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# AN ADDITIONAL STUDY ON CHAETODONT FISHES (CHAETODONTIDAE) WITH DESCRIPTION OF TWO NEW SPECIES\*

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#### ABSTRACT

Shih-Chieh Shen and Peng-Chee Lim (1975). An Additional Study on Chaetodont Fishes (Chaetodontidae) with Description of Two New Species. Bull. Inst. Zool., Academia Sinica 14(2): 79-105. Fifty-two species of the family Chaetodontidae have been reported since 1973, in addition, thirteen more species were collected and described in the waters around Taiwan and its adjacent islands. Among them eleven species including Chaetodon meyeri, C. nippon, C. quadrimaculatus, Genicanthus vermiculatus sp. nov., G. watanabei, G. venustus, G. semifasciatus, G. melanospilus, Chaetodontoplus cephalreticulatus sp. nov., C. personifer and C. melanosoma are first recorded in Taiwan, and two juveniles of Euxiphipops sexstriatus and Pomacanthus annularis are illustrated for the first time. Genicanthus fucosus and G. macclesfieldiensis are recognized as the female phases of G. semifasciatus and G. melanospilus respectively. Most species were collected at the depth of 20 meters or more, and appeared in the coral reefs of north-eastern and south-eastern of Taiwan.

Recently, additional thirteen species have been collected from the waters around Taiwan and its adjacent islands since fifty-two species of the chaetodont fishes (Chaetodontidae) were reported previously by Shen<sup>(10)</sup> in 1973.

Yasuda and Tominaga<sup>(49,50)</sup> recognized only one genus, *Holacanthus*, for the Indo-Pacific Pomacanthines. We thought that it is better to be reclassified tentatively after Fraser-Brunner<sup>(16)</sup> except the complications between the genera of the Pomacanthinae were solved. Therefore the characters used here for the genera of the subfamily Pomacanthinae are modified after Fraser-

#### Brunner.

In the present study, only one species G. venustus is somewhat doubtful as its unusual rounded caudal fin, but the hind margin of its preorbital is free and serrated, median notch apparently appears in the right side but not in the left, and the interopercle without small spine fits the key characters of Fraser-Brunner<sup>(10)</sup>.

All measurements are expressed in both percentages and proportions in parenthesis of standard length (SL) or of head length (HL). The methods used in the present study are followed Shen 1973.

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## KEY TO THE ADDITIONAL SPECIES OF CHAETODONTIDAE

- Preoperculum without strong and long spine at the angle (Chaetodontinae)......2 Preoperculum with a very strong spine at the angle (Pomacanthinae)......3
   Body, head and fins with irregularily curved black strips.....Chaetodon meyeri Fig. 1 Body, head and fins without any strip.... .....Chaetodon nippon Fig. 2 Body with two white spots and head with
- one vertical dark brown cross band.....
  ........ Chaetodon quadrimaculatus Fig. 3
  3. Scales large, 60 or less, in regular series...4
  Scales small, more than 75, not in regular

- 6. Margins of dorsal and anal black......7 Margins of dorsal and anal not black.....8
- Wavy stripes black on lower part of body .....G. vermiculatus Fig. 7 Regular stripes black on lower part of body in male, for black markings from occiput to snout in female.....
- G. watanabei Figs. 8-9
  8. Body yellow anteriorly, with a blue triangular patch on above eye, blue or dusk yellow posteriorly....G. venustus Fig. 10
  Body silvery brown ......9
- Caudal peduncle black; head with two black bands, one on above eye and margin of operculum..........G. semifasciatus (female) Figs. 11
   Caudal peduncle similar color to body; head without black band......

.....G. melanospilus (female) Figs. 13

10. Body with transverse yellowish stripes ex-

tending to abdomen..... ..... G. melanospilus (male) Fig. 14 Body with transverse stripes not extending to abdomen ..... ..... G. semifasciatus (male) Fig. 12 11. Anterior nostril larger than the posterior one; lateral line complete (Pomacanthus). Body with curved blue stripes ..... .....P. annularis Fig. 15 Anterior nostril smaller than the posterior one; lateral line incomplete, terminates at end of the base of soft dorsal fin (Chaetodontoplus) ..... 12 12. Head with blue stripes ..... ..... C. cephalareticulatus Fig. 16 13. A yellowish band passes from occiput to ventral; head white grayish, with yellowish spots in male..... ..... C. personifer Figs. 17-19 No band from occiput to ventral; head yellowish paler, with mottlings and vermiculations in older ones..... ..... C. melanosoma Figs. 20-22

# Chaetodon meyeri (BLOCH and SCHNEIDER) Fig. 1

- Chaetodon meyeri Bloch and Schneider, 1801: 233 (Moluccas)<sup>(8)</sup>; Günther, 1860: 13 (Celebes, Amboina, Java, Moluccas)<sup>(10)</sup>; Weber, 1913: 305 (Banda, Timor)<sup>(45)</sup>; Fowler and Bean, 1929: 60, figs. 3-4 (numerous localities)<sup>(15)</sup>; Weber and de Beaufort, 1936: 69, Fig. 20 (13 localities)<sup>(46)</sup>; Hiyama and Yasuda, 1971: 47, fig. 98<sup>(22)</sup>; Axelrod and Emmens, 1971: 295<sup>(22)</sup>; Burgess and Axelrod, 1972: 65, fig. 106 and 108 (Ishigaki Island)<sup>(5)</sup>.
- Tetragonptrus (Citharoedus) meyeri Bleeker, 1877: 32, pl.<sup>(14)</sup> 378, fig. 5 (Java, Celebes, Amboina, Ceram, New Guinea<sup>(6)</sup>.

DESCRIPTION: D. XII, 23; A. III, 19;

P. 16; V. I, 5; L. 1. 47 (tubular), L. tr. 11/27. In SL: Head length 28.4 (3.4); depth of body 60.8 (1.6); predorsal length 29.5 (3.4); preventral length 24.2 (4.1); preanal length 52.1

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(1.9); length of longest (12th) dorsal spine 19.0 (5.3); length of longest (7th) dorsal ray 24.2 (4.1); base of dorsal fin 69.5 (1.4); length of third anal spine 23.4 (4.3); length of longest (7th) anal ray 24.2 (4.1); base of anal fin 39.5 (2.5); length of pectoral fin 29.2 (3.4); length of ventral spine 19.0 (5.3); length of ventral ray 24.5 (4.1).

In HL: Snout 30.0 (3.3); interorbital width 41.7 (2.4); horizontal diameter of eye 28.3 (3.5); postocular length 43.3 (2.3); length of caudal peduncle 20.6 (4.9); least depth of caudal peduncle 43.9 (2.3).

Body orbicular and strongly compressed; head profile straight; interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, the anterior one with a fleshy rim; mouth small, terminal; teeth slender, bristle-like, tricuspid; lower jaw slightly protruded; dorsal spines strong and progressively longer, posterior margins of soft dorsal and anal fins rounded; ventrals reach anus; scales arranged in regular eries, smaller on head, soft dorsal, anal and caudal fins; lateral line ended at end of base of dorsal fin.

Color in life pearly tint on body, yellow on

abdomen and vertical fins; a yellow patch with red dots on base of anterior six dorsal spines and several short red lines on basal half of soft dorsal; lips black; head and fins with curved yellow-edged black bands as illustrated on Fig. 1. First band across mouth corner, second as ocular, third one extending obliquely from nape to base of first dorsal spine and running posteriorly along submargin of dorsal fin; fourth one from base of fifth dorsal spine arched forward to preopercle then down ward to base of ventral, and along anal base to last three anal rays; fifth one running anteriorly from base of tenth dorsal spine along dorsal base to opercular margin and base of pectoral, then running posteriorly along ventral side of caudal peduncle; the shorter sixth band extending anteriorly from base of 10th dorsal spine to the interception with the previous band on upper pectoral base; seventh and eighth bands arched, running anteriorly from base of tenth and eleventh dorsal spines to posterior part of pectoral; anal with a submarginal broad blackish band and a narrow one in the middle; whiteedged caudal with two red narrow lines and two black band.

RANGE OF DISTRIBUTION: Widespread



Fig. 1. Chaetodon meyeri (Bloch and Schneider) 126.6 mm SL

in the tropical Indo-Pacific, from east Africa to to the Philippine Islands, northward to southern part of Japan, eastward to Bismarck Archipelagos; southward to Marshall Islands.

SPECIMEN EXAMINED: NTUM 02703, 126.6 mm SL, 1974-6-15, Lü-tao (Green Island).

# Chaetodon nippon (STEINDACHNER and DÖDERLEIN) Fig. 2

- Chaetodon nippon Steindachner and Doderlein 1884: 23, pl. 4, fig. 2; Jordan and Fowler 1902: 537 (Totomi Bay)<sup>(25)</sup>; Fowler and Bean 1929: 82<sup>(15)</sup>; Matsubara 1955: 943<sup>(30)</sup>; Kamohara 1964: 55; Abe 1965: 167.
- Chaetodon carens Seale 1910: 115, pl. 1, fig. 1; Herre 1953: 500; Herre and Montalban 1927: 55<sup>(20)</sup>.

DESCRIPTION: D. XIII, 21; A. III, 16; P. 14; V. I, 5; L. 1. 45, L. tr. 9/19.

In SL: Head length 30.0 (3.3); depth of body 61.0 (1.6); predorsal length 29.0 (3.5); preventral length 26.0 (2.8); preanal length 66.0 (1.5); length of longest (4th) dorsal spine 24.0 (4.1); length of longest dorsal ray (first) 16.0 (6.1); base of dorsal fin 66.0 (1.4); longest anal spine (2nd) 22.0 (4.5); longest anal ray (1st) 17.0 (5.9); base of anal fin 26.0 (3.8); longest pectoral ray 24.0 (4.1); longest ventral spine 18.0 (5.7); longest ventral ray 23.0 (4.3).

In HL: Snout length 19.0 (5.2); interorbital width 35.0 (2.9); horizontal diameter of eye 36.0 (2.8); postocular length 44.0 (2.3); length of caudal peduncle 28.0 (3.6), least depth of it 38.0 (3.6), least depth of it 38.0 (2.6).

Body moderately deep and strongly compressed; head moderate, characterized by large eyes and short pointed snout, dorsal profile of forehead about 45°, interorbital space slightly concave; mouth small; teeth brushlike in several rows, slightly projecting; two nostrils close together and located just before eye, rim of anterior nostril with a short flattened flap; spinons dorsal higher at 4th spine and decreased in height gradually; soft dorsal higher anteriorly and decreased in height posteriorly; both soft portions of dorsal and anal fins rounded; scales regularly rounded, smaller on head soft dorsal and anal and caudal fins; lateral line ends beneath rear base of dorsal fin.

Color in life yellow, a broad blackish band extends from posterior half of spinous dorsal and



Fig. 2. Chaetodon nippon (Steindachner and Döderlein) 106.8 mm SL

entire soft dorsal to almost the entire anal; margins of both soft dorsal and anal fins white; caudal fin yellow on anterior half, slightly dusky in the middle and whitish on posterior one third; ventral brown basally; pectorals yellowish white.

RANGE OF DISTRIBUTION: From the Philippines northward to Japan.

SPECIMEN EXAMINED: NTUM 02704, 106.8 mm SL, 1975-6-1, Kee-lung.

## Chaetodon quadrimaculatus (GRAY) Fig. 3

Chaetodon quadrimaculatus Gray, 1831: 33; Gunther, 1860: 13<sup>(19)</sup>; Gunther, 1873: 38, pl. 30, fig. A; Fowler, 1938: 124; Schultz, 1943: 152; Gosline, 1960: 329; Burgess and Axelrod, 1972: 50, fig. 78.

DESCRIPTION: D. XIV, 21; A. III, 18; P. 16; V. I, 5; L. 1. 10/21.

In SL: Head length 31.0 (3.2); depth of body 59.1 (1.7); predorsal length 25.4 (3.9); preventral length 38.4 (2.6); preanal length 63.8 (1.6); longest dorsal spine (3rd)\_14.3 (7.0); long-\_\_\_ est anal spine (3rd) 18.7 (5.3); longest anal ray (4th) 22.5 (4.4; base of dorsal fin 67.9 (1.5); base of anal fin 26.7 (3.8); length of dectoral fin 25.4 (3.9); length of ventral fin 25.4 (3.9); length of ventral spine 19.7 (5.3).

In HL: Snout length 34.9 (2.9); interorbital width 27.7 (3.6); horizontal diameter of eye 32.8 (3.1); postocular leagth 34.9 (2.9); length of caudal peduncle 16.3 (6.1), least depth of it 34.4 (2.9).

Body moderately deep and very compressed; head moderate; snout slightly produced, its dorsal profile concave slightly; mouth small, teeth brushlike in several rows and projecting slightly; nostrils close together and located just before eyes, anterior one with a short rim; scales smaller, arranged in regular series; laterl line ends beneath rear base of dorsal fin; dorsal and anal fins with the posterior angle rounded.

Color in life yellow, a ocular band begins from the nape of the neck, is as broad as the orbit, black above the eye and brown beneath edged with black and whitish blue on its anterior and posterior margins; upper half of the body



Fig. 3. Chaetodon quadrimaculatus (Gray) 63 mm SL

black, with two white spots on each side, one below the middle of spinous dorsal, the other below the middle of the soft; the soft dorsal and anal with a bluish stripe separated yellow basally and brown distally; pectoral, ventral and caudal fins yellowish.

RANGE OF DISTRIBUTION: From southern Japan southward to Taiwan and eastward to Hawaii Islands.

SPECIMEN EXAMINED: NTUM 02009, 63 mm SL, 1975-9-5, Kee-lung.

# Euxiphipops sexstriatus (CUVIER and VALENCIENNES) Figs. 4-6

- Holacanthus sexstriatus Cuvier and Valenciennes, 1831: 194,<sup>(12)</sup>; Günther, 1860: 49 (Molucca Sea)<sup>(10)</sup>; Bleeker, 1877: 66, pl.<sup>(10)</sup> 372, fig. 4,<sup>(6)</sup>; Herre and Montalban, 1927: 84 (Philippines)<sup>(20)</sup>; Fowler and Bean, 1929: 177 (many localities)<sup>(15)</sup>; Hyama and Yasuda, 1971: 10, fig. 16–18,<sup>(22)</sup>.
- Holacanthus semicirculatus Fowler and Bean (in part), 1929: 186, middle left figure on fig. 9,<sup>(15)</sup>.
- Heteropyge sexstriatus Fraser-Brunner, 1933: 569, textfig. 12 (4 localities)<sup>(16)</sup>.
- Pomacanthus (Pomacanthodes) chrysursus Weber and de Beaufort, 1936: 139, fig. 35<sup>(46)</sup>.
- Euxiphipops sexstriatus Weber and de Beaufort, 1936: 146, fig. 38 (5 localities)<sup>(46)</sup>; Marshall, 1965: 264, pl. 42, fig. 272 (N. Queensland)<sup>(28)</sup>; Yasuda and Tominaga, 1969: 146, fig. 2, 4-6 (Onna village, Okinawajima)<sup>(49)</sup>; Chen and Chao, 1971: 60, fig. 25,<sup>(11)</sup>; Axelrod and Emmeens, 1972: 391<sup>(2)</sup>; Burgess and Axelrod, 1972: 4, figs. 16-18 (Okinawa<sup>(9)</sup>.

DESCRIPTION: D. XIII, 20–21; A. III, 18–20; P. 18–19; V. I, 5; L. 1. 46–60.

In SL: Head length 27.6-31.1 (3.2-3.6); depth of body 53.2-64.0 (1.6-1.9); preodorsal 24.2-28.0 (3.6-4.1); preventral 28.0-31.7 (3.2-3.6); preanal 55.0-62.1 (1.6-1.8); length of thirteenth dorsal spine 19.7-24.0 (4.2-5.1); length of longest dorsal ray (6th) 23.0-31.7 (3.2-3.4); base of dorsal fin 61.3-69.8 (1.4-1.6); length of third anal spine 18.2-20.0 (4.9-5.5); length of (6th) anal ray 27.4-27.5 (3.6-3.7); base of anal fin 29.0-37.3 (2.73.5); length of pectoral fin 24.0-27.0 (3.7-4.1); length of ventral spine 10.0-21.3 (4.7-9.8); length of first ventral ray 36.0-47.1 (2.1-2.8).

In HL: Snout length 23.4-29.6 (3.4-4.3); interorbital width 25.5-33.6 (3.0-3.9); horizontal diameter of eye 24.9-31.9 (3.1-4.0); postocular length 40.0-46.1 (2.2-2.5); length of caudal peduncle 11.7-28.1 (3.6-8.6), least depth of it 42.1-51.6 (1.9-2.4); preopercular spine 12.8-30.4(3.3-7.8).

Body ovate and compressed; head gently arched; snout profile straight; interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, the anterior one with a posterior rim; mouth small, terminal; teeth brush-like, tricuspid; dorsal spines progressively longer; posterior margin of soft dorsal anal fins broadly rounded; pectorals rounded; ventral spine reaches anus, first ray long, reaching anterior few anal rays; caudal fin rounded.

Preorbital convex, without spine, not free on hind margin; preopercle serrated on upper limb, a prominent large spine at angle, and one or two (none on the right side of larger specimens) smaller spines below it; interopercle large, without spines; subopercle entire; scales large, in regular series; lateral line complete and terminates to caudal base.

Color in life yellowish brown; each scale on body with a dark blue spot; a silvery vertical band from nape over posterior margin of eye to base of preopercular spine and extending to breast in smaller individuals; six vertical bluish brown bands on trunk and tail; a short blue line running along anterior margin of eye, additional seven lines of the same color on peduncle and fin of caudal, which extend somewhat to posterior portion of soft dorsal and anal fins, these lines break into rows of spots: fins of dorsal, anal and caudal yellowish brown, their margins with a bluish horder; pectorals bluish; ventrals brown, spine and first ray with bluih margins.

Color of a specimen of 60 mm SL grayish brown; there are eighteen curved stripes on head and body; the anterior three stripes are blue, the

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Fig. 4. Euxiphipops sexstriatus (Cuvier and Valenciennes) 60.0 mm SL



Fig. 5. Euxiphipops sexstriatus (Cuvier and Valenciennes) 94.0 mm SL



Fig. 6. Euxiphipops sexstriatus (Cuvier and Valenciennes) 157.0 mm SL

first two descending from occiput obliquely forward to cheek, the third short, passing through the eye; the fourth is white, broader, descending from nape along posterior margin of eye to origin of ventrals; the fifth is blue, starting from upper opercle to ventrals; the sixth is blue on upper, white on lower; the seventh is white on upper, blue on lower; the eighth to eighteen stripes arranged in alternative blue and white, among them, nineth, thirteenth, and fifteenth stripes are broader whereas others are narrower; those stripes on body and tail extend to dorsal and anal and bent posteriorly; fins of dorsal and anal greenish brown; pectorals transparent; ventrals grayish brown with bluish distal margin; caudal fin white.

RANGE OF DISTRIBUTION: Found from East Indies to the Philippine Islands, northward to souther part of Japan, southward to north western Australia.

SPECIMENS EXAMINED: NTUM 01401, 157.0 mm SL, 1973-9-20, Kee-lung; NTUM 01411, 94.0 mm SL, 1973-9-18, Fan-tu-tao; NTUM 01439, 60.0 mm SL, 1973-12-15, Keelung.

#### Genicanthus vermiculatus (sp. nov.) Fig. 7

HOLOTYPE: A single male specimen, 95.4 mm SL, collected from Lü-tao (Green Island) by Mr. Cheng-ping Chen of the Kee-lung Aquarium, using dipnet, from coral reefs, water depth about 20 meters, June 15, 1974. The specimen is deposited at Department of Zoology, National Taiwan University, NTUM 02695.

DESCRIPTION: D. XV, 15; A. III, 16; V. I, 5; L. l. (tuqular) 45, L. tr. 8/18.

In SL: Head length 28.1 (3.6); depth of body 47.0 (2.1); predorsal length 25.2 (4.0); preventral length 30.0 (3.3); preanal length 56.7 (1.8); length of fifteenth dorsal spine 63.7 (1.6); length third anal spine 14.5 (6.9); length of tenth anal ray 18.0 (5.6); base of anal fin 31.9 (3.1); length of pectoral fin 21.2 (4.7); length of ventral spine 15.9 (6.3); length of ventral ray 23.3 (4.3).

In HL: Snout length 24.6 (4.1); interorbital width 32.1 (3.1); horizontal diameter of eye 32.8 (3.1); postocular length 41.8 (2.4); length of caudal peduncle 29.9 (3.4), least depth of it 47.8 (2.1); preopercular spine 33.6 (3.0).

Body ovate and compressed, head gently

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Fig. 7. Genicanthus vermiculatus n. sp. 95.4 mm SL

arched; snout profile straight; interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, the anterior one with a posterior rim; mouth small, terminal; teeth brush-like, tricuspid; spinous dorsal rapidly increasing in length from first to third spine, the rest are nearly the same in length; soft dorsal and anal slightly pointed at nineth and tenth rays, and sharply deflected afterward; ventral spine nearly reaches anus, first not not extending to anal; caudal deeply lunate, both lobes end in filaments.

Preorbital notched mesially, anterior margin with one stout spine, lower mergin with two (one on the right side) spines, hinder margin with four (three on the right side) spines; preopercle with 28 (25) on the right side) small spines, among them a prominent spine at angle, and three smaller ones below it; interopercle serrated; subopercle entire; cleithrum with small spines; scales large, in regular series; lateral line ends beneath rear base of dorsal fin.

Color in preserved specimen yellowish gray dorsally, paler ventrally; body with several black wavy stripes on lower half; dorsal dusky, with a marginal broad black band commencing from fourth spine to tip of last fifth soft ray, and white border seen on posterior one-third of the band; anal dusky, with two rows of short black bars on posterior soft rays, followed by a black longitudinal line and a broad, white-bordered black band from first spine to tip of last fifth ray; caudal dusky, black on lobes including filamentous tips; pectorals and ventrals pale.

DIAGNOSIS: The present species is closely related to *G. watanabei*, but quite differs from it by having black wavy stripes on lower sides of body, black band of dorsal fin not extending anteriorly to the nape; without black marks above eye; and two parallel black bands on anal fin instead of only one in the latter species.

# Genicanthus watanabei (YASUDA and TOMINAGA) Figs. 8-9

Holacanthus watanabei Yasuda and Tominaga, 1970: 144, figs. 3-7, 11-12 (Type locality Onna Beach, Okinawa-jima, Ryuyu Islands)<sup>(50)</sup>; Hiyama and Yasuda, 1971: 11, figs. 21-22<sup>(22)</sup>.

Holacanthus caudovittatus Watanabe, 1949: 40, fig. 4

(Zamami-shima, Ryukyu Islands)(44).

- Genicanthus caudovittatus Matsubara, 1955: 937 (part, in key)<sup>(80)</sup>.
- Genicanthus watanabei Burgess and Axelrod, 1972: figs. 21-22, (Okinawa)<sup>(9)</sup>.

DESCRIPTION: D. XV, 15-16; A. III, 16-17; V. I, 5; L. l. (tubular) 45-46, L. tr. 7-8/17-18.

The following measurements are recorded for female and male specimens respectively.

Head length 28.0-28.3 (3.5-3.6), In SL: 26.4-29.0 (3.5-3.8); depth of body 40.4-47.2 (2.1-2.2), 22.2-25.2 (4.0-4.5); preventral length 30.8-31.4 (3.2-3.3), 29.9-34.8 (2.9-3.3); preanal length 57.3-58.6 (1.7-1.8), 55.9-60.2 (1.7-1.8); length of fifteenth dorsal spine 15.3-15.5 (6.5-6.6), 13.4-15.0 (6.7-7.4); length of seventh dorsal ray 16.4-16.7 (6.0-6.1), 17.0-17.3 (5.8-5.9); base of dorsal fin 66.7-68.3 (1.5), 64.5-67.7 (1.5-1.6); length of third anal spine 14.2-15.5 (6.5-7.1), 14.2-15.0 (6.7-7.0); length of tenth anal ray 15.5-15.8 (6.3-6.5), 18.0-18.3 (5.5); base of anal fin 31.9-32.4 (3.1), 29.0-31.1 (3.2-3.5); length of pectoral fin 21.3-22.2 (4.5-4.7), 21.4 (4.7); length of ventral spine 16.2-16.7 (6.2-6.3), 13.1-16.9 (5.9-7.6); length of ventral ray 20.0-25.0 (4.0-4.8), 25.0-28.6 (3.5-4.4).

In HL: Snout length 22.6-27.3 (3.7-4.4), 22.7-28.6 (3.5-4.0); interorbital width 31.4 (3.2), 30.0-34.5 (2.9-3.3); horizontal diamter of eye 31.4-33.3 (3.0-3.2), 26.8-30.0 (3.3-3.8); postocular length 43.0-44.1 (2.3), 42.1-49.2 (2.0-2.4); length of caudal peduncle 28.9-31.4 (3.2-3.5), 34.1-37.1 (2.7-2.9), least depth of it 44.6-46.1 (2.2), 46.7-50.0 (2.0-2.1); preopercular spine 25.5-26.5 (3.8-3.9), 30.0-34.1 (2.9-3.3).

Body oblong and compressed; head gently arched; snout profile convex; interorbital space convex; eyes moderate; two nostrils close together in front of eye, the anterior one with a posterior rim; mouth small, terminal; teeth cardiform, tricuspid; length of spinous dorsal rapidly increasing from first to third spine, the rest are nearly the same in length; posterior margin of soft dorsal and anal fins pointed; pectorals rounded; ventral spine reaches anus and first ray extends to anal origin in male, while those are shorter in female; caudal lunate with filamentous lobes.

Preorbital notched mesially, anterior margin with 1 or 2 stout spines, lower margin with 2 or 3 spines, posterior margin with 3 to 5 spines preopercle with 26 to 41 spines, of which 23rd to 35th on upper limb, a prominent spine at angle, and 2 to 5 below it; inter and subopercle serrated; cleithrum with small spines; scales large in regular series; lateral line terminates at rear base of dorsal fin, with separate portion on caudal peduncle.

FEMALE: Color in life bluish green dorsally, silvery blue ventrally; four black stripes on top of head, each with blue edge; the first on occiput, the second across interorbital and eyes, the third across preorbital, the fourth across snout tip; a black marking on upper membrane of opercle; a black spot at origin of pectorals; the basal half of dorsal and anal silvery blue, outer half black with bluish edge; caudal plain, its upper and lower lobes black; pectorals and ventrals plain.

MALE: Color in life blue dorsally and silvery ventrally; some spemens with a bluishedged black marking on nape, and a black marking across interorbital and eyes, but in most specimens these markings are replaced by a continuous black stripe extending from the black band of dorsal fin; membrane of opercle dusky; a black spot at the insertion of pectorals; nine black longitudinal bands of different length on body side; the first four bands shorter; the fifth and sixth extending posteriorly to caudal peduncle, the fifth one may be bifurcated; the seventh, eighth, and ninth narrower at beginning and broader posteriorly when entering the anal fin; dorsal and anal black except the violet-blue basal portion of soft rays, besides, black zone of dorsal and anal fins each with outer violet-blue and inner bluish margins; a yellow stripe extends from end of third black stripe to peduncle; caudal base violet blue, fin plain, both the upper and lower lobes black; pectorals transparent;

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Fig. 8. Genicanthus watanabei (Yasuda and Tominaga) 86.4 mm SL (Female)



Fig. 9. Genicanthus watanabei (Yasuda and Tominaga) 103.6 mm SL (Male)

ventrals violet blue.

RANGE OF DISTRIBUTION: Found from the southern part of Japan and Taiwan.

SPECIMENS EXAMINED: NTUM 01403, 86.4 mm SL, 1973-9-20, Tai-tung; NTUM 02691, 72.0 mm SL, 1974-6-27, Tai-tung; NTUM 02692, 193.6 mm SL, 1974-4-17, Tai-tung; NTUM 07693<sup>(2)</sup>, 100.0 mm SL and 107.0 mm SL respectively, 1974-7-27, Tai-tung; NTUM 02694, 98.3 mm SL, 1974-7-15, Tai-tung.

#### Genicanthus venustus (YASUDA and TOMINAGA) Fig. 10

Holacanthus venustus Yasuda and Tominaga, 1969: 143, figs. 1 and 3, (Type locality: Oshima Island, Sagame Bay)<sup>(49)</sup>; Hiyama and Yasuda, 1971: 11, fig. 20<sup>(22)</sup>; Burgess and Axelrod, 1972: 17, fig. 20 (Isu-Ishima Island)<sup>(9)</sup>.

DESCRIPTION: D. XIV, 17-18; A. III, 16-17; V. I, 5; L. 1. (tubular) 44, L. tr. 7/24.

In SL: Head length 30.8-32.0 (3.1-3.3); depth of body 57.3-58.3 (1.7); predorsal length 24.8-26.2 (3.8-4.0); preventral length 29.8-34.7(2.9-3.4); preanal length 62.2-62.3 (1.6); length of longest (14th) dorsal spine 17.2-18.7 (5.4-5.8); length of longest (4th) dorsal ray 20.5-24.9 (4.0-4.9); base of dorsal fin 63.6-77.2 (1.3-1.6); length of third anal spine 20.0-21.8 (4.6-5.0); length of third anal ray 22.2-24.9 (4.0-4.9); base of anal fin 26.7-31.8 (3.2-3.8); length of pectoral fin 27.2-30.7 (3.3-3.7); length of ventral spine 22.2-22.5 (4.4-4.5); length of ventral ray 36.0-36.1(2.8).

In HL: Snout length 17.9-25.0 (4.0-4.9); interrorbital width 27.8-29.0 (3.4-3.6); horizontal diameter of eye 33.3-36.1 (2.8-3.0); postocular length 41.7-43.6 (2.3-2.5; length of caudal peduncle 29.0-29.2 (2.2-2.4), least depth of it 41.7-46.2 (2.2-2.4); preopercular spine 16.0-25.8(3.9-6.3).

Body ovate and compressed; head deep, arched dorsally; snout profile straight; interorbital space flattened or slightly convex; eyes moderate; two nostrils in front of eys, the anterior one with a posterior rim; mouth small, terminal; teeth cardiform and tricuspid; length of spinous dorsal increasing rapidly from first to third spine, the others subequel; posterior part of soft dorsal and anal fins rounded; ventral spine reaches anus; first ray filamentous and reaching third anal spines; caudal fin rounded.

Preorbital not prominent, notched mesially, with 4-6 small spines; preopercle with 29 to 30 (30-32 on the right) spines, of which 26-28 (27-29 on the right) small spines on upper limb, one strong and long (6.3 in larger and 3.9 in smaller samples, all in head length) and 1 or 2 (2 on the right) spines on lower limb; interorpercle without spine; subopercle with 5 small spines in larger sample, none in smaller sample; opercle entire; scales larger, in regular series; scales on opercle in 8 rows; lateral line terminates at rear base of soft dorsal fin, with a separate portion on caudal peduncle.

Color in life brilliant yellow on anterior half of body, with a triangular light blue area extending above eye to origin of spinous dorsal and to pectoral inserteion; posterodorsal part of body including spinous dorsal and caudal peduncle blue, with lighter blue markings on each scale; soft dorsal and caudal dark blue with light blue markings; posteroventral side of body and anterior half of anal dusky yellow, posterior half of anal darkblue, with light blue markings on either outer and submargins; pectorals yellow; ventrals yellow, except first ray with blue on outer margin.

Color in preserved specimens pale on anterior and posteroventral part of body, with a triangular greyish patch on head; fins of soft dorsal, anal and caudal brown with dark markings; pectorals pale; ventrals gray with dark brown on outer margin.

RANGE OF DISTRIBUTION: Found from the southern part of Japan to Taiwan.

SPECIMEN EXAMINED: NTUM 01412, 60.4 mm SL, 1973-9-20, Kee-lung; NTUM 02720, 45.0 mm SL, 1974-3-10, Kee-lung.



Fig. 10. Genicanthus venustus (Yasuda and Tominaga) 60.4 mm SL

# Genicanthus semifasciatus (KAMOHARA) Figs. 11-12

- Holacanthus semi asciatus Kamohara, 1934: 459, fig.
  2 (type locality: Kashi Island)<sup>(26)</sup>; Hiyama and Yasuda, 1971: 13, fig. 27<sup>(22)</sup>.
- Genicanthus semifasciatus Matsubara, 1955: 937 (Japan)<sup>(80)</sup>.
- Holacanthus (Genicanthus) semifasciatus Okada, 1966: 394, fig. 984 (Japan)<sup>(84)</sup>.
- Holacanthus fucosus Yasuda and Tominaga, (junior synonym) (in communication with Dr. John E. Randall), 1970: 141, figs. 1-2, 13 (type locality: Sanbon-ne, Miyako-jima)<sup>(50)</sup>; Hiyama and Yasuda 1971: 11, fig. 19,<sup>(22)</sup>.
- Genicanthus fucosus Burgess and Axelrod, 1972: 17, fig. 9 (Miyako Islands)<sup>(9)</sup>.

DESCRIPTION: Based on 4 specimens, 3 females 73.0-80.0 mm SL, 1 male 97.4 mm SL, collected from north-eastern and south-eastern coasts of Taiwan.

D. XIV, 16 (female), XV, 17 (male); A. III, 17; P. 16-17; V. I, 5; L. l. (tubular) 35-38 (female), 40 (male), L. tr. 8/18 (female, 8/15 (male). In SL: Head length 25.8-27.6 (3.6-3.9); depth of body 46.2-48.1 (2.1-2.2); predorsal length 20.6-24.6 (4.1-4.9); preventral length 27.8-31.2 (3.2-3.6); preanal length 56.2-58.0 (1.7-1.8); length of last dorsal spine 15.2-16.0 (6.0-6.6); length of longest dorsal ray 15.7-20.3 (4.9-6.4); base of dorsal fin 69.8-77.1 (1.3-1.4); length of third anal spine 16.8-18.1 (5.3-5.9); length of longest anal ray 19.0-20.8 (4.8-5.3); base of anal fin 19.6-35.5 (2.8-5.3); length of pectoral fin 20.5-26.6 (4.2-5.3); length of ventral spine 16.0-18.2 (5.5-6.0); length of longest ventral ray 22.5-24.1 (4.2-4.4).

In HL: Snout length 20.0-22.9 (4.4-5.0); interorbital width 33.0-37.0 (2.8-3.0); horizontal diameter of eye 33.0-37.6 (2.7-3.1); postocular length 43.5-46.0 (2.2-2.3); length of caudal peduncle 33.1-35.9 (2.8-3.1); least depth of caudal peduncle 48.9-52.5 (1.9-2.1); preopercular spine 28.0-35.1 (2.9-3.6).

Body oblong and compressed; head profile gently arched; snout straight; interorbital space slightly convex; eyes median; two nostrils close together in front of eye, the anterior one with a low rim; mouth small, terminal; teeth brush-



Fig. 11. Genicanthus semifasciatus (Kamohara) 79.0 mm SL (Female)



Fig. 12. Genicanthus semifasciatus (Kamohara) 97.4 mm SL (Male)

like, tricuspid; length of dorsal spines increasing rapidly from first to third and nearly the same in length for the rest of spines; posterior margin of soft dorsal and anal fins slightly pointed; pectorals fan-like; ventrals reach anus; caudal emarginates behind with elongated lobes.

Preorbital notched mesially, with 10-12 small spines; preopercle with 27-31 spines, of which 23rd-25th smaller on upper margin, a prominent spine (3.6 in HL) and 3-5 shorter ones on lower margin; interopercle with 2-5 small spines; subopercle with 1-9 small spines; opercle without spine; scales large, in regular series; lateral line with a short separate portion on caudal peduncle.

Life color of female olivaceous dorsally, silvery; a black triangular patch running from occiput to upper margin of eye, beneath it, there is another inconspicuous gray stripe along preopercular margin and angular spine; a vertical black bar on opercular margin; a silvery band extends from dorsal insertion over opercle to preopercular spine just between the above mentioned two black markings; another silvery band running from predorsal to tip of snout; dorsal fin orange yellow; anal fin paler; pectorals plain; ventrals silvery blue; black on posterior half of caudal peduncle and outer caudal lobes; anterior halves of caudal peduncle and fin silvery, posterior half of the latter transparent with 3 or 4 rows of wavy dark speckles.

Life color of male grayish green dorsally, pale silvery ventrally; head dusky greenish; upper sides of body with many vertical irregular or interrupted blackish wavy stripes; broad yellowish band extends from gill opening to anterior part of caudal peduncle; eye yellowish, surrounded by a bluish ring; a yellowish band running along the postorbital margin and extending anteriorly to lower lips; another yellowish stripe extending horizontally from anterior margin of eye to upper lip; opercle pale yellow; dorsal fin gray, with yellow markings except dark green markings on posterior part of soft rays; caudal pale, peduncle with interrupted blackish stripes, fin with blackish markings, lobes blackish with small yellowish dots; pectorals and ventrals pale silvery; anal grayish yellow.

RANGE OF DISTRIBUTION: Found from southern part of Japan to Taiwan.

SPECIMEN EXAMINED: NTUM 01414, 97.4 mm SL, 1973-12-15, Kee-lung. NTUM 01414, 79.0 mm SL, 1973-12-15, Kee-lung; NTUM 02700, 72 mm SL, 1974-6-27, Tai-tung; NTUM 02701, 79 mm SL, 1974-5-10, Tai-tung.

# Genicanthus melanospilus (BLEEKER) Figs. 13-14

- Holacanthus melanospilus Bleeker, 1877: 56 (Amboina)<sup>(5)</sup>; 1877: 60, pl. 6, 368, fig. 2 (Amboina)<sup>(6)</sup>; Klunzinger, 1884: 60 (Koseir)<sup>(27)</sup>; Fowler and Bean, 1929: 162<sup>(15)</sup>.
- Holacanthus melanospilos Gunther, 1860: 48(19).
- Holacanthus semicinctus Waite, 1900: 204, pl. 36(42).
- Genicanthus melanospilus Fraser-Brunner, 1933: 574<sup>(16)</sup>; Weber and de Beaufort, 1936: 153 (Amboina)<sup>(46)</sup>; Smith 1955: 381, pl. 5b (Malidi, Konya and Pinda<sup>(41)</sup>; Masuda, 1970: 104, upper figure<sup>(28)</sup>.
- Genicanthus macclesfieldiensis Chan (junior synonym, in communication with Dr. John E. Randall) 1965: 330, figs. 4-5 (type locality: Macclesfield Bank)<sup>(10)</sup>.
- Genicanthus caudovittatus Masuda 1970: 104, lower figure<sup>(29)</sup>.

DESCRIPTION: D. XV, 17; A. III, 18; P. 16; V. I, 5; L. l. (tubular) 36 (female), 48 (male), L. tr. 9/25.

In SL: Head length 26.9-31.1 (3.2-3.7; depth of body 55.0-57.0 (1.8); predorsal length 23.1-24.3 (4.1-4.3); preventral length 28.6-32.5(3.1-3.5); preanal length 58.6-63.4 (1.6-1.8); length of longest (15th) dorsal spine 12.1 (8.2); length of longest dorsal ray 21.6-25.5 (3.9-4.6); base of dorsal fin 65.1-77.1 (1.3-1.5); length of third anal spine 13.2-16.0 (6.3-7.6); length of longest anal ray (10th) 22.8-33.0 (3.0-4.4); base of anal fin 31.2-35.3 (2.8-3.3); length of pectoral fin 25.8-26.6 (3.8-3.9); length of ventral spine 15.4-20.1 (5.0-6.5); longest ventral ray 28.7-36.5(2.6-3.5); caudal concavity 16.3 (6.2) in female and 48.5 (2.1) in male.

In HL: Snout length 24.8-25.8 (3.9-4.0); interorbital width 28.6-37.4 (2.7-3.5); horizontal



Fig. 13. Genicanthus melanospilus (Bleeker) 115.4 mm SL (Male)



Fig. 14. Genicanthus melanospilus (Bleeker) 67.6 mm SL (Female)

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diameter of eye 30.7-32.4 (3.1-3.3); postocular length 42.9-50.3 (2.0-2.3); preopercular spine 28.6-41.9 (2.4-3.5); length of caudal peduncle 37.4 (2.7); least depth of caudal peduncle 59.4(1.7).

Body ovate and compressed; head profile gently arched; snout straight; interorbital space slightly convex or flattened; eyes moderate; two nostrils close together in front of eye, the anterior nostril with a membraneous rim which is elevated into flattened flap postero-dorsally; mouth small, terminal; teeth slender, flexible and bristle like; spinous dorsal gradually increasing in height posteriorly; soft dorsal and anal pointed, the median rays being prolong and sharply deflected; pectorals fan-like; ventrals with filamentous first ray, reaching third anal spine; caudal concave, with filamentous lobes.

Preorbital notched mesially, with 6-8 small spines; preopercle with 24-28 spines directed posteriorly, of which 23-24 smaller spines on upper limb, and a prominent large spine, 3.5 in head length at angle, and 1 or 2 short spines directed posteriorly below it; interopercle denticulate or entire; subopercle with 3 or 5 small spines; scales large, arranged in regular series; lateral line with a separate portion on caudal peduncle.

Life color of male pearl yellowish, with 29 irregular blackish vertical stripes, of which 12 on head, 15 on body, and 2 on caudal peduncle; a large black blotch a little before ventral insertion dorsal, anal and caudal fins ray yellowish, marked with minute white rings in regular rows; margins of dorsal and anal violet; pectorals and ventrals yellowish.

Color of a preserved female specimen olivaceous dorsally, brownish ventrally, interorbital and snout dusky brown; lips blackish; dorsal fin yellowish with blackish edge, posterior rays brownish, membrance of soft rays with light wavy lines arranged obliquely; anal fin dusky brown, with black margin and pale oblique lines on submargin; pectorals and ventrals plain; caudal peduncle and fin silvery brown; upper and lower part of caudal peduncle, and lobes of caudal fin black, with white edges.

REMARKS: Fraser-Brunner<sup>(16)</sup> synonymized caudovittatus<sup>(17)</sup>, caudibicolor<sup>(38)</sup>, and semicinctus<sup>(43)</sup> with melanospilus<sup>(6)</sup>. Weber and de Beaufort<sup>(46)</sup> followed Fraser-Brunner<sup>(16)</sup> and synonymized the first species as synonym and juvenile stage of melanospilus. Smith<sup>(41)</sup> separated caudovittatus from melanospilus as two different species, Yasuda and Tominaga<sup>(50)</sup> illustrated differences between body shape and color patterns of watanabei, caudovittatus, caudibicolor, and macclesfieldiensis, but they were observed and proved by Dr. John E. Randall that they are but sexual diamorphisms of G. melanospilus.

#### Pomacanthus annularis (BLOCH) Fig. 15

- Chaetodon annularis Bloch, 1787: 114, pl. 215, fig. 2 (East Indies(<sup>(7)</sup>.
- Holacanthus septentrionalis Richardson (in part), 1846: 256(87).
- Holacanthus annularis Gunther, 1860: 42 (Ceylon, Molucas)<sup>(19)</sup>; Fowler and Bean, 1929: 191 (Batavia, Java)<sup>(15)</sup>.
- Holacanthus pseudannularis Gunther, 1860: 43 (Batavia)<sup>(19)</sup>.
- Acanthochaetodon annularis Bleeker, 1877: 71, pl. 1<sup>(8)</sup> 370, fig. 172 (5 localities)<sup>(6)</sup>.
- Pomacanthus annularis Frasser-Brunner, 1933: 559, text-fig. 7<sup>(16)</sup>; Matsubara, 1955: 936 (Japan)<sup>(80)</sup>;
   Chen and Chao, 1971: 56, fig. 23<sup>(11)</sup>; Hiyama and Yasuda, 1971: 16, fig. 34<sup>(22)</sup>; Burgess and Axelrod, 1972: 26, fig. 38<sup>(9)</sup>.
- Pomacanthus (Pomacanthodes) annularis Weber and de Beaufort, 1936: 135, fig. 34 (8 localities)<sup>(46)</sup>.
- Pomacanthodes annularis Smith, 1955: 383 (Delago Bay)<sup>(41)</sup>.

DESCRIPTION: D. XIII, 21; A. III, 19; P. 18; V. I, 5; L. 1. 86, L. tr. 18/66.

In SL: Head length 29.2 (3.4); depth of body 65.3 (1.5); predorsal length 32.2 (3.1; preventral length 29.4 (3.4); preanal length 55.3 (1.8); length of longest (13th) dorsal spine 19.4 (5.2); length of longest (6th) dorsal ray 26.1 (3.8); base of dorsal fin 63.3 (1.6); length of third anal spine 17.1 (5.9); length of longest



Fig. 15. Pomacanthus annularis (Bloch) 79.6 mm SL

of longest (6th) anal ray 26.1 (3.8); base of anal fin 37.2 (2.7); length of pectoral fin 26.6 (3.8); length of ventral spine 18.8 (5.3); length of ventral ray 35.7 (2.8).

In HL: Snout length 26.0 (3.9); interorbital width 31.0 (3.2); horizontal diameter of eye 31.2 (3.3); postocular length 44.0 (2.3); length of vaudal peduncle 23.3 (4.3); least depth of caudal peduncle 48.3 (2.1); preopercular spine 16.4 (6.1).

Body ovate and compressed; head profile arched; interorbital space convex; eyes moderate; two nostrils close together in front of eye, anterior nostril larger than posterior and with a membraneous rim which is elevated into a flap postero-dorsally; mouth small, terminal; teeth cardiform, tricuspid; dorsal spines progressively longer; soft dorsal longest at about sixth ray, posterior margin of soft rayed portion truncate; anal spines rapidly increasing in length from first to third; posterior margin of soft anal broadly rounded; pectorals rounded; ventral spine reaches anus, first ray reaching to third anal spine; caudal fin truncate.

Preorbital without spines; preopercle with about 34 (28 on the right side) small spines on upper limb, a prominent large spine (6.1 in HL), curved upward at angle, and 5 (4 on the righ side) short spines directed posteriorly below it; subopercle and interopercle entire; scales small; lateral line complete and terminates at caudal base.

Color in life dark gray, deep on bases of dorsal, anal and caudal peduncle; 4 black-edged blue bands extending obliquely from pectoral to dorsal; body side with about 14 pale-bluish transverse stripes which become darker when extend to ventral, dorsal and anal fins; head with two longitudinal blue lines, one on postorbital and one on suborbital; fins of dorsal, anal and ventral dusky gray; margins of dorsal and anal fins blue; caudal fin white; pectorals dusky yellow, with two transverse blue bars.

Formalin preserved specimen brownish; stripes and lines turned pale on body, black on dorsal, anal and ventral fins; posterior margins of dorsal and anal white.

REMARKS: The present species is apparently the younger stage of *P. annularis* Bleeker<sup>(6)</sup> described and figured a larger sample with transverse stripes on the head under the name *pseudannularis*. In our sample, there are other stripes on posterior part of body, but without a blue ring on its shoulder. The color pattern shows apparently the earlier stage of *annularis*, in adult the transverse stripes on belly gradually disappeared due to ages and then replaced by blue ring.

RANGE OF DISTRIBUTION: From East Indian Sea to southern part of Japan.

SPECIMEN EXAMINED: NTUM 02697, 79.6 mm SL, 1974–8–12, Tai-tung.

#### Chaetodontoplus cephalareticulatus sp. nov. Fig. 16

Chaetodontoplus chrysocephalus (not Bleeker) Masuda, 1970, 2: 105; Hiyama and Yasuda, 1971: 25, fig. 50; Burgess & Axelrod, 1972: 35, fig. 52 (Izu Mar. Park).

HOLOTYPE: 88.8 mm SL collected from north-eastern coast of Taiwan.

DESCRIPTION: D. XIII, 17; A. III, 16; P. 17; V. I, 5; L. 1. 90, L. tr. 17/68.

In SL: Head length 27.7 (3.6); depth of body 54.5 (1.8); predorsal length 18.9 (5.3); preventral length 24.8 (4.0); preanal length 52.9 (1.9); length of longest (9th) dorsal spine 20.5 (5.9); length of longest (5th) dorsal ray 19.1 (5.2); base of dorsal fin 69.8 (1.4); length of third anal spine 18.5 (5.4); length of longest (6th) anal ray 19.4 (5.2); base of anal fin 37.2 (2.7); length of pectoral fin 21.9 (4.6); length of ventral spine 23.2 (4.3); length of ventral ray 19.1 (5.2).

In HL: Snout length 26.8 (3.7); interorbital width 34.2 (2.9); horizontal diameter of eye 29.7 (3.4); postocular length 45.5 (2.2); length of caudal peduncle 26.8 (3.7), least depth of it 47.2 (2.1); preopercular spine 28.5 (3.4).

Body ovate and compressed; head arched, snout profile straight, interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, the posterior nostril larger than anterior; mouth small, terminal; teeth bursh-like, tricuspid; dorsal spines progressively longer; posterior margin of soft portion of dorsal fins broadly rounded; pectorals rounded; ventral spine reaches anus, first ray reaching second anal spine; caudal fin slightly rounded.

Preorbital without spine; preopercle with 19 spines, of which 18 smallspines directed posteriorly on upper limb, and a prominent large spine (3.5 in HL) at angle; subopercle with one small spine; interopercle and opercle entire; supracleithrum with 35 small spines; scales small; lateral line terminates in front of soft dorsal



Fig. 16. Chaetodontoplus cephalareticulatus sp. nov. 88.6 mm SL



Fig. 17. Chaetodontoplus chrysocephalus (Bleeker) (original figure, after Bleeker)

and a separate portion on caudal peduncle.

Color in life light gray with several longitudinal irregular or interrupted yellowish stripes on body side, those stripes on breast are obscure and easily confused as a patch covering an area between thorax and origin of anal; dorsal yellowish anteriorly, becoming blackish posteriorly, with a submarginal bluish gray stripe running between first and last spine; soft rayed margin yellowish; anal blackish except a yellowish margin and a longitudinal blue line; pectorals yellowish gray, with a basal blue ring; ventrals blackish; caudal yellow.

Color in preserved specimen gray; the stripes on head and breast turned pale; fins of dorsal, anal black with paler margins on soft portions; pectoral dusky; ventrals black.

REMARKS: The present species C. cephalareticulatus is very closely related to C. chrysocephalus and C. septentrionalis but differs by having paler grayish body color and wider wavy stripes on head, whereas body color in septentrionalis yellowish with a bluish stripes extending from snout to caudal, and in chrysocephalus (Fig. 16) the wavy stripes on head are slender than the first species. The differences mentioned above have been compared by using the specimens of similar size. Weber & de Beaufort<sup>(46)</sup> confused *chrysocephalus* as intermediate phase of *septentrionalis* particularly due to presence of blue stripes on head.

RANGE OF DISTRIBUTION: Found from Java, Taiwan to Japan.

SPECIMEN EXAMINED: NTUM 02696 88.6 mm SL, 1974-2-20, Kee-lung.

#### Chaetodontoplus personifer (McCULLOCH) Figs. 18-19

- Holacanthus (Chaetodontoplus) personifer McCulloch, 1914: 221, pl. 31 (Shark Bay)<sup>(81)</sup>; and 1916: 195, pl. LVI, fig. 2 (Wide Bay Queenland)<sup>(82)</sup>.
- Chaetodontoplus personifer Fraser-Brunner 1933: 552<sup>(10)</sup>; Marshall, 1965: 262 (Western Australia and South Queensland)<sup>(28)</sup>.

DESCRIPTION: D. XIII, 20; A. III, 19; P. 18: V. I, 5; L. 1. 90.

The following measurements are recorded for male and female specimens respectively.

In SL: Head length 24.6 (4.1), 25.2 (4.0);

# AN ADDITIONAL STUDY ON CHAETODONT FISHES



Fig. 18. Chaetodontoplus personifer (McCulloch) 199.0 mm SL (Male)



Fig. 19. Chaetodontoplus personifer (McCulloch) 169.0 mm SL (Female)

depth of body 48.2 (2.1), 56.9 (1.8); predorsal length 17.3 (5.8), 18.6 (5.4); preventral length 27.6 (3.6), 28.1 (3.6); preanal length 49.8 (2.0), 53.5 (1.9); length of thirteenth dorsal spine 18.1 (5.3), 19.8 (5.1); base of dorsal fin 71.9 (1.4), 74.0 (1.5); length of third anal spine 15.1 (6.6), 19.4 (5.2); length of longest (6th) anal ray 20.8 (4.8), 22.3 (4.5); base of anal fin 39.7 (2.5), 38.3 (2.6); length of pectoral fin 19.4 (5.2), 20.4 (4.9); length of ventral spine 14.6 (6.9), 16.2 (6.2); length of ventral ray 23.4 (4.3), 23.0 (4.4).

In HL: Snout length 21.6 (4.6), 22.9 (4.4); interorbital width 33.1 (3.0), 33.8 (3.0); horizontal diameter of eye 24.9 (4.0), 28.6 (3.5); postocular length 51.0 (2.0), 50.0 (2.0); Iength of caudal peduncle 35.9 (2.8), 33.0 (3.0); least depth of caudal peduncle 48.2 (2.1), 46.2 (2.2).

Body elongate-ovate, heavily compressed laterally on anterior part; head deep, dorsal profile of forehead steep; snout straight; interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, posterior nostril larger than anterior and the latter with a membraneous rim which is elevated into a flap postero-dorsally; mouth small, terminal; teeth slender, flexible, tricuspid and bristle-like; dorsal spines progressively longer; posterior margins of soft postions of dorsal and anal fins broadly rounded; pectorals fan-like; ventrals longer, first ray reaches first anal spine in male and anus in female; caudal fin slightly lunate, with slightly longer upper lobe.

Preobital without spine; preopercle with 20 spines, of which 19 (20 on the right side) small spines on upper limb in male and 42 (40 on the right side) smaller spines in female, and a prominent large spine (2.9 in male, 3.5 in female, all in head length) on lower limb; interopercle large, without spine; subopercle and opercle also without spine; scales small, in irregular series; lateral line terminates at the rear base of soft dorsal, and a separate portion on caudal peduncle.

Body color of male fresh specimen black; head pale gray with large yellow irregular spots, covering the area from occiput to snout tip anteriorly, a broad predorsal band of light yellow downwards to the area covering isthmus and preventral; dorsal and anal fins black; basal part of pectorals black, distal half yellowish; caudal peduncle black; base of caudal fin pale gray, followed by a blackish lunate marking extending from tip of upper lobe to tip of lobe, than a submarginal yellowish area and finally a black margin.

Formalin preserved specimen black brown; the spots on head turned while, base of caudal fin gravish brown.

Body color of female fresh specimen yellowish brown posteriorly; head grayish yellow; a white backward creascent-like band extending from predorsal to the area covering pectoral base, ventral origin, breast and isthmus; dorsal and anal fins black except yellow-black margin on spinous part of fins; pectorals yellow with grayish bases; ventrals yellow; caudal peduncle brown; base of caudal fin yellowish, followed by a narrow blackish lunate, and a submarginal yellowish region and finally a narrow blackish margin.

REMARSK: The present species was firstly found in the Western Australia and nominated by McCulloch in 1914. In 1916, he described five specimens of *Chaetodontoplus* ranging from 110 to 193 mm in length, and stated that younger specimens had deeper coloration than adults, coloration of younger specimens on head, nape and isthmus nearly uniform brown, being broken into white spots in larger specimens.

After the dissection of two collected specimens, we confirm that the larger one with spotted face is male and the smaller one without spot on face is female.

RANGE OF DISTRIBUTION: Found from western Australia to Taiwan.

SPECIMENS EXAMINED: NTUM 01408, 199 mm SL (male), 1973–10–7, Kee-lung; NTUM 01409, 167 mm SL (female), 1973–10–7, Kee-lung.

# Chaetodontoplus melanosoma (BLEEKER) Figs. 20-22

Holacanthus melanosoma Bleeker, 1854: 78(4); Gunther,

1860:  $55^{(19)}$ ; Fowler & Bean, 1929: 195 ( $\Gamma$  oc Can Island and Jolo Island)<sup>(15)</sup>.

- Chaetodontoplus melanosoma Bleeker, 1877: 57, pl.<sup>(9)</sup>
  369, fig. 1,<sup>(6)</sup>; Fraser-Brunner, 1933: 551 (Misel Island; Jolo, Philippines)<sup>(16)</sup>; Weber and de Beaufort, 1936: 126 (Solor, Ambon, Misol; Philippines)<sup>(46)</sup>; Hiyama and Yasuda, 1971: 25, fig. 51-52,<sup>(52)</sup>; Burgess and Axelrod, 1972, 35, figs. 52-54,<sup>(9)</sup>.
- Chaetodontoplus dimidiatus Bleeker, 1877: 57, pl.<sup>(7)</sup> 369, fig. 4 (Amboina)<sup>(6)</sup>.
- Holacanthus dimidiatus Fowler and Bean, 1928: 8, 195<sup>(15)</sup>

DESCRIPTION: D. XIII, 17; A. III, 17; P. 17; V. I, 5; L. l. 100.

In SL: Head length 28.6-29.4 (3.6); depth of body 55.3-56.7 (1.8); predorsal 16.9-21.8 (4.6-5.9); preventral 31.7 (3.2); preanal 54.7-57.9 (1.7-1.8); length of thirteen dorsal spine 17.2-19.5(5.1-5.8); length of sixth dorsal ray 16.9-17.9(5.6-5.9); base of dorsal fin 70.0-73.6 (5.1-5.8); length of fifth anal ray 20.0-20.2 (5.0); base of anal fin 35.4-35.6 (2.8); length of pectoral fin 19.3-21.3 (4.7-5.2); length of ventral spine 17.9-19.7(5.1-5.6); length of ventral ray 22.8-24.7(4.1). In HL: Snout length 25.3-27.3 (3.7-4.0); interorbital space 31.8-32.9 (3.1); horizontal diameter of eye 26.4-27.1 (3.7-3.8); posterior ocular length 45.5-47.7 (2.1-2.2); length of caudal peduncle 23.6-27.7 (3.6-4.2); least depth of caudal peduncle 45.5-47.7 (2.1); preopercular spine 31.8-32.9 (3.1).

Body ovate and compressed; head gently arched; snout profile straight; interorbital space slightly convex; eyes moderate; two nostrils close together in front of eye, posterior nostril larger than anterior, the latter with a membraneous rim which is elevated into a flap postero-dorsally; mouth small, terminal; length of dorsal spines rapidly increasing from first to third spines, the rest are nearly in equal length; posterior margin of soft dorsal and anal fins rounded; pectorals rounded; ventral spine reaches anus, first ray reaching to anal; caudal rounded; preorbital without spine; preopercle with small spines on upper limb, and a prominent large spine at angle; interopercle entire; subopercle with small spines; supracleithrum with small spines; scales small; lateral line terminates at the end of dorsal base.

Color in life black on body, ventrals, dorsal,



Fig. 20. Chaetodontoplus melanosoma (Bleeker) 35.0 mm SL



Fig. 21. Chaetodontoplus melanosoma (Bleeker) 72.0 mm SL



Fig. 22. Chaetodontoplus melanosoma (Bleeker) 122.0 mm SL

and anal; and anal; in a specimen of 122 mm SL, light yellow on head, covered with mottles and vermiculations, posterior margins of dorsal and anal fins light yellow, caudal fin light yellow, pectorals with blackish base, and paler distal half. In a specimen of 72 mm SL, head with markings while the caudal with a submarginal vertical black bar. In a more juvenile specimen of about 35 mm SL with black body color; there is a yellowish line starting from occiput through mouth to chest; a broad yellowish band descending from nape downward to ventrals a broader yellowish margin on dorsal starting from fourth spine; caudal light yellow except a submarginal yellow bar.

REMARKS: Fraser-Brunner<sup>(16)</sup> put C. dimidiatus as a synonym of C. melanosoma. We have collected a more earlier stage of juvenile specimen of C. melanosoma which shows the changes of color pattern comparing with older ones. It is no doubt that C. melanosoma represents its intermediate phase, and C. dimidiatus represents its adult phase.

The initial phase of the present specimen is an excellent mimic of *C. septentrionalis*. But it differs from *septentrionalis* in having much broader yellow bands on opercle and on dorsal border which extends to fourth spine, and its caudal with a black submarginal band.

RANGE OF DISTRIBUTION: Found from East Indies to southern part of Japan, southward to Australia.

SPECIMENS EXAMINED: NTUM 02698, 72 mm SL, 1974–2–20, Kee-lung; NTUM 02699, 122 mm SL, 1974–2–10, Kee-lung.

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# 臺灣近海產魚類形態及生態之研究 臺灣產蝴蝶魚科之研究(續)

# 沈世傑 林炳智

本篇報告乃爲補充前文報告「臺灣產蝴蝶魚科之研究」,又增列了前文未曾記載的十三種,綜合前文 的五十二種,共爲六十五種。

在這十三種中,其中有 Genicanthus vermiculatus sp. nov. (蟲紋棘蝶魚), Chaetodontoplus cephalreticulatus sp. nov. (網紋頭棘蝶魚)二新種及 Chaetodon meyeri, C. nippon, C. quadrimaculatus, Genicanthus watanabei, G. venustus, G. semifasciatus, G. melanospilus, Chaetodontoplus personifer C. melanosoma 等九種新記錄外,並初次記述 Euxiphipops sexstriatus, Pomacanthus annularis 二種之幼魚。本文所記述 之種類皆係採自本省東北部及東南部沿海,在水深約二十公尺的岩礁或珊瑚礁叢中。