

FISHES OF THE FAMILY NEMIPTERIDAE
(TELEOSTEI: PERCOIDEI)
OF TAIWAN¹

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Sin-Che Lee (1986) Fishes of the family Nemipteridae (Teleostei: Percoidei) of Taiwan. *Bull. Inst. Zool., Academia Sinica* 25(2): 161-175. This report includes twenty species in three genera of nemipterids occurring around the coastal waters of Taiwan. They are *Scolopsis eriomma*, *S. inermis**, *S. monogramma*, *S. margaritifera*, *S. vosmeri*, *S. bilineatus*, *S. xenochrous**, *S. personatus*, *S. cancellatus*, *Nemipterus metopias*, *N. hexodon*, *N. peronii*, *N. tolu*, *N. japonicus*, *N. virgatus*, *N. bathybus**, *N. marginatus**, *N. delagoae**, *Pentapodus nagasakiensis** and *P. macrurus**. The above seven species with asterisks are new records for the Taiwan area. The specimens of another two nominal species, *Nemipterus matsubarae* and *N. ovenii*, appeared in the previous literatures are not available during this study period. They are now provisionally excluded from this report. Keys, diagnostic characters, synonyms and figures of all studied species are given.

Key words: *Faunistic study, Formosan nemipterids.*

Fishes of the family Nemipteridae are brightly coloured and moderately sized marine food fishes which occur mostly in the tropical and subtropical seas of Indo-West Pacific with about 35 species in three genera, *Nemipterus*, *Scolopsis* and *Pentapodus* (Nelson, 1984). They commonly have a single continuous dorsal fin with ten spines and 9 soft rays and well developed subocular shelf and accessory subpelvic keel.

The family Nemipteridae together with Sparidae and Lethrinidae form the superfamily Sparoidea. Within the Sparoidea, Nemipteridae is distinct from the remaining two families in having more numerous pyloric caeca (5-9 vs 3-4) and fewer imperfect interneural spines (2 vs 3).

The earliest literatures to deal with the Formosan nemipterids may date back to 1902 when Jordan and Evermann listed three species: *Nemipterus matsubarae*, *Scolopsis vosmeri* and *S. monogramma*. Later in 1909, Jordan and Richardson added *Nemipterus ovenii*, *N. virgatus*, *N. japonicus* and *Scolopsis eriomma*. In 1951, Liang listed furtherly on *Nemipterus peronii* and *N. hexodon*. In 1957, Chu increased *S. margaritifera*. In 1969, Chen recorded three more species including *Scolopsis temporalis* (= *S. monogramma*), *S. cancellatus* and *S. bilineatus*. In 1984, the following five species including *Scolopsis dubiosus* (= *S. monogramma*), *S. ciliatus*, *S. personatus* and *Nemipterus tolu* (Shen, 1984) and *Nemipterus marginatus* (Shen and Lin, 1984) were recorded. Nevertheless, *Nemipterus marginatus* is

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in fact the misidentification of *N. metopias*, and *Scolopsis ciliatus* is a Philippine fish which was collected from Manila according to the collecting data of National Taiwan University Museum. As the result of the present work, seven more species were increased, namely *Nemipterus bathybus*, *N. marginatus*, *N. delagoae*, *Scolopsis inermis*, *S. xenochrous*, *Pentapodus nagasakiensis* and *P. macrurus*. Thus the total number of nemipterid species known to Taiwan is increased to twenty two. Among them, specimens of *Nemipterus matsubarai* and *N. ovenii* were not available during this study period. They are provisionally excluded from this paper due to uncertainty.

Because the morphomeristic differences between species of one particular genus are insignificant, therefore, the characteristic color patterns of nemipterids are recognized as an useful aid for species identification. It is hoped that the present paper will provide a reliable guide for biologists or fishermen with the color photographs, keys and diagnostic characters of each species in this paper.

MATERIALS AND METHODS

The specimens were mostly collected by the writer from the fish markets at Keelung, Kaohsiung, Tungkang and Hengchun from where the fishes were landed by the fishing boats operated from the waters near the above fishing harbours by longline, handline and bottom trawling. Specimens were photographed when fresh. Body was preserved in 10% formalin thereafter for further observations. Standard length was taken from the tip of lower jaw to the base of caudal fin and the counts of fin rays and vertebrae were based on the radiographs. The transverse series of scales were counted between lateral line and the base of median dorsal spines. Gill rakers were counted only on the lower limb of first left gill arch. Most of specimens are now deposited in the Museum of the Institute of Zoology, Academia Sinica (ASIZP), except *Scolopsis margaritifera* (NTUM) and *Nemipterus marginatus* were the

loans from National Taiwan University and Suao Fisheries High School, respectively.

RESULTS AND REMARKS

Systematic accounts

Key to genera of Family Nemipteridae of Taiwan

1. Canine teeth on jaws; first suborbital bone without spine; posterior margin of preoperculum smooth2
Absence of canine teeth on jaws; first suborbital bone with a spine; posterior margin of preoperculum serrated.....
.....*Scolopsis*
2. Three scale rows on cheek; scales on head not extend to interorbital; canine teeth on lower jaw normal. *Nemipterus*
Four scale rows on cheek; scales on head extend to interorbital; canine teeth in front of lower jaw directed outward horizontally *Pentapodus*

Genus *Scolopsis* Cuvier, 1817

Key to species of *Scolopsis* of Taiwan

1. Interorbital naked; $2\frac{1}{2}$ scale rows between lateral line and median dorsal spines2
Interorbital scaled; $3\frac{1}{2}$ - $4\frac{1}{2}$ scale rows between lateral line and median dorsal spines3
2. Gill rakers on lower limb 12; body uniformly bright red without transverse bands on body side.....*S. eriomma*
Gill rakers on lower limb 6-7; body pink with three red transverse bands.....
.....*S. inermis*
3. $4\frac{1}{2}$ scale rows between lateral line and median dorsal spines ...*S. monogramma*
 $3\frac{1}{2}$ scale rows between lateral line and median dorsal spines.....4
4. Scales on head extending forwardly to or even beyond the anterior nostril5
Scales on head extending to anterior margin of eyes or a little farther, but not beyond the hind nostril.....7

5. Lateral line scales less than 40; lateral bands on body side absent; scales with silvery spots.....*S. margaritifera*
Lateral line scales more than 40; lateral bands absent.....6
6. Body deeper, 2.15-2.32 in standard length; a light nuchal band present...*S. vosmeri*
Body less deep, 2.46-2.61 in standard length; body side with lateral bands in young and with an oblique black bordered light band from suborbital to base of dorsal.....*S. bilineatus*
7. Mouth smaller, hind margin of maxilla reaching to below posterior nostril; a broad silvery-yellow band crossed anteriorly by several oblique black streaks.....*S. xenochrous*
Mouth larger, maxilla reaching to below anterior margin of eyes; the above mentioned color patterns absent.....8
8. Head pointed, its dorsal profile almost straight from nape to snout; 5-6 transverse scale rows on preoperculum; brown with a yellow or a trace of dark band from eye to caudal base, and a bluish band between eyes...*S. personatus*
Head blunt, its dorsal profile convex at anterior half of interorbital; 4 transverse scale rows on preoperculum; upper part of body with three interrupted broad black lateral bands which are complete in young....*S. cancellatus*

1. *Scolopsis eriomma* (Jordan and Richardson, 1909)

紅赤尾冬

Plate 1, Fig. 1

Scolopsis eriomma Jordan and Richardson, 1909: 188 (Kaohsiung); Fowler, 1931: 273; Liang, 1951: 23; Matsubara, 1955: 675; Chen, 1969: 397; Wongratana, 1978: 28; Masuda *et al.*, 1984: 175.
Parascolopsis eriomma, Shen, 1984: 274.

Materials: ASIZP 055500, 055615, and 055679, 3 specimens, 199.7, 167.2 and 156mm SL, February, September 1980, and February 1981 respectively, Hengchun; 11 uncatalogued specimens, 142-242mm SL, April 1985, Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 16-17; Ll. 34-35, tr. $2\frac{1}{2}$; Gr. on lower limb 12; vertebrae 10+14. Head 3.00-3.55, body depth 2.49-2.88 and pectoral 3.44-4.12 in standard length. Top of head naked forwardly from the posterior $\frac{1}{4}$ of the orbit. Suborbital spine tiny, about $\frac{1}{4}$ eye diameter, with 5-6 denticulations below it. Maxilla reaching to or slightly beyond the anterior edge of orbit. Ventral fin does not extend to vent. Color in live orangish red above and silvery orangish below. Dorsal and upper lobe of caudal fin orangish red, pectoral, ventral and anal fins and lower lobe of caudal fin orangish.

Remarks: It is closely related to *S. inermis* but distinguishable from the latter in having more gill rakers and the lack of transverse bands on body side.

2. *Scolopsis inermis* (Temminck and Schlegel, 1843)

橫帶赤尾冬

Plate 1, Fig. 2

Scolopsides inermis Temminck and Schlegel, 1843: 63 (Japan).

Scolopsis inermis, Fowler, 1931: 274; Weber and de Beaufort, 1936: 330; Matsubara, 1955: 676; Akazaki, 1962: 112; Masuda *et al.*, 1984: 175.

Materials: ASIZP 055780, 1 specimen, 150 mm SL, May 1982, Hengchun; ASIZP 055775, 3 specimens, 135.5-156 mm SL, April 1983, Kaohsiung; 7 uncatalogued specimens, 116.6-134 mm SL, June 1985, Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 15-16 (mostly 16); Ll. 35-36, tr. $2\frac{1}{2}$; Gr. on lower limb 6; vertebrae 10+14. Head 2.87-3.33, body depth 2.61-2.96 and pectoral fin 3.59-4.16 in standard length. Naked area on head begins at posterior $\frac{1}{4}$ of the orbit. Suborbital spine tiny, $1/15$ - $1/12$ eye diameter, with 5-6 serrations below it. Maxilla reaching to below anterior edge of pupil. Color in live pink with 3 broad reddish transverse bands on body side.

Remarks: This species is in common with *S. eriomma* in having tiny suborbital spine. It is distinct from the latter in having

less gill rakers and the presence of cross bands on body side.

3. *Scolopsis monogramma* (Cuvier and Valenciennes, 1830a)

黑帶赤尾冬

Plate 1, Fig. 3A-B

Scolopsides monogramma Cuvier and Valenciennes, 1830a: 338 (Batavia).

Scolopsis monogramma, Jordan and Evermann, 1902: 349; Jordan and Richardson, 1909: 188; Weber and de Beaufort, 1936: 345; Matsubara, 1955: 676; Munro, 1967: 307; Chen, 1969: 398.

Scolopsis dubiosus, Weber and de Beaufort, 1936: 344; Wongratana, 1978: 33; Masuda *et al.*, 1984: 175; Shen, 1984: 274.

Scolopsis temporalis, Chen, 1969: 398.

Materials: ASIZP 055415, 1 specimen, 108.2 mm SL, October 1979, Tungkang; ASIZP 055711 and 055476, 2 specimens, 100.8 and 282 mm SL, October 1975 and November 1981, respectively, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 18; Ll. 43-47, tr. $4\frac{1}{2}$; Gr. on lower limb 6-7; vertebrae 10+14. Head 3.11-3.24, body depth 2.50-2.56 and pectoral fin 3.92-4.41 in standard length. Head scaled from the front edge of eyes. Suborbital spine about $\frac{1}{4}$ eye diameter, with 5-6 denticulations below it. Maxilla reaching to below anterior nostril. Caudal fin forked with blunt tips when young, becoming sharply pointed in large adult. Live color in young, body pale greyish brown with broad black lateral band and silvery below. In larger specimen, caudal fin yellowish. Bluish lines are found to extend from anterior edge of orbit to opercular corner, a further suborbital stripe extends backward to operculum and a yellowish band on interorbital. An oblique black patch on temporal region. Several oblique stripes on upper lateral side of body.

Remarks: Despite a minor difference between *Scolopsis monogramma* and *S. temporalis* by a complete scaly area on supraocular and temporal region in the latter, they were combined with *S. dubiosus* by several authors. However, the present author adopts

the name *S. monogramma* because of its seniority in nomenclature.

4. *Scolopsis margaritifer* Cuvier and Valenciennes, 1830a

條紋赤尾冬

Text-fig. 1

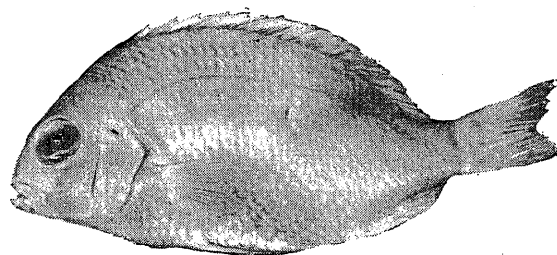
Scolopsides margaritifer Cuvier and Valenciennes, 1830a: 337 (Waigiou).

Scolopsis margaritifer, Fowler, 1931: 277; Weber and de Beaufort, 1936: 328; Chu, 1957: 19; Munro, 1967: 305; Chen, 1969: 398; Wongratana, 1978: 31; Shen, 1984: 273.

Materials: NTUM 01182, 1 specimen, 138 mm SL, Penghu, August 1956.

Diagnosis: D. X, 9; A. III, 7; P. 18; Ll. 38, tr. $3\frac{1}{2}$; vertebrae 10+14; Gr. on lower limb 5. Head 3.07, body depth 2.16 and pectoral 3.83 in standard length. Scales on head extending forwardly to or slightly beyond the anterior nostril. Ridge of maxillary smooth, the posterior end of maxilla extending to below the front edge of eye. Suborbital spine moderate, about $\frac{1}{3}$ eye diameter, with 6 denticulations below it. Caudal lobes blunt, not ended in filaments. A preserved specimen, color uniformly brown without any particular patterns remained, however, the scales on ventral side of body with yellowish dots when alive.

Remarks: This is a tropical species of Southern Seas occurring abundantly around Indo-Australian Archipelago. Southern China and Taiwan are perhaps the northernmost extent of this species. No body in Taiwan has ever collected this species since the first record made by Chu (1957) from Pescadore Islands.



Text-fig. 1. *Scolopsis margaritifer*, 138 mm SL.

5. *Scolopsis vosmeri* (Bloch, 1792)

白頸赤尾冬

Plate 1, Fig. 4

Anthias vosmeri Bloch, 1792: 120 (not seen); Bloch and Schneider, 1801: 304.

Scolopsis vosmeri, Jordan and Evermann, 1902: 349; Jordan and Richardson, 1909: 188; Weber and de Beaufort, 1936: 341; Liang, 1951: 23; Matsubara, 1955: 676; Akazaki, 1962: 121; Chen, 1969: 398; Wongratana, 1978: 31; Masuda *et al.*, 1984: 175; Shen, 1984: 274.

Materials: ASIZP 055424, 1 specimen, 84.5 mm SL, November 1979, Anping; ASIZP 055719, 1 specimen, 111.2 mm SL, July 1975, Pescadores; 7 uncatalogued specimens, 106.5–136 mm SL, June 1985, Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 17–19 (mostly 18); Ll. 42, tr. $3\frac{1}{2}$; Gr. on lower limb 8–9; vertebrae 10+14 (one specimen 9+15). Head 3.00–3.38, body depth 2.15–2.44, pectoral 4.02–4.96 in standard length. Head scaled forwardly beyond the anterior nostril. Suborbital spine about $\frac{1}{4}$ eye diameter, with 6–7 denticles below it. Maxilla reaching to or slightly beyond the anterior edge of orbit. Ventral fin reaches the vent. Second anal spine much longer than the third. Color in live purplish brown with a white vertical nuchal band. Pectoral, ventral, anal and caudal fins orangish, outer half of dorsal yellow, the rest are the same as body color.

Remarks: The presence of a light nuchal band is the distinctive feature of this species. The second anal spine is much stouter than that in other *Scolopsis* species.

6. *Scolopsis bilineatus* (Bloch, 1793)

雙帶赤尾冬

Plate 1, Fig. 5

Anthias bilineatus Bloch, 1793: 3 (Japan) (not seen); Bloch and Schneider, 1801: 306.

Scolopsis bilineatus, Fowler, 1931: 292; Weber and de Beaufort, 1936: 339; Matsubara, 1955: 676; Munro, 1967: 305; Chen, 1969: 398; Masuda *et al.*, 1984: 175; Shen, 1984: 274.

Materials: ASIZP 055499, 2 specimens, 148.3–168.5 mm SL and ASIZP 055554, 1 specimen, 153 mm SL, February and May

1980, respectively, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 17; Ll. 44–45, tr. $3\frac{1}{2}$; Gr. on lower limb 5–7, vertebrae 10+14. Head 3.26–3.32, body depth 2.46–2.61 and pectoral 3.33–3.60 in standard length. Head scaled anteriorly to the anterior nostril. Suborbital spine large, about $\frac{1}{3}$ eye diameter, with 5–6 spinules below it. Maxilla reaching the front edge of orbit. Ventral fin almost extends to the vent. Second anal spine only slightly longer than the third. Color in live pale greenish grey above and silvery below; a black bordered oblique white band running from suborbital to the base between last dorsal spine and first soft dorsal ray; a yellowish oblique line from the commence of lateral line to base of fifth dorsal spine. A bright patch at the base of posterior half of soft dorsal while a purplish black lengthy patch at anterior half. Anal fin black anteriorly. Caudal fin greyish. Pectoral and ventral fins yellowish.

Remarks: The young of this species is distinctive from the adult in having three horizontal black stripes instead of one oblique light band on body side.

7. *Scolopsis xenochrous* Gunther, 1872

欖斑赤尾冬

Plate 1, Fig. 6

Scolopsis xenochrous Gunther, 1872: 423 (Moluccas) (not seen); Fowler, 1931: 276; Weber and de Beaufort, 1936: 338; Munro, 1967: 306.

Materials: ASIZP 055678, 1 specimen, 156 mm SL and ASIZP 055820, 1 specimen, 133 mm SL, February 1981 and November 1983, respectively, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 17; Ll. 43–44, tr. $3\frac{1}{2}$; Gr. on lower limb 6; vertebrae 10+14. Head 3.20–3.22, body depth 3.05–3.08 and pectoral 3.92–4.01 in standard length. Scales on top of head begins at front edge of eye. Suborbital spine large, $\frac{1}{4}$ – $\frac{1}{3}$ eye diameter, with 6 spinules below it. Maxilla smooth, reaching to below the posterior nostril. Caudal fin moderately forked with a short filamentous tip on upper lobe. Color in live bluish brown above and silvery below;

an anterior oblique bluish band and posterior lengthwise yellow band on lateral side; seven black oblique rows of spots between the above two bands; a bluish band on suborbital. Dorsal, anal and ventral fins pale yellow. Pectoral fin pink and caudal fin pale brown with purplish outer margins and base.

Remarks: The present species resembles *S. ghanam* by dark basal spot on each scales of mid-lateral part of body. It is clearly distinguished from the latter by the absence of black longitudinal stripes on the back.

8. *Scolopsis personatus* (Cuvier and Valenciennes, 1830a)

烏面赤尾冬

Plate 2, Fig. 7

Scolopsides personatus Cuvier and Valenciennes, 1830a: 344 (Batavia).

Scolopsis personatus, Fowler, 1931: 281; Weber and de Beaufort, 1936: 333; Munro, 1967: 306; Wongratana, 1978: 31; Masuda *et al.*, 1984: 175; Shen, 1984: 274.

Materials: ASIZP 055534 and 055589, 2 specimens, 150.2–152.8 mm SL; ASIZP 055716, 2 specimens, 149–181.5 mm SL; February and June, 1980 respectively, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 17; Ll. 43–44, tr. $3\frac{1}{2}$; Gr. on lower limb 7–8; vertebrae 10+14. Head 3.04–3.18, body depth 2.93–3.14 and pectoral 4.08–4.48 in standard length. Head pointed, its dorsal profile from nape to snout nearly straight. Scales on top of head extend forwardly to posterior nostril. Maxilla reaching to below the anterior edge of eye. Ventral fin not reaching to the vent. Caudal fin moderately forked without filamentous ending on lobes. Pale greyish brown above and silvery below, a yellowish band extending from eye to the dorsal profile of caudal base; a bluish band across eyes and a bluish horizontal band on suborbital. Pectoral and caudal fins yellowish. Dorsal fin brown. Ventral and anal fins transparent.

Remarks: This species differs from *S. cancellatus* by its more or less straight profile between snout and nape, and the presence of a bluish interorbital band.

9. *Scolopsis cancellatus* (Cuvier and Valenciennes, 1830a)

黃帶赤尾冬

Plate 2, Fig. 8A–B

Scolopsides cancellatus Cuvier and Valenciennes, 1830a: 351 (Waigiu, N. E. New Guinea).

Scolopsis cancellatus, Fowler, 1931: 283; Weber and de Beaufort, 1936: 335; Matsubara, 1955: 676; Akazaki, 1962: 115; Munro, 1967: 306; Chen, 1969: 398; Masuda *et al.*, 1984: 175; Shen, 1984: 274.

Materials: ASIZP 055106, 1 specimen, 74.3 mm SL, August 1978, Lanyu; ASIZP 055720, 1 specimen, 175.3 mm SL, October 1981, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 16; Ll. 42–43, tr. $3\frac{1}{2}$; Gr. on lower limb 5–7; vertebrae 10+14. Head 3.03–3.15, body depth 2.79–2.88 and pectoral 3.88–4.20 in standard length. The squamous area on head begins at front border of orbit. Suborbital spine about $\frac{1}{2}$ eye diameter, with 4 spinules below it. Maxilla reaching to anterior border of orbit. The filamentous tip of ventral fin reaching to vent. Color in live greenish yellow above with three distinct black horizontal bands in young, becoming obscure in adult; ventral side of body silvery. All fins transparent except the black blotch on the first 4 dorsal spines in young.

Remarks: The color patterns of young *S. cancellatus* is similar to that of *S. bilineatus*, however, a black anal blotch in *S. bilineatus* can distinguish them.

Genus *Nemipterus* Swainson, 1839

Key to species of *Nemipterus*

1. Canine-like teeth on both jaws.....2
Canines on upper jaws only.....4
2. Body less deep, about 4 in standard length; upper caudal lobe filamentous*N. metopias*
Body deeper, 2.66–3.05 or more, in standard length; upper caudal tip not protruded into a filament3

3. Scales on lateral line 49-51; a brilliant yellow stripe running throughout the entire dorsal fin, which is bordered by bluish edges on either sides; tip of upper caudal lobe yellow... *N. hexodon*
Scales on lateral line 44-45; dorsal fin uniformly red and the upper caudal lobe not tipped with yellowish.....
.....*N. peronii*
4. Membrane between dorsal spines deeply notched.....*N. tolu*
Membrane between dorsal spines entire.....5
5. Canines 5 or 6 pairs; body deeper, 2.93 in standard length.....*N. japonicus*
Canines 3-4 pairs; body less deep.....6
6. Soft anal rays 8; pectoral rays mostly 17; upper caudal tip filamentous.....
.....*N. virgatus*
Soft anal rays 7; pectoral rays mostly fewer than 17; upper caudal tip filamentous or not.....7
7. Upper caudal tip filamentous; ventral fin not reaching to the origin of anal fin.....*N. bathybus*
Upper caudal tip not filamentous; ventral fin extends beyond the origin of anal fin.....8
8. Upper caudal tip sharp; body with two yellowish lateral stripes; dorsal fin with yellow outer margin and a submarginal stripe of same color; upper caudal lobe tipped with yellow.....*N. marginatus*
Upper caudal lobe blunt; no yellowish lateral stripes but with about 5 obscure silvery-white stripes instead; dorsal margin yellow and a deep orangish stripe along the base of the fin.....
.....*N. delagoae*

10. *Nemipterus metopias* (Bleeker, 1857)

姬金線魚

Plate 2, Fig. 9

Dentex metopias Bleeker, 1857: 51.

Nemipterus metopias, Weber and de Beaufort, 1936: 365; Masuda *et al.*, 1984: 176.

Nemipterus marginatus (not of Valenciennes), Shen and Lin, 1984: 13.

Materials: ASIZP 055712, 1 specimen, 141 mm SL and ASIZP, 1 specimen, 165 mm SL, October 1981 and May 1985 respectively;

12 uncatalogued specimens, 127.5-177.4 mm SL, June 1985, all from Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 16; Gr. on lower limb 6; Ll. 47-49, tr. 3½; vertebrae 10+14. Head 3.10-3.57, body depth 3.91-4.25 and pectoral 3.75-4.55 in standard length. Head much longer than body depth. Maxilla reaches beyond the anterior 1/4 the orbit. Ten smaller canines on the front of each jaw. Caudal fin deeply forked, the upper tip protruded into a short filament. Color in live, reddish above and silvery below. Two horizontal wide yellow bands, one on suborbital and the other running through the orbit horizontally. Dorsal fin with orangish margin.

Remarks: *Nemipterus metopias* from Kaohsiung was previously misidentified as *N. marginatus* by Shen and Lin (1984).

11. *Nemipterus hexodon* (Quoy and Gaimard, 1824)

虹色金線魚

Plate 2, Fig. 10

Dentex hexodon Quoy and Gaimard, 1824: 301 (Timor) (not seen); Cuvier and Valenciennes, 1830b: 243.

Nemipterus hexodon, Weber and de Beaufort, 1936: 360; Liang, 1951: 25; Matsubara, 1955: 667; Akazaki, 1962: 84; Munro, 1967: 25; Chen, 1969: 380; Wongratana, 1970: 480; Shen, 1984: 272.

Materials: ASIZP 055803, 3 specimens, 156-160.5 mm SL, June 1985, Tungkuang.

Diagnosis: D. X, 9; A. III, 7; P. 16-17 (mostly 17); Ll. 44-45, tr. 3½; Gr. on lower limb 7; vertebrae 10+14. Head 2.83-3.18, body depth 2.66-3.01 and pectoral 3.06-3.76 in standard length. Head slightly shorter than body depth. Maxilla extends to below anterior 1/4 the orbit (or front edge of pupil). Three pairs of canine-like teeth on each jaw. Caudal fin tip not filamentous. Color in live pink above and silvery below, with 5-6 yellow horizontal lines. Dorsal fin with a golden stripe which is edged with bluish on either sides. Tip of upper caudal lobe yellowish.

Remarks: This species is easily recognized by the presence of a bluish edged golden stripe on dorsal fin.

12. *Nemipterus peronii* (Cuvier and Valenciennes, 1830b)

裴氏金線魚

Plate 2, Fig. 11

Dentex peronii Cuvier and Valenciennes, 1830b: 245.
Nemipterus peronii, Weber and de Beaufort, 1936: 357; Liang, 1951: 25; Matsubara, 1955: 667; Akazaki, 1962: 82; Munro, 1967: 312; Chen, 1969: 381; Masuda *et al.*, 1984: 176.

Materials: ASIZP 055766, 2 specimens, 238–258 mm SL, August 1982, Keelung; ASIZP 055862, 1 specimen, 223 mm SL, June 1985, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 16–17; Ll. 48–49, tr. $3\frac{1}{2}$; Gr. on lower limb 6–7; vertebrae 10+14. Head 3.02–3.19, body depth 3.02–3.05 and pectoral 4.34–4.59 in standard length. Head slightly shorter than body depth. Maxilla not reaching to below the front edge of orbit, extending only to the position in between hind nostril and anterior edge of orbit. Each jaw with 3 pairs of canine teeth. Caudal lobes not filamentous. Color in live uniformly bright red without any stripes on body side.

Remarks: This species resembles *N. hexodon*, but differs from the latter by the absence of bluish-edged golden stripe on dorsal fin and the yellowish upper caudal tip.

13. *Nemipterus tolu* (Cuvier and Valenciennes, 1830b)

薔薇金線魚

Plate 2, Fig. 12

Dentex tolu Cuvier and Valenciennes, 1830b: 248 (New Guinea).

Nemipterus tolu, Weber and de Beaufort, 1936: 367; Akazaki, 1962: 88; Chen, 1969: 381; Wongratana, 1970: 474; Masuda *et al.*, 1984: 176; Shen, 1984: 272.

Nemipterus mulloides, Fowler and Bean, 1922: 36.

Nemipterus peronii (not of Cuvier and Valenciennes), Shen and Lin, 1984: 21.

Synagris mulloides, Fowler, 1933: 115.

Odontoglyphis tolu, Munro, 1967: 311.

Materials: ASIZP 055436, 1 specimen, 158 mm SL, November 1979, Kaohsiung; 10 uncatalogued specimens, 124–187.6 mm SL,

March 1985, Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 15–17 (mostly 16); Gr. on lower limb 6–7; Ll. 46, tr. $3\frac{1}{2}$; vertebrae 10+14. Head 3.47–3.90, body depth 3.30–3.64 and pectoral 4.77–5.70 in standard length. Head shorter than body depth. Maxilla reaches to below the anterior edge of orbit. Six frontal canines on upper jaw only. Dorsal spines long, flexible, membrane of the fin deeply emarginated. Upper caudal lobe sharp which is not ended in filament. Color in live pink above and silvery below, with 5–6 obscure red saddle-like patches along dorsal profile; a red spot at the origin of lateral line. Inner base of ventral fin yellowish. Anal fin transparent. Upper caudal tip yellowish. Other fins pink.

Remarks: This species is distinct from the other species of *Nemipterus* by deep emargination on dorsal fin membranes. The *N. peronii* identified by Shen and Lin (1984) is the misidentification of this species.

14. *Nemipterus japonicus* (Bloch, 1791)

日本金線魚

Plate 3, Fig. 13

Sparus japonicus Bloch, 1791: 110 (not seen).

Nemipterus japonicus, Jordan and Richardson, 1909: 186; Weber and de Beaufort, 1936: 369; Matsubara, 1955: 657; Akazaki, 1962: 91; Chen, 1969: 380; Wongratana, 1970: 472; Shen, 1984: 272.

Synagris japonicus, Fowler, 1933: 101.

Materials: ASIZP 055432, 1 specimen, 158.5 mm SL, November 1979; ASIZP 055346, 5 specimens, 119.5–150 mm SL and ASIZP 055433, 1 specimen, 132 mm SL, July 1979; 10 uncatalogued specimens, 146–202 mm SL. March/April 1985, all from Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 17–18 (mostly 17); Gr. on lower limb 9–10; Ll. 45–48, tr. $3\frac{1}{2}$; vertebrae 10+14. Head 2.98–3.48, body depth 2.80–3.08 and pectoral 3.23–3.64 in standard length. Head shorter than body depth. Maxilla extends to below the front edge of orbit. Five pairs of canines in upper jaw but absent in lower jaw. Upper caudal

lobe with a filamentous tip. Color in live red above and silvery below, a red spot at the origin of lateral line, body side with 4-5 golden stripes, the last one being the widest which is along the ventral flank of the body from isthmus to ventral side of caudal base. Caudal filament yellowish.

Remarks: This species is easily recognized by having shorter head than body depth, filamentous upper caudal tip and a brilliant red spot at the origin of lateral line. This species is commonly trawled from Southern Taiwan Strait near the vicinity of Kaohsiung and Tungkang.

15. *Nemipterus virgatus* (Houttuyn, 1782)

金線魚

Plate 3, Fig. 14

Sparus virgatus Houttuyn, 1782: 323 (Japan) (not seen).

Nemipterus virgatus, Jordan and Evermann, 1902: 346; Jordan and Richardson, 1909: 186; Matsubara, 1955: 666; Akazaki, 1962: 93; Chen, 1969: 380; Masuda *et al.*, 1984: 176; Shen, 1984: 272.
Synagris virgatus, Fowler, 1933: 107.

Materials: ASIZP 055738, 2 specimens, 188.7-209 mm SL, October 1981, Keelung.

Diagnosis: D. X, 9; A. III, 8; P. 17; Gr. on lower limb 8; Ll. 46-47, tr. $3\frac{1}{2}$; vertebrae 10+14. Head 3.49-3.56, body depth 3.44-3.45 and pectoral 3.67-3.68 in standard length. Head shorter than body depth. Maxilla extends to below the anterior border of orbit. Three or 4 pairs of canines on frontal part of upper jaw, they are absent on lower jaw. Upper caudal lobe ended in a long filament. Color in live red above and silvery below, with 6-7 golden lines; a lengthy red spot at the origin of lateral line. Both dorsal and anal fins with reddish margins and a golden line running almost along their bases.

Remarks: This species along with *N. upenoides* has more numerous anal soft rays (8) than other *Nemipterus* species. It resembles *N. japonicus* but differs from the latter in having more anal soft rays and different color patterns on dorsal and anal fins. *Dentex matsubarae* of Jordan and Evermann, 1902

(=*Nemipterus matsubarae*) agrees quite well with the present species in having 8 anal soft rays and similar dental formulae, for the exception of the absence of upper caudal filament which is probably lost due to damage.

16. *Nemipterus bathybus* Snyder, 1911

底金線魚

Plate 3, Fig. 15

Nemipterus bathybus Snyder, 1911: 532 (Kagoshima); Matsubara, 1955: 666; Akazaki, 1962: 97; Masuda *et al.*, 1984: 176.

Synagris bathybus, Fowler, 1933: 100.

Materials ASIZP 055769, 2 specimens and ASIZP 055770, 2 specimens, 154-165 mm SL, October 1982, Kaohsiung; 10 uncatalogued specimens, 133-210 mm SL, April/May 1985, Kaohsiung.

Diagnosis: D. X, 9; A. III, 7; P. 15-17 (mostly 15); Ll. 43-45, tr. $3\frac{1}{2}$; Gr. on lower limb 9-11; vertebrae 10+14. Head 3.16-3.86, body depth 2.93-3.52 and pectoral 3.23-3.63 in standard length. Head slightly shorter than body depth. About 4 pairs of canines in upper jaw but not in lower jaw. Caudal fin with the tip of upper lobe protruded into filament. Color in live pink-red with 3 bright yellowish horizontal stripes on body side, the third one on the ventral edge. Dorsal fin scattered with short wavy yellow lines. Caudal filament bright yellow.

Remarks: The scattered yellowish wavy patterns on dorsal fin, two lateral and one ventral yellowish stripes and the absence of red spot at the origin of lateral line and the presence of yellowish filamentous upper caudal tip are the characteristic color patterns of this species.

17. *Nemipterus marginatus* (Cuvier and Valenciennes, 1830b)

黃緣金線魚

Plate 3, Fig. 16

Dentex marginatus Cuvier and Valenciennes, 1830b: 245 (Vanicolo, Java).

Nemipterus marginatus, Weber and de Beaufort, 1936: 372; Akazaki, 1962: 100; Wongratana, 1970: 478; Masuda *et al.*, 1984: 176.

Materials: One uncatalogued specimen (Suao Fisheries High School), 144 mm SL, March 1979, Tungkang.

Diagnosis: D. X, 9; A. III, 7; P. 16; Ll. 43, tr. $3\frac{1}{2}$; Gr. on lower limb 8; vertebrae 10+14. Head 3.35, body depth 3.51 and pectoral 3.41 in standard length. Head slightly longer than body depth. Maxilla reaches to front edge of pupil. Seven or probably 8 canine teeth in upper jaw while absent in lower jaw. Pectoral slightly shorter than head length. Ventral fin with the first ray protruded into filament which extends beyond the vent and almost reaches to anal fin. Color in live pink with two longitudinal yellow stripes on body side. Dorsal fin with yellow margin and a submarginal yellow stripe. Upper caudal tip yellow.

Remarks: The presence of two yellowish lateral stripes in this species is easily confused with *N. bathybus*. However, its lack of yellowish ventral stripe and filamentous upper caudal tip can distinct them.

18. *Nemipterus delagoae* Smith 1941

蝶金線魚

Plate 3, Fig. 17

Nemipterus delagoae Smith, 1941: 450; Wongratana, 1970: 477; Masuda *et al.*, 1984: 176.

Materials: ASIZP 055804, 2 specimens, 170–182 mm SL and 5 uncatalogued specimens, 131.6–141.6 mm SL, June 1985, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 16 (one with 15); Ll. 46–47, tr. $3\frac{1}{2}$; Gr. on lower limb 8; vertebrae 10+14. Head 3.02–3.35, body depth 3.31–3.43 and pectoral 3.76–4.05 in standard length. Head slightly longer than body depth. Maxilla reaches to below posterior nostril. Upper jaw with 3 pairs of large canine-like teeth while the lower jaw without canines. Ventral fin in long filament, its tip extends to anal fin. Caudal tips blunt without filaments. Color in live, pink above and silvery below, with about 5 silvery-white longitudinal stripes. Dorsal fin yellow with dark golden-yellow margin and a basal stripe of orangish in color. Anal fin transparent

with a faint yellow stripes in the middle. Caudal fin pink. Other fins transparent.

Remarks: The rather elongated first ventral ray beyond the anal fin origin and the presence of curved yellow lines on body sides enable this species to separate from other *Nemipterus* species.

Genus *Pentapodus* Quoy and Gaimard, 1824

Key to species of *Pentapodus*

1. Body less deep, 3.50–4.39 in standard length; eye large, 2.53–3.25 (2.95) in head length; caudal lobes not tipped with filaments.....*P. nagasakiensis*
- Body deeper, 3.04 in standard length; eye smaller, 3.67 in head length; both caudal lobes ended in filaments.....*P. macrurus*

19. *Pentapodus nagasakiensis*

(Tanaka, 1911–1914)

長崎錐齒鯛

Plate 3, Fig. 18

Leptoscolopsis nagasakiensis Tanaka, 1911–1914: 365 (Nagasaki); Matsubara, 1955: 676.

Pentapodus nagasakiensis, Masuda *et al.*, 1984: 174.

Materials: ASIZP 055680, 2 specimens, 143–145.8 mm SL, February 1981, and 9 uncatalogued specimens, 116–142 mm SL, May/June 1985, all from Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 15–17 (mostly 16); Gr. on lower limb 8–9; Ll. 45–46, tr. $2\frac{1}{2}$; vertebrae 10+14. Head 3.28–3.65, body depth 3.50–4.39 and pectoral 4.38–6.10 in standard length. Eye 2.85–3.25 in head length. Body low, spindle-like. Head scaled except the snout. Six scale rows on cheek. Maxilla extends to anterior edge of orbit. Two canines on the front of each jaw, those in lower jaw directed outward horizontally. Color in live bright bluish with a broad yellow band from snout to caudal base. Pectoral and caudal fins reddish. Dorsal and ventral fins yellowish.

Remarks: The species is distinguished from other species of this genus by its rather elongated body shape and the absence of filaments at caudal fin tips.

Plate 1

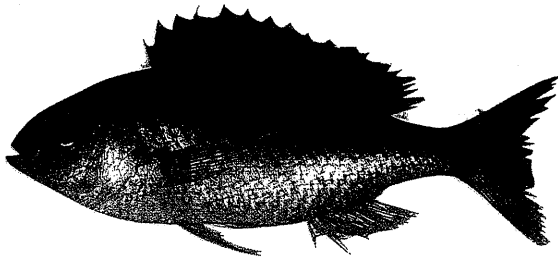


Fig. 1. *Scolopsis eriomma*, 156 mm SL.

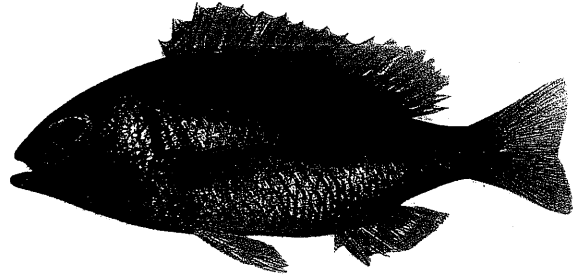


Fig. 2. *Scolopsis inermis*, 135.5 mm SL.

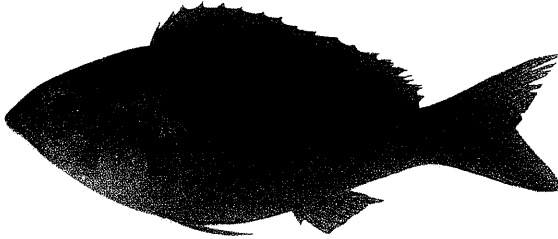


Fig. 3A. *Scolopsis monogramma*, 108.2 mm SL.

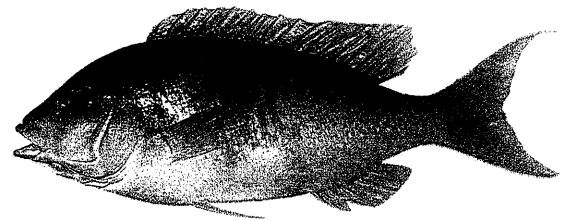


Fig. 3B. *Scolopsis monogramma*, 282 mm SL.

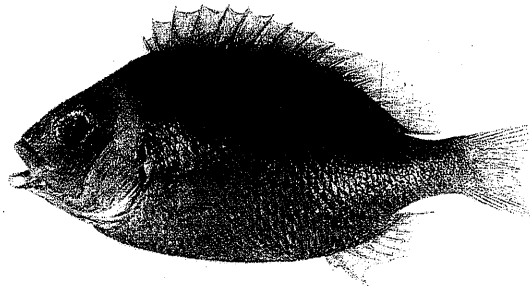


Fig. 4. *Scolopsis vosmeri*, 119 mm SL.

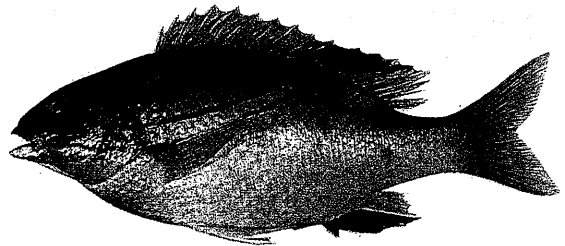


Fig. 5. *Scolopsis bilineatus*, 153 mm SL.

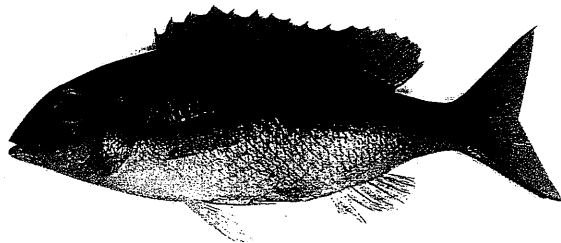


Fig. 6. *Scolopsis xenochrous*, 156 mm SL.

Plate 2

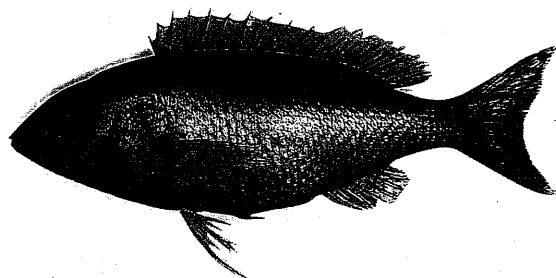


Fig. 7. *Scolopsis personatus*, 150.2 mm SL.

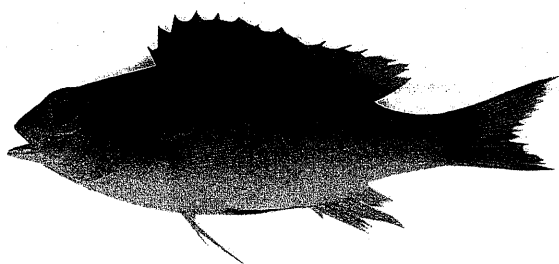


Fig. 8A. *Scolopsis cancellatus*, 74.3 mm SL.

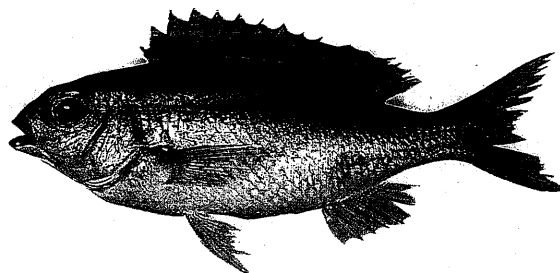


Fig. 8B. *Scolopsis cancellatus*, 175.3 mm SL.

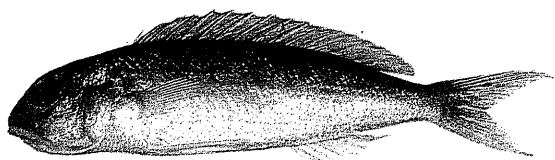


Fig. 9. *Nemipterus metopias*, 165 mm SL.



Fig. 10. *Nemipterus hexodon*, 156 mm SL.



Fig. 11. *Nemipterus peronii*, 223 mm SL.

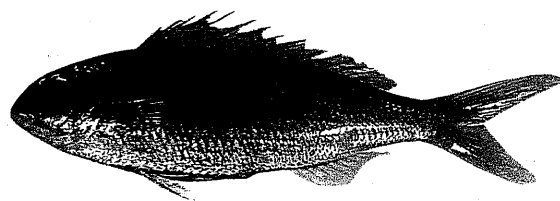


Fig. 12. *Nemipterus tolu*, 156 mm SL.

Plate 3

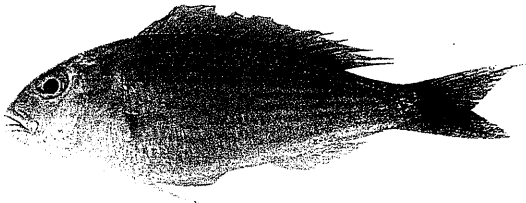


Fig. 13. *Nemipterus japonicus*, 132 mm SL.

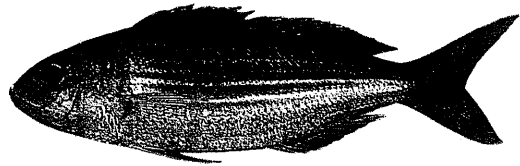


Fig. 14. *Nemipterus virgatus*, 188.7 mm SL.

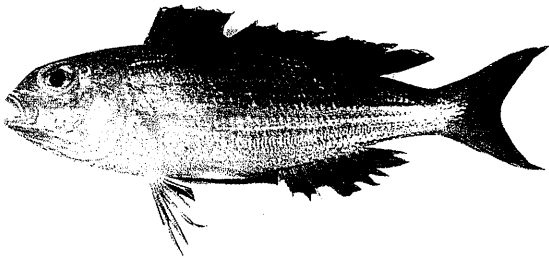


Fig. 15. *Nemipterus bathybus*, 165 mm SL.

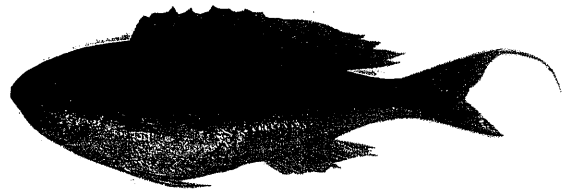


Fig. 16. *Nemipterus marginatus*, 144 mm SL.

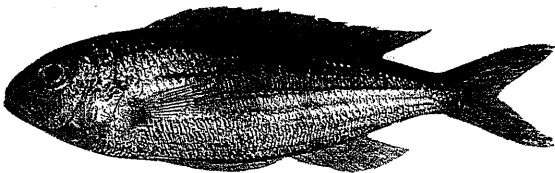


Fig. 17. *Nemipterus delagoae*, 170 mm SL.

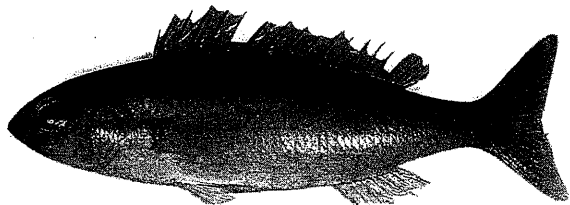


Fig. 18. *Pentapodus nagasakiensis*, 143 mm SL.



Fig. 19. *Pentapodus macrurus*, 171 mm SL.

20. *Pentapodus macrurus* (Bleeker, 1850)

黃帶錐齒鯛

Plate 3, Fig. 19

Heterognathodon macrurus Bleeker, 1850: 101 (Batavia) (not seen).

Pentapus macrurus, Weber and de Beaufort, 1936: 387.

Pentapus formosulus, Snyder, 1911: 531.

Pentapodus macrurus, Fowler, 1933: 72; Akazaki, 1962: 109; Masuda *et al.*, 1984: 175.

Materials: ASIZP 055851, 1 specimen, 171 mm SL, December 1980, Hengchun.

Diagnosis: D. X, 9; A. III, 7; P. 16; LL. 46, tr. $2\frac{1}{2}$; Gr. on lower limb 8; vertebrae 10+14. Head 3.72, body depth 2.94 and pectoral 4.91 in standard length. Eye 3.83 in head length. Maxilla extends to anterior margin of orbit. Four frontal canine-teeth in upper jaw and 2 in lower jaw, the canines in the lower jaw directed outward and obliquely upward. The first soft ray of ventral fin filamentous, not reaching to the origin of anal fin. Both upper and lower tips of caudal ended in filaments. Color in live greenish yellow above and paler below. Body side with 3 yellowish stripes: a broader lateral one from pectoral base to caudal base, a narrower one between dorsal base and lateral line, the third one being on the ventral flank of the body running from throat, belly toward the ventral side of caudal peduncle. Dorsal and pectoral fins reddish. Anal and ventral yellowish. Caudal greenish with outer yellowish margins.

Remarks: This species is recognizable by its deeper body and the filamentous tips on both caudal lobes. The lower filament shown in Plate 3, Fig. 19 was lost.

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臺灣之金線魚科魚類

李 信 徽

本文記載以下三屬二十種棲息於臺灣近海之金線魚科魚類：紅赤尾冬 (*Scolopsis eriomma*)、橫帶赤尾冬 (*S. inermis**)、黑帶赤尾冬 (*S. monogramma*)、條紋赤尾冬 (*S. margaritifera*)、白頸赤尾冬 (*S. vosmeri*)、雙帶赤尾冬 (*S. bilineatus*)、橈斑赤尾冬 (*S. xenochrous**)、烏面赤尾冬 (*S. personatus*)、黃帶赤尾冬 (*S. cancellatus*)、姬金線魚 (*Nemipterus metopias*)、虹色金線魚 (*N. hexodon*)、裴氏金線魚 (*N. peronii*)、薔薇金線魚 (*N. tolu*)、日本金線魚 (*N. japonicus*)、金線魚 (*N. virgatus*)、底金線魚 (*N. bathybus**)、黃緣金線魚 (*N. marginatus**)、蝶金線魚 (*N. delagoae**)、長崎錐齒鯛 (*Pentapodus nagasakiensis**) 及黃帶錐齒鯛 (*P. macrurus**)。以上加註星號之七種為臺灣之新記錄種。另外，過去文獻上所記載之松原金線魚 (*N. matsubarai*) 及歐氏金線魚 (*N. ovenii*) 因一直未獲標本無法肯定其存在性，故暫予刪略。其中之松原金線魚根據其原始記載，其齒式與臀鰭軟條數 (8 條) 均與金線魚相同，唯獨尾鰭上葉缺絲狀延長，可能為折斷之結果，因模式標本已遺失，無從查考而存疑。本文附有檢索表，各魚種之主要特徵，異名錄及彩色圖照，以利學者之查考。

