AMERICAN MUSEUM
Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N.Y. 10024
Number 3082, 7 pp., 3 figures December 27, 1993

Pseudochromis kolythrus, a New Species of Dottyback from New Caledonia, with Comments on its Relationships (Teleostei: Perciformes: Pseudochromidae)

ANTHONY C. GILL[1] AND RICHARD WINTERBOTTOM[2]

ABSTRACT

Pseudochromis kolythrus is described from the 37.7 mm SL male holotype collected at Récif Mbere, New Caledonia. It is distinguished from other pseudochromines in having the following combination of characters: segmented dorsal-fin rays 25, with all rays branched; segmented anal-fin rays 14; fin spines slender and weakly pungent; circumpeduncular scales 16; and anterior lateral line with 25 or 26 scales, terminating beneath segmented dorsal-fin ray 15 or 16. It also has a distinctive live coloration, with the anterior four-fifths of the body olive-gray and the posterior one-fifth bright purple. *Pseudochromis kolythrus* belongs to the *P. tapeinosoma* complex, a clade that includes *P. coccinicauda, P. cyanotaenia, P. flammicauda, P. jamesi, P. luteus, P. tapeinosoma,* and *P. wilsoni.* This complex is diagnosed by a unique, synapomorphic modification of the cleithrum. The new species further shares apomorphic elongation of the pleural rib on the terminal precaudal vertebra with *P. flammicauda, P. jamesi, P. luteus,* and *P. wilsoni.*

INTRODUCTION

The Indo-Pacific Pseudochromidae includes about 115 species classified in four subfamilies: Anisochrominae, Congrogadinae, Pseudochrominae, and Pseudoplesiopinae (Godkin and Winterbottom, 1985; Gill, 1990). The nearly 70 species in the Pseu-

[1] Lerner-Gray Research Fellow, Department of Herpetology and Ichthyology, American Museum of Natural History.

[2] Curator, Department of Ichthyology and Herpetology, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, Canada M5S 2C6, and Department of Zoology, University of Toronto, Toronto, Ontario, Canada M5S 1A1.

ISSN 0003-0082 / Price $1.00

dochrominae are distinguished from other pseudochromids by the symplesiomorphic presence of five segmented pelvic-fin rays (versus 0–4 in the other subfamilies). During recent fieldwork in New Caledonia (Aug/Sept 1991), the second author collected an undescribed species of the genus *Pseudochromis* Rüppell. The purposes of the present paper are to describe the new species, to distinguish it from other pseudochromines, and to comment on its relationships.

Materials and Methods

Methods of counting and measuring follow Gill and Randall (1992). Where counts were recorded bilaterally, both counts are given and separated from each other by a slash; the first value presented is the left count. Osteological details were determined from a radiograph of the holotype. Comparisons with *P. jamesi, P. luteus,* and other pseudochromines are based on specimens listed in Gill (1990). Institutional acronyms follow Leviton et al. (1985).

Acknowledgments

This study was completed while ACG was a Lerner-Gray Research Fellow in the Department of Herpetology and Ichthyology of the American Museum of Natural History. RW gratefully acknowledges financial support from NSERC Grant A 7615, the ROM, and Benjamin Film Laboratories (Ltd.). The assistance of M. Kulbicki, J. Rivaton, the captain, crew, and divers of the "Dawa" (ORSTOM, New Caledonia), and G. Klassen is much appreciated. We thank R. D. Mooi, G. Nelson, L. R. Parenti, C. L. Smith, and M. L. J. Stiassny for reviewing the manuscript. J. Beckett provided the photograph of the holotype.

Pseudochromis kolythrus, new species
Figure 1

Holotype: ROM 65061, 37.7 mm SL male, New Caledonia, Récif Mbere, north of Passe de Dumbéa (22°19′10″S 167°12′45″E), cave in steep wall of dropoff, heavy *Acropora* growth, 18.3–30.5 m, rotenone, R. Winterbottom, G. Klassen, J. Menou, and P. Tirard, 4 Sept 1991.

Diagnosis: The following combination of characters distinguishes *P. kolythrus* from all other pseudochromines: segmented dorsal-fin rays 25, with all rays branched; segmented anal-fin rays 14; fin spines slender and weakly pungent; anterior lateral-line scales 25 or 26, terminating beneath segmented dorsal-fin ray 15 or 16; and circumpeduncular scales 16.

Description: Dorsal-fin rays III,25, all segmented rays branched; anal-fin rays II,14, all segmented rays branched; pectoral-fin rays 18/18, upper 2/2 and lower 2/2 rays unbranched; pelvic-fin rays I,5, all segmented rays branched; principal caudal-fin rays 9 + 8; branched caudal-fin rays 8 + 7; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; scales in lateral series 37/37; anterior lateral-line scales 26/25; anterior lateral line terminating beneath segmented dorsal-fin ray 16/15; peduncular lateral-line scales 5/5; caudal-fin lateral-line scales 0/0; horizontal scale rows between anterior and peduncular lateral lines 4/4; horizontal scale rows above anal-fin origin 12 + 1 + 3/13 + 1 + 3; predorsal scales 15; circumpeduncular scales 16; scales behind eye 2; scales to preopercular angle 3; circumorbital pores 17/23; preopercular pores 9/8; dentary pores 4/4; posterior interorbital pores 1; gill rakers 3 + 11; pseudobranch lobes 7.

As percentage of SL: head length 26.3; predorsal length 34.5; prepelvic length 34.0; preanal length 66.0; dorsal-fin base length 52.8; anal-fin base length 22.5; dorsal-fin origin to pelvic-fin origin 28.4; anal-fin origin to middle dorsal-fin ray (spines included in ray count) 25.2; snout length 5.6; orbit diameter 9.8; body width 13.3; fleshy interorbital width 4.5; bony interorbital width 2.7; snout tip to retroarticular tip 20.4; caudal peduncle length 13.8; caudal peduncle depth 15.4; first dorsal-fin spine length 1.6; second dorsal-fin spine length 4.0; third dorsal-fin spine length 7.2; first segmented dorsal-fin ray length 11.1; fourth last segmented dorsal-fin ray length 15.9; first anal-fin spine length 3.4; second anal-fin spine length 6.1; first segmented anal-fin ray length 10.3; fourth last segmented anal-fin ray length 15.1; third pectoral-fin ray length 17.5; pelvic-fin spine length 11.4; second segmented pelvic-fin ray length 19.9; caudal-fin length 23.6.

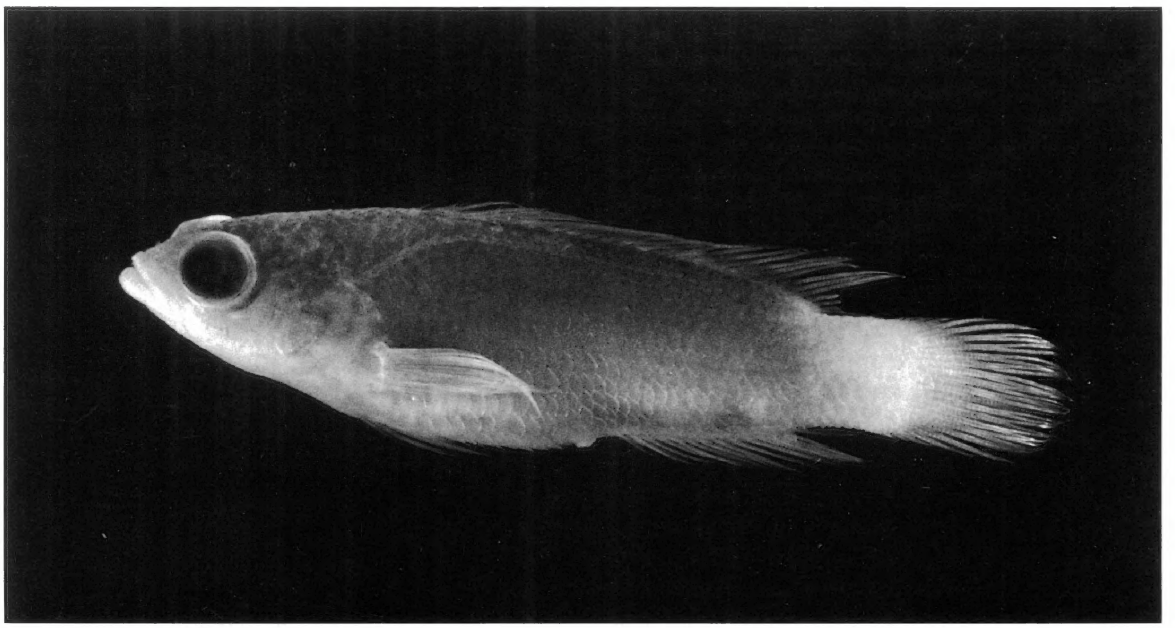

Fig. 1. Holotype of *Pseudochromis kolythrus* new species, ROM 65061, 37.7 mm SL male, north of Passe de Dumbéa, Récif Mbere, New Caledonia.

Ventral margin of lower lip narrowly interrupted at symphysis; scales on head, nape, anterior part of body including pectoral-fin base, preanal contour, and dorsal contour of body beneath anterior part of dorsal fin cycloid, the remainder ctenoid; dorsal and anal fins without basal scale sheaths, although with a few intermittent small scales overlapping fin bases; predorsal scales extending anteriorly to second anterior interorbital pore; operculum with 6 small, irregular bumps; denticles of outer ceratobranchial-1 gill rakers well developed only on distal halves or tips of rakers; predorsal formula 0/0/0 + 2/1 + 1/1/1/1/1/1 + 1; dorsal-fin spines slender and weakly pungent; preanal formula 1/1 + 1/1/1 + 1/1; anal-fin spines slender and weakly pungent, the first spine much less stout than the second; pelvic-fin spine slender and weakly pungent; second segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 10 + 16; epipleural ribs 13; epurals 3.

Upper jaw with 5 pairs of curved, enlarged caniniform teeth anteriorly, the medial pair smallest, and 5 or 6 (at symphysis) to 1 or 2 (on sides of jaw) inner rows of small conical teeth; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, the lateral pair largest, and 4 or 5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, the conical teeth becoming slightly larger and more curved on middle of jaw; vomer with 2 (anteriorly) to 2 or 3 (posterolaterally) rows of small conical teeth, forming a chevron; palatines with 3 or 4 (anteriorly) to 1 or 2 (posteriorly) irregular rows of small conical teeth, forming a triangle.

PRESERVED COLORATION: Head and body brown, paler on snout, lips, ventral part of head, and abdomen; posteroventral part of orbital rim dusky gray-brown; caudal peduncle pale yellowish brown; dorsal fin hyaline with scattered gray-brown melanophores, these densest on basal third to half of fin; anal fin hyaline, narrowly grayish brown on distal and proximal edges of fin; caudal fin pale yellow basally, becoming white centrally; outside white area, caudal fin with broad dusky gray-brown convex mark, this curving from anterodorsal and anteroventral edges of fin to central part of middle rays; behind curved marking, caudal fin hyaline with scattered gray-brown melanophores; pelvic fins hyaline with anterior, posterior, and distal margins narrowly gray-brown; pectoral fins hyaline.

LIVE COLORATION (from fieldnotes made immediately after collection): Anterior four-

fifths of body olive-gray, posterior one-fifth bright purple.

ETYMOLOGY: From the Greek "kolythron," a ripe fig, an allusion to the olive-gray coloration with the purple representing the split test of the ripe fruit exposing the interior. To be treated as a noun in apposition.

COMPARISONS: *Pseudochromis kolythrus* closely resembles *P. jamesi* Schultz from the southwest Pacific (including New Caledonia) and *P. luteus* Aoyagi from Taiwan, the Ryukyu Islands (Japan), and the Batan Islands (Philippines) in most meristic and morphometric details. The three species are distinguished from other pseudochromines in possessing the following combination of characters: segmented dorsal-fin rays 24–26, usually 25, with all or all but first rays branched; segmented anal-fin rays 13 or 14, usually 14; circumpeduncular scales 16; and anal-fin spines weakly pungent to flexible, with the penultimate spine less stout than the ultimate.

Pseudochromis kolythrus differs from *P. jamesi* in having fewer anterior lateral-line scales (25 or 26 vs. 27–34, usually 28–31), with the anterior lateral line not extending as far posteriorly beneath the dorsal fin (terminating beneath segmented dorsal-fin ray 15 or 16 vs. 19–25); fewer upper procurrent caudal-fin rays (6 vs. 6–8, usually 7); more horizontal scale rows between anterior and peduncular lateral lines (4 vs. 2–4, rarely 2 or 4); more consecutive dorsal-fin pterygiophores immediately posterior to neural spine 4 with a 1:1 association with interneural spaces (4 vs. 1 or 2, usually 1); a shorter caudal peduncle (13.8 vs. 15.4–17.4% SL); a longer caudal fin (23.6 vs. 20.7–23.0% SL); and a longer fourth last segmented dorsal-fin ray (15.9 vs. 12.9–15.2% SL). *Pseudochromis jamesi* also differs from *P. kolythrus* in usually having a white- or yellow-edged gray to black spot on the dorsoposterior part of the caudal peduncle; however, the spot is occasionally absent in females and juveniles, and is usually indistinct or absent in males (see Randall et al., 1990: 128).

Pseudochromis kolythrus differs from *P. luteus* in having fewer anterior lateral-line scales (25 or 26 vs. 26–32, usually 28–31), with the anterior lateral line not extending as far posteriorly beneath the dorsal fin (terminating beneath segmented dorsal-fin ray 15 or 16 vs. 17–24, usually 20–23); more consecutive dorsal-fin pterygiophores immediately posterior to neural spine 4 with a 1:1 association with interneural spaces (4 vs. 2–4, usually 3); a more posteriorly positioned dorsal fin (predorsal length 34.5 vs. 29.4–33.1% SL); and a longer pelvic-fin spine (11.4 vs. 8.2–11.2% SL).

The olive-gray and purple male live coloration of *P. kolythrus* further distinguishes it from the male live colorations of *P. jamesi* (see Randall et al., 1990: 128) and *P. luteus* (see Aoyagi, 1943: pl. 32, fig. 1, and Burgess and Axelrod, 1974: fig. 263), which are both more or less uniformly bright orange. However, along with many other pseudochromids, *P. jamesi* and *P. luteus* appear to be protogynous hermaphrodites (e.g., see Springer et al., 1977, for discussion of protogynous hermaphroditism in anisochromines); it is therefore possible that the holotype of *P. kolythrus* may be exhibiting a female or transitional coloration and that the true male coloration of the species is different and unknown. The holotype's coloration bears some resemblance to the ground coloration of female *P. jamesi* (see Randall et al., 1990: 128) and *P. luteus* females: head and body brown to bluish gray, becoming pinkish gray ventrally, and sometimes pinkish gray to pink on the caudal peduncle.

The presence of two anal-fin spines with only a single supernumerary spine on the first pterygiophore is unique to *P. kolythrus* among pseudochromines; other pseudochromines have three anal-fin spines, with two supernumerary and one serial spine on the first pterygiophore. Anisochromines and some pseudoplesiopines resemble *P. kolythrus* in having only a single supernumerary spine on the first anal-fin pterygiophore. However, the anal-fin spines of *P. jamesi, P. luteus,* and other close relatives of *P. kolythrus* (see below) are slender; the first spine, in particular, is often poorly ossified and minute. It is therefore possible that the absence of a second supernumerary spine in the holotype of *P. kolythrus* is the result of damage or developmental anomaly, rather than being typical for the species. Even if the presence of a single supernumerary spine was found to be

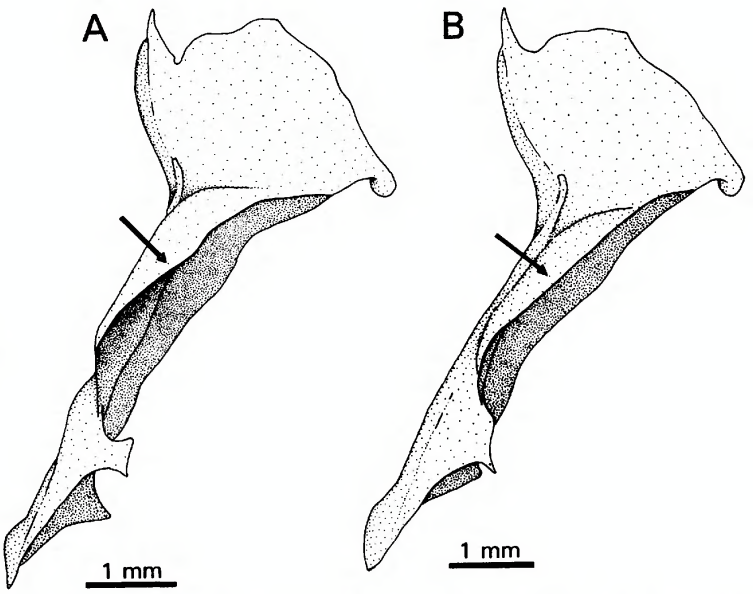

Fig. 2. Lateral views of right cleithra (reversed) of: (**A**) *Pseudochromis flammicauda* Lubbock and Goldman, AMS I.19473-101, 38.9 mm SL, (**B**) *P. fuscus* Müller and Troschel, AMS I.18469-178, 48.0 mm SL. Arrows indicate lateral wings.

typical for *P. kolythrus,* it would be of little diagnostic value, as the anterior supernumerary spine in related species is often easily overlooked (sometimes visible only after dissection, or on radiographs). For example, Aoyagi (1943) erroneously recorded two instead of three anal-fin spines for five nominal species of *Pseudochromis,* all of which are close relatives of *P. kolythrus,* and Lubbock and Goldman (1976) erroneously recorded two anal-fin spines for a paratype of *P. flammicauda* Lubbock and Goldman.

RELATIONSHIPS: *Pseudochromis kolythrus* belongs to a clade, hereafter termed the "*P. tapeinosoma* complex," that includes *P. coccinicauda* (Tickell) (from the eastern and central Indian Ocean), *P. cyanotaenia* Bleeker (from the eastern Indian Ocean to the Gilbert Islands), *P. flammicauda* (from the Great Barrier Reef), *P. jamesi, P. luteus, P. tapeinosoma* Bleeker (from the eastern Indian Ocean and West Pacific), and *P. wilsoni* Whitley (from northern Australia). The *P. tapeinosoma* complex is diagnosed by a single synapomorphy: lateral wing of cleithrum expanded anteriorly well past the anterior profile of the main cleithral shaft (fig. 2). Species of this complex also share other apomorphic features that have relatively restricted distributions in the Pseudochromidae (including relatively weak [vs. strong] fin spines, and a weakly interrupted to complete [vs. broadly interrupted at symphysis] lower lip). In a parsimony analysis of these and additional characters, these apomorphies may prove either to corroborate monophyly of the complex, or to link it with other clades within the family.

The *P. tapeinosoma* complex is divisible into two smaller clades, one consisting of *P. coccinicauda, P. cyanotaenia,* and *P. tapeinosoma,* and the other consisting of *P. flammicauda, P. jamesi, P. kolythrus, P. luteus,* and *P. wilsoni.* Monophyly of the first of these clades is supported by the synapomorphic presence of two epurals (pseudochromids primitively have three epurals), and monophyly of the second clade is supported by the synapomorphic presence of an elongate pleural rib on the last precaudal vertebra (rib greater [usually much greater] than 50% of the length of the pleural rib on the penultimate caudal vertebra [fig. 3A], whereas in other pseudochromids it is less [usually much less] than 40% of the length of the preceding pleural rib [fig. 3B]). The two clades also differ in several meristic values. For example, members of the first clade have fewer dorsal- and anal-fin rays (segmented dorsal-fin rays

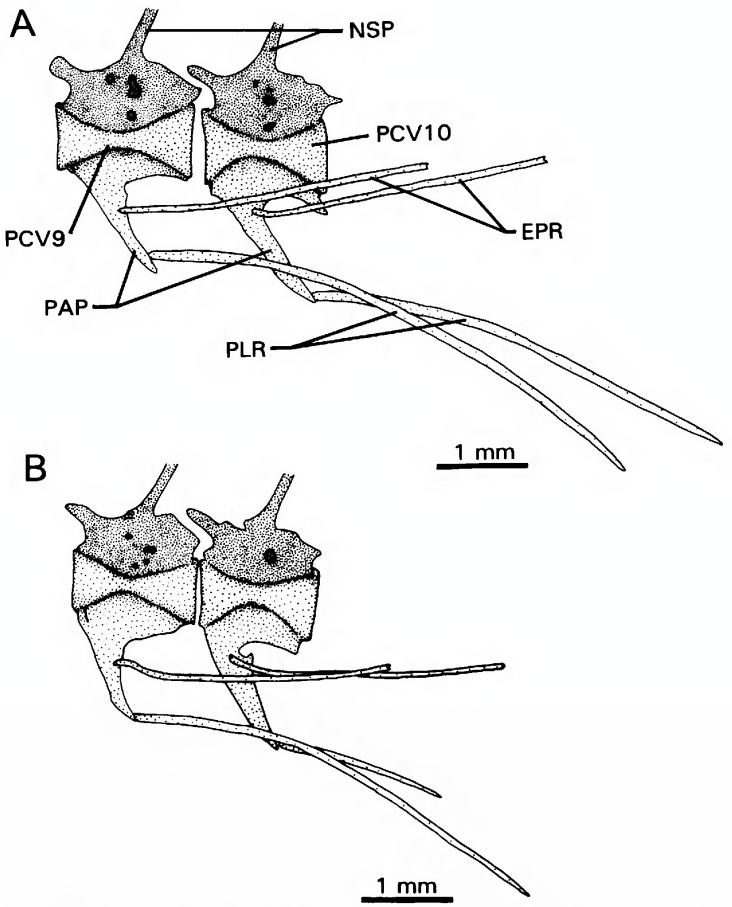

Fig. 3. Lateral views of ultimate (10th) and penultimate (9th) precaudal vertebrae of: (**A**) *Pseudochromis luteus* Aoyagi, AMNH 57369SW, 42.0 mm SL; (**B**) *P. cyanotaenia* Bleeker, AMNH 49636SW, 39.1 mm SL. Abbreviations: EPR epipleural ribs; NSP neural spines; PAP parapophyses; PCV9 9th precaudal vertebra; PCV10 10th precaudal vertebra; PLR pleural ribs.

21–23, usually 22, and segmented anal-fin rays 12–14, usually 13 vs. 23–27, usually 24–26, and 13–15, usually 14, respectively, for the second clade). Values for these characters vary widely among the remaining *Pseudochromis* species, covering the full diversity seen within the *P. tapeinosoma* complex, and relationships within the genus are too poorly resolved to apply global parsimony argumentation to polarize these characters for the complex. Whatever their polarity, however, these characters must corroborate monophyly of one of the two clades.

Pseudochromis flammicauda and *P. wilsoni* are unique among members of the *P. tapeinosoma* complex in usually having 20 circumpeduncular scales (vs. 16 in other members of the complex); on that basis they are hypothesized to be sister species. A sister-group relationship between *P. jamesi* and *P. luteus* is also supported by a single synapomorphy: male coloration more or less uniformly orange. As noted above, however, the male coloration of *P. kolythrus* may be unknown; this character may therefore prove to be a synapomorphy linking *P. kolythrus* with these two species. The testing of this and alternative hypotheses (e.g., whether *P. kolythrus* is the sister group of either *P. flammicauda* + *P. wilsoni*, *P. jamesi* + *P. luteus*, or a clade consisting of all four species) must await the analysis of additional characters. These and other phylogenetic studies of pseudochromids are in progress by the first author.

REFERENCES

Aoyagi, H.
1943. Coral fishes. Tokyo: Maruzen, 224 pp., 37 pls.

Burgess, W., and H. R. Axelrod
1974. Pacific marine fishes. Book 5. Fishes of Taiwan and adjacent waters. Neptune City: T.F.H. Publications, pp. 1111–1382.

Gill, A. C.
1990. A taxonomic revision of the fish subfamily Pseudochrominae (Perciformes: Pseudochromidae). Ph.D. thesis, Univ. of New England, Armidale, N.S.W., Australia.

Gill, A. C., and J. E. Randall
1992. *Pseudochromis steenei,* a new sexually dimorphic species of dottyback fish from Indonesia (Perciformes: Pseudochromidae). Rev. Franc. Aquariol. 19(1/2): 41–46.

Godkin, C. M., and R. Winterbottom
1985. Phylogeny of the Congrogadidae (Pisces; Perciformes) and its placement as a subfamily of the Pseudochromidae. Bull. Mar. Sci. 36(3): 169–219.

Leviton, A. E., R. H. Gibbs, Jr., E. Heal, and C. E. Dawson
1985. Standards in herpetology and ichthyology: part 1. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985(3): 802–832.

Lubbock, R., and B. Goldman
1976. Two distinctive new Australasian *Pseudochromis* (Teleostei: Perciformes). J. Nat. Hist. 10: 57–64.

Randall, J. E., G. R. Allen, and R. C. Steene
1990. Fishes of the Great Barrier Reef and the Coral Sea. Bathurst: Crawford House Press, 507 pp.

Springer, V. G., C. L. Smith, and T. H. Fraser
1977. *Anisochromis straussi,* new species of protogynous hermaphroditic fish, and synonymy of Anisochromidae, Pseudoplesiopidae, and Pseudochromidae. Smithson. Contrib. Zool. 252: 1–15.

Recent issues of the *Novitates* may be purchased from the Museum. Lists of back issues of the *Novitates, Bulletin,* and *Anthropological Papers* published during the last five years are available free of charge. Address orders to: American Museum of Natural History Library, Department D, Central Park West at 79th St., New York, N.Y. 10024.

This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).