, when first described by Robins & Böhlke (1961), and the species of *Chriolepis* presently known have been reduced to minor differences in the branching of pelvic-fin rays (Hastings & Bortone 1981) and the extent of squamation on the body. Until the discovery of *C. atrimelum*, no fully-scaled member of the *Chriolepis-Varicus* complex had ever been known from the eastern Pacific. The five known species of *Varicus* (Findley 1983) have only been taken in the Western Atlantic. Findley (1983) presented a provisional list of 10 Pacific and six Atlantic species of *Chriolepis*. The latter three authors have suggested that a future consolidation of these two genera may be warranted. Birdsong *et al.*(1988) found that the Atlantic members of *Chriolepis-Varicus* complex differ from the Pacific representatives of *Chriolepis*, as well as the majority of the genera in the *Gobiosoma* Group, in the juxtaposition of the anal pterygiophores to the first haemal spine and suggested a possible generic reassignment between Atlantic and Pacific species may be in order. The Atlantic species have one anal pterygiophore (vs two anal pterygiophores in the Pacific species) anterior to the first haemal spine.

At the present time, there is little to support the two genera *Chriolepis* and *Varicus*, but in view of the large number of undescribed species of both (Findley 1983), I have decided to refrain from uniting the two or from creating yet another genus for the new species. Further study is necessary to determine if the difference in anal pterygiophore position could justify a taxonomic separation of Atlantic members from the Pacific species of the complex.

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## RESUMEN

Se describe una especie nueva de gobio de siete espinas dorsales del Pacífico en agua profunda frente a la Isla del Coco. La especie presenta características intermedias entre las especies anfiamericanas del género *Chriolepis* y las del género atlántico *Varicus*, ambos carecen también de poros cefálicos. El holotipo y único ejemplar conocido de *Chriolepis atrimelum* se distingue de sus congéneres por presentar el cuerpo completamente cubierto de escamas, incluyendo pecho y vientre; las primeras tres espinas de la primera aleta dorsal muy alargadas; las aletas dorsal y anal largas y la mancha opercular negra grande.

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