

Holacanthus interruptus, a Valid Pomacanthid Species, Distinct from *Centropyge fisheri*

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(Received May 25, 1973)

Abstract *Holacanthus interruptus* (Tanaka) is proved to be a valid species, being distinct from *Centropyge fisheri* Snyder. The holotype of the species is reexamined and illustrated. Additional material of various sizes are also examined.

Introduction

The original description of *Angelichthys interruptus* is entirely in Japanese language, brief, and without figure (Tanaka, 1918). Without stating reasons, Tanaka (1931) himself synonymized the species with *Holacanthus fisheri* Snyder, 1902. Since then all Japanese ichthyologists followed him regarding the fish which agrees with the description of *A. interruptus* as *H. fisheri* (*Centropyge fisheri* by recent authors). On the other hand, Fraser-Brunner (1933: 584) stated: "*Angelichthys interruptus* Tanaka is described entirely in Japanese and no figure is given. It is unlikely that a species from Japan belongs to this genus (*Holacanthus* subgenus *Angelichthys*) and it may prove to be a *Pomacanthus*." Obviously he did not check the original description in Japanese and he might have implicitly assumed that *Angelichthys* is the subgenus confined to the Atlantic.

The holotype of *Angelichthys interruptus* is reexamined and is proved to be different from *H. fisheri*. It belongs to the genus *Holacanthus*, not to *Centropyge* nor *Pomacanthus* (all generic names in this sentence, sensu Fraser-Brunner). Further informations on individual variations, changes with growth, life color, geographical distribution, etc., are obtained by the study of the additional material of *H. interruptus*.

Word-for-word translation of the original description (Tanaka, 1918: 224)

Angelichthys interruptus, sp. n.
(Chaetodontidae) renten-yakko

Head length $3\frac{3}{4}$, body depth $2\frac{1}{7}$, depth of caudal peduncle 8 in body length without

caudal. Eye diameter $3\frac{5}{9}$, interorbital width $2\frac{9}{10}$, snout $3\frac{1}{5}$, maxillary 4 in head length. Dorsal XIV, 17; anal III, 17; pelvic I, 5; branched caudal rays 15. Scale rows counted below lateral line 18. Teeth on mandible slender and densely set. A long and stout spine at angle of preopercle; vertical edge above the spine markedly serrated. Caudal very slightly rounded.

Color in formalin: head light gray with faint red tint, anterior portion of body adjacent to head light brown and slightly redder than head, posterior part of body blackish brown with red tint, caudal peduncle yellowish gray. Blackish brown stripes on head, interrupted here and there, forming elongate spots. Irregular spot on each scale above pectoral on body. Spinous dorsal gray; soft-rayed part black, with indigo blue stripes along its margin of anterior part and parallel with soft rays posteriorly. Narrow black line along whole margin of dorsal. Anal black with indigo blue streaks. Pectoral yellow at middle; peripheral areas white; and blackish areas scattered at base. Pelvic gray; its spine and tip of 1st soft ray black. Caudal mostly yellow near base; periphery slightly gray. Fork length 149 mm. Collected by Nuizo Ui at Tanabe, Wakayama Pref., Japan.

Holacanthus interruptus (Tanaka)
(renten-yakko)

Angelichthys interruptus Tanaka, 1918: 224 (original description; Tanabe, Wakayama Pref.); Ui, 1929: 199, fig. 77 (brief note; Tanabe, Wakayama Pref.); Fraser-Brunner, 1933: 584 (in foot-note).

Holacanthus fisheri (non Snyder); Tanaka, 1931:

33 (name only); Kamohara, 1935: 731 (brief note; Susaki, Kōchi Pref.); Okada and Matsubara, 1938: 272 (key)*; Kamohara, 1950: 187 (brief desc.); Kamohara, 1961: 32, pl. 32, fig. 1; Masuda and Hata, 1969: 71 (upper left fig., Hachiyo-jima).

Centropyge fisheri (non Snyder); Matsubara, 1955: 939 (key)*; Imajima, 1969: 165 (listed; Ogasawara Is.); Hiyama and Yasuda, 1971: 27, pl. 55 and p. 294 (color photo; Ito, Shizuoka Pref.); Burgess and Axelrod, 1972: 37, fig. 57 (same photo as that of Hiyama and Yasuda, 1971); Kataoka et al., 1970: 24 (listed; Ogasawara I).

Holacanthus (Centropyge) fisheri (non Snyder); Kamohara, 1958: 44 (listed); Kamohara, 1964: 57 (listed); Kamohara, 1965: 395, fig. 988; Masuda and Abe, 1972: pl. 131 and 132, and p. 193 (Futo, Izu Pen., and Kōzu-shima).

Material

ZIUT (Zoological Institute, Faculty of Science, the University of Tokyo) 8343. Holotype. Collected at Tanabe, Wakayama Pref., preserved in formalin and recently transferred into alcohol.

ZIUT 22315. Obtained at Tokyo Fish Market. Unknown date, before Mar., 1931.

ZIUT 52760 to 52763. Donated by Mr. Hajime Masuda. Assumed to be captured near Futo, Izu Pen. (34°54'N, 139°08'E), from 1969 to 1970. Preserved in formalin without data. ZIUT 52762 (male) is partly dissected and stained with alizarin.

ZIUT 52793. Donated by Mr. Hajime Masuda. Collected at Futo, Izu Pen., from the depth of about 30 m, on Sept. 17, 1967.

Description

The counts and measurements of the holotype and other specimens are shown in Table 1. The following counts are constant for all specimens studied. Dorsal XIV, 16; anal III, 17; pelvic I, 5; caudal branched rays 8+7. Vertebrae 10+14 (terminal half vertebra counted as 1); branchiostegals 6; predorsal bone 1. The following data are based on a male, ZIUT 52762. Gill rakers on the first gill arch 7+1+16; pored

scales in lateral line 35 to near the end of soft dorsal fin base, 1 pored scale slightly behind the continuous series, and 1 separate pored scale on caudal peduncle (right); no pyloric caeca.

Teeth on both jaws are brush-like, trilobed with lateral lobes much shorter than the median, and arranged in four rows; internal ones are shorter. The vomer and palatine lack the teeth. The anterior opening of the nostril has a raised fleshy rim. Eye diameter is shorter than the interorbital width. The ventral margin of the 1st infraorbital (preorbital) is free from the cheek. On the 1st infraorbital, there are several blunt spines or serrations along its anterior and ventral margins; spines on the anterior rim are more or less separated from those of the ventral rim by a notch between them. The preopercle has a stout spine at the angle and 0~2 (usually 1) spines in front of it; posterior vertical margin has 10~30 spines of various sizes and shapes. The interopercle has 1~4 spines antero-ventrally. The rim of the subopercle has 2~10 weak spines. Posterior exposed rim of the supracleithrum are also finely serrated. Some of spines or serrations on the posterior vertical rim of the preopercle, subopercle, and supracleithrum are minute, resembling the ctenii of the scales adjacent to them. Number, size, and shape of spines are much variable not only among specimens but also from left and right sides of a same specimen.

Scales are rather deciduous for the pomacanthids. They are strongly tenoid, except those on the areas of the belly hidden by the pectoral and pelvic fins which are cycloid or weakly ctenoid. Scales are set regularly on the body below the lateral line, but rather irregular above it. Scales located dorsoanterior to the eye are minute and their ctenii are erected against the body surface, so as to give the head spinulose appearance. Auxiliary scales are marked and numerous along the lateral line; owing to their presence it is difficult to count pored scales. On the region anterior to the anus and below the pectoral fin there are occasionally auxiliary scales. The lateral line is continuous to slightly anterior to the posterior end of the dorsal base; posterior to the continuous series of pored scales, several isolated pored scales are present on the caudal peduncle. Third to 6th branchiostegals are scaled.

* Key characters used by them are those of true *Centropyge fisheri*, but Japanese records are based on *Holacanthus interruptus*.

Table 1. The counts and measurements of *Holacanthus interruptus*. Measurements are expressed in hundredths of standard length. L, left side; r, right.

Catalogue number Character	8343, holotype		22315		52760		52761		52762		52763		52793		range	mean
	l.	r.	l.	r.	l.	r.	l.	r.	l.	r.	l.	r.	l.	r.		
Pectoral fin	17	17	17	17	17	17	17	17	17	16	16	16	17	17	16 ~ 17	16.8
Scales above lateral line	4		—		4		4		4		5		5		4 ~ 5	4.3
Scales below lateral line	18		—		19		18		18		18		18		18 ~ 19	18.2
Scale rows slanting forward ventrally to caudal base	46	44	46	45	44	44	45	—	45	44	41	—	44	44	41 ~ 46	44.3
Scale rows slanting backward ventrally to caudal base	29	29	29	29	29	29	27	—	28	28	29	—	27	27	27 ~ 29	28.3
Standard length (mm)	118.9		119.8		111.8		108.9		94.0		80.7		52.8		52.8~119.8	
Total length (mm)	147.8		144.9		138.7		134.4		117.9		96.4		66.5		66.5~147.8	
Body depth	49.7		51.8		54.6		49.7		51.2		50.9		52.7		49.7~ 54.6	51.5
Body width	17.7		23.4		24.0		22.5		19.9		16.4		20.1		16.4~ 24.0	20.6
Head length	28.8	27.8	30.1	29.2	28.5	28.5	27.1	—	—	27.1	26.0	25.4	32.6	32.2	25.4~ 32.6	28.9
Snout length	11.5	12.1	13.4	13.5	11.5	10.9	9.2	—	9.9	9.1	8.2	8.4	12.5	13.6	8.2~ 13.6	10.9
Caudal peduncle depth (least)	13.0		13.2		13.3		12.8		12.9		12.4		13.6		12.4~ 13.6	13.0
Orbit diameter	8.2	8.0	6.8	7.2	7.1	7.4	7.7	—	8.6	8.1	9.3	9.2	11.0	11.0	6.8~ 11.0	8.4
Interorbital width	9.8		9.9		10.2		9.5		10.1		9.5		9.7		9.5~ 10.2	9.8
Dorsal base	66.7		65.9		68.4		68.2		68.0		62.3		69.3		62.3~ 69.3	67.0
Anal base	34.6		39.3		41.8		36.5		38.4		35.7		38.6		34.6~ 41.8	37.8
Length of 4th dorsal spine	13.5		11.9		11.8		12.9		11.8		10.7		15.2		10.7~ 15.2	12.5
Length of longest anal spine	14.6		12.0		15.7		14.4		17.1		15.7		21.6		12.0~ 21.6	15.9
Length of pectoral fin	25.8	27.2	25.2	—	24.9	25.4	25.6	26.4	26.5	26.2	27.9	26.6	—	29.2	24.9~ 29.2	26.0
Length of pelvic fin	29.8	25.9	28.1	25.2	29.1	31.7	30.1	30.0	31.6	29.8	30.5	30.4	30.1	34.5	25.2~ 34.5	29.9
Length of preopercle spine	10.4	11.4	8.9	9.4	8.0	7.4	8.7	9.0	7.8	8.3	7.8	8.3	8.9	8.3	7.4~ 11.4	8.6
Snout to dorsal origin	35.6		38.4		36.7		34.6		33.8		35.6		42.4		33.8~ 42.4	36.7
Snout to dorsal end	90.9		91.2		92.3		90.4		91.0		86.2		93.4		86.2~ 93.4	90.8
Snout to anal origin	64.5		61.9		59.2		61.0		63.9		60.8		57.4		57.4~ 64.5	61.2
Snout to anal end	90.6		91.5		90.9		88.9		90.7		85.7		91.7		85.7~ 91.7	90.0
Snout to pectoral insertion	28.3	27.2	29.0	30.0	28.5	27.6	26.6	27.2	26.4	26.7	25.0	25.4	31.3	31.3	25.0~ 31.3	27.9
Snout to pelvic insertion	36.2	36.4	39.2	37.9	36.6	37.1	35.3	35.4	37.2	37.6	33.8	34.0	38.8	38.4	33.8~ 39.2	36.7

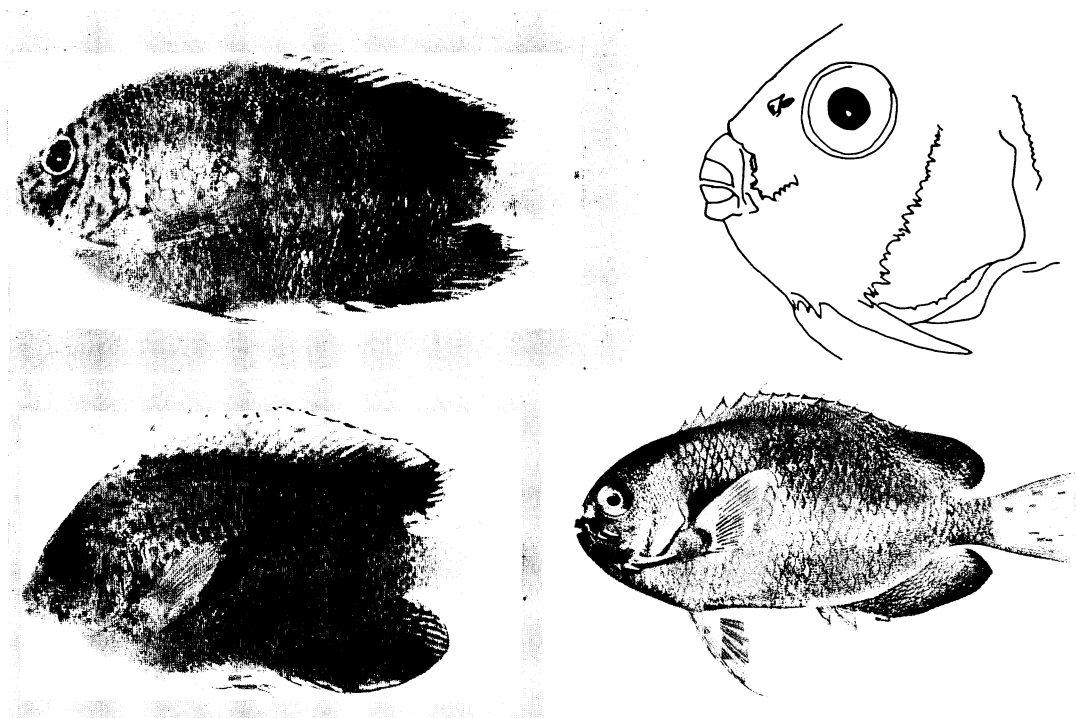


Fig. 1. *Holacanthus interruptus* and *Centropyge fisheri*. Upper left: holotype of *H. interruptus*, ZIUT 8343, 118.9 mm in standard length; upper right: head region of the holotype to show spines and serrations; lower left: a juvenile specimen of *H. interruptus*, ZIUT 52793, 52.8 mm in standard length; lower right: holotype of *Centropyge fisheri*, USNM 50881, 78 mm in standard length (after Snyder, 1904).

Dorsal spines grow gradually longer from the 1st to last; the 1st spine is more than $3/4$ length of the 2nd. Membrane between the 1st and 2nd spines is nearly cleft to the base, and notches between following spines becomes successively shallower; membranes between the 1st and 3rd spines are scaled only at the base, but remaining membranes are covered with minute scales except the distal margin. Except anterior 3 spines, their bases are covered with scales and flesh, so that the base line of the dorsal fin is not distinct in the external view.

Anal spines become longer from the 1st to 3rd; membrane between the 1st and 2nd spines is nearly cleft to the base. Soft-rayed part of anal fin is much similar to the soft dorsal. Soft portions of the dorsal and anal fins are somewhat pointed. The pectoral fin is scaled only at the base; 4th and 6th rays form its distal tip. The pelvic fin is scaled except its distal margin. The 1st ray of the pelvic extends filamentously near to the anal origin. The hind margin of the

caudal fin is truncate and scaleless.

Coloration

In life, the ground color is orange yellow with more or less pinkish tint anteriorly and becomes violet blue posteriorly. Some individuals are mostly bluish, moreover, a single fish kept in an aquarium may change its dominant color within several days. Irregular blue bars are scattered on the head, and blue spots on the dorsoanterior part of body. The eye is surrounded by a blue circular line which is interrupted anteriorly. Blue dots which are confined on each scales are scattered on the body above the pectoral fin. The preopercular spine is blue. The pectoral fin and caudal fin including the caudal peduncle is yellow. The dorsal and anal fins are margined with blue. Several longitudinal blue and black stripes of the similar width are present on the posterior parts of the dorsal and anal fins; these stripes may be absent, or confined only to the anal fin in smaller specimens and

entirely absent in those less than 100 mm in standard length. The filamentous 1st ray and sometimes distal margin of the pelvic fin is blue; remaining part of the fin is yellow.

A young specimen, about 32 mm in standard length was caught alive in late Nov., 1972 from Futo, Izu Pen. at the depth of about 20m and has been reared up to Aug., 1973. According to its color photographs, blue spots and bars are more conspicuous but less densely set on the dorsal side of the body and base of the dorsal fin except anterior part of the head than larger specimens. The soft dorsal is provided posteriorly with a blue-edged black spot. Posterior to the black spot, the dorsal fin is yellow, and blue and black stripes in the adult are absent on the dorsal and anal fins. The black spot on the dorsal fin is perhaps the marking peculiar to the juvenile stage, as well as absence of blue and black stripes on the dorsal and anal fins. Such juvenile characters are also evident in ZIUT 52793, 52.8 mm in standard length.

In formalin, the ground color is warm brown and is darker posteriorly. Blue markings when alive are turned to be dark brown. The black stripes on the dorsal and anal fins of adult specimens are darker than the neighboring blue stripes.

Habit and habitat

Mr. Hajime Masuda informed us that this species inhabits rocky shores at the depths from 15 to 60 m, rather common in Izu Pen., Izu Shichito, and Hachijo-jima.

Distribution

Pacific coast of central to southern Japan; known from Susaki, Kōchi Pref. to Izu Pen., Shizuoka Pref., Hachijo-jima, and Ogasawara Gunto. No records nor information have been hitherto present from Ryūkyū Is. or Formosa.

Note

Holacanthus interruptus is different from *Centropyge fisheri* (Snyder) (type locality, Hawaii) in the body color and markings (Fig. 1). Although the color patterns of the pomacanthid fishes are subject to wide intraspecific variation, the differences between them are beyond the species level. In markings on the body, *H. interruptus* is somewhat similar to *C. potteri*. The ventral rim of

the 1st infraorbital has blunt spines in *H. interruptus*, 1~3 sharp, backward recurved spines characteristic to *Centropyge fisheri* or *C. flavicauda* are never present.

In addition to the peculiar markings on the head and body, *H. interruptus* has fewer dorsal soft rays for known *Holacanthus* (sensu Fraser-Brunner); 16 dorsal soft rays were reported only in *H. venustus*.

The juvenile marking similar to *H. interruptus* on the soft dorsal also appears in *H. diacanthus* and *H. trimaculatus* (Fowler and Bean, 1929: 170, fig. 8; Hiyama and Yasuda, 1972: 246).

Acknowledgments

We thank Mr. Hajime Masuda who presented specimens and informations of present species, and to Mr. Akira Watanabe who assisted Fujio Yasuda in rearing a young of *H. interruptus*.

Literature cited

- Burgess, W. and H. R. Axelrod. 1972. Pacific marine fishes. T.F.H. Pub. Inc. Ltd., Hong Kong, 280 pp., 489 color photos.
- Fowler, H. W. and B. A. Bean. 1929. The fishes of the series Caprifformes, Ehippiformes, and Squamipinnes, collected by the United States Bureau of Fisheries Steamer "Albatross", chiefly in Philippine seas and adjacent waters. U.S. Nat. Mus., Bull. 100, 8: xi+352 pp., 25 figs.
- Fraser-Brunner, A. 1933. A revision of the chaetodont fishes of the subfamily Pomacanthinae. Proc. Zool. Soc. London, 1933: 543-599, 29 figs., 1 pl.
- Hiyama, Y. and F. Yasuda. 1971. Living fishes of the Japanese coastal waters. Kodansha Co., Tokyo, 377 pp., 240 color photos. In Japanese.
- Kamohara, T. 1935. Tosa san chōchōuo ka gyorui no bunrui. [The classification of the Chaetodontidae of Tosa Province]. Shokubutsu oyobi Dōbutsu [Plants and Animals], 3: 730~736. In Japanese.
- Kamohara, T. 1950. Description of the fishes from the Provinces of Tosa and Kishu, Japan. Kōchiken Bunkyo Kyōkai, Kōchi, 3+288+5+48+26 pp., 220 figs. In Japanese.
- Kamohara, T. 1958. A catalogue of fishes of Kōchi Prefecture (Province Tosa), Japan. Rep. Usa Mar. Biol. Sta., 5 (1): 1~76.
- Kamohara, T. 1961. Coloured illustrations of the fishes of Japan (II). Hoikusha, Osaka, xi+168 pp., 68 pls. In Japanese.
- Kamohara, T. 1964. Revised catalogue of fishes

- of Kōchi Prefecture, Japan. Rep. Usa Mar. Biol. Sta., 2 (1): 1~99, 63 figs.
- Kamohara, T. 1965. Chaetodontidae. In Okada, K., S. Uchida, and T. Uchida ed. New illustrated encyclopedia of the fauna of Japan (III). Hokuryu-Kan, Tokyo, 390~395, 23 figs. In Japanese.
- Kataoka, T., S. Kitamura, M. Sekido, and K. Yamamoto. 1970. Coral fishes of the Ogasawara (Bonin) Islands. Report on the marine biological expedition to the Ogasawara (Bonin) Islands, 1968. Toba Aquarium and Asahi Shimbun Pub. Co., 7~40, 3 figs., 33 photos. In Japanese.
- Matsubara, K. 1955. Fish, morphology and hierarchy. 2. Ishizaki Shoten Co., Tokyo, 791~1605, figs. 290~536. In Japanese.
- Masuda, H. and T. Abe. 1972. Sea fantasy. Wonders of fish life in Japan's coastal waters. Mainichi Shinbun-sha, Tokyo, etc., 201 pp., 172 color pls. In Japanese and English.
- Masuda, H. and M. Hata. 1969. Marine life of Japan. Gakushu Kenkyusha Co., Tokyo, ii+198 pp., many color photos. In Japanese.
- Okada, Y. and K. Matsubara. 1938. Keys to the fishes and fish-like animals of Japan. Sanseido Co. Ltd., Tokyo and Osaka, x1+584 pp., 113 pls. In Japanese.
- Snyder, J. O. 1904. A catalogue of the shore fishes collected by the steamer "Albatross" about the Hawaiian Islands in 1902. Bull. U.S. Fish Comm., 1902 (1904): 513~538, 13 pls.
- Tanaka, S. 1918. Nippon san gyorui no 12 shinshu. (Twelve new species of fishes of Japan). Dōbutsugaku Zasshi (Zool. Mag., Tokyo), 30 (356): 22~227. In Japanese.
- Tanaka, S. 1931. On the distribution of fishes in Japanese waters. J. Fac. Sci., Imp. Univ. Tokyo, Sec. 4, 3: 1-90, 3 pls.
- Ui, N. 1929. Kishū gyofu (Descriptions and illustrations of fishes from the Province Kishū). rev. ed. Kindai-Bungei-sha, Osaka, 284+45 pp., 108 figs. In Japanese.
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レンテンヤッコの学名と形態

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レンテンヤッコは原産地がハワイの *Centropyge fisheri* Snyder とは異なる種類であることが判明した。レンテンヤッコの学名には *Holacanthus interruptus* (Tanaka) を用いるのが妥当である。レンテンヤッコの完模式標本を再査したほか他の標本も調べ、個体変異、成長に伴う変化、生時の色彩、地理的分布などを明らかにした。

(113, 東京都文京区本郷 東京大学総合研究資料館:
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