

## ***Myripristis earlei*, a New Soldierfish (Beryciformes: Holocentridae) from the Marquesas and Phoenix Islands**

John E. Randall<sup>1,\*</sup>, Gerald R. Allen<sup>2</sup> and D. Ross Robertson<sup>3</sup>

<sup>1</sup>Bishop Museum, 1525 Bernice St., Honolulu, HI 96817-2704, USA

<sup>2</sup>Conservation International, 1 Dreyer Road, Roleystone, Australia; Western Australian Museum, Francis Street, Perth, Australia

<sup>3</sup>Smithsonian Tropical Research Institute (Balboa, Panama), Unit 0948 APO AA 34002, USA

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**John E. Randall, Gerald R. Allen and D. Ross Robertson (2003)** *Myripristis earlei*, a new soldierfish (Beryciformes: Holocentridae) from the Marquesas and Phoenix Islands. *Zoological Studies* 42(3): 405-410. The common holocentrid fish in the Marquesas Islands, previously regarded as an insular variant of the wide-ranging *Myripristis berndti*, is described as a new species, *M. earlei*, after discovering a typical *M. berndti* in the islands and also finding the species in the Phoenix Islands with *M. berndti*. No meristic or proportional measurement differences were found to separate the 2 species, and no mtDNA differences were detected. *Myripristis earlei* differs from *M. berndti* by lacking or having only a few small scales on the lower 1/2 of the pectoral-fin axil; the lower jaw of adults not as strongly projecting; the leading edges of the soft dorsal, anal, and caudal fins not white; and the spinous portion of the dorsal fin red instead of being orange-yellow on the outer part as in *M. berndti*. <http://www.sinica.edu.tw/zool/zoolstud/42.3/405.pdf>

**Key words:** Fish taxonomy, Holocentridae, New soldierfish, Oceania.

Randall and Greenfield (1996) revised the Indo-Pacific species of soldierfishes of the genus *Myripristis*, recognizing 22 species. The most widely distributed is *M. berndti* Jordan and Evermann which occurs from the coast of East Africa to the eastern Pacific where it ranges from the Gulf of California to Panama and the eastern oceanic islands (Allen and Robertson, 1994: 94, lower fig.).

Randall and Greenfield noted that specimens of *M. berndti* from southern Queensland and New South Wales are more melanistic and have slightly lower lateral-line scale and gill-raker counts. They wrote, "We provisionally conclude that these specimens represent a southern population of *M. berndti*, but there is need for additional material, and a color photograph or color description of an adult would be welcome."

They also reported on 21 specimens of *M. berndti* from the Marquesas Is. that differed in lacking or having only a few scales on the lower

1/2 of the axil of the pectoral fin. Initially it was believed these represented an undescribed species, but they have the same modal number of fin rays, lateral-line scales, and gill rakers as *berndti* and the same proportional measurements, so it was concluded that they represent a Marquesan variant of *berndti*.

The 1st author and John L. Earle made a brief dive trip to the northern Marquesas Is. in Oct. 1998. It was noted that fish then regarded as *M. berndti* lacked white leading edges of the 2nd dorsal, anal, and caudal fins which are typical color markings for the species. At that time it was decided that this was just another slight population difference. However, during a Marquesan dive cruise a year later, Earle and the 3rd author observed typically colored *M. berndti*. These fish were far less numerous than the form without the white edge on the fins, and when several were seen, they tended to aggregate apart from the more-common form. One was speared (BPBM

\*To whom correspondence and reprint requests should be addressed. Tel: 808-848-4130. Fax: 808-847-8252. E-mail: jackr@hawaii.rr.com

38676, 190 mm SL) which proved to be typical of *M. berndti* in color, in the jutting lower jaw, and in having scales on the lower 1/2 of the pectoral-fin axil. We concluded that the common soldierfish in the Marquesas that coexists with *M. berndti* represents a new species.

In June 2002, the 2nd author participated in an expedition to the Phoenix Is. He observed *M. berndti*, but also a similar species he could not identify that lacked the white on the median fins that one sees on *berndti*. Both species were common and were sometimes seen together in caves or beneath ledges. The unknown species was observed in the depth range of 10-37 m. Eight adult specimens were collected which proved to be the same as the new species from the Marquesas. The specimens were welcome as additional types because of their larger size than the available Marquesan material.

## MATERIALS AND METHODS

Specimens of the new species of *Myripristis* were deposited at the following institutions: Australian Museum, Sydney (AMS); Institute of Zoology, Academia Sinica, Taipei (ASIZP); Bernice P. Bishop Museum, Honolulu, HI (BPBM); California Academy of Sciences, San Francisco, CA (CAS); Field Museum of Natural History, Chicago, IL (FMNH); Museum of Comparative Zoology, Harvard University, Cambridge, MA (MCZ); Museum National d'Histoire Naturelle, Paris (MNHN); National Science Museum, Tokyo (NSMT); the US National Museum of Natural History, Washington, DC (USNM); and the Western Australian Museum, Perth (WAM).

Lengths given for specimens are standard length (SL), the straight-line distance from the front of the upper lip (when not protruding) to the base of the caudal fin (distal end of the hypural plate). Head length was measured from the same median anterior point to the end of the opercular membrane, and snout length from the same point to the fleshy edge of the orbit. Body depth is the maximum depth, and body width the greatest width just posterior to the gill opening. Orbit diameter is the greatest bony diameter, and interorbital width the least bony width. Caudal-peduncle depth is the least depth, and caudal-peduncle length was measured horizontally from the rear base of the anal fin to the caudal-fin base. Dorsal-fin spines were measured from their tips to where they emerge from the groove in the back into which they fold,

whereas anal fin spines and soft rays of the dorsal and anal fins were measured from the tips to the base of the scaly sheath. Caudal-fin length was measured horizontally from the fin base to a vertical at the tip of the longest ray (with the fin in a normal position). Caudal concavity is the horizontal distance between verticals at the tips of the shortest and longest caudal rays.

The last 2 dorsal and anal soft rays were counted separately, even if closely spaced, unless they shared the same pterygiophore. Pectoral-ray counts included the uppermost rudimentary ray. Gill-raker counts were made on the 1st gill arch and included the rudiments; the upper-limb count is given first, and the raker at the angle is contained in the lower-limb count.

Proportional measurements are presented in table 1 as percentages of standard length. Proportions in the text are step-in measurements rounded to the nearest 0.05. Measurements of juveniles less than 69 mm SL were not used for the proportions given in the text of the description. Data in parentheses in the description refer to paratypes if different from those of the holotype.

### *Myripristis earlei* sp. nov.

(Table 1; Figs. 1-4)

*Myripristis intermedius* (non Günther, in part): Herre, 1936: 73 (Hiva Oa and Nuku Hiva, Marquesas Is.).

*Myripristis murdjan* (non Forsskål): Plessis and Maugé, 1978: 229 (Hiva Oa and Nuku Hiva).

*Myripristis berndti* (in part) Randall and Greenfield, 1996: 22 (Marquesas Is.).

**Holotype:** BPBM 10373, 131.0 mm, Marquesas Is., Tahuata, Hana Hevane Bay, rotenone, JJ Magnuson and crew of the *Charles H. Gilbert*, 16 Oct. 1961.

**Paratypes:** FMNH 17952, 3: 54-61 mm, Marquesas Is., Nuku Hiva, Crane Pacific Expedition, 7 Feb. 1929; USNM 360583, 129.2 mm, Nuku Hiva, Anaho Bay, reef near shore, 2.5-6 m, spear, JE Randall, 15 July 1957; BPBM 10350, 6: 45.5-97.2 mm, ASIZP 60491, 87.1 mm, AMS I.4000-001, 73.0 mm, CAS 211840, 80.5 mm, MNHN 2000-584, 2: 47.2-81.8 mm, NSMT-P 59359, 73.8 mm, Nuku Hiva, Taiohae Bay, coral reef, 1-3 m, rotenone, crew of the *Charles H. Gilbert*, 11 Oct. 1961; BPBM 11474, 2: 78.0-84.0 mm, Fatu Hiva, point at N side of Hanau Bay, 12-23 m, rotenone, JE Randall, DB Cannoy, and RM McNair, 21 Apr. 1971; WAM P.32101-111, 5: 168.3-198.8 mm, Phoenix Is., Kanton I., outer reef off NW tip (2°45.639'S, 171°43.350'W, under coral

ledges in 12-15 m, spear, GR Allen and SL Bailey, 21 June 2002; MCZ 161949, 180 mm, Kanton I., 15-37 m, spear, GR Allen, 23 June 2002; MCZ 16151, 132 mm, Kanton I., 12 m, spear, GR Allen, 23 June 2002; MCZ 161950, 180 mm, Phoenix Is., Enderbury I., 10 m, rotenone, GR Allen, SL Bailey, et al., 28 June 2002.

*Diagnosis:* Dorsal rays X-I, 14-15 (usually 14); anal rays IV, 12-13 (usually 12); pectoral rays 14-15 (usually 15); lateral-line scales 29-30 (usually 29); no small scales or only a few ventrally in axil of pectoral fins; gill rakers 12-13 + 23-27, total 36-39; body depth 2.25-2.5 in SL; interorbital width 4.35-5.1 in head length; lower jaw only slightly projecting when mouth fully closed (may be moderately projecting in large adults); a single pair of tooth patches outside gape at front of lower jaw; vomerine tooth patch subtriangular, with a straight poste-

rior edge; spinous portion of dorsal fin mainly red; no white leading edge on 2nd dorsal, anal, or caudal fins.

*Description:* Dorsal rays X-I, 15 (1 paratype with 15, the rest with 14); 1st dorsal soft ray simple, the remaining rays branched, the last to base; anal rays IV, 12 (2 paratypes with 13, the rest with 12); all anal soft rays branched, the last to base; pectoral rays 14 (1 paratype with 14, the rest with 15); upper 2 pectoral rays simple, the remaining rays branched in holotype (lowermost simple in small paratypes); pelvic rays I, 7; principal caudal rays 19, the upper and lower simple; upper procurvent caudal rays 5, the anterior 4 spinous; lower procurvent caudal rays 4, the anterior 3 spinous; lateral-line scales 29 (4 paratypes with 30, the rest with 29); scales above lateral line to origin of dorsal fin 3; scales below lateral line to origin of anal

**Table 1.** Proportional measurements of type specimens of *Myripristis earlei* expressed as percentages of standard length

	Holotype				Paratypes					
	BPBM 10373	BPBM 10350	BPBM 10350	BPBM 10350	BPBM 10350	ASIZP 60491	USNM 360583	WAM 32101	WAM 32101	WAM 32101
Standard length (mm)	131.0	48.1	69.7	72.2	80.9	87.1	129.2	168.3	178.3	197.8
Body depth	43.2	38.0	44.4	44.3	41.2	42.1	40.0	38.7	44.6	39.2
Body width	20.6	18.8	20.4	18.9	19.2	19.7	20.6	17.6	17.8	19.1
Head length	36.0	39.1	38.5	38.0	36.8	36.7	36.3	33.0	35.0	34.1
Snout length	7.6	7.4	7.7	8.2	8.1	7.7	7.7	7.0	7.3	7.7
Orbit diameter	14.5	18.7	18.5	18.4	16.6	16.2	14.5	14.2	12.6	13.1
Interorbital width	7.9	9.6	8.6	8.7	7.7	7.8	7.8	6.8	6.9	6.8
Caudal-peduncle depth	11.4	10.0	12.9	11.0	10.8	10.3	10.9	9.8	9.6	10.0
Caudal-peduncle length	14.7	15.2	15.6	15.0	14.9	15.4	15.1	14.9	15.6	15.4
Upper-jaw length	20.6	22.0	22.2	23.1	20.6	21.2	20.4	18.1	19.3	19.9
Predorsal length	39.0	42.2	42.4	42.5	39.9	40.7	40.0	36.1	39.8	37.3
Preanal length	66.4	67.0	66.2	67.1	66.9	66.0	66.7	67.1	68.4	67.5
Prepelvic length	38.4	37.4	38.6	39.8	38.3	37.9	38.1	37.0	39.9	39.5
First dorsal spine	10.1	14.5	13.0	12.4	12.1	11.7	10.3	10.2	12.3	9.4
Second dorsal spine	14.0	18.7	16.0	15.0	14.9	15.0	14.2	13.9	11.4	11.0
Longest dorsal spine	14.9	19.6	18.4	17.1	17.0	15.9	14.1	14.2	14.5	14.7
Tenth dorsal spine	3.8	4.0	4.7	4.6	4.2	3.9	3.8	–	–	–
Eleventh dorsal spine	9.8	11.5	11.6	11.3	11.3	10.8	9.8	9.7	9.7	9.4
Longest dorsal ray	22.6	27.8	27.3	26.9	24.0	24.2	23.9	18.2	18.9	14.9
First anal spine	1.6	1.9	1.9	2.1	2.1	1.9	1.6	1.6	1.6	1.3
Second anal spine	5.5	6.1	5.6	6.3	5.1	4.9	5.3	5.9	4.2	3.9
Third anal spine	14.5	16.5	16.4	16.8	15.1	14.8	15.1	13.5	13.7	13.5
Fourth anal spine	13.7	15.5	15.2	15.9	14.4	13.8	14.7	13.4	14.5	14.1
Longest anal ray	23.6	28.2	27.2	26.9	24.8	24.0	23.4	18.8	18.2	18.5
Caudal-fin length	29.2	35.3	33.0	32.9	33.5	31.4	broken	28.5	27.1	23.9
Caudal concavity	15.4	17.0	16.5	16.2	16.1	15.7	–	11.3	9.0	9.8
Pectoral-fin length	24.6	25.4	27.3	26.8	26.0	25.3	24.8	23.6	26.5	23.5
Pelvic-spine length	15.2	16.6	16.5	16.3	15.3	14.9	16.4	14.0	14.0	13.5
Pelvic-fin length	23.0	26.3	25.7	25.4	25.0	23.4	23.2	21.1	20.8	21.8

fin 6; median predorsal scales 9 (counting paired scales that cross the middorsal line as 1); median prepelvic scales 10; oblique rows of scales on cheek 4; circumpeduncular scales 14 (12-14); gill rakers 12 + 25 (12-13 + 23-27); total gill rakers 37 (35-39); pseudobranch lamellae 25 (15 in 48-mm paratype, increasing with growth); branchiostegal rays 8; vertebrae 11 + 15.

Body moderately deep, the depth 2.3 (2.25-2.6) in SL, and compressed, the width 2.1 (1.95-2.2) in depth; head length 2.8 (2.5-2.75) in SL; snout length 4.75 (4.4-5.0) in head length; eye large, the orbit diameter 2.5 (2.1-2.8) in head length; interorbital space slightly convex, the least width 4.55 (4.35-4.8) in head length; caudal-peduncle depth 3.15 (3.0-3.65) in head length; caudal-peduncle length 2.45 (2.2-2.5) in head length.

Mouth large, maxilla reaching well posterior to a vertical at rear edge of pupil, the upper-jaw length 1.75 (1.65-1.9) in head length; mouth oblique, gape forming an angle of about 35° to horizontal axis of head and body; lower jaw slightly

projecting when mouth fully closed (moderately projecting in occasional large adults); front of upper lip very slightly concave when viewed from above; a single pair of tooth patches at front of lower jaw just outside gape (5 teeth in 1 patch of holotype, 9 in the other), patches separated by a space slightly greater than their largest diameter; jaws with a band of small, incurved, and inwardly depressible villiform teeth, those in outer row on side near front of upper jaw and at midside of lower jaw enlarged as blunt conical to nodular teeth; vomer with a subtriangular patch of small villiform teeth, row on straight posterior border slightly enlarged; palatines with a band of small villiform teeth broader anteriorly and narrowing posteriorly. Tongue broadly triangular. Gill rakers long and slender, the longest about 1/2 orbit diameter.

Pattern of longitudinal bony ridges and mucoid channels dorsally on head similar to figure 4C of Randall and Greenfield (1996: 9), channels with numerous small pores. Opercular spine at level of upper edge of pupil, its length about 1/3 to 1/2 pupil diameter; outer edge of opercle ventral to

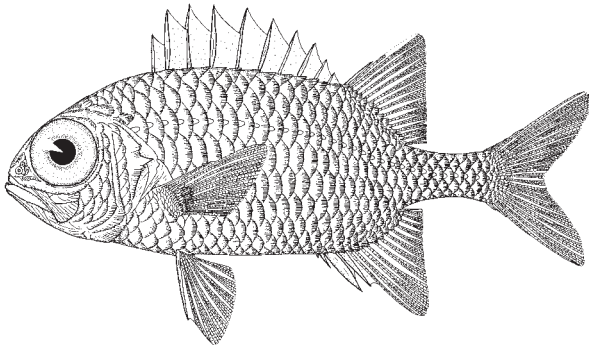


Fig. 1. Holotype of *Myripristis earlei*, BPBM 10373, 131 mm SL, Tahuata, Marquesas Is. (Takeshi Shimizu)



Fig. 2. Underwater photograph of *Myripristis earlei*, Eiao, Marquesas Is. (John L. Earle)



Fig. 3. Underwater photograph of *Myripristis earlei*, Enderbury I., Phoenix Is. (Gerald R. Allen)



Fig. 4. Underwater photograph of *Myripristis berndti*, Marshall Is. (John E. Randall)

notch just below opercular spine smooth, inner edge serrate, surface finely ridged posteriorly; subopercle, both margins of preopercle, and suborbital series finely serrate, each spinous tip preceded by a narrow ridge; surface of maxilla and mandible with longitudinal striation, mandible with numerous small pores; posterior edge of triangular nasal fossa serrate, 6-7 serrae on holotype.

Scales strongly ctenoid, the surface ridged except basally, 43-45 cteni on scales of row below lateral line above tip of pectoral fin in holotype; a sheath of small scales on base of soft dorsal and anal fins; small scales extending posteriorly on caudal fin nearly to posterior margin (extensively lost on most specimens); small scales on basal 1/4 to 1/5 of pectoral fins, outer row pointed; no small scales in axil of pectoral fins except for a few ventrally on 6 of the 18 paratypes and 1 with the lower 2/5 scaled; no scales on pelvic fins; a triangular scaly process extending posteriorly from between bases of pelvic fins, its length about 1/4 length of pelvic spines.

Origin of dorsal fin above 2nd lateral-line scale, predorsal length 2.55 (2.35-2.7) in SL; dorsal spines slender, the 3rd longest (4th spine nearly as long), 2.4 (2.1-2.55) in head; dorsal spines and rays progressively shorter with growth; 10th dorsal spine shortest, 9.5 (8.2-9.5) in head length; 11th dorsal spine 3.7 (3.25-3.7) in head length; 2nd dorsal soft ray longest, 1.6 (1.4-1.55) in head length; origin of anal fin below base of 10th dorsal spine, preanal length 1.5 (1.45-1.5) in SL; 1st anal spine very short, 22.5 (17.5-27) in head length; 3rd anal spine slightly longer than 4th in small specimens, about equal or 3rd slightly longer in large specimens (see Table 1), 2.5 (2.25-2.65) in head length; 2nd anal soft ray longest, 1.55 (1.4-1.9) in head length; caudal fin forked, 3.4 (3.0-4.2) in SL, the caudal concavity 2.35 (2.3-3.5) in head length; 3rd or 4th pectoral rays longest, 1.45 (1.3-1.45) in head length; origin of pelvic fins below lower base of pectoral fins, prepelvic length 2.6 (2.5-2.65) in SL; pelvic-spine length 2.35 (2.35-2.5) in head length; 2nd pelvic ray longest, 1.55 (1.5-1.55) in head length.

Color of holotype in alcohol: orangish brown with pale stripes on body following center of scale rows; some dark pigmentation faintly visible on opercular membrane, especially just below opercular spine; axil of pectoral fin brown except for a small ventral pale spot next to base of lower rays; spines and rays of fins yellowish, the membranes translucent and yellowish.

Less-faded paratypes show the dark pigment

of the opercular membrane continuing to the level of the pectoral-fin base, but also darkest just below the opercular spine. However, none show the striping on the body as clearly as the holotype.

The fresh coloration of the holotype in life was not recorded.

The color in life of this species is as shown in the underwater photograph of 2 individuals from the Marquesas (Fig. 2): light red, the edges of the scales reddish brown dorsally on body, red on the side and ventrally; opercular membrane dark reddish brown; axil of pectoral fin black; a broad black bar as wide as pupil through eye; spinous portion of dorsal fin red; remaining median fins red, the membranes a little yellowish posteriorly and most intensely red anteriorly; pectoral fins red; pelvic fins red anteriorly, yellowish red posteriorly, 1 individual with a bluish-white leading edge. Figure 3 of an adult from Enderbury I., Phoenix Is. is similar in color; it differs in having all of the scales of the body bordered by red, those dorsally more conspicuously.

Figure 4 is an underwater photograph of an adult of *M. berndti* from the Marshall Is. to provide a comparison of the live color with *M. earlei*.

*Etymology:* We name this species *Myripristis earlei* in honor of John L. Earle who first suspected that it differed from *M. berndti*, collected a specimen of the latter in the Marquesas, and provided the photograph of figure 2.

*Remarks:* Herre (1936: 73) was the first to record this species. He reported a 129-mm specimen from Atuona, Hiva Oa, and 6 specimens, 52-61 mm, from Nuku Hiva as *M. intermedius* Günther. These specimens were requested from the Field Museum of Natural History, but the 129-mm one was not found, and only 3 of the 6 small specimens were located (FMNH 17952).

The 1st author collected a single 129.2-mm specimen of *M. earlei* by spearing at Nuku Hiva during his 1st visit to the Marquesas in 1957; it was cataloged as *M. berndti* Jordan and Evermann at the Bishop Museum. Two lots were collected by personnel of the Honolulu Laboratory of the National Marine Fisheries Service at Tahuata and Nuku Niva in 1961 and deposited in the Bishop Museum. During a month of extensive fish collecting in the Marquesas in 1971, with support of a grant from the National Geographic Society to the 1st author, many specimens of what were believed to be the common and widespread *M. berndti* were collected, but only 2 were saved.

In their revision of the Indo-Pacific *Myripristis*, Randall and Greenfield (1996) examined all these

specimens, as well as AMS I.220015-034, 180 mm SL, from Nuku Hiva obtained on loan from the Australian Museum. Although the AMS fish is probably *M. earlei*, it was not designated as a paratype; it was reported as having 3 scales in the axil of the pectoral fins and a protruding lower jaw. Of the 5 adult specimens from the Phoenix Is., 2 have protruding lower jaws. When specimens of *M. berndti* of about equal size are compared to these two, the lower jaw of *berndti* is more jutting.

As mentioned in the description, 6 of 18 paratypes of *Myripristis earlei* have a few small scales ventrally in the axil of the pectoral fins, and 1 has the lower 2/5 of the axil scaled (1 of the 2 Fatu Hiva specimens, the other with no axillary scales). By contrast, the lower 1/2 of the axil is scaled in specimens of *M. berndti*. One other species of the genus, *M. amaena*, has a naked pectoral axil except for a few specimens that have small scales ventrally in the axil (Randall and Greenfield 1996). It is possible that the few specimens of *M. earlei* with scales ventrally in the pectoral axil are hybrids of *M. berndti* and *M. earlei*.

The 3rd author is making a genetic study of the phylogeography of *Myripristis berndti* throughout the Indo-Pacific which involves the use of ATPase 6 and ATPase 8 mitochondrial markers. Comparisons of 2 individuals of *M. berndti* and 6 of *M. earlei* collected by him in the Marquesas with specimens of *M. berndti* throughout the tropical and subtropical Pacific revealed no fixed phylogenetically informative differences that would confirm that *M. berndti* and *M. earlei* are separate species. We might therefore speculate that the population of *M. berndti* became isolated in the Marquesas relatively recently (within the last few thousand years) and evolved to *M. earlei*. More recently, *M. berndti* has reinvaded the Marquesas where it coexists with *M. earlei*. *Myripristis earlei* has also become established in the Phoenix Is. as

a probable result of downcurrent dispersal of larvae from the Marquesas.

Kotlyar (1997) described *M. astakhovi* from a single specimen from Viet Nam. He differentiated it from the related *M. melanosticus* (= *M. botche*) by the black pigmentation on the outer part of the spinous dorsal fin and by the 3rd anal spine being shorter than the 4th. With the description of *M. earlei*, the number of Indo-Pacific species of the genus is now 24.

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