The Fishes of the Family Holocentridae Found in the Waters of Taiwan

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This paper presents a review of the fishes belonging to the family Holocentridae found in the waters of Taiwan. It is mostly based on the material preserved in the Ichthyological Laboratory of Tunghai University. Four species of this family were recorded from this region by other authors many years ago. JORDAN and FOWLER first reported *Ostichthys japonicus* (C. & V.) obtained from Taiwan in 1902. TANAKA reported another species *Myripristis murdjan* (FORKÅL) taken by OSHIMA from Keelung in 1911. NAKAMURA recorded *Holocentrus spinosissimus* (T. & S.) in 1943. LIANG recorded *Holocentrus ruber* (FORSKÅL) in 1954. Now the writer is attempting to make a more complete report of the fishes of this family to deal with the specimens which have been collected in the past three years. Among these collectoins, ten species (including the above mentioned four) may be classified into three genera as the following key indicates.

The writer wishes to express his sincere gratitude to Prof. JCHNSON T. F. CHEN for his kind encouragement and guidance in preparing this report and in reading the original manuscript. Heartfelt thanks also are due to Mr. H. C. YANG, Taiwan Fisheries Research Institute, who offered valuable specimens for the writer's comparison, and to Mr. T. C. WENG, who has helped in making figures.

KEY TO TAIWANIAN GENERA AND SPECIES OF HOLOCENTRIDAE

1a. Preopercle without conspicuous spine.

2a. Scales very rough, and with distinct parallel striae; opercular spine enlarged; dorsal spines XII, last one equal to or little longer than preceding one..... *Ostichthys japonicus*

2b. Scales relatively smooth; upper part of opercle with a short spine; dorsal XI or X-I, last one longer than preceding one, and adhered to first dorsal ray.

3a. Perforated scales in lateral line 27-30.

4a. Tips of caudal fin rays with broad black band; distal portion of anterior dorsal and anal fin rays with broad black margin; distal one-third of spinous dorsal black; black blotch on hind portion of opercle slightly above and below opercular spine; body violet..... *Myripristis adustus*

4b. Tips of caudal fin rays dusky; anterior few rays of dorsal and anal with distal half dusky or black; spinous dorsal whitish yellow; black blotch on hind portion of opercle extending downwards to level of upper base of pectoral; body reddish yellow..... *Myripristis murdjan*

4c. Tips of caudal fin rays whitish yellow; soft dorsal and anal whitish yellow; spinous dorsal

with same color of rest of fin; blotch on hind portion of opercle brown, below spine lighter; body reddish brown, top of head and back dark brown. ..... *Myripristis microphthalmus*

3b. Perforated scales in lateral line 36-41; opercular membrane black above spine; body pale pink. ..... *Myripristis pralinius*

1b. Angle of preopercle with long, heavy spine.

5a. Perforated scales in lateral line 35-38.

6a. Scales of body with white rounded spot, forming 9-10 silvery longitudinal bands; fins uniform red or dotted with black. ..... *Holocentrus spinosissimus*

6b. Body with 9 dark brown longitudinal bands; distal margin of spinous dorsal black; outer rays of caudal with dark longitudinal streak; membranes between third and fourth anal spine and first soft ray black. ..... *Holocentrus ruber*

5b. Perforated scales in lateral line more than 40.

7a. Scales in lateral line 42-45, 4 scales above lateral line; snout pointed, longer or equal to eye-diameter; upperpart of preopercle with dark blotch; body reddish yellow. ..... *Holocentrus spinifer*

7b. Scales in lateral line 46-50, 3 scales above lateral line.

8a. Body with 9-10 silvery longitudinal bands; black blotch distally between first to third spines, then light gray blotch distally between each spine. ..... *Holocentrus microstomus*

8b. Body with 9 silvery longitudinal bands; membranes between spinous dorsal mostly black, crossed by two white bands, distal margin also white. ..... *Holocentrus diadema*

Genus OSTICHTHYS JORDAN and EVERMANN, 1896

Ostichthys (Langsdorf Ms.) CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 3, 1829, p. 174 (*Myripristis japonicus* CUVIER and VALENCIENNES, name only).

Ostichthys JORDAN and EVERMANN, Fishes N. and M. America, I, 1896, p. 849 (Type, *Myripristis japonicus* CUVIER and VALENCIENNES.)

OSTICHTHYS JAPONICUS (CUVIER and VALENCIENNES)

Figure 1

Myripristis japonicus CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 3. 1829, p. 173, pl. 58, Japan Coll. Langsdorf.—TEMMINCK and SCHLEGEL, Fauna Japonica, 1847, p. 23. pl. 9A (Nagasaki).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 25 (Japan, China).

Myripristes japonicus RICHARDSON, Ichth. China and Japan, 1846, p. 222 (Sea of Japan).

Ostichthys japonicus JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 334 (Formosa).—JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 26, 1902, p. 11, fig. 2 (Misaki, Formosa).—JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 4, no. 4, 1909, p. 177 (Formosa, after JORDAN and EVERMANN).—JORDAN, TANAKA and SNYDER, Journ. Coll. Sci. Imp. Univ. Tokyo, vol. 33, Art. 1, 1913, p. 116, fig. 86 (Tokyo to Nagasaki, Formosa).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 97, pl. 6A (Hawaii).—CHU, Biol. Bull. St. John's Univ., no. 1, 1931, p. 96 (reference).—FOWLER, Hong Kong

Naturalist, vol. 5, no. 4, 1934, p. 305, fig. 37 (China. Canton, Formosa, Japan, Mauritius, Hawaii).—OKADA, UCHIDA and MATSUBARA, Fig. Descr. Jap. Fishes, 1935, p. 108, pl. 45, fig. 2 (Southern Japan, Taiwan, China Sea, Southern Korea).—OKADA, Cat. Vert. Japan, 1938, p. 166 (Japan, Taiwan).—OKADA and MATSUBARA, Keys Fish. Fish-like Anim. Japan, 1938, p. 139 (Japan, Taiwan).—CHEN, Quart. Journ. Taiwan Mus., vol. 5, no. 4, 1952, p. 309 (list).—TANAKA, Fishes of Japan, vol. 31-48 (Rev.), 1952, p. 854, pl. 178, fig. 487(China, Formosa, Southern Japan North to Tokyo).—KAMOHARA, Rep. Kochi Univ., Nat. Sci., no. 3, 1952, p. 29 (Japan).—MATSUBARA, Fish Morph. Hierar., 1955, pt. 1, p. 443, pt. III, pl. 42, fig. 146 (Japan Taiwan).—TANAKA and ABE, Fig. Descr. Thousand Useful Fishes, pt. 1, 1955, p. 83 (Japan).—CHEN, Synop. Vert. Taiwan, 1956, p. 118 (list).—KAMOHARA, Rep. Usa Marine Biol. Sta., vol. 5, no. 1, 1958, p. 22 (list.)—TOMIYAMA, ABE and TOKIOKA, Encyclo. Zool. Illust. Colours, vol. 2, 1958, p. 234, fig. 694 (Japan).

Depth 2⅓—2⅖, 2⅗—3 in total length. Head as measured to tip of opercular spine 2⅓—2⅖, 2⅗—3 in total length. Snout 5. Eye 3⅖, 1½ of snout. Interorbital space 5⅘—6, 1⅗—1⅘ of eye. Least depth of caudal peduncle 4⅖—4⅔ in head, 1⅖—1⅗ in its length. Gill rakers 6 + 10 (2), long and strong, almost 1½ of longest filaments.

Scales in lateral line 28, 4 scales above lateral line, 7 below, 8 predorsal, 4 rows smaller scales on cheek, one verticle row along anterior edge of opercle.

D. XII, 1,12, third and fourth spine longest, 2⅙—2⅓ in head; third ray 2⅕—2¼. A. IV, 11, third spine 2⅙—2¼, second ray 2½. V. I, 7, spine 2⅓, outer ray (longest) 1⅘—2½. P. I, 1, 14—16, upper rays 1½—1⅗. C. 1⅔.

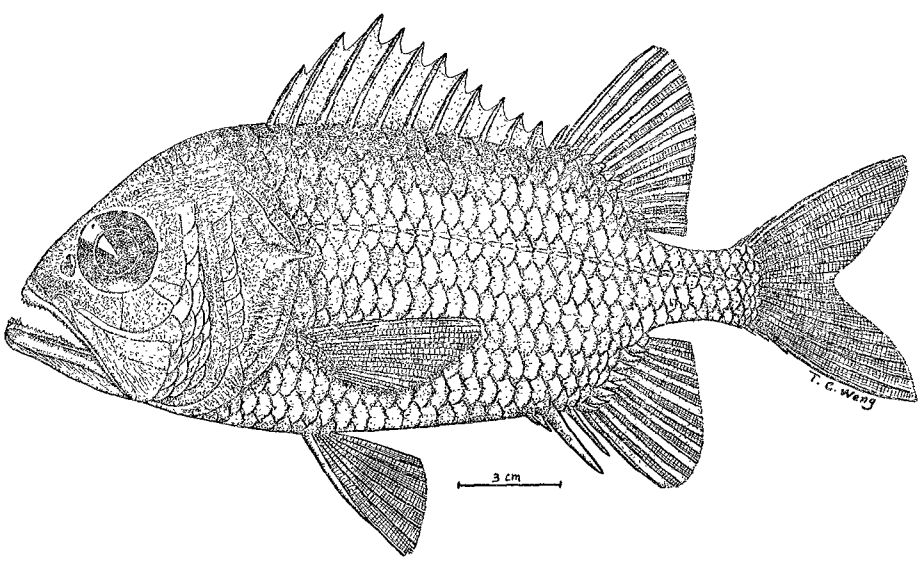

Figure 1.—*Ostichthys japonicus*. (CUVIER and VALENCIENNES)

Body deep and compressed. Caudal peduncle abruptly slenderized off from end of dorsal and anal. Head large and heavy, with steeply curved upper profile and pointed tip; ridges of bones prominent and striated. Eye large, high up, situated entirely in posterior half of head. Interorbital space broad and slightly elevated. Snout short. Nostrils two, very close together, directly in front of eye, anterior one very small,

represented by thin valve; posterior one very large, about 4 in eye, with its longer axis in subverticle direction. Mouth large and inclined, lips rather broad and fleshy; maxillary with parallel striae on surface, its end reaching posteriorly beyond eye, expanded distally till 1¼ in eye; lower jaw slightly projecting, and well fitting in scooped front part of premaxillary with mouth closed. Flat spine on upper part of opercle extended posteriorly beyond opercular flap. Opercle with strong bony ridges, arranged in parallel rows forming small serrations behind, ventral to upper large spine.

Scales large, with prominent parallel striae forming prickly edge behind, middle ones sharper and stronger. Dorsal inserted slightly before posterior edge of opercular flap; spines gross and strong, striated on surface; membranes between spines deeply notched; soft dorsal higher in front, rounded behind. Anal inserted below last dorsal spine, third spine strongest; spines striated as dorsal; soft anal similar to soft dorsal. Soft dorsal and anal with low scaly sheath. Pectoral low, its tip slightly beyond the end of ventral. Ventral below base of pectoral, spines equal to third dorsal spine.

Color in formalin whitish yellow, each scale with median darker patch, forming parallel longitudinal streaks.

We have two specimens THUP 00478, 00479, 258 mm. and 264 mm. in total length respectively, collected on June 5, 1960, from Taichung Market.

Genus MYRIPRISTIS CUVIER, 1829

Myripristis CUVIER, Regne Anim., 2nd Ed., vol. 2, 1829, p. 150. Type *Myripristis jacabus* CÜVIER and VALENCIENNES.

MYRIPRISTIS ADUSTUS BLEEKER

Figure 2

Myripristis adustus BLEEKER, Nat. Tijds. Ned. Ind., vol. 4, 1853, p. 108 (type locality, Amboyna).—JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 220 (Samoa).—FOWLER, B. P. Bishop Mus. Bull. 22, 1925, pp. 6, 31 (Guam, Samoa).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 106, pl. 6B (Tahiti, New Guinea, Apia, etc).—HERRE Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 72 (New Hebrides).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1. 1953, p. 201 (Guam).—SMITH, Sea Fishes S. Africa, 1961 (4th Edi.), pp. 153, 504, pl. 35, fig. 298a (Delagoa Bay).

Myripristis batche DAY, Fishes of India, 1878, p. 169, pl. 41, fig. 1 (Coromandel Coast of India).

Depth 2½, 3⅛ in total length. Head 3; 3⅘ in total length. Snout 6¼. Eye 3, 2⅘ of snout. Interorbital space 3⅗, 1½ in eye. Least depth of caudal peduncle 3⅖ in head, 1⅖ in its length. Gill rakers 12+25, little longer than its filaments.

Scales in lateral line 28, 3 scales above lateral line, 6 scales below, 9 predorsal, 3 oblique rows smaller scales on cheek.

D. X-I, 1,14 (1), fourth spine longest, 2 in head; second ray 1⅘. A. IV, 1, 12 (1), fourth spine 3, first and second ray 1⅘. P. I, 1, 14, upper ray 1⅓. V. I, 7, spine

2⅓, outer ray 1⅝. C. 1¼.

Body ovoid, compressed, upper and lower contour rather even. Head heavy, rather obtuse. Eye large, rounded, little smaller than postorbital part of head. Interorbital space convex, bony ridges there not so visible as other species. Snout short. Mouth large, inclined; maxillary reaching beyond posterior one-third of eye, expanded distally, its width 1/10 in eye-diameter, its lower border at posterior edge with series of rounded teeth; lower jaw slightly protruding, and fitting in scooped front part of upper jaw. Teeth in jaws in rough bands, outer row slightly enlarged and rounded at tip, four or more large and stout ones on each side of anterior of each jaw. Teeth on scooped part of upper jaw fewer. Patch of six or more strong rounded teeth on each side of symphysis of lower jaw, and another one on each side of chin below those just mentioned. Nostrils two, close together, posterior one large, depressed and crescentic. Edges of

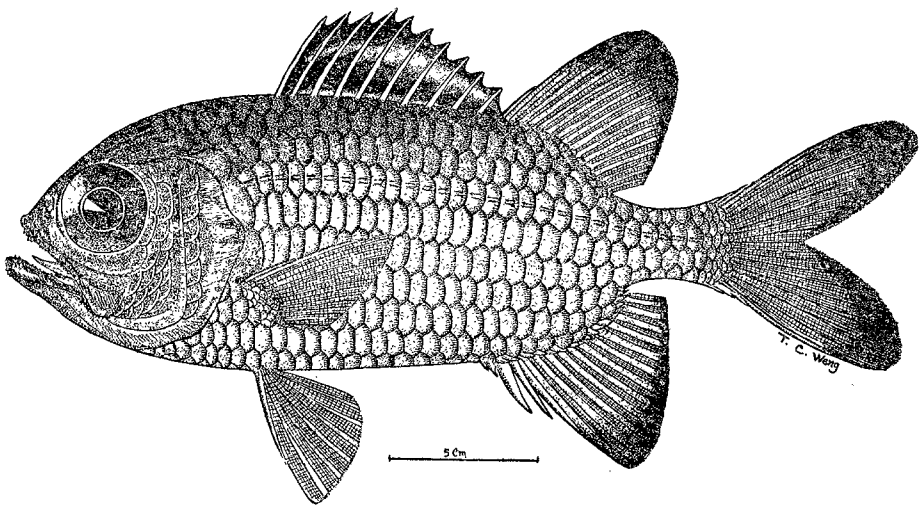

Figure 2,—*Myripristis adustus* Bleeker

preorbital and infraorbital with fine serrations. Opercle with flat spine, tip not beyond opercular flap. Hind edges of opercle and preopercle with indistinct parallel striae on surface. Dorsal inserted slightly beyond end of opercular flap; spines slender and pungent, first one equal to eye, last one 1⅔ in eye; spaces between spines gradually increased from first to fifth, others broader and subequal; membranes between spines incised; soft dorsal decreased in length from second posteriorly, last one only one-third of second. Third anal spine stronger, but little shorter than fourth; soft anal similar to soft dorsal. Ventral little behind pectoral, ventral spine equal to postorbital part of head. Caudal deeply forked.

Color in formalin violet, lower lighter, tip of lower jaw and tip of snout black, top of head dark brown or black; lips and inside of mouth blackish, cheek dusky; black blotch on posterior part of opercle slightly above and below opercular spine; upper part of pectoral base black; scales on side of body with dark brown margin, those above

lateral line more distinct; membranes between dorsal spines black on distal one-third, dusky on basal two-thirds; outer third of soft dorsal, anal and caudal lobes black; other fins lighter.

We have only one specimen. THUP 01980, 295 mm. in total length, collected on Aug. 4 1962, from Kaohsiung Fishery Auction Market.

Note: WEBER and BEAUFORT and other authors considered this species as a synonym of *M. murdjan*. WOODS studied a large series of specimens of this genus and indicated that this species indeed has different coloration and number of gill rakers. Our specimen of 232 mm. (295 mm. in total length) possesses the same coloration, number of gill rakers and body proportions of the specimen of 71 mm. which WOODS described. I agree with WOODS and arrange *M. adustus* as a separate species.

Our specimen, on the other hand, is very similar in teeth form to *M. melanostictus*, those described by WEBER and BEAUFORT, but their coloration is undoubtedly distinguishable. In my opinion, the likeness or difference in teeth patch on each side of symphysis and chin may be due to sex, age or individual variations.

WEBER and BEAUFORT also united *M. microphthalmus* with *M. murdjan*. On the basis of the criteria used by WOODS, I also arrange *M. microphthalmus* separately.

MYRIPRISTIS MURDJAN (FORSKÅL)

Figure 3

Sciaena murdjan FORSKÅL, Descrip. Anim., 1775, p. 48, Djidda, Red Sea.

Myripristis murdjan GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 21 (Red Sea, India, Amboyna).—DAY, Fishes of India, 1878, p. 170, pl. 40, fig. 2 (Madras).—JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 220 (Hawaii, Samoa).—JORDAN, TANAKA and SNYDER, Journ. Coll. Sci. Imp. Univ. Tokyo, vol. 33, Art, 1, 1913, p. 117 (Nagasaki to Kagoshima, Formosa, etc.).—FOWLER, B. P. Bishop Mus., Bull. 22, 1925, pp. 6, 24, 31 (Guam, Hawaii, Samoa).—FOWLER, Proc. Acad. Nat. Sci. Philad., vol. 79, 1927, p. 206 (Philippines).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 106 (Honolulu, Tahiti, Guam, etc.).—WEBER and DE BEAUFORT, Fish. Indo-Austral. Archip., vol. 5, 1929, p. 259 (Numerous E. Indian localities northern to Japan; including *M. adustus* BLEEKER and *M. Microphthalmus* BLEEKER).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 73 (Tuamotu Archip., New Hebrides, Solomon Islands).—OKADA and MATSUBARA, Keys Fish. Fish-like Anim. Japan, 1938, p. 139 (Japan, Hawaii, Samoa, Guam, E. Indies, etc.).—AOYAGI, Coral Fishes, pt. 1, 1943, p. 44 (part) (Ishigaki Island, Miyako Island and Okinawa Honto).—FOWLER, Proc. Aca. Nat. Sci. Philad., vol. 98, 1946, p. 128 (Riu Kiu Islands).—TANAKA, Fishes of Japan, vols. 1—30, 1951 (Rev.), p. 53, pl. 14, figs. 46, 47 (Formosa, E. Indies, Philippines, Japan, etc.).—KAMOHARA, Rep. Kochi Univ., Nat. Sci., no. 3, 1952, p. 29 (several Japanese localities).—HERRE, Check list Philippine Fishes, 1953, p. 200 (reference).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1. 1953, p. 198, pl. 17D, (Marshall and Marianas Islands).—MUNRO, Marine and Fresh-water Fishes Ceylon, 1955, p. 88, pl. 15, fig. 244.—MATSUBARA, Fish Morph. Hierar., pt. 1, 1955, p.444 (Japan, Hawaii, Samoa, Guam, E. Indies, etc.; including *M. adustus* BLEEKER).—TANAKA and ABE, Fig. Descr. Thousand Useful Fishes, pt. I, 1955, p. 82 (Japan).—KAMOHARA, Rep. Usa Marine Biol. Sta., vol. 5, no. 1, 1958, p. 22 (Tokyo to Korea, etc.).—TOMIYAMA, ABE and TOKIOKA, Encyclo. Zool. Illust. Colours, vol. 2, 1958, p. 234, fig. 695

(Japan) —SMITH, Sea Fishes S. Africa, 1961 (Rev.), p. 154, pl. 9, fig. 198.

Myripristis mardjan (error) OKADA, Cat. Vert. Japan, 1938, p. 166 (Japan, Hawaii, Samoa, Guam, E. Indies, etc.).

Depth 2⅓, 3 in total length. Head 3, 3⅖ in total length. Snout 6⅞. Eye 2⅖, 2⅘ of the snout. Interorbital space 4⅘, 1⅖ of snout, 2 in eye. Least depth of caudal peduncle 3⅓ in head, 1½ in its length. Gill rakers 11-23, rather slender and strong, about 1½ of its filaments.

Scales in lateral line 28, 2½ scales above lateral line, 6 scales below, 10 scales predorsal, 4 oblique rows smaller scales on cheek, one verticle row along anterior edge of opercle.

D. XI, 1, 13 (1), fourth spine longest, 2⅒ in head, second and third ray 1½. A. IV, 1, 11 (1), third spine 3, second ray 1⅗. P. I, 1, 13, upper ray 1⅖. V. I, 7, spine 1⅒, outer ray 1½. C. 1¼.

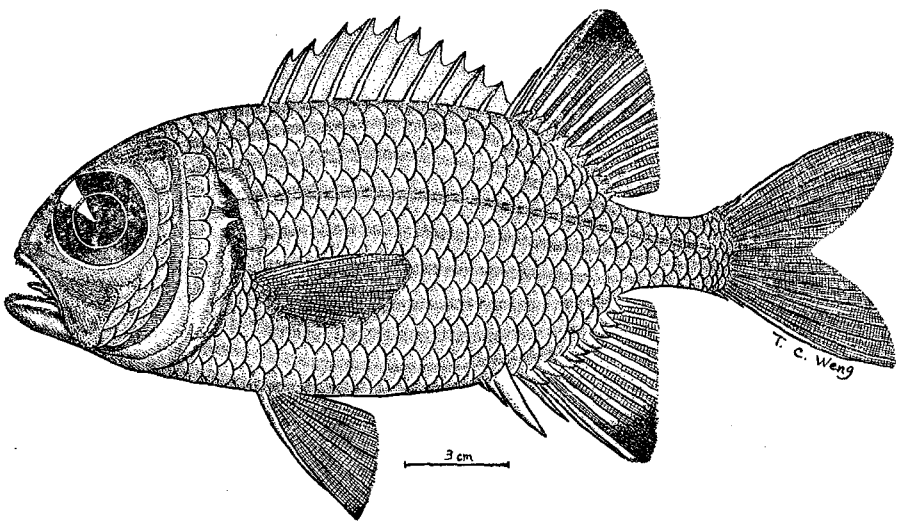

Figure 3.—*Myripristis murdjan* (FORKSÅL)

Body ovoid, compressed, outer profile evenly curved. Head heavy, obtuse in front. Eye large, about equal to postorbital part of head. Interorbital space somewhat convex, bony ridges there rather prominent. Snout very short. Mouth large, inclined; with lower jaw projecting and fitting in notch in front part of upper jaw; maxillary reaching to below posterior rim of eye pupil, expanded distally till 1½ in eye, with parallel striae on surface and several small rounded teeth on its lower border at posterior edge. Teeth in jaws in rough band, outer row somewhat enlarged. A patch of larger and papillose teeth on each side of anterior of upper jaw; similar patch on each side of symphysis of lower jaw; another ill-developed one on each side of chin below those just mentioned; teeth on notched part of upper jaw fewer. Nostrils two, posterior one large, somewhat crescentic in form, its longer axis in verticle direction. Edges of preorbital and infraorbital with fine serrations. Opercular spine short, its end not beyond opercular flap, with ridge on its surface. Hind edge of opercle, preopercle and subopercle with

parallel ridges, forming small serrations behind. Scales large, with parallel striae on surface. Dorsal inserted little behind end of opercular flap; spines rather slender and pungent, first one shorter than eye, last one subequal to first; space between first and second spines only half of the others; membranes between spines deeply incised; soft dorsal with anterior rays longer, last one 3½ in second. Third anal spine much stronger, its length equal to fourth; soft anal similar to soft dorsal. Ventral little behind pectoral, ventral spine slightly longer than eye. Caudal forked.

Color in formalin reddish yellow; scales with reddish center, forming indistinct longitudinal bands corresponding to scale rows; opercular flap black, black area extending ventrally to level of upper base of pectoral; anterior margin of soft dorsal and anal pale, then two or three rays black on distal half, basal portion and rest of fin pale; caudal with terminal portion dusky.

We have a specimen THUP 01350, 258 mm. in total length, collected in June, 1960 from Kaohsiung Fishery Auction Market.

MYRIPRISTIS MICROPHTHALMUS BLEEKER

Figure 4

Myripristis microphthalmus BLEEKER, Nat. Tijds. Ned. Ind., vol. 3, 1853, p. 261 (Type locality, Amboyna).—JORDAN and SEALE, Bull. U. S. Bur. Fisher., Vol. 25, 1905 (1906), p. 220 (Apia, Pago Pago.).—FOWLER, B. P. Bishop Mus., Bull. 22, 1925, p. 31 (Samoa).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 107 (Fate, Apia).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 75 (Tahiti).—HERRE, Check list Philippine Fishes, 1953, p. 220 (reference).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1, 1953, p. 195 (Marshall and Marianas Islands.)

Depth 2⅖, 3⅕ in total length. Head 3, 4 in total length. Snout 7. Eye 2⅖, 3 of snout. Interorbital space 3⅔, 2 of snout, 1⅓ in eye. Least depth of caudal peduncle 3 in head, 1⅗ in its length. Gill rakers 16+29, slender and somewhat flexible, longest about 1½ of its filaments.

Scales in lateral line 29, 2½ scales above lateral line, 6 scales below, 9 scales predorsal, 3 oblique rows smaller scales on cheek, one verticle row along anterior edge of preopercle.

D. X-I, 1, 14, third and fourth longest, 2 in head; second and third ray 1½. A. IV, 1, 12 (1), third spine 2⅗, second and third ray 1½. P. I, 1, 13, spine 2¾, upper ray 1¾. V. I, 7, spine 2⅒, outer ray 1½. C. 1⅒.

Body ovoid, compressed, outer profile gently curved. Head moderate, rather obtuse in front. Eye large, equal to postorbital part of head. Interorbital space somewhat convex, bony ridges there not very prominent. Snout very short. Mouth inclined, with lower jaw projecting and fitting in notch in front part of upper jaw; maxillary reaching to posterior rim of eye pupil, expanded distally, its width 1⅕ in eye, with parallel striae on surface and several small rounded teeth on lower edge of posterior angle. Villiform

teeth in jaws and on vomer and palatines. Patch of larger teeth on each side of anterior of each jaw; teeth in notched part of upper jaw fewer. Nostrils two, posterior one not so large as other species. Edges of preorbital and infraorbital with fine serrations. Opercular spine flat and triangular in form, its end not beyond opercular flap. Hind edges of opercle and preopercle with parallel striae, forming fine serrations behind; edge of subopercle smooth. Scales large, with indistinct striae on surface. Dorsal inserted little behind end of opercular flap; spine rather slener and pungent, first one shorter than eye, last one little longer than first; space between first and second spines

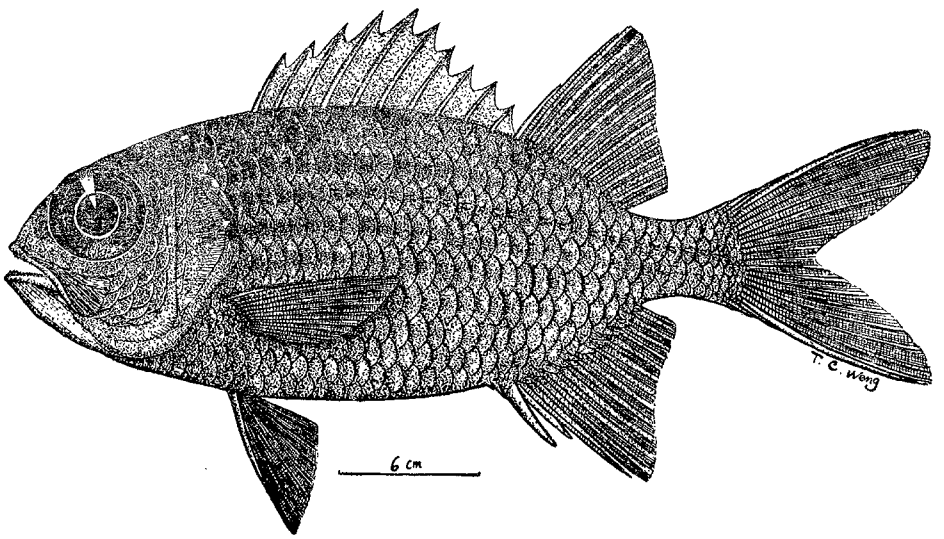

Figure 4,—*Myripristis microphthalmus* BLEEKER

narrowest, gradually increased posteriorly to fifth, others subequal; membranes between spines deeply incised; soft dorsal with anterior rays longer, last one only one-third of second. Third anal spine strongest, subequal in length to fourth; soft anal similar to soft dorsal. Ventral little behind pectoral, ventral spine longer than eye. Caudal deeply forked.

Color in formalin reddish, top of head and back reddish brown; scales above lateral line and those in lateral line with dark brown base and margin, median portion of scales with verticle light streak; scales below lateral line with middle portion reddish, forming longitudinal bands, corresponding to scale rows; cheek and chin dusky; opercular flap not black, but dark brown, below spine lighter; upper part of pectoral axis black; fins whitish yellow; caudal base pale.

We have a specimen THUP 01157, 176 mm. in total length, collected on July 24, 1960, from Pescadores.

MYRIPRISTIS PRALINIUS CUVIER and VALENCIENNES

Figure 5

Myripristis pralinius CUVIER and VALENCIENNES, Hist. Nat. Poiss., vol. 3, 1829, p. 170 (type locality, New Ireland).—GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 20 (Celebes, Louisiades Archip., India),—JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 222 (Samoa).—WEBER and DE BEAUFORT, Fish. Indo-Austral. Archip., vol. 5, 1929, p. 253, fig. 69 (Several E. Indian localities, Philippines, etc).—FOWLER, Hong Kong Naturalist, vol. 5, no. 4, 1934, p. 306, fig. 38 (China, Canton, etc.).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 79 (Tahiti).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1, 1953, p. 207 (Marshall and Marianas Islands).—HERRE, Check list Philippine Fishes, 1953, p. 201 (reference).—MUNRO, Marine and Fresh-water Fishes Ceylon, 1955, p. 88, pl. 15, fig. 243.

Myripristis pralinus RICHARDSON, Ichth. China and Japan, 1845, p. 223 (Coast of China, Canton).

Myripristis praslinus FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 108 (types of *M. sanguineus* JORDAN and SEALE, *M. symmetricus* JORDAN and EVERMANN, *M. phaeopus* SEALE).

Myripristis multiradiatus JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 222 (Pago Pago).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 109, pl. 7C (Honolulu, New Guinea, Apia, etc.).

Myripristis sanguineus JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 221, fig. 24 (Tahiti, Samoa).

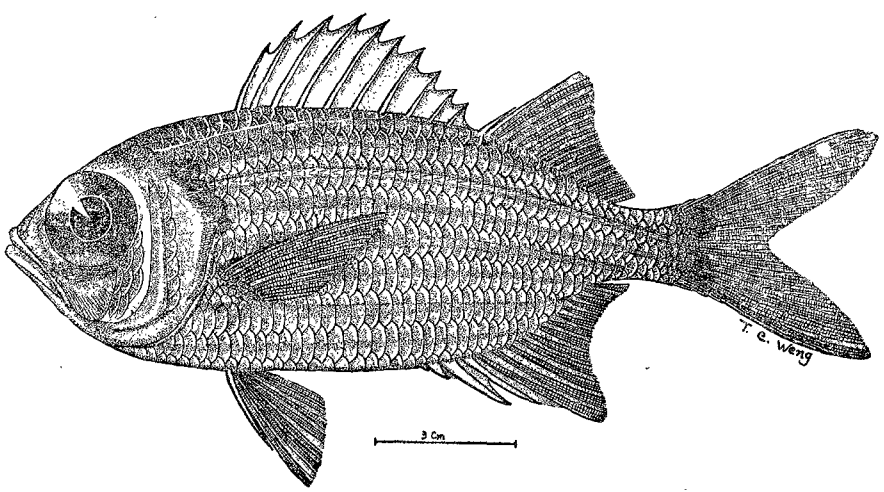

Figure 5.—*Myripristis pralinius* CUVIER and VALENCIENNES

Depth 2½, 3⅗ in total length. Head 3, 4 in total length. Snout 6⅘. Eye 2⅓, 3 of snout. Interorbital space 4, 1¾ in eye. Least depth of caudal peduncle 2⅖ in head, 1⅗ in its length. Gill rakers 11+24, slender and flexible, longest almost double its filaments.

Scales in lateral line 39, 2½ scales above lateral line, 6 scales below, 7 or 8 predorsal, 3 oblique rows smaller scales on cheek, 2 verticle rows along anterior edge of opercle.

D. X-I, 1,16, third and fourth longest, 2 in head; second ray 1¾. A. IV, 1,14, fourth spine longest, 2⅗ in head, first ray 1⅔. P. I, 1, 13, upper rays 1⅕. V. I, 7, spine 2¼, outer ray 1½. C. 1⅙

Body ovoid, compressed, upper profile gently rising up to middle part of body. Head moderate. Eye large. Interorbital space even. Mouth inclined; maxillary reaching to below or beyond posterior margin of pupil, its distal part expanded, equal to half eye; lower jaw slightly projecting. Teeth in jaws in villiform band, those on palatines in broad band; patch of larger teeth on each side of symphysis. Nostrils two, posterior one irregular in form. Hind and lower edges of opercle and preopercle with fine denticulations. Large flat spine on upper part of opercle, its end not beyond opercular flap Dorsal inserted just above end of opercular flap; spines slender and pungent, somewhat flexible; space between first and second spines half next one, one-fourth of others; membranes between spines deeply incised. Third anal spine largest, but somewhat shorter than fourth, which is equal to postorbital part of head. Ventral behind pectoral, ventral spine equal to eye. Caudal deeply forked.

Color in formalin pale pink, back darker; sides with light orange bands, corresponding to scale rows, narrowing and fading posteriorly; hind margin of upper part of opercular bone black, extend to some scales of nape, membrane black down to just below opercular spine; upper part of pectoral axil blackish; fins light pinkish.

We have only one specimen THUP 01668, 188 mm. in total length, collected on Feb. 13, 1961, from Tungkong.

Genus HOLOCENTRUS Scopoli, 1777

Holocentrum Artedi, Seba, III, about 1738 (Sciaena rubra Forskål).
Holocentrus Gronow. Zoolphyl., 1763, p. 65 (*Holocentrus rostratus* Gronow, non—binomial).
Holocenthrus (Gronow) Scopoli, Int. Hist. Nat., 1777, p. 449 (misprinted.).

HOLOCENTRUS SPINOSISSIMUS (Temminck and Schlegel)

Figure 6

Holocentrum spinosissimum Temminck and Schlegel, Fauna Japonica, 1847, p. 22, pl. 8A, Nagasaki.—?Richardson, Ichth. China and Japan, 1845, p. 223 (Coast of Japan and China).—Günther, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 41 (copied).

Holocentrus spinosissimus Jordan and Fowler, Proc. U. S. Nat. Mus., vol. 26, 1902, p. 13, fig. 3 (Wakanoura).—Jordan, Tanaka and Snyder, Journ, Coll. Sci. Imp. Univ. Tokyo, vol. 33, Art. 1, 1913, p 115 (Wakanoura, Misaki, Sagami).—Okada, Uchida and Matsubara, Fig. Descr. Jap. Fishes, 1935, p. 108, pl. 45, fig. 1 (Tokyo, Southern Japan).—Okada and Matsubara, Keys Fish. Fish-like Anim. Japan, 1938, p 140, pl. 21, fig. 2 (Southern Japan).—Okada, Cat. Vert. Japan, 1938, p. 166 (Honsyu Japan).—Aoyagi, Coral Fishes, pt. 1, 1943, p. 47 (Okinawa Honto).—Nakamura, Illust. Taiwan Fish. etc., 1943, p. 31, fig. 62 (?) (Coast of Taiwan).—? Liang, Lab, Biol., Taiwan Fish. Res. Inst., Rep. no. 3, 1951, p.14 (name only).—Chen, Quart. Journ. Taiwan Mus., vol. 5, no. 4, 1952 p. 310 (list).

—TANAKA and ABE, Fig. Descr. Thousand Useful Fishes, 1955, p. 82 (Japan).—MATSUBARA, Fish Morph. Hierar., pt. 1, 1955, p. 444 (Southern Japan, Okinawa).—CHEN, Synop. Vert. Taiwan, 1956, p. 119 (list).—KAMOHARA, Rep. Usa Marine Biol. Sta., vol. 4, no.1, 1957, p. 10, fig. 7 (Naze Japan), ibid, vol. 5, no. 1, 1958, p. 22 (Sagami Bay to Formosa and Korea).—TOMIYAMA, ABE and TOKIOKA, Encycl. Zool. Illust. Colours, vol. 2, 1958, p. 233, fig. 693 (Japan).

Head 2⅔; depth 2⅔; D. XI, 13; A. IV, 9; P. I. 13; V. I, 7. Scales 3—37 or 38—6. Body rather long, compressed, and covered with large striated scales, rather rough to the touch. Head compressed, and the upper profile somewhat convex; eye large, its posterior margin nearer the gill opening than the tip of the snout, 2¾ in the head and equal to the maxillary; snout bluntly pointed, 2 in the eye; nostrils directly in

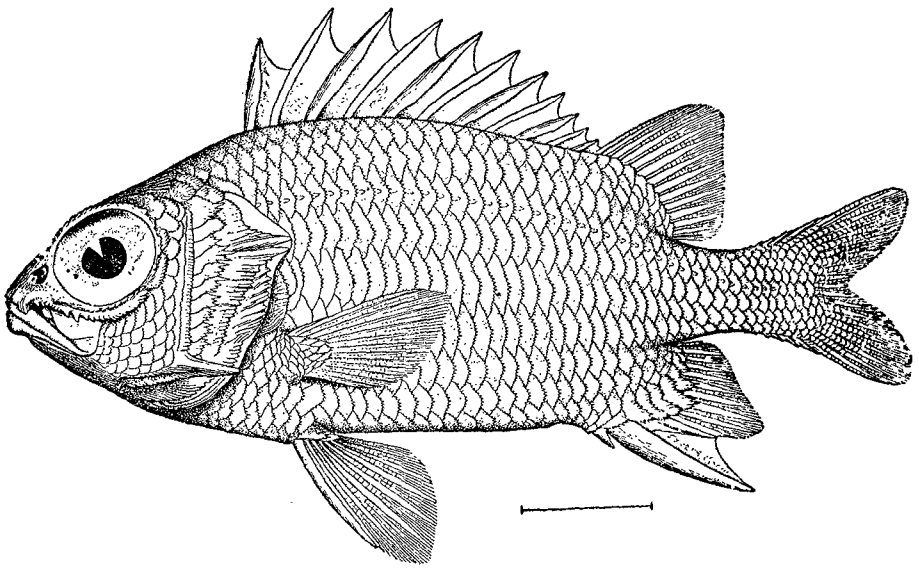

Figure 6.—*Holocentrus spinosissimus* TEMMINCK and SCHLEGEL, (from JORDAN and FOWLER)

front of the eye, and the posterior very large; mouth inclined, the maxillary expanded distally till it is 2 ⅗ in the eye, and reaching below the first two-thirds of the eye; teeth in fine, roughened bands in the jaws; the lips rather thick and fleshy; the lower jaw projects but little; interorbital space concave above and equal to about three-fifths the eye; bones on the head rough, striated, and with the edges serrated; two opercular spines; preoperculum with its lower angle with a strong backward spine; five rows scales on the cheeks; preorbital spine strong; gill opening large; gill rakers 7+10, rather short and most of them poorly developed. Dorsal before the edge of the gill-opening and the pectoral, the third and fourth spines the highest; soft dorsal highest in front and nearly as high as the spinous dorsal; third anal spine very strong and long, though not as long as the longest rays, which are in front; pectoral a trifle shorter than the ventral, and about equal to the third anal spine; ventrals a little behind pectorals and with their tips reaching for nearly two-thirds the space between their base and the origin of the anal; caudal emarginate, the lobes distinct; rudimentary caudal rays several and developed as graduated spines above and below; lateral lines

inclosed from the head to the base of the caudal; caudal peduncle compressed, about two-thirds the eye.

Color plain brown in alcohol, with traces of longitudinal silvery bands, and the cheeks and opercles silvery. Color in life brilliant scarlet, with white stripes, one stripe extending obliquely below the eye (JORDAN and FOWLER).

Note: This species is hardly distinguishable from *H. ruber*, except when the specimens are fresh and show the typical color pattern. Our laboratory has no collection of this species for a critical comparison.

NAKAMURA (1943) briefly noted that it could be found about the coast of Taiwan, but his figure labeled *H. spinosissimus* is probably *H. ruber*. I have also examined a specimen, no. T. W. F. 252, preserved in the Taiwan Fisheries Research Institute. This specimen shows the same color pattern as *H. ruber*, and is probably not *H. spinosissimus*. Thus I have found no certain evidence of a Taiwan record of this species.

HOLOCENTRUS RUBER (FORSKÅL)

Figure 7

Sciaena rubra FORSKÅL, Descrip. Animal., 1775 p. 48, Red Sea.

Holocentrum alborubrum LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, p. 372 (China Sea).—RICHARDSON, Ichth. China and Japan, 1845, p. 223 (Canton, Seas of China and Japan).

Holocentrum rubrum GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 35 (Amboyna, Japan, Philippines, China, India).—DAY, Fishes of India, 1878, p. 172, pl. 41, fig. 4.—WEBER and DE BEAUFORT, Fish. Indo-Austral. Archip., vol. 5, 1929, p. 244 (Numerous E. Indian localities, northern to Philippines and Japan).

Holocentrus alboruber JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 26, 1902, p. 15 (Okinawa, Riu Kiu).

Holocentrus rubrum MUNRO, Marine and Fresh-water Fishes Ceylon, 1955, p. 88, pl. 15, fig. 241.—SMITH, Sea Fishes S. Africa, 1961 (4th. edi.), p. 153, fig. 295.

Holocentrus praslin JORDAN and SEALE, Bull, U. S. Bur. Fisher., vol. 25, 1905 (1906). p. 225, fig. 26 (Apia, Pago Pago).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1, 1953, p. 215 (Marshall and Marianas Islands).

Holocentrus ruber JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 225 (Louisiades, E. Indies, China).—JORDAN, TANAKA and SNYDER, Journ, Coll. Sci. Imp. Univ. Tokyo, vol. 33, Art. I, 1913, p. 115 (Kagoshima, Okinawa, Philippines, China, India, etc).—FOWLER, Mem. B. P. Bishop Mus., Vol. 10, 1928, p. 97 (New Guinea, Samoa, etc.).—CHU, Biol. Bull. St. John's Univ., no. 1, 1931, p. 96 (reference).—FOWLER, Hong Kong Naturalist, vol. 5, no. 4, 1934, p. 309 (China).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 59 (New Hebrides).—OKADA, Cat. Vert. Japan, 1938, p. 166 (Japan, China Sea, E. Indies, etc.).—OKADA and MATSUBARA, Keys Fish. Fish-like Anim. Japan, 1938, p. 140 (Japan, China Sea, E. Indies).—AOYAGI, Coral Fishes, pt. 1, 1943, p. 47 (Ishigaki Island, Miyako Island and Okinawa Honto).—KAMOHARA, Rep. Kochi Univ., Nat. Sci., no. 3, 1952, p. 28 (including *H. spinosissimus* T. & S.).—HERRE, Check list Philippine Fishes, 1953, p. 197 (reference).—LINANG, Mon. Rep. Taiwan Fish. Res. Inst., vol. 2, no. 7, 1954, p. 4. (Keelung).—KAMOHARA, Pub. Seto Marine Biol. Lab., vol. 3, no. 3, 1954, p. 273 (Nankanoshima).—MATSUBARA, Fish Morph.

Hierar., pt. I, 1955, p. 444 (Japan, Riu Kiu, China Sea, Samoa, E. Indies).—CHEN, Synop. Vert. Taiwan, 1956, p. 119 (list).—CHU, Rep. Inst. Fish. Biol. Minis. Econ. Aff. and Nat. Taiwan Univ., vol. 1, no. 2, 1957, p. 16 (Pescadores).—KAMOHARA, Rep. Usa Marine Biol. Sta., vol. 5, no. 1, 1958, p. 22 (Kochi to Red Sea, Africa, Australia, etc.).

Depth 2⅜—2⅝, 3⅛—3⅞ in total length. Head 2⅜—3⅛, 3⅓—3⅝ in total length. Snout 4⅝—5¼. Eye 2¾—3⅖, 1⅖—2⅕ of snout. Interorbital space 3½—4⅖, 1⅕—1¼ in eye. Least depth of caudal peduncle 3⅜—3⅝ in head, 1½—1⅘ in its length. Gill rakers 5—6+10—12, rather blunt, longest one shorter than its filaments.

Scales in lateral line 33—36, 2½ scales above lateral line, 7 scales below, 5—7 predorsal, 5 oblique rows smaller scales on cheek, one verticle row along anterior edge of opercle.

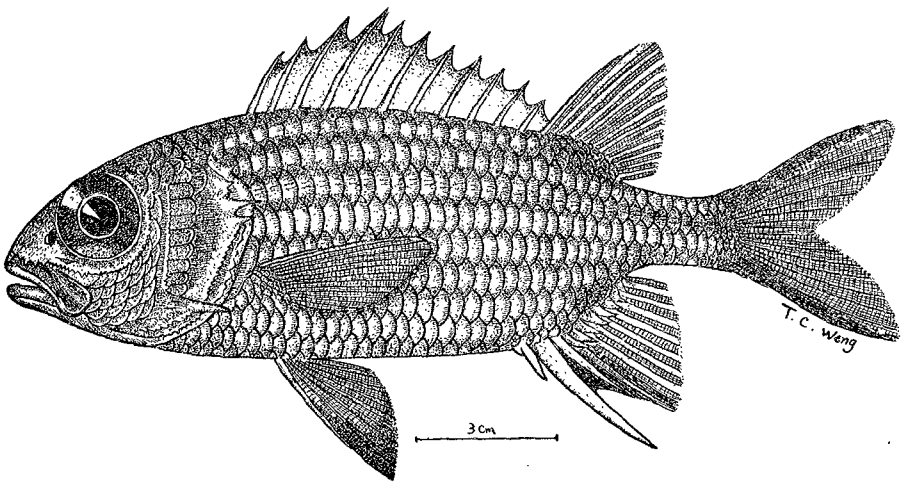

Figure 7.—*Holocentrus ruber* (FORSKÅL)

D. XI, 1, 11—13, third and fourth or fourth and fifth longest, 1⅞—2 in head; second and third ray 1⅗—1⅘. A. IV, 9, third spine 1½—1⅘; first and second ray 1⅗—1⅘. P. I, 1, 12—13, upper ray 1¼—1½. V. I, 7, spine 1⅘—2¼, outer ray 1⅓—1⅔. C. 1⅖—1⅗.

Body ovoid compressed, more slender in young stage; upper contour gently curved up to middle of body, and rather abruptly descending from occiput to snout; lower contour rather even. Head moderate; jaws nearly equal in front, or lower jaw somewhat included. Eye large, situated in anterior half of head; interorbital space even. Maxillary reaching to below or slightly beyond middle of eye, expanded distally, its width 2⅕—2⅗ in eye. Bony ridges in front of nostrils ending anteriorly in blunt spine, turned forward, more prominent in large specimens; lower border of preorbital with series of irregular spines, anterior one largest; preorbital ridge with triangular spine, directed outwards; infraorbital and postorbital densely denticulated. Nostrils two, close together, posterior one oblong, depressed, its longer axis almost in verticle direction. Two flat spines at upper part of operculum, upper one longer and stronger than lower one, and extending posteriorly beyond opercular flap. Opercle with sharp bony ridges, arranged

in parallel rows, serrated posteriorly below two large spines. Preopercular spine heavy and strong, less than eye or almost equal to it. Inferior edges of preopercle and subopercle also with serrations. Scales large, with pearl reflection. Dorsal inserted just above or little before end of upper opercular spine; spines stiff and stout; space between first and second spines narrower, others subequal; membranes between spines deeply incised. Third anal spine especially large. Ventral little behind pectoral, ventral spine equal to or little longer than postorbital part of head.

Color in formalin light pink or bright red; in young specimens dark brown above, lighter below; each row of scales with longitudinal broad silvery band. Operculum dark brown, its hind border lighter. Distal part of membranes between dorsal spines blackish, as well as that between third and fourth anal spine and first ray; some specimens with black blotch on membranes of first two dorsal spines. Longitudinal dark blotch sometimes at base of soft dorsal, ovoid blotch at base of soft anal. Outer rays of caudal with longitudinal darkish streak. Ventral with distal third blackish.

We have six specimens, THUP 00472, 00473, 00491, 00951, 00960, 01427, 187 to 297 mm. in total length, two from Pescadores, three from Taichung, one from Kaohsiung.

Commonest species of *Holocentrus* in Taiwan region.

HOLOCENTRUS SPINIFER (FORSKÅL)

Figure 8

Sciaena spinifera FORSKÅL, Descrip. Anim., 1775, pp. 12, 49 (type locality, Djedda, Red Sea).

Holocentrum spiniferum GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 39 (Red Sea, Louisiades Archip.). —WEBER and DE BEAUFORT, Fish. Indo-Austral. Archip., vol. 5, 1929, p. 235 (Several E. Indian localities, Philippines, etc.).

Holocentrum andamanense DAY, Fishes of India, 1878, p. 172, pl. 41. fig. 3 (Andamans).

Holocentrus spiniferus SMITH, Sea Fish. S. Africa, 1961 (4th, edi.), p. 515, fig. 297a (Delagoa Bay).

Holocentrus spinifer JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 223 (Apia).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 103 (Samoa, Honolulu, etc.).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 69 (Bora Bora, Solomon Islands).—AOYAGI, Coral Fishes, pt. I, 1943, p. 49 (Miyako and Okinawa Honto).—HERRE, Check List Philippine Fishes, 1953, p. 199 (reference)—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1. 1953, p. 218, pl. 20A, (Marshall and Marianas Islands).—MATSUBARA, Fish Morph. Hierar., pt. 1, 1955 (Riu Kiu, Miyago, E. Indies, etc.).

Holocentrus andamanensis SMITH, Sea Fish. S. Africa, 1961, (4th. edi.), p. 515, fig. 297b (Delagoa Bay).

Depth 2½—2⅗, 3⅐ in total length. Head 2⅐—2 ⅘, 3⅓—3⅖ in total length. Snout 3⅖—3 ⅗. Eye 3⅑—4, 1⅐ in snout. Interorbital space 7⅖—7⅘, 2 of eye. Least depth of caudal peduncle 3¼—3⅔ in head, 1⅖—1⅐ in its length. Gill rakers 6—7+11—12, stout, the longest one shorter than its filaments.

Scales in lateral line 43, 4 scales above lateral line, 9 scales below, 8 or 9 scales predorsal, 5 oblique rows smaller scales on cheek, one verticle row along anterior edge of opercle.

D. XI, 1, 14—15, third and fourth spine longest, 2¼—2½ in head; third and fourth ray 1⅞—2. A. IV, 10, third spine 2⅕—2¼, first ray 2—2⅐. P. I, 1, 13—14, upper rays 1½—1⅗. V. I, 7, spine 2⅞—2¾, outer ray 1¾—1⅘. C. 1⅗—1⅞.

Body oblong, compressed, dorsal profile running in straight line from dorsal fin to snout, with slight gibbosity at nape. Head moderate, with pointed tip. Eye rather large, slightly less than snout. Interorbital space narrow and even. Mouth rather small;

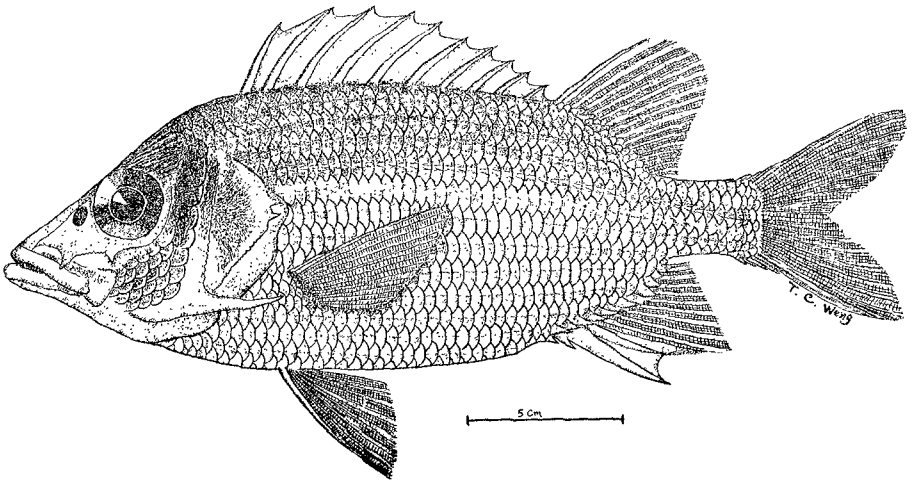

Figure 8.—*Holocentrus spinifer* (Forsk̊al)

maxillary reaching to below anterior one-third of eye; lower jaw projecting beyond upper. Nostrils two, posterior one large, ovoid and depressed. Bony ridges in front of nostrils ending anteriorly in blunt bifurcate spine. Preorbital with two large obtuse spines, pointing downwards, some much smaller and slender ones between them. Infraorbital and postorbital narrow, with fine denticulations on outer edge. Hind border of preopercle with serrations gradually larger ventrad; preopercular spine large and strong, its length equal to snout. Operculum with three flat spines above, upper one largest, its end not beyond opercular flap; series of fine denticulations following three larger ones. Dorsal fin inserted before end of opercular flap; spines long and stout, first spine equal to or longer than eye, last one less than half eye; space between first and second spines narrower, others subequal; membranes between spines slightly depressed; soft dorsal higher than spinous part. Third anal spine very stout, but not beyond first anal ray. Ventral behind pectoral.

Color in formalin yellowish, upper part reddish yellow, cheek dusky; upper part of preopercle with blackish blotch; center of each scale lighter than ground color, forming longitudinal lines corresponding to scale rows; spinous dorsal light yellow.

We preserved two specimens THUP 01974, 01975, 286-288 mm. in total length, collected on Aug. 4, 1962, from Kaohsiung Fishery Auction Market.

HOLOCENTRUS MICROSTOMUS GÜNTHER

Figure 9

Holocentrum microstomus GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 34 (type locality, Amboyna).
Holocentrus microstomus JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 226 (Samoa). —FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 103 (Society Islands, Pago Pago, Hawaii, etc.). —HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 71 (Tuamotu Archip., New Hebrides).—OKADA, Cat. Vert. Japan, 1938, p. 167 (Riu Kiu, Hawaii, E. Indies).—OKADA and MATSUBARA, Keys Fish. Fish-like Anim. Japan, 1938, p. 140 (Riu Kiu, Hawaii, E. Indies).—AOYAGI, Coral Fishes, pt. 1, 1943, p. 49 (Riu Kiu Islands; after SCHMIDT, 1930) —WOODS, Bull. U. S. Nat. Mus., 202, vol. 1, 1953, p. 223, pl. 21A (Marshall and Marianas Islands).—MATSUBARA, Fish Morph. Hierar., pt. I, 1955, p. 445, (Riu Kiu, Hawaii, E. Indies).

Depth 3¼, 4 in total length. Head 3 as measured to tip of opercular spine, 3 7/10 in total length. Snout 4⅘. Eye 2⅗, 1⅞ of snout. Interorbital space 4 1/10, 1½ in eye. Least depth of caudal peduncle 3⅞ in head, 1⅘ in its length. Gill rakers 6+12, rather week, longest one little less than its filaments, anterior four on upper limb atrophied.

Scales in lateral line 48, 3 scales above lateral line, 8 scales below, 8 predorsal, 5 oblique rows smaller scales on cheek, one or two verticle rows along anterior edge of opercle.

D. XI, 1, 12, fourth spine longest, 2 in head, third ray 1⅗. A. IV, 9, third spine 1⅓, first ray 1⅔. P. I, 1, 13, upper rays 1⅓. V. I, 7, spine 2, outer ray 1⅖. C. 1⅓.

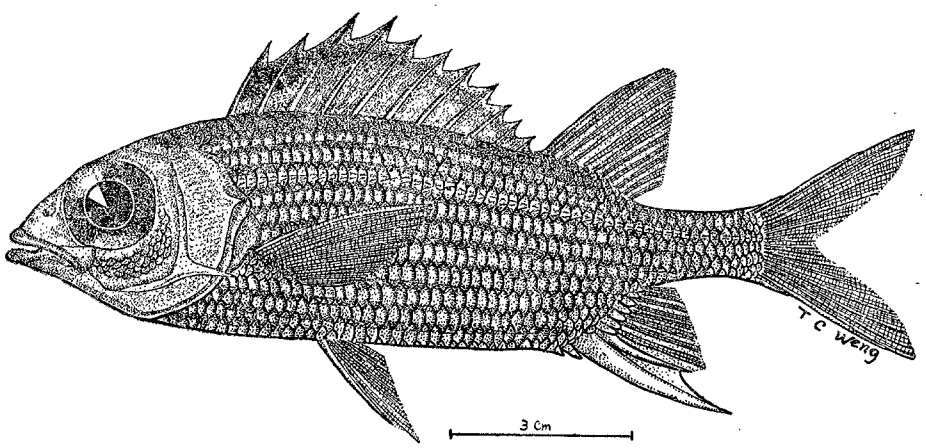

Figure 9.— *Holocentrus microstomus* GÜNTHER

Body oblong, compressed, upper profile gently rising up to middle of body; upper part of head with gentle curve; lower contour rather even. Head moderate, with pointed tip. Eye large, equal to postorbital part of head. Interorbital space somewhat concave. Snout short. Nostrils two, very close together, anterior one minute, posterior one large, oblong and depressed, with its longer axis in subverticle direction. Mouth moderate, somewhat inclined; maxillary reaching to anterior one-third of eye; lower jaw protruding

slightly beyond upper. Strong triangular spine, directed downwards anteriorly on lower edge of preorbital, followed by series of small poorly developed serrations. Two sharp spines on upper part of operculum, the upper one longer than lower one, its end little beyond opercular flap. Opercle with bony ridges, arranged in parallel rows, forming serrations behind. Preopercular spine less than half eye; hind and lower edge of preopercle finely denticulated. Scales moderate, with pearl reflection. Dorsal inserted little before tip of upper opercular spine; spines pungent and strong, first one equal to eye; membranes between spines deeply notched; soft dorsal gradually shorter from third to last, length of last one-third of third. Third anal spine especially strong; first ray longest, last one-fourth of first. Ventral comparatively far behind the pectoral.

Color in formalin silvery reddish, upper part yellowish brown; body with yellow bands, corresponding to longitudinal rows of scales; cheek pale; dorsal fin with membranes between distal two-thirds of first three spines black, then light gray blotch distally between each spine.

We have only one specimen THUP 01659, 152 mm. in total length, collected on Feb. 13, 1961, from Tungkong.

HOLOCENTRUS DIADEMA LACÉPÈDE

Figure 10

Holocentrus diadema LACÉPÈDE, Hist. Nat. Poiss., vol. 4, 1802, pp. 335, 372; pl. 32, fig. 3, in vol. 3, 1802, "manuscrits chinois" (type locality, South Seas).—JORDAN and SEALE, Bull. U. S. Bur. Fisher., vol. 25, 1905 (1906), p. 225 (Samoa, Honolulu).—FOWLER, Proc. Aca. Nat. Sci. Philad., vol. 79, 1927, p. 266 (Philippines).—FOWLER, Mem. B. P. Bishop Mus., vol. 10, 1928, p. 102, pl. 7A (Honolulu, Tahiti, Apia, Guam, etc.).—CHU, Biol. Bull. St. John's Univ., no. 1, 1931, p. 96 (reference).—FOWLER, Hong Kong Naturalist, vol. 5, no. 4, 1934, p. 308, fig. 39 (China, Ceylon, E. Indies, etc.).—HERRE, Field Mus. Nat. Hist., Zool. Ser., vol. 21, 1936, p. 70 (Tuamatu Archip., Solomon Islands).—OKADA, Cat. Vert. Japan, 1938 p. 167 (Japan, Hawaii, Samoa, Sumatra).—OKADA and MATSUBARA, Keys Fish. Fish-like Anim. Japan, 1938, p. 140 (Hawaii, Samoa, Sumatra, Kochi).—KAMOHARA, Rep. Kochi Univ., Nat. Sci., no. 3, 1952 (including *M. ittodai* JORDAN and FOWLER).—WOODS, Bull. U. S. Nat. Mus., 202, vol. 1, 1953, p. 224, pl. 21C (Marshall and Marianas Islands).—HERRE, Check list Philippine Fishes, 1953, p. 196 (reference).—MUNRO, Marine and Fresh-water Fishes Ceylon, 1955, p. 87, pl. 15, fig. 238.—MATSUBARA, Fish Morph. Hierar., pt. I. 1955, p. 445 (Kochi, Hawaii, Samoa, Sumatra).—KAMOHARA, Rep. Usa Marine Biol. Sta., vol. 4, no. 1, 1957, p. 11 (Somachi, Ankyaba; including *H. ittodai* JORDAN and FOWLER,)., ibid, vol. 5, no. 1, p. 23.—SMITH, Sea Fish. S. Africa, 1961 (4th, edi.), p. 153, pl. 9, fig. 296.

Holocentrum diadema GÜNTHER, Cat. Fish. Brit. Mus., vol. 1, 1859, p. 42 (China Sea, Borneo, Ceylon, India, etc.).—DAY, Fishes of India, 1878, p. 171 (China and beyond, etc.).—WEBER and DE BEAUFORT, Fish. Indo-Austral. Archip., vol. 5, 1929, p. 238 (Numerous E. Indian localities, China, India, etc).

Depth 3—3⅒, 3⅒—4 in total length. Head 2⅘—3 as measured to tip of opercular spine, 3⅗—3⅘ in total length. Snout 3⅒—4 ⅓. Eye 3, 1⅖—1⅗ of snout. Interorbital

space 4⅓, 1⅖ in eye. Least depth of caudal peduncle 3⅑ in head, 1½—1⅔ in its length. Gill rakers 5+12—13, rather weak, longest one shorter than its filaments, anterior three on upper limb atrophied.

Scales in lateral line 46, 3 scales above lateral line, 7 scales below, 6—7 predorsal, 4 or 5 oblique rows smaller scales on cheek, one or two verticle rows along anterior edge of opercle.

D. XI, 1, 12, the fourth and fifth spines longest, 1⅔—1⅘ in head, third ray 1⅔—2. A. IV, 9, third spine 1⅓—1⅖, first ray 1½. P. I, 1, 11—12, upper rays 1½. V. I, 7, spine 1½, outer ray 1⅑—1⅖. C. 1⅓.

Body oblong, compressed, outer profile much like *H. microstomus*. Eye large, its posterior border little behind middle of head. Interorbital space even. Snout short. Nostrils two, posterior one large, rounded and depressed. Mouth moderate, maxillary reaching to below anterior one-third of eye; jaws equal in front. Blunt triangular spine, directed downwards anteriorly on lower edge of preorbital, followed by series of small serrations. Infraorbital and postorbital narrow, edges with fine denticulations. Preopercular spine stout, little shorter than snout. Operculum with prominent parallel bony ridges and forming serrated edges behind. Two enlarged spines in superior part of operculum, upper one much longer than lower one, about equal to preopercular

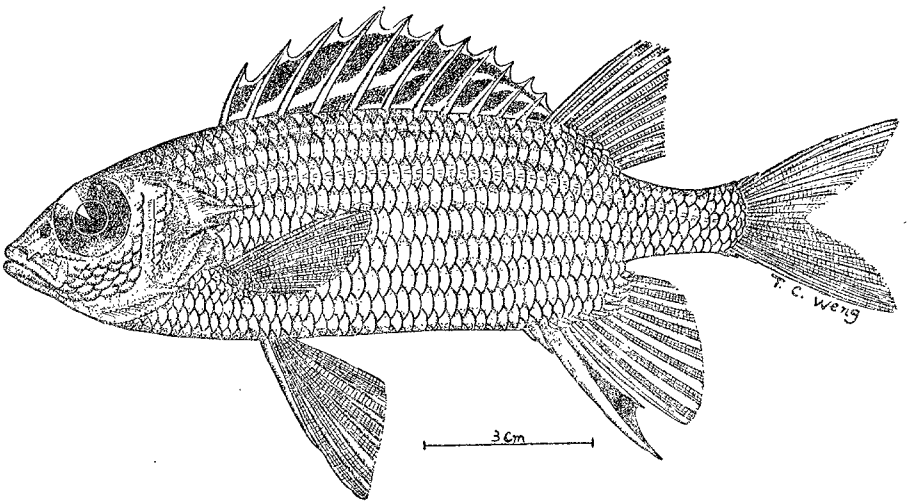

Figure 10.—*Holocentrus diadema* LACÉPÈDE

spine, its end beyond the opercular flap. Hind edge of preopercle with serrations gradually enlarging inferiorly; lower edge of preopercle finely denticulated. Dorsal inserted before upper opercular spine; spines pungent and strong, first one shorter than eye, last one shortest, equal to or little shorter than half diameter of eye; membranes between spines deeply incised; soft dorsal gradually shorter from third to last, length of last only one-third of third. Third anal spine especially strong. Ventral behind pectoral.

Color in formalin reddish, upper part darker, with light bands along body, corresponding to longitudinal rows of scales. Membranes between spinous dorsal

blackish, crossed by white band between basal part of anterior spines, and similar band between upper part of posterior spines; distal margin of spinous dorsal also white; membrane between third and fourth anal spine darkish.

We have two specimens THUP 00308, 01352, 144-155 mm. in total length, collected in April and June, 1960, from Kaohsiung.

臺灣產金鱗魚科報告

于 名 振

臺灣產金鱗魚類見於前人報告者僅四種，本文就東海大學魚類標本室現存本科標本加以鑑定整理，共得三屬十種，每種之特徵皆曾詳加分析敍述（一種係錄自 JORDAN and FOWLER, 1902），並各附插圖以爲參考。十種金鱗魚之名稱如下（附＊者爲新記錄）：

Ostichthys japonicus (CUVIER and VALENCIENNES)
* *Myripristis adustus* BLEEKER
Myripristis murdjan (FORSKÅL)
* *Myripristis microphthalmus* BLEEKER
* *Myripristis pralinius* CUVIER and VALENCIENNES
Holocentrus spinosissimus (TEMMINCK and SCHLEGEL)
Holocentrus ruber (FORSKÅL)
* *Holocentrus spinifer* (FORSKÅL)
* *Holocentrus microstomus* GÜNTHER
* *Holocentrus diadema* LACÉPÈDE