

## Geographic Variation in the Central Pacific Halfbeak, *Hyporhamphus acutus* (Günther)<sup>1</sup>

BRUCE B. COLLETTE<sup>2</sup>

**ABSTRACT:** *Hyporhamphus acutus* (Günther) is distinguished from other Central Pacific species of *Hyporhamphus* by its long upper jaw, long anal fin base (longer than dorsal base), and shape of its preorbital lateral line canal. Two subspecies are recognized: *Hyporhamphus acutus acutus* (Günther) with fewer vertebrae and fin rays inhabits the chain of islands from Wake Island and the Marshall Islands in the northwest to the Tuamotu Archipelago and Easter Island in the southeast; *Hyporhamphus acutus pacificus* (Steindachner) with more vertebrae and fin rays is found in the Hawaiian Islands and at Johnston Island. *Hemiramphus furcatus* Philippi from Easter Island and *Odontorhamphus cancellori* Weed from the Cook Islands are placed in the synonymy of *Hyporhamphus acutus acutus*.

THE SYSTEMATICS of the Central Pacific species of halfbeaks are badly confused; the purpose of this paper is to eliminate this confusion for one species, *Hyporhamphus acutus*. Further studies are in progress to solve the systematic problems of the nominal species *Hyporhamphus affinis* (Günther), *Hyporhamphus laticeps* (Günther), and *Hyporhamphus dussumieri* (Valenciennes). Australian populations of *Hyporhamphus affinis* and *Hyporhamphus dussumieri* are dealt with in a review of the Australian halfbeak fauna (Collette 1974). This paper is the 13th in a series on the systematics of the Synentognathi.

Material examined is in the collections of the Australian Museum, Sydney (AMS); the Academy of Natural Sciences, Philadelphia (ANSP); the British Museum (Natural History) (BMNH); the Bernice P. Bishop Museum, Honolulu (BPBM); the California Academy of Sciences, San Francisco (CAS, SU, GVF); the Field Museum of Natural History, Chicago (FMNH); the Los Angeles County Museum (LACM); the Museum of Comparative Zoology, Cambridge (MCZ); and the U.S. National Museum (USNM).

Characters studied were number of rays in the dorsal, anal, and pectoral fins; number of gill rakers on the first and second gill arches; number of vertebrae; shape of the preorbital

lateral line canal; and the following eight measurements: lower jaw length, head length, distance from pectoral fin origin to pelvic fin origin, distance from pelvic fin origin to caudal fin base, length of dorsal and anal fin bases, and maximum body depth and width. Frequency distributions of meristic characters were compared geographically, by island groups. Sketches of preorbital canals were made of samples from each island group and compared. Morphometric data were combined for samples from four geographic areas: Marshall Islands ( $N = 12-17$ ), Hawaiian Islands-Johnston Island ( $N = 10-18$ ), Central Pacific Islands ( $N = 28-50$ ), and Easter Island ( $N = 16-18$ ). Regressions of the eight measurements were run against standard length and then the slopes and heights of the regression lines were compared by analysis of covariance with the procedure used by Snedecor (1956: 394-399) being followed. Only  $F$  values greater than those for  $P = .999$  were considered significant to avoid the possibility of concluding that populations were distinct, unless large differences were present.

*Hyporhamphus acutus* (Günther)

Fig. 1

*Diagnosis*

A member of the *Hyporhamphus* species group that has a deeply forked caudal fin and a poster-

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<sup>2</sup> National Marine Fisheries Service Systematics Laboratory, U.S. National Museum, Washington, D.C. 20560.

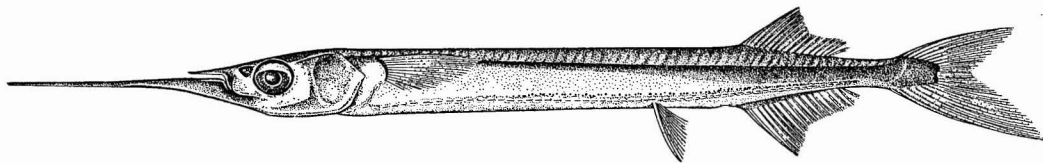


FIG. 1. *Hyporhamphus acutus acutus*. Easter Island. USNM 204214, 156 mm standard length.

ior branch to the preorbital lateral line canal. Upper jaw longer than in most other species of *Hyporhamphus*, usually longer than or at least equal to the width of the upper jaw. Base of anal fin almost always longer than base of dorsal fin. Preorbital canal narrow, usually with four pores. Anterior branch on a straight line with posterior branch as in the Australian-New Zealand group of species *Hyporhamphus australis* (Steindachner), *Hyporhamphus melanochir* (Valenciennes), and *Hyporhamphus ihi* Phillipps. Pigment outlines the lateral line along the ventral margin of the body but not as prominently as it does in *Hyporhamphus dussumieri* (Valenciennes).

#### Description

Lower jaw moderately long, usually slightly longer than head length (measured to tip of upper jaw) in adults; much longer in juveniles. Teeth frequently extending well out on the lower jaw. Maximum body depth considerably greater than maximum body width. Pelvic fins about equidistant between pectoral fin origin and caudal fin base. Distance from pelvic fin origin to caudal base extended anterior from pelvic fin origin reaches pectoral fin base or anterior half of adpressed pectoral fin. Scales present on dorsal and anal fins of larger specimens. Dorsal fin rays 13–16, usually 14 or 15; anal rays 16–19, usually 17 or 18; pectoral rays 10–12, usually 11; gill rakers on first arch (8–12) + (24–31) = 32–43, usually 35–39; gill rakers on second arch (3–6) + (19–26) = 22–30, usually 23–27; vertebrae (35–38) + (18–20) = 53–58, usually 54–57; and branchiostegals 11–13.

#### Color

Back iridescent dark blue-green, sides lighter blue-green, lower sides silvery with fine dusky mottling. Underside of tip of lower jaw

slightly reddish. Dorsal, caudal, and distal part of anal fin dusky. Paired fins clear with dusky rays. (J. E. Randall's field notes for BPBM 6592 from Easter Island.)

#### Remarks

Weed (1933) described *Odontorhamphus cancellori* from the Cook Is. as a new genus because of the extension of teeth well out along the lower jaw, almost to the tip of the beak. As Woods and Schultz (1953: 175) have pointed out, *Hyporhamphus acutus* shows all gradations from completely toothed lower jaws to small specimens with only a few scattered teeth on the lower jaw. In all other respects, *Hyporhamphus acutus* is a typical member of the *Hyporhamphus* species group that has a forked caudal fin and a posterior branch to the preorbital canal.

#### Range

The specimens examined indicate that the range of *Hyporhamphus acutus* extends from Wake Island and the Marshall Islands in the northwest and the Hawaiian Islands in the north, south, and east through the Gilbert, Phoenix, Tokelau, Samoan, Tonga, Cook, Line, Society, Marquesas, and Tuamotu islands to Easter Island (Fig. 2). No specimens were examined from the Ellice Islands, but *Hyporhamphus acutus* probably occurs there also. It may also occur in the Mariana and Caroline islands but no specimens have yet been reported that far west. No specimens are known from Fiji, the New Hebrides, the Solomons, or New Guinea, in all of which a reasonable amount of collecting has been done. These areas are all south or west of the andesite line (Fig. 2), which separates continental- from non-continental-type rocks (Macdonald 1949, Menard 1964). (See Springer 1971 for comments on

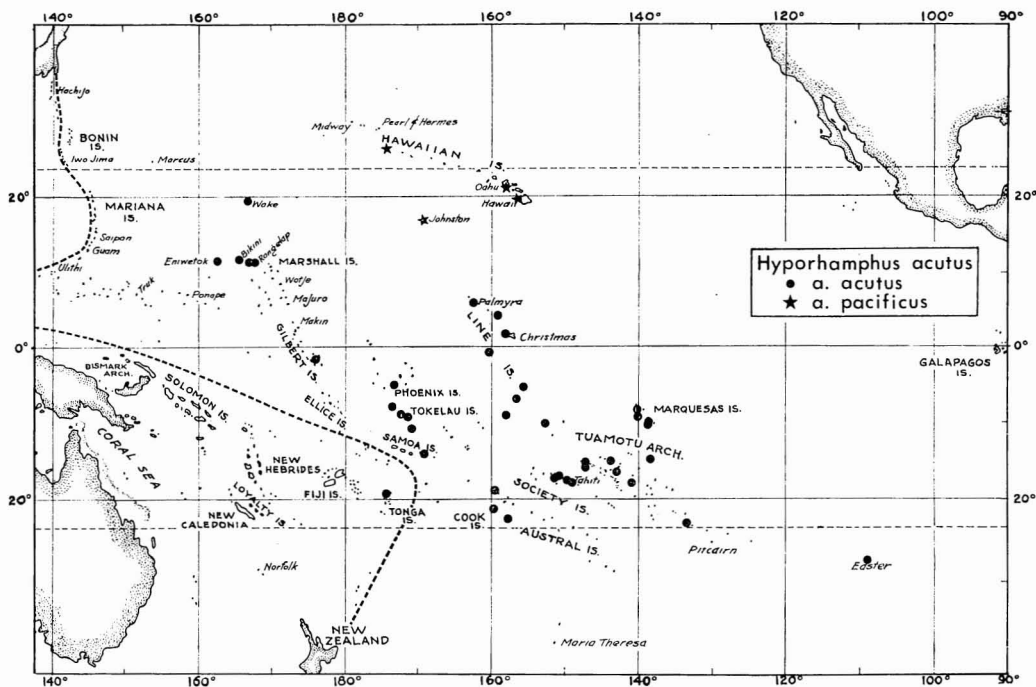


FIG. 2. Distribution of *Hyporhamphus acutus* based on specimens examined. Dots, *Hyporhamphus acutus acutus*; stars, *Hyporhamphus acutus pacificus*. Dotted line indicates andesite line which separates continental- from noncontinental-type rocks.

blenny distribution in relation to the andesite line.)

### Geographic Variation

Meristically, specimens from the Hawaiian Islands and Johnston Island differ from the other populations in having higher counts of vertebrae, dorsal, anal, and pectoral rays (Tables 1 and 2). Hawaiian-Johnston specimens have a mode of 56 vertebrae ( $\bar{X}$  56.18) and all other specimens combined have a mode of 55 ( $\bar{X}$  54.80). Nearly 90 percent of the 256 specimens counted can be separated by a line drawn between 55 and 56 vertebrae. Similarly with fin rays, there is a mean difference of slightly less than half a ray between Hawaiian-Johnston is. and all other specimens combined: dorsal rays, 14.86 vs. 14.46; anal rays, 17.53 vs. 17.10; pectoral rays, 11.26 vs. 10.83.

Populations do not appear to differ significantly in number of gillrakers (Table 3) or in shape of the preorbital canal (Fig. 3).

Morphometrically, there were no significant differences between the samples from the four main populations (Marshall Is., Hawaiian-Johnston is., Central Pacific Is., and Easter Is.) in four of the eight characters tested: lower jaw length, dorsal base length, and maximum body depth and width.

In head length, the heights of regression lines of the Marshall Is. specimens were significantly different from both Easter Is. ( $F = 18.31$ ) and Hawaiian-Johnston is. ( $F = 22.03$ ) but not from the Central Pacific Is. ( $F = 0.57$ ). The Central Pacific Is. specimens were significantly different from both Hawaiian-Johnston is. ( $F = 31.30$ ) and Easter Is. ( $F = 20.61$ ). Therefore, the Central Pacific Is. were combined with the Marshall Is. and tested against Hawaiian-Johnston is. and against Easter Is. The heights for these tests were significantly different ( $F = 39.56$  and  $22.43$ , respectively). Thus, on the basis of head length, there are three populations of *Hyporhamphus acutus*: Hawaiian-Johnston is. ( $Y = 0.224x - 0.937$ ), Easter Is.

TABLE 1  
 NUMBER OF DORSAL, ANAL, AND PECTORAL FIN RAYS IN POPULATIONS OF *Hyporhamphus acutus*

POPULATION	DORSAL RAYS						ANAL RAYS						PECTORAL RAYS					
	13	14	15	16	N	$\bar{X}$	16	17	18	19	N	$\bar{X}$	10	11	12	N	$\bar{X}$	
<i>Hyporhamphus acutus pacificus</i>																		
Hawaiian		17	29	7	53	14.81		28	24	1	53	17.49	1	33	15	49	11.29	
Johnston		8	32	4	44	14.91	1	18	24	1	44	17.57	1	34	10	44	11.23	
Total		25	61	11	97	14.86	1	46	48	2	97	17.53	1	67	25	93	11.26	
<i>Hyporhamphus acutus acutus</i>																		
Wake		5	2		7	14.29	1	4	2		7	17.14	2	5		7	10.71	
Marshall		10	18		28	14.64	4	18	6		28	17.07	2	17	1	20	10.95	
Gilbert		1	7	1	9	15.00		5	4		9	17.44		8	1	9	11.11	
Phoenix		5	7		12	14.58	2	7	3		12	17.08		12		12	11.00	
Tokelau		12	9	1	22	14.50	4	9	9		22	17.23	8	11		19	10.58	
Samoa		13	9		22	14.41	3	16	3		22	17.00	3	19		22	10.86	
Tonga	1	9	6		16	14.31	2	12	2		16	17.00	4	7		11	10.64	
Cook		4	3		7	14.43		6	1		7	17.14		5		5	11.00	
Line	1	11	14		26	14.50	3	18	5		26	17.08	7	14		21	10.67	
Society	1	21	13		35	14.34	6	22	7		35	17.03	5	25	3	33	10.94	
Marquesas		16	15		31	14.48		18	13		31	17.42	1	19		20	10.95	
Tuamotu	1	23	16		40	14.38	6	27	7		40	17.03	9	16	1	26	10.69	
Easter	1	10	9		20	14.40		15	5		20	17.25	3	17		20	10.85	
Total	5	140	128	2	275	14.46	31	177	67		275	17.10	44	175	6	225	10.83	

TABLE 2  
TOTAL NUMBER OF VERTEBRAE IN POPULATIONS OF *Hyporhamphus acutus*

POPULATION	53	54	55	56	57	58	N	$\bar{X}$
<i>Hyporhamphus acutus pacificus</i>								
Hawaiian			1	20	8	1	30	56.30
Johnston			4	32	8		44	56.09
Total			5	52	16	1	74	56.18
<i>Hyporhamphus acutus acutus</i>								
Marshall		10	10	6			26	54.85
Phoenix		5	6	1			12	54.67
Tokelau		7	12	3			22	54.82
Samoan	1	8	10	2			21	54.62
Tonga		4	10	1			15	54.80
Line	1	7	8				16	54.44
Society		4	4	1			9	54.67
Marquesas		6	18	3			27	54.89
Tuamotu		4	8	1			13	54.77
Easter		3	11	7			21	55.19
Total	2	58	97	25			182	54.80

( $Y = 0.215 \times + 0.576$ ) and Central Pacific plus Marshall is. ( $Y = 0.227 \times + 0.022$ ).

Easter Is. was significantly different from the other three populations in the heights of regression of pectoral to pelvic distance against standard length: Marshall Is. ( $F = 42.78$ ), Hawaiian-Johnston is. ( $F = 27.54$ ), and Central Pacific Is. ( $F = 40.19$ ). None of the other three populations differed among themselves ( $F = 0.10-0.44$ ). Therefore, the data for these three populations were combined ( $Y = 0.412 \times - 2.05$ ) and tested against Easter Is. ( $Y = 0.434 \times - 2.629$ ) and this comparison was also significant ( $F = 44.34$ ).

The pelvic to caudal base distance for the Easter Is. population is significantly different from both the Hawaiian-Johnston is. ( $F = 32.35$ ) and the Marshall Is. ( $F = 22.99$ ) but not from the Central Pacific Is. ( $F = 7.68$ ). There are no significant differences among populations from the Marshall Is., and Hawaiian-Johnston is., and Central Pacific Is. ( $F = 0.66-5.53$ ). Variation in this character is similar to that for the pectoral to pelvic distance, which is to be expected because both measurements reflect the relative position of the pelvic fin.

The heights of regression lines of anal base length of the Marshall Is. population were significantly different from the Hawaiian-Johnston is. populations ( $F = 15.19$ ). This is

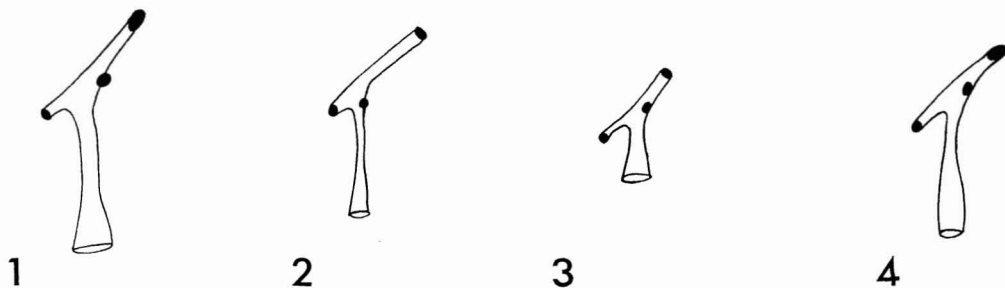
difficult to interpret because no significant differences were found for this character between either Marshall Is. or Hawaiian-Johnston is. and the Central Pacific Is. Perhaps this indicates slight differentiation in the Marshall Is., which may be obscured by the combination of several subpopulations in the Central Pacific Is. Analyses of larger numbers of specimens from smaller island groupings would be necessary to resolve this problem.

In summary, the two most isolated populations of *Hyporhamphus acutus*—Hawaiian-Johnston is. in the north and Easter Is. in the east—show some differentiation from the populations of the Central Pacific island chain extending from Wake Is. to the Tuamotus and Marquesas. The amount of endemism of the Hawaiian shore fish fauna has been estimated to range from 15 percent (Fowler 1928) to 50 percent (Jordan and Evermann 1905) with the latest figure being 34 percent (Gosline and Brock 1960). Easter Island also appeared to have a high level of endemism (Randall 1970) but many Easter Is. endemics have since turned up at Rapa and Pitcairn (Randall, personal communication).

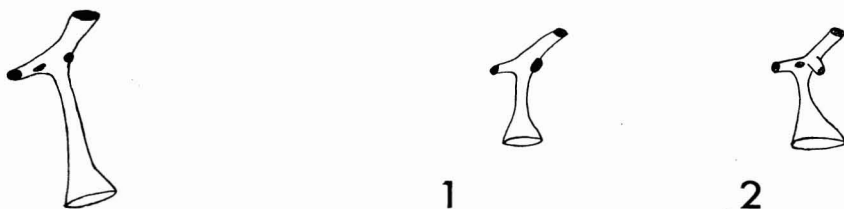
Hawaiian-Johnston is. *Hyperhamphus acutus* differ morphometrically in head length and meristically in having more vertebrae and dorsal, anal, and pectoral fin rays. Based on a

TABLE 3  
 NUMBER OF GILL RAKERS ON FIRST AND SECOND ARCHES IN POPULATIONS OF *Hyporbambus acutus*

POPULATION	FIRST ARCH													SECOND ARCH											
	32	33	34	35	36	37	38	39	40	41	42	43	N	$\bar{X}$	22	23	24	25	26	27	28	29	30	N	$\bar{X}$
<i>Hyporbambus acutus pacificus</i>																									
Hawaiian	1	—	—	1	3	4	7	4	1	—	—	1	22	37.64			4	4	4	7	1			20	25.85
Johnston				3	9	2	3	2	1				20	36.75			2	8	8	2				20	25.50
Total	1	—	—	4	12	6	10	6	2	—	—	1	42	37.21			6	12	12	9	1			40	25.68
<i>Hyporbambus acutus acutus</i>																									
Wake				1	2	—	1	—	1				5	37.00			1	1	1	1	1			5	26.00
Marshall	1	1	2	1	3	5	5	3					21	36.57		1	3	6	8	2	—	—	1	21	25.57
Phoenix				1	2	2	3	—	2				10	36.50		1	—	2	3	3	1			10	26.00
Tokelau			1	4	3	2							10	34.60	1	1	3	2	2	1				10	24.60
Samoan	1	—	1	4	4	6	3	2	1				22	36.55		1	4	5	9	3				22	25.41
Tonga			1	—	—	1	2	1					5	36.20			2	3						5	24.60
Cook					2	1	—	1	1				5	36.60			1	2	—	2				5	25.60
Line						6	2	—	2	1			11	37.09			1	4	4	2				11	25.64
Society			1	5	4	2	3	6	1				22	36.05			2	6	9	3	2	1		23	25.00
Marquesas				1	3	3	2	2	1	1			13	36.62	1	1	4	3	2	2				13	24.77
Tuamotu	1	1	2	7	3	6	1	2					23	35.83	1	3	4	4	6	3	2			23	25.22
Easter				2	6	4	3	3					18	35.94	1	2	7	5	3					18	24.39
Total	3	5	18	33	33	32	23	14	4				165	36.24	3	12	36	46	41	21	5	—	1	165	25.21



HY. ACUTUS



HY. DUSSUMIERI

HY. AFFINIS

FIG. 3. Right preorbital canals of three Central Pacific species of *Hyporhamphus*. *Hyporhamphus acutus*: 1, USNM 55109, topotype of *Hemiramphus pacificus*; 2, FMNH 16208, holotype of *Odontorhamphus cancellori*; 3, BMNH 1871.9.13.156, holotype of *Hemiramphus acutus*; 4, USNM 208436, topotype of *Hemiramphus furcatus*. *Hyporhamphus dussumieri*: Mus. Nat. Hist. Nat. Paris B. 1063, holotype of *Hemiramphus dussumieri* Valenciennes. *Hyporhamphus affinis*: 1, BMNH prereg. holotype of *Hemiramphus affinis* Günther; 2, BMNH 1856.9.4.105, syntype of *Hemiramphus laticeps* Günther.

dividing line between 55 and 56 vertebrae, 93 percent of the Hawaiian-Johnston specimens can be separated from 86 percent of the specimens from all the other islands (including Easter Is.). Several groups of inshore fishes from Hawaiian-Johnston is. have been reported to have higher counts of fin rays (Gosline 1955, Strasburg 1955, Gosline and Brock 1960) and vertebrae (Kanazawa 1958) than do related populations elsewhere in the Central Pacific. The name *Hyporhamphus pacificus* (Steindachner) has long been applied to the Hawaiian population.

Therefore, I recognize the differentiation of the Hawaiian-Johnston is. population at the subspecific level and use the name *Hyporhamphus acutus pacificus* for that population and the name *Hyporhamphus acutus acutus* (Günther) throughout the rest of the range of the species.

Easter Is. *H. acutus* differs only morphometrically—in head length and position of pelvic fin origin—so this population is not considered different enough from the other Central Pacific populations to warrant recognition at the subspecific level.

- Hyporhamphus acutus acutus* (Günther)  
*Hemirhamphus acutus* Günther, 1871: 671 (original description; Rarotonga, Cook Is.).  
 Günther 1909: 356 (described from holotype).  
*Hemiramphus furcatus* Philippi, 1876: 263–264 (original description; Easter Is.).  
*Hemiramphus phurcatus*. Fowler 1944: 45 (synonymy). Mann 1950: 25 (Easter Is.), fig. 38.  
 Fowler 1951: 283 (in key). Mann 1954: 172–174 (Easter Is., fig., description).  
*Hemirhamphus phurcatus*. Delfin 1901: 45 (Easter Is.). Fuentes 1914: 310–111 (Easter Is.).  
*Hemiramphus acutus*. Fowler 1928: 75 (after Günther 1871 and 1909).  
*Hemiramphus pacificus*. Fowler 1932: 6 (Nuku Hiva, Marquesas). Fowler 1934: 392 (Marquesas, after Fowler 1932: 6).  
*Odontorhamphus chancellori* Weed, 1933: 52–54 (original description; fig. 1; Aitutaki Is., Cook Is.). Schultz 1943: 56 (Hull Is., Phoenix Is.; Rose Is., Swains Is., Samoan Is.).  
 Fowler 1949: 56 (after Weed 1933 and Schultz 1943).  
*Hemirhamphus arnoldorum* Curtis, 1938: 41–42 (original description; Tahiti).  
*Hyporhamphus acutus*. Fowler 1938: 86–87 (synonymy and material examined, in part; Takaraoa, Tuamotu Is. [ANSP 79812]); 159 (Huahine, Society Is. [ANSP 109641, one specimen removed from 86244]); 179 (Tongareva, Line Is. [ANSP 82224]); 270 (in part, summary of range). Fowler 1949: 56 (synonymy; Baker, Phoenix Is.). Woods and Schultz 1953: 174–175 (Bikini, Eniwetok, and Rongelap atolls, Marshall Is.; description; *Odontorhamphus chancellori* placed in synonymy).  
*Hemirhamphus pacificus*. Harry 1953: 59 (life colors, ecology; Raroia, Tuamotu Is.).  
*Hyporhamphus* (cf. *unifasciatus* Ranzani). Wilhelm and Hulot 1957: 148 (Easter Is., listed).  
*Hyporhamphus phurcatus*. Buen 1963: 7 (fig. 4), 19–20 (synonymy; description; similar to *Hyporhamphus pacificus*).

#### Misidentifications

Most of Fowler's 1938 records of *Hyporhamphus acutus* are based on other species of *Hyporhamphus*; 1938: 86–87 (Takaraoa, Tuamotu

Is. [ANSP 82700]); 118 (Apataki, Tuamotu Is. [ANSP 95597]); 136 (Tahiti, Society Is. [ANSP 79832]); 159 (Huahine, Society Is. [ANSP 86244, 28 of 29 specimens]); 166 (Bora Bora, Society Is. [ANSP 82706]); 193 (Christmas Is., Line Is. [ANSP 91907, 86227, 95847]). Records of *Hyporhamphus pacificus* from Samoa by Jordan and Seale (1906: 207) and Fowler and Silvester (1922: 114–115) are also based on other species of *Hyporhamphus*.

All of Fowler's 1928 and 1938 records of *Rhynchorhamphus georgii* (Valenciennes) are based on specimens of *Hyporhamphus acutus acutus*; 1928: 76 (Kingsmill Is. [MCZ 8777]); 1938: 87 (Takaraoa, Tuamotu Is. [ANSP 79881, 79820]); 1938: 154 (Moorea, Society Is. [ANSP 75772]); 1938: 193 (Christmas, Line Is. [ANSP 75795]); 1938: 270 (summary of 1938 records).

The specimens (BPBM 2489 and ANSP 101372, originally BPBM 2490) that Seale (1906: 13) reported as *Hemiramphus affinis* from Makatea, Tuamotu Is. are both *Hyporhamphus acutus acutus*.

#### Questionable Localities

Three specimens (ANSP 7526–7528, 95–122 mm SL) are labelled and listed in the ANSP catalogue as having been collected by Dr. W. H. Jones at "Christian I., W coast of Mexico." The specimens are clearly *Hyporhamphus acutus acutus*, which does not occur in the eastern Pacific, and I can find no reference to a Christian I. The specimens may have been mislabelled Christian for Christmas Is., in the Line Islands, where the species does occur. Just before I submitted this paper for publication, Eugenia B. Böhlke kindly called my attention to the fact that Kanazawa (1958: 228–230) had come to the same conclusion while unraveling the actual locality for the type of *Leptocephalus caudalis*, a congrid eel described by Fowler from another "Christian I." specimen collected by Jones.

The second questionable collection is MCZ 8777, labelled as being from the Kingsmill Islands, Andrew Garrett, 9 (160–210 mm SL). These specimens have higher vertebral counts (six specimens with 56, two with 57) and dorsal and anal fin ray counts (means 15.00 and 17.44, respectively) than do other Central Pacific *Hyporhamphus acutus acutus* and are thus more



similar to specimens from Hawaiian-Johnston is. One difficulty with the assumption that the collection is a mislabelled Hawaiian collection is in the large size of the specimens: four of the nine are 183–210 mm whereas only one of 59 other Hawaiian specimens reaches 183 mm.

### Material Examined

WAKE IS.: SU 50048 (1, 62); Wilkes Is., Kuku Pt.; J. and P. Kauanui; 9 Oct. 1956. SU 50045 (1, 60); Wilkes Is., Kuku Pt.; J. and P. Kauanui; Nov. 1957. GVF 2865 (4, 134–155); J. Oetzel; 16 March 1957. GVF 2868 (1, 82).

MARSHALL IS.: 145 specimens (55–152 mm SL) from 12 collections: USNM 140595 (2, 92–113); Bikini; L. P. Schultz et al.; 21 July 1947. USNM 140596 (2, 61–141); Namu Is., Bikini; L. P. Schultz et al.; 7 Aug. 1947. USNM 140597 (8, 98–152); Bikini, L. P. Schultz et al.; 17 July 1947. USNM 140600 (104, 63–96); Namu Is., Bikini; L. P. Schultz; 3 April 1946. USNM 140605 (1, 56); Boro Is. channel, Bikini; L. P. Schultz and V. Brock; 6 April 1946. FMNH 44249 (10, 90–118); Namu Is., Bikini; L. P. Schultz; 6 Aug. 1947. FMNH 44247 (4, 88–124); Boro Is., Bikini; L. P. Schultz and V. Brock; 6 April 1946. USNM 140918 (1, 58); Rongerik; J. E. Marr; 2 June 1946. USNM 140614 (1, 124); Yugni Is., Rongelap; E. S. Herald; 30 July 1946. FMNH 44250 (5, 66–103); Enybarbar Is., Rongelap; 18 June 1946. USNM 140618 (1, 55); Rigili Is., Eniwetok; L. P. Schultz et al.; 25 May 1946. USNM 202978 (6, 125–141); Marshall Is.; A. B. Amerson; Oct.–Nov. 1964.

GILBERT IS.: MCZ 8777 (9, 148–210); Kingsmill Is.; A. Garrett.

PHOENIX IS.: USNM 115206 (1, 116); Hull; L. P. Schultz; 7–17 Aug. 1939. USNM 115208 (11, 64–165); Hull; L. P. Schultz; 12–15 July 1939.

TOKELAU IS.: USNM 202948 (2, 72); Nukunono; L. N. Huber; 1 March 1965. USNM 202973 (5, 60–72); Fakaofu; L. N. Huber; 1965. USNM 202975 (17, 65–83); Atafu. USNM 202974 (12, 63–75); Fakaofu; L. N. Huber; 27 Feb. 1965. USNM 202976 (9, 62–79); Fakaofu; L. N. Huber; 27 Feb. 1965.

SAMOAN IS.: USNM 115209 (61, 60–162); Rose; L. P. Schultz; 11–14 June 1939. USNM 115207 (1, 138); Swains Is.; L. P. Schultz; 4 May 1939.

TONGA IS.: USNM 142820 (16, 69–81); Vavau; *Albatross*; 1899.

COOK IS.: FMNH 16208 (1, 172); Aitutaki; Chancellor-Stuart Exped.; holotype of *Odon-torbamphus chancellori*. BMNH 1871.9.13.156 (1, 104); Rarotonga, holotype of *Hemirbamphus acutus*. SU uncat. (3, 107–131); Mangaia, Terua-pui; D. S. Marshall 35; 12 May 1958. AMS IA 5380–5381 (2, 127–146); Rarotonga; G. P. Whitley.

SOCIETY IS.: 35 specimens (57–180 mm SL) from 12 collections: USNM 202971 (5, 99–141); Bora Bora; W. L. Schmitt; 27 April 1957. USNM 202970 (1, 71); Huahine near Fare; W. L. Schmitt; 3 May 1957. USNM 203440 (3, 108–129); Bora Bora; W. L. Schmitt; 27 April 1957. ANSP 75772 (2, 56–57); Moorea; Vanderbilt S. Pac. Exped.; 15 April 1937. ANSP 109641 (1, 58); Fare Bay, Huahine; Vanderbilt S. Pac. Exped.; 17 April 1937. BPBM 6121 (2, 96–116); Hitiaa, Tahiti; J. E. Randall; 10 Aug. 1967. BPBM 6047 (2, 87–105); Papara, Tahiti; J. E. Randall; 7 Dec. 1967. GVF 57–29 (12, 103–136); Tupai; Ellsworth et al.; 7 Aug. 1957. GVF 1143 (1, 76); Tahiti; J. E. Randall 1956–67. GVF 1153 (3, 60–64); Tahiti; J. E. Randall 1956–77. GVF 1145 (1, 66); Tahiti; J. E. Randall. GVF 1278 (2, 135–180); Tahiti, Papeete market; J. E. Randall; 12 March 1957.

LINE IS.: 27 specimens (57–185 mm SL) from 12 collections: USNM 202943 (2, 65–120); Vostok; L. N. Huber; 15 June 1965. USNM 202945 (2, 125–146); Starbuck; L. N. Huber; 22 June 1965. USNM 202946 (1, 145); Malden; L. N. Huber; 24 June 1965. USNM 202949 (3, 65–89); Christmas; L. N. Huber; 27 June 1965. USNM 202977 (3, 68–90); Tongareva; L. N. Huber; 13 June 1965. ANSP 82224 (4, 59–70); Tongareva; Vanderbilt S. Pac. Exped.; 28 April 1937. BPBM 7576 (1, 185); Fanning; J. E. Randall; 31 Oct. 1968. GVF 51–51 (1, 81); Christmas; Vanderbilt Pac. Equat. Exped.; 25 Aug. 1951. GVF 51–50 (6, 57–89); Christmas, Vanderbilt Pac. Equat. Exped.; 24 Aug. 1951. ANSP 75795 (2, 62–68); Christmas; Vanderbilt

S. Pac. Exped.; 5 May 1937. BPBM 10122 (1, 162); Jarvis; Coman Exped.; 1935. BPBM 14077 (1, 80); Palmyra; J. E. Randall; 13 Nov. 1968.

TUAMOTU IS.: 46 specimens (24–147 mm SL) from 21 collections: USNM 202972 (1, 77); Tikahau; W. L. Schmitt; 15 April 1957. CAS 12001 (8, 24–89); Hao Is.; Crocker Galapagos Exped.; 27 Oct.–3 Nov. 1934. CAS uncat. (1, 57); Gambier Is., Mangareva; Crocker Galapagos Exped.; 16 Dec. 1934. CAS uncat. (1, 44); Hao; Crocker Galapagos Exped.; 31 Oct. 1934. ANSP 79811 (1, 56); Takaroa; Vanderbilt S. Pac. Exped.; 24 March 1937. ANSP 79812 (1, 88); Takaroa; Vanderbilt S. Pac. Exped.; 29 March 1937. ANSP 79820 (1, 58); Takaroa; Vanderbilt S. Pac. Exped.; 29 March 1937. ANSP 101372 (1, 92); Makatea; A. Seale; 1901. USNM 206086 (7, 102–127); Raroia; R. R. Harry; 4–5 Aug. 1952; GVF 52–45. CAS uncat. (20, 57–189); nine collections from Raroia; R. R. Harry; July–Aug. 1952; GVF 52–17, 22, 23, 26, 28, 38, 58, 61, 66. BPBM 10116 (2, 132–138); Pukapuka; R. D. Frisbie; 1936. BPBM 2489 (1, 110); Makatea; A. Seale; 1901. BPBM 10311 (1, 82); Rangiroa; Charles H. Gilbert Cruise 54; J. Magnuson and H. Yuen; 31 Oct. 1961.

MARQUESAS IS.: 31 specimens (57–162 mm SL) from eight collections: USNM 89741 (1, 58) Nuku Hiva; G. B. Pinchot; 25 Sept. 1929. CAS uncat. (2, 74–80) Hiva Oa, Tua Huka; Crocker Galapagos Exped.; 19–20 Oct. 1934. BPBM 12624 (1, 162); Nuku Hiva; J. R. Haywood; 15 May 1971. BPBM 12583 (1, 81); Nuku Hiva; J. E. Randall et al.; 12 May 1971. BPBM 12322 (1, 62); Nuku Hiva; J. E. Randall; 17 July 1957. BPBM 12561 (3, 79–91); Nuku Hiva; J. E. Randall and D. Bryant; 10 May 1971. BPBM 11034 (6, 57–75); Ua Pou; J. E. Randall et al.; 29 April 1971. BPBM 10395 (16, 66–106); Tahuata; Charles H. Gilbert Cruise 54; J. Magnuson; 16 Oct. 1961.

EASTER IS.: 21 specimens (72–158 mm SL) from five collections: USNM 208438 (1, 152); Vinapu; I. E. Efford and J. A. Mathias; 25 Jan. 1965. USNM 208436 (1, 138); Hanga Roa; I. E. Efford and J. A. Mathias; 29 Dec. 1964. USNM 208437 (2, 126–160); Hanga Piko; I. E. Efford and J. A. Mathias; 14 Jan. 1965. LACM 6560–22 (12, 72–145) and USNM 204214

(4, 95–156); Anakina Cove; R. Parks; 1 Oct. 1958. BPBM 6592 (1, 158); Hanga Piko; J. E. Randall; 1 Feb. 1969.

*Hyporhamphus acutus pacificus* (Steindachner)

*Hemirhamphus pacificus* Steindachner, 1900: 511 (original description; Laysan Is., Hawaiian Is.). Günther 1909: 356–357 (Hawaiian Is.).

*Hemiramphus pacificus*. Fowler 1928: 75 (synonymy in part; description; Honolulu and Laysan, Hawaiian Is.). von Wahlert 1955: 326 (type not in Bremen Übersee-Mus.).

*Hyporhamphus pacificus*. Snyder 1904: 522 (Laysan Is. [USNM 55109], Hawaiian Is.). Jordan and Evermann 1905: 126–127 (Kailua, Hawaiian Is.; description; fig. 41). Fowler 1919: 6 (Hawaiian Is.). Fowler 1922: 82 (Hawaiian Is.). Jordan and Jordan 1922: 18 (Hawaiian Is.). Jordan and Evermann 1926: 6 (Hawaiian Is.). Gosline and Brock 1960: 50 (Hawaiian Is., fig. after Jordan and Evermann 1905); 130 (related to *Hyporhamphus acutus*); 318 (brief synonymy).

*Hyporhamphus acutus*. Fowler 1938: 270 (Hawaiian Is.). Gosline 1955: 448–449 (description; Johnston Is.).

*Misidentification*

Fowler's 1900 record of "*Hyporhamphus* sp.?" was based, at least in part (ANSP 7507), on two juvenile specimens of *Cololabis adocoetus* Böhlke. The other collection (ANSP 23338) cannot presently be located (J. E. Böhlke, personal communication).

*Material Examined*

HAWAIIAN IS.: 58 specimens (53–183 mm SL) from 18 collections: USNM 118035 (1, 54); Hawaii; *Albatross* 3921; 1902. USNM 131892 (2, 59–61); 21° 15' 49" N, 157° 44' 27" W; *Albatross* survey sta. 286. USNM 118038 (3, 53–67); off Diamondhead Light, Oahu; *Albatross* 3921; 1902. USNM 126014 (6, 93–178); Kailua, Hawaii; Fish. Comm.; 1901. USNM 55109 (1, 183); Laysan; *Albatross*; 1902. USNM 109340 (2, 56–64); Mokuleia, Oahu; O. Degener; 1938. FMNH 55720 (2, 76–91); Honolulu; Jordan.

FMNH 4193 (4, 104-148); Hawaiian Is.; Fish. Comm. ANSP 101429 (2, 84-89); Honolulu; Fish. Comm.; 1901. ANSP 101377 (1, 99); Honolulu; J. W. Thompson. ANSP 80493 (1, 95); Honolulu; J. W. Thompson. ANSP 28121-4 (4, 89-109). Hawaiian Is.; Fish. Comm. MCZ 673 (6, 86-131); Sandwich Is.; A. Garrett. MCZ 28929 (3, 90-109); Fish. Comm. CAS uncat. (2, 84-92); Honolulu; E. Ehrhorn; Nov. 1922. CAS IU 10358 (4, 97-116); Hawaiian Is. CAS GVF 51-12 (11, 62-160); Laysan Is.; Vanderbilt Pac. Equat. Exped.; 26 June 1951.

JOHNSTON IS.: 44 specimens (70-163 mm SL) from six collections: USNM 141751 (5, 103-163); Brock, Francis, and Welsh; 1948. USNM 202947 (1,150); Sand Is.; A. B. Amerson; 1964. USNM 202944 (1, 70); Sand Is.; 6 June 1964. USNM 140623 (14, 97-156); L. P. Schultz; 28-29 Aug. 1947. LACM 9291-3 (2, 90-93); C. Mitchell; 30 July 1960. LACM 9292-4 (21, 88-134); C. Mitchell; 1 Aug. 1960.

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the manuscript were reviewed by Daniel M. Cohen, Victor G. Springer, and John E. Randall.

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