

Two New Species of the Anthiine Genus *Lepidoperca* from Australia and New Zealand

Masao Katayama and Eiichi Fujii

(Received January 12, 1980)

Abstract Four species of the anthiine genus *Lepidoperca* (Serranidae) were captured off Australia and New Zealand region. Two of them are referable to *Lepidoperca occidentalis* Whitley and *Lepidoperca pulchella* (Waite). *Lepidoperca inornata* Regan is a female form of *L. pulchella* and a junior synonym of it. Two other species are described as new under the names *Lepidoperca brochata* and *Lepidoperca magna*. *L. brochata* is closely related to *L. occidentalis*, but differs in having no scales on the axil of pectoral fin, higher body and longer pectoral fin. *L. magna* can be distinguished from congeners by a deeper body, fewer anal fin rays, more projected lower jaw and larger number of pored lateral line scales.

Four species belonging to the anthiine genus *Lepidoperca* were captured at depths between 140 m and 480 m off the coasts of Western Australia, South Australia and eastern Australia, the Norfolk Ridge, and the Kermadec Ridge in the 1975~76 and 1976~77 cruises of the R/V Kaiyo-maru (Fig. 1). These species are large and excellent food fish.

One of them was referred to *Lepidoperca occidentalis* Whitley. Because the original description of *L. occidentalis* was quite brief and devoid of illustration, the present paper will describe this species more completely. The second species, *Lepidoperca pulchella* (Waite), is transferred from the genus *Anthias* to *Lepidoperca* in the present paper. The type species of *Lepidoperca*, *Lepidoperca inornata* Regan, is the female form of *L. pulchella*. The other two species are considered to be new. *L. brochata* was collected off the coast of New South Wales and *L. magna* from the Derwent-Hunter Guyot, the Gifford Seamount, the Norfolk Ridge and the Kermadec Ridge.

Material and methods

Collection data of the specimens examined are shown in Table 1. All specimens were captured by the R/V Kaiyo-maru, a bottom trawler of the Japanese Fishery Agency. Specimens are deposited in National Science Museum, Tokyo (NSMT-P), Department of Zoology, University Museum, University of Tokyo (ZUMT) and Australian Museum, Sydney (AMS).

In the following descriptions, data for the paratypes differing from those of the holotype are given in parentheses. Measurements and counts were made according to the methods of Hubbs and Lagler (1964) except for the following: orbit diameter is the horizontal diameter of the bony orbit; the number of scales between the middle of the spinous dorsal fin and the lateral line was counted in a series from the dorsal fin base postero-ventrally to the lateral line, excluding any smaller scales at the base of the fin; the last ray of dorsal and anal fins was counted as one when branched to the base. Sex was determined by dissection. Osteological observations were based on the following specimens: *L. occidentalis* (NSMT-P 21455), 135 mm; *L. pulchella* (NSMT-P 21461), 194 mm; *L. brochata* (NSMT-P 21440), 206 mm; and *L. magna* (NSMT-P 21446), 237 mm. Counts for vertebrae and predorsal bones were taken from radiographs.

Genus *Lepidoperca* Regan, 1914

Lepidoperca Regan, 1914a: 15 (type species: *Lepidoperca inornata* Regan, 1914, by monotypy (=female form of *Anthias pulchellus* Waite (1899)).

Body oblong or ovate, moderately compressed. Eye large, its diameter longer than interorbital space. Interorbital space flattish. Dorsal fin X, 15~18; its margin slightly notched before the soft-rayed portion; anal fin III, 7~9. Pectoral fin rays 15~17, the two uppermost rays

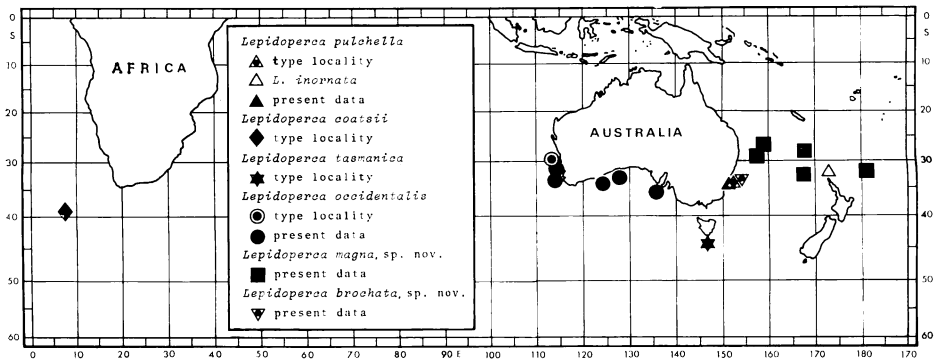


Fig. 1. Localities where four species of *Lepidoperca* were collected by the R/V Kaiyo-maru and the type locality of the species of *Lepidoperca* recorded in the literature.

Table 1. Collection data associated with bottom trawls (T), bottom long line (LL) and vertical line (L) in the 1975~76 and 1976~77 cruises of the R/V Kaiyo-maru.

| Operation no. | Date | Initial position | | Depth (m) | Water temperature (°C) | | Bottom salinity (%) |
|---------------|--------------|------------------|-------------|-----------|------------------------|---------|---------------------|
| | | | | | Bottom | Surface | |
| T20 | 15 Nov. 1975 | 31°32.0' S | 115°00.0' E | 190 | 19.0 | 21.5 | 35.3 |
| T21 | 15 Nov. 1975 | 31°36.0' S | 115°07.0' E | 143 | 20.2 | 20.6 | — |
| T24 | 23 Nov. 1975 | 34°02.7' S | 114°36.0' E | 141 | 18.0 | 19.1 | 35.6 |
| T26 | 23 Nov. 1975 | 34°0.30' S | 124°29.0' E | 169 | 16.9 | 19.2 | 35.5 |
| T35 | 28 Nov. 1975 | 33°16.4' S | 127°16.1' E | 168 | 16.6 | 18.2 | 35.6 |
| T54 | 7 Dec. 1975 | 36°28.7' S | 136°17.8' E | 152 | 14.6 | 17.2 | 35.5 |
| T69 | 31 Dec. 1975 | 34°51.7' S | 151°07.5' E | 236 | 11.7 | 24.4 | — |
| T71 | 31 Dec. 1975 | 34°36.7' S | 151°11.5' E | 229 | 12.3 | 23.9 | 35.1 |
| T78 | 15 Jan. 1976 | 31°51.9' S | 167°49.5' E | 331 | 13.3 | 22.5 | — |
| T80 | 16 Jan. 1976 | 31°48.5' S | 167°48.6' E | 275 | 12.9 | 23.5 | 35.2 |
| T82 | 17 Jan. 1976 | 29°35.0' S | 168°05.8' E | 308 | 15.2 | 25.1 | 35.2 |
| T 1 | 13 Dec. 1976 | 30°50.6' S | 156°15.6' E | 310~310 | 18.4 | 23.4 | 35.6 |
| T 2 | 13 Dec. 1976 | 30°34.9' S | 156°09.3' E | 467~476 | 12.8 | 23.6 | 35.1 |
| T 3 | 14 Dec. 1976 | 30°48.5' S | 156°13.8' E | 308~305 | 18.5 | 23.1 | 35.6 |
| T 4 | 14 Dec. 1976 | 30°36.3' S | 156°12.2' E | 394~396 | 14.7 | 23.6 | 35.3 |
| T 6 | 17 Dec. 1976 | 26°42.2' S | 159°19.6' E | 318~320 | 16.6 | 25.7 | 35.4 |
| T15 | 23 Dec. 1976 | 31°48.6' S | 167°51.0' E | 315~315 | 11.5 | 18.3 | — |
| LL3 | 28 Dec. 1976 | 32°25.7' S | 179°08.0' W | 186~322 | — | 19.9 | — |
| L 6 | 29 Dec. 1976 | 32°25.1' S | 179°09.9' W | 220 | 11.1 | 20.1 | — |
| L 7 | 30 Dec. 1976 | 32°10.1' S | 179°04.0' W | 286~381 | 11.8 | 19.9 | — |

unbranched, other rays branched. Caudal fin truncate or lunate; 15 branched rays. Supramaxilla present or absent. First infraorbital serrated on lower border. Preopercle with round angle, finely serrated along margin; opercle with three flat spines posteriorly, middle one longest; subopercle and interopercle serrated. A pair of canines on tip of both jaws, directed anteriorly; vomerine teeth v-shaped patch; tongue smooth. Gill rakers long and numerous, 8~11+21~33. Scales large, ctenoid (Fig. 2);

apical margin of scale provided with slender ctenii; inner ctenii which end distally with a clear-cut edge at the base of the ctenii arranged in rasp fashion. Head closely scaled except for lips; chin and some branchiostegals scaled. Lateral line complete and normally curved; pored scales 36~51. Subocular shelf developed on 3rd infraorbital. Upper edge of ceratohyal deeply concave; branchiostegals 7; length of urohyal equal to hyoid body or slightly longer. Cranium (Fig. 4) rather high, its base strongly curved;

frontals with a large anterior excavation; inter-orbital region rather wide and flat; sensory canal of frontal on each side runs rather closely; a median depression bordered by the very short lateral branch of the sensory canals; occipital crest high; a transverse ridge in front of the crest distinct or indistinct; posterior opening of myodome large; exoccipital condyles for the first vertebra slightly separate. Predorsal bones 3. Vertebrae 10+16. Pyloric caeca 5~6.

Remarks. This genus is closely related to *Caesioperca* De Castelnau, 1872, but differs from it in having a small number of dorsal (15~18 instead of 19~22) and anal rays (7~9 instead of 8~11), a small number of pored lateral line scales (36~51 instead of 50~65), larger eyes, and v-shaped patch of teeth on vomer (◊-shaped).

Lepidoperca occidentalis Whitley
(Fig. 3)

Lepidoperca occidentalis Whitley, 1951: 398 (type locality, between Naturaliste and Geraldton, Western Australia, 20 to 100 fathoms); Whitley, 1959: 19 (description; South Australia)

Material examined. In the following, trawl numbers are given instead of localities. See Table 1 and Fig. 1 for the data of each trawl number. NSMT-P 21451, 98 mm SL, NSMT-P 21452, 79 mm, NSMT-P 21453, 103.5 mm (Trawl no. T20); NSMT-P 21454, 112.8 mm, ZUMT 54317, 122.2 mm (Trawl no. T26); NSMT-P 21455, 135 mm, NSMT-P 21456, 151 mm (Trawl no. T54).

Diagnosis. Dorsal fin rays X, 15~16, mostly

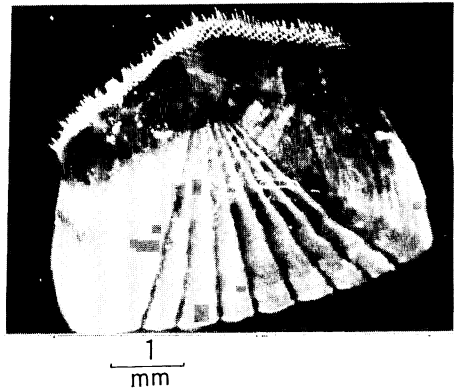
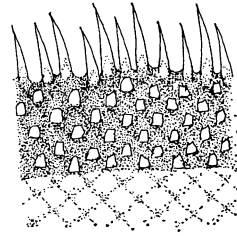


Fig. 2. Scales on anterior lateral part of the body in *Lepidoperca occidentalis*, 135 mm SL.

15; anal fin rays III, 7~8, mostly 7; pectoral fin rays 15~16, mostly 15; pored lateral line scales 44~48; gill rakers 8~11+25~30. Body oblong, compressed; greatest body depth 3.18~3.95 in SL. Lower jaw slightly projecting beyond the upper when mouth is closed. First infra-orbital with 4~5 spines on lower border; no supramaxilla. Caudal fin lunate; pectoral fin shorter than head. Spinous dorsal naked; axil of pectoral fin scaled. Upper side of body pink, middle side yellow; dorsal fin yellow with a

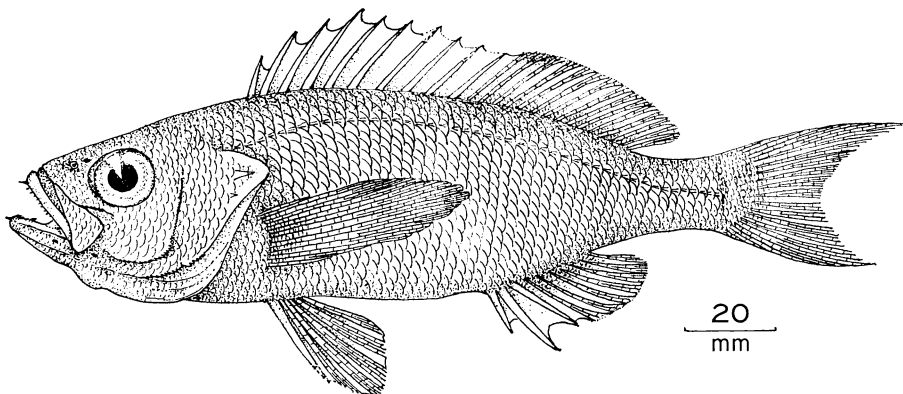


Fig. 3. *Lepidoperca occidentalis* Whitley, NSMT-P 21456, 151 mm SL, south Australia.

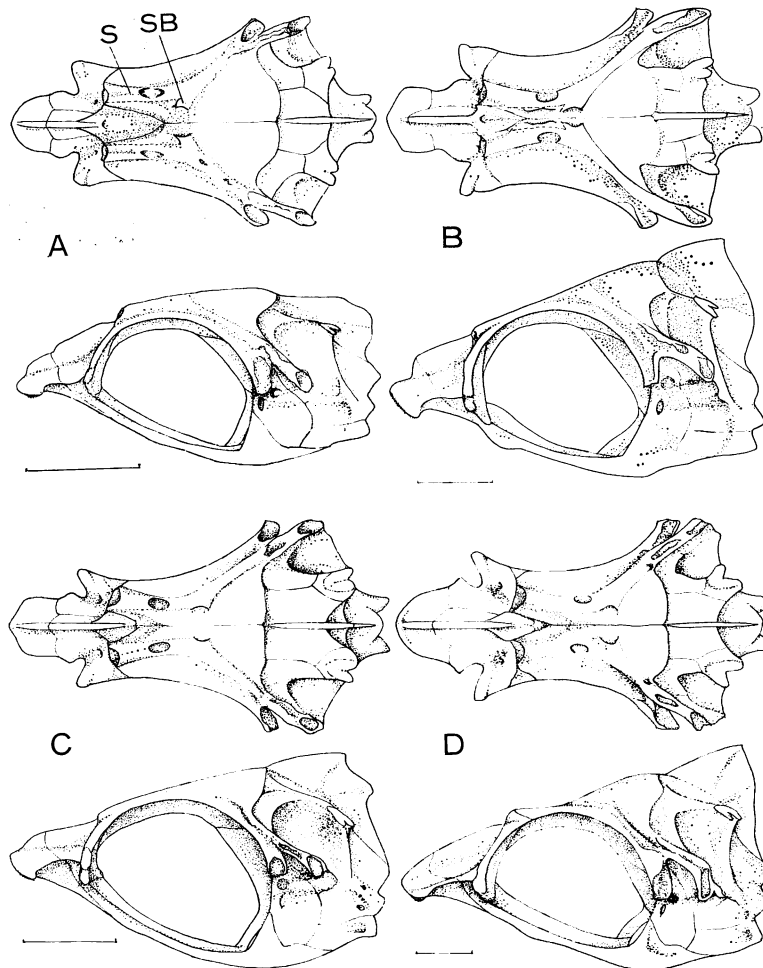


Fig. 4. Upper and lateral aspects of the cranium in four species of *Lepidoperca*. A: *L. occidentalis*, 135 mm SL. B: *L. pulchella*, 194 mm. C: *L. brochata*, 206 mm. D: *L. magna*, 237 mm. Scales: 10 mm.

dark blotch at tip of anterior soft dorsal fin.

Description. Dorsal fin rays X, 15~16 (mostly 15); anal fin rays III, 7~8 (mostly 7); pectoral fin rays 15~16 (mostly 15); pored lateral line scales 44~48; gill rakers 8~11+25~30=34~41.

Body oblong, compressed; greatest body depth 3.18~3.95 in SL; width just behind gill opening 5.81~6.68 in SL; dorsal profile of head gently curved, ventral profile largely convex; head length 2.74~3.04 in SL; snout length 4.02~4.54 in head; diameter of orbit 2.78~3.15 in head; interorbital space slightly convex and shorter than eye diameter, 3.28~3.76 in head; length of caudal peduncle 1.42~1.70, depth

of the same 3.13~3.66 in head.

Mouth large, oblique, and slightly protractile; lower jaw slightly projecting beyond the upper when mouth is closed; upper jaw length 2.29~2.48 in head; maxilla expanded distally, reaching below anterior margin of pupil; no supramaxilla. Nostrils close together, directly in front of eye; anterior nostril with an elevated rim and a produced posterior flap; posterior one larger, ovoid in shape. Upper jaw with a band of villiform teeth, outermost ones canine-like, a pair of strong canines on tip of upper jaw, directed anteriorly; teeth on lower jaw also villiform; a pair of strong canines on tip of lower jaw, directed anteriorly; a few canines

on each side of the jaw posteriorly; vomer and palatines with narrow bands of villiform teeth, the band of vomer v-shaped; tongue smooth. Preopercle with round angle, finely serrated along margin; opercle with three flat spines, middle one longest, subopercle and interopercle serrated. Gill rakers numerous, longer than gill filaments.

Dorsal fin inserted slightly before hind margin of operculum; dorsal spine strong, 4th one longest, 2.10~2.43 in head, length of last dorsal spine 3.00~3.90; length of longest (5th) dorsal soft ray 2.46~3.09 in head. Anal fin originating below base of second dorsal soft ray; second anal spine stouter and longer than the third; length of first anal spine 4.11~4.79, second anal spine 2.26~2.68, third anal spine 2.63~2.99 in head; longest (1st) anal soft ray 2.02~2.35; posterior tip of dorsal and anal fins rounded. Pectoral fin subsymmetrical, shorter than head, reaching vertical through anus, its length 3.09~3.66 in SL; the rays mostly branched; pelvic fin inserted slightly anterior to lower end of pectoral fin base, its length 4.37~5.20 in SL. Caudal fin lunate, upper lobe longer; its branched rays 15.

Scales large, ctenoid; 6 in a series from origin of dorsal to lateral line, 3 in a series from middle of spinous dorsal to lateral line and 13 or 14 from origin of anal to lateral line; head closely scaled except for lips; axil of pectoral fin scaled; soft dorsal and anal covered with small scales basally. Lateral line normally curved; tubes on lateral line scales bifurcate.

Color in formalin pale yellowish, with a dark blotch at tip of anterior soft dorsal fin. Color when fresh: Upper side of body pink; middle side yellow, lower jaw pink; dorsal fin yellow with a dark blotch at tip of anterior soft dorsal fin; caudal fin yellow; pectoral fin pale yellow; pelvic fin pale pink; anal spine and anterior anal rays yellow, the posterior part colorless.

Internal characters: First infraorbital with 4~5 spines on lower border; subocular shelf developed on 3rd infraorbital; upper edge of ceratohyal deeply concave; branchiostegals 7; length of urohyal about equal to hyoid body. Cranium (Fig. 4A) rather high, its base largely curved; frontals with a large anterior excavation; interorbital region rather wide and flat, its width 3.06 in cranium length; sensory canal of

frontal on each side runs rather closely; a median depression bordered by the very short lateral branch of the sensory canals; occipital crest high; a transverse ridge in front of the crest indistinct; posterior opening of myodome large; exoccipital condyles for first vertebra slightly separate. Vertebrae 10+16. Predorsal bones 3. Pyloric caeca 6.

Distribution and collection data. Western Australia; South Australia. Specimens were collected by bottom trawls off southern Western Australia (T20, T21, and T24) and South Australia (T26, T35, and T54).

Lepidoperca pulchella (Waite)

(Fig. 5)

Anthias pulchellus Waite, 1899: 77~89; pl. XII (type locality, from Bungaree Norah to Wollongong, New South Wales, 32 and 78 fathoms); McCulloch, 1929~30: 155 (listed); McCulloch, 1934: 44~45, pl. 17, fig. 161a (New South Wales); Munro, 1961: 172, fig. 1013; Whitley, 1964: 42 (listed); Whitley, 1968: 54 (Moeraki, New Zealand) (listed).

Lepidoperca inornata Regan, 1914a: 15 (type locality, Cape North, New Zealand, 70 fathoms); Regan, 1914b: 17 (from original description); Whitley, 1968: 54 (listed). New synonym.

Material examined. NSMT-P 21457, 198.5 mm, male, NSMT-P 21458, 143.5 mm, female, NSMT-P 21459, 189.5 mm, male, NSMT-P 21460, 144 mm, female, NSMT-P 21461, 194 mm, male (Trawl no. T69); ZUMT 54318, 157 mm, female, NSMT-P 21462, 220 mm, male, NSMT-P 21463, 193.5 mm, male NSMT-P 21464, 202 mm, male, NSMT-P 21465, 148 mm, female, NSMT-P 21466, 156 mm, female, ZUMT 54323, 183 mm, male, NSMT-P 21468, 196.5 mm, male, NSMT-P 21467, 177.7 mm, female (Trawl no. T71).

Diagnosis. Dorsal fin rays X, 16~17; anal fin rays III, 7~8, mostly 8; pectoral fin rays 16~17, mostly 16; pored lateral line scales 42~46; gill rakers 10~12+25~29. Body ovoid, compressed; greatest body depth 2.32~2.72 in SL. Lower jaw slightly projecting beyond the upper when mouth is closed. First infraorbital finely serrated on lower border; no supramaxilla. Caudal slightly emarginate; pectoral fin long, about equal to head length. About half basal

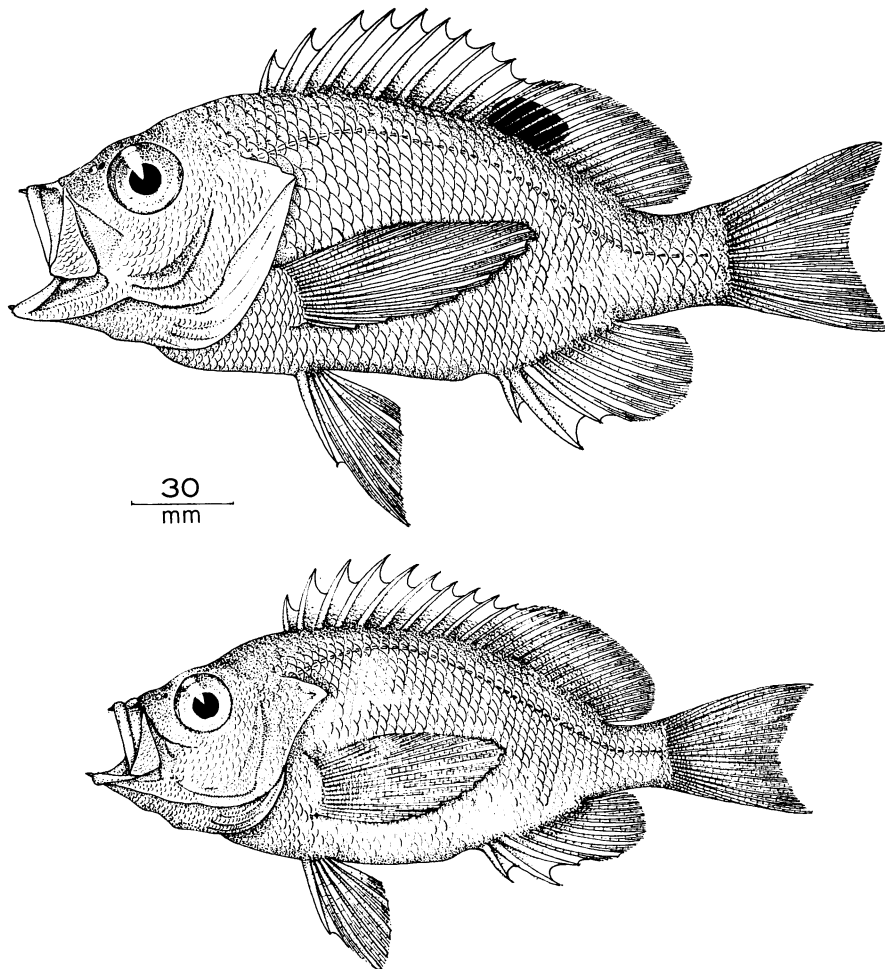


Fig. 5. *Lepidoperca pulchella* (Waite). Top: NSMT-P 21462, 220 mm SL, male. Bottom: ZUMT 54318, 157 mm, female, southeastern Australia.

part of spinous dorsal scaled; axil of pectoral fin scaled. Upper side of body red, middle side orange; fins yellow. In male a large black blotch present on anterior rays of soft dorsal.

Description. Dorsal fin rays X, 16~17; anal fin rays III, 7~8 (mostly 8); pectoral fin rays 16~17 (mostly 16); pored lateral line scales 42~46; gill rakers 10~12+25~29=35~40 (excluding 1 or 2 rudimentary ones on lower part).

Body ovoid, compressed; greatest body depth 2.32~2.72 in SL; width just behind gill opening 4.95~5.79 in SL; dorsal profile of head slightly concave above eye, ventral profile gently curved; head length 2.56~2.93 in SL; snout length 3.95~4.72 in head; diameter of orbit 3.02~3.56 in

head; interorbital space flattish and shorter than eye diameter, 3.44~4.32 in head; the length of caudal peduncle 1.60~2.11, depth of the same 2.91~3.19 in head.

Mouth large oblique and slightly protractile; lower jaw projecting beyond upper when mouth is closed; upper jaw length 2.26~2.46 in head; maxilla expanded distally, reaching below anterior border of pupil; no supramaxilla. Nostrils, close together, directly in front of eye; anterior nostril with an elevated rim and a produced posterior flap; posterior one larger, ovoid in shape. Upper jaw with a band of small teeth, outermost ones larger and canine-like, a pair of canines on tip of upper jaw, directed anteriorly; two or three canines on each side of the

jaw posteriorly; teeth on lower jaw also villiform; a pair of large canines on tip of lower jaw, directed anteriorly; few canines on each side of the jaw posteriorly; vomer and palatines with narrow bands of villiform teeth, the band of vomer v-shaped; tongue smooth. Preopercle with round angle, finely serrated along margin; opercle with three flat spines, middle one longest; subopercle and interopercle serrated. Gill rakers numerous, longer than gill filaments.

Dorsal fin inserted slightly before hind margin of operculum; dorsal spines strong, 3rd or 4th one longest, 2.05~2.49 in head; length of last dorsal spine 2.45~3.80; length of longest (5th) dorsal soft ray 2.19~2.49. Anal fin originating below base of third dorsal soft ray; second anal spine stouter and longer than first; length of first anal spine 3.77~4.29, second anal spine 2.01~2.62, third anal spine 2.26~2.87, and longest (3rd) anal soft ray 1.79~2.05 in head; posterior tip of dorsal fin and anal fin rounded. Pectoral fin subsymmetrical, about as long as head, reaching vertical through anterior part of anal fin base, its length 2.68~2.97 in SL; caudal fin slightly emarginate, branched rays 15.

Scales large, ctenoid; 5 in a series from origin of dorsal to lateral line, 3 in a series from middle of spinous dorsal to lateral line and 13 or 14 from origin of anal to lateral line; head closely scaled except for lips; pectoral axil with scales; about half basal part of dorsal fin and anal fin scaled. Lateral line normally curved, forming an angle under last dorsal rays; tubes on lateral line scales bifurcate.

Color in formalin pale yellowish; a large black blotch on anterior rays of soft dorsal fin in male. Color when fresh: Upper side of body red, each scale with a dark mark in the center, tending to form longitudinal lines; middle side orange; fins yellow; iris red, upper rim of eye with a black blotch in female but fade away in male. In male a large black blotch present on anterior rays of soft dorsal fin.

Internal characters: First infraorbital finely serrated on lower border; subocular shelf developed on 3rd infraorbital. Upper edge of ceratohyal deeply concave; branchiostegals 7; urohyal rather large, its length slightly longer than hyoid body. Cranium (Fig. 4B) rather high, its base strongly curved; frontals with a

large anterior excavation; interorbital region rather wide and flat, its width 3.00 in cranium length; sensory canal of frontal on each side runs rather closely; a median depression bordered by the very short lateral branch of the sensory canals; occipital crest very high; a transverse ridge in front of the crest; a lateral wing on each side of the anterior part of parasphenoid; posterior opening of myodome large; exoccipital condyles for first vertebra slightly separate. Vertebrae 10+16. Predorsal bones 3. Pyloric caeca 5~6.

Distribution and collection data. Eastern Australia; New Zealand. Specimens were collected by a bottom trawl off New South Wales (T69).

Remarks. Investigations on our 14 specimens, male: 8 and female: 6, disclosed the differences between sexes, as follows. (1) The body size of male (183~220 mm SL) is larger than that of female (143.5~177 mm SL). (2) All of male specimens have a large black blotch on anterior rays of soft dorsal fin, whereas absent in female. The size-sex distribution which was detected in this study implies a possible protogynous mode of reproduction in this species like *Sacura margaritacea* and *Caprodon schlegeli*. The sex reversal of this species probably takes place in the range between 170 and 180 mm SL. Our female specimens (143.5~177 mm SL) agree well with the holotype of *Lepidoperca inornata* (135 mm in total length, from near Cape North, New Zealand) except for having smaller eye (Table 2). The ratio of the diameter of eye to the head length becomes smaller as the length of body increases. In Regan's figure many scales are seen on spinous dorsal fin as in our specimens. On the other hand our male specimens (183~220 mm SL) which have a dark blotch on anterior rays of soft dorsal fin agree with the holotype of *Anthias pulchellus* Waite (1899), 223 mm in total length, from off the coast of New South Wales.

Lepidoperca brochata sp. nov.

(Fig. 6)

Holotype. NSMT-P 21438, 196 mm in SL, southeastern Australia (34°51.7'S, 151°07.5'E) 236 m depth, 31 December 1975 (Trawl no. T69).

Paratypes. NSMT-P 21439, 165 mm. ZUMT

54320, 188.5 mm, AMS I. 23359-001, 199 mm, NSMT-P 21440, 206 mm (Trawl no. T69); NSMT-P 21441, 171 mm, NSMT-P 21442, 217 mm, (Trawl no. T71).

Diagnosis. Dorsal fin rays X, 16; anal fin rays III, 7; pectoral fin rays 15; pored lateral line scales 45~46; gill rakers 10~12+27~29. Body oblong, compressed; greatest body depth 2.65~2.95 in SL. Lower jaw slightly projecting beyond the upper when mouth is closed. First infraorbital finely serrated on lower border; no supramaxilla. Caudal fin slightly emarginate; pectoral fin long, its length about equal to head length. Spinous dorsal naked; axil of pectoral fin naked. Upper side of body red, middle side orange; fins yellow.

Description. Dorsal fin rays X, 16; anal fin rays III, 7; pectoral fin rays 15; pelvic fin rays I, 5; pored lateral line scales 46 (45~46); gill rakers 11+27=38 (10~12+27~29=37~41).

Body oblong, compressed; greatest body depth 2.65 (2.73~2.95) in SL; width just behind gill opening 5.60 (5.58~5.91) in SL; dorsal profile of head slightly concave above eye, ventral profile largely convex; head length 2.84 (2.70~2.86) in SL; snout length 4.06 (4.00~4.84) in head; diameter of orbit 3.29 (3.04~3.38) in head; interorbital space slightly convex and shorter than eye diameter, 3.83 (3.81~4.45)

in head; length of caudal peduncle 1.68 (1.43~1.69), depth of the same 3.00 (3.09~3.39) in head.

Mouth large, oblique and protractile; lower jaw slightly projecting beyond the upper when mouth is closed; upper jaw length 2.23 (2.26~2.37) in head; maxilla expanded distally, reaching below anterior margin of pupil; no supra-maxilla. Nostrils close together, directly in front of eye, anterior nostril with an elevated rim and a produced posterior flap; posterior one larger, ovoid in shape. Upper jaw with a band of villiform teeth, outermost ones much larger and canine-like, a pair of large strong canines on tip of upper jaw, directed anteriorly; teeth on lower jaw also villiform; a pair of large strong canines on tip of lower jaw, directed anteriorly; a few canines on each side of the jaw posteriorly; vomer and palatines with narrow bands of villiform teeth, the band on vomer v-shaped; tongue smooth. Preopercle with round angle, finely serrated along margin; opercle with three flat spines, middle one longest; subopercle and interopercle serrated along their margin, near the point of their union. Gill rakers numerous, longer than gill filaments.

Dorsal fin inserted slightly before hind margin of operculum; dorsal spines strong; fourth spine longest, 2.16 (1.98~2.20) in head; length of

Table 2. Characteristics of holotypes of *Lepidoperca inornata*

| | Holotype of <i>A. pulchellus</i> (after Waite, 1899) | Holotype of <i>L. inornata</i> (after Regan, 1914) | NSMT-P 21458 | NSMT-P 21460 | NSMT-P 21465 | Present NSMT-P 21466 |
|------------------------------|---|---|-----------------|-----------------|-----------------|----------------------------|
| Standard length (mm) | — | — | 143.5 | 144.0 | 148.0 | 156.0 |
| Total length (mm) | 223 | 135 | 184.0 | 183.0 | 192.5 | — |
| Dorsal rays | X, 16-17 | X, 16 | X, 17 | X, 16 | X, 16 | X, 17 |
| Anal rays | III, 8 | III, 8 | III, 8 | III, 8 | III, 7 | III, 8 |
| Pectoral rays | 16 | 17 | 16 | 16 | 16 | 16 |
| Gill rakers on lower part | 26 | 25 | 28 | 25 | 26 | 27 |
| Pored scales in lateral line | 44 | 41 | 44 | 42 | 46 | 45 |
| In standard length | | | | | | |
| Head length | 2.8 | 2.75 | 2.64 | 2.77 | 2.63 | 2.56 |
| Body depth | 2.47 | 2.5 | 2.43 | 2.64 | 2.37 | 2.32 |
| In head length | | | | | | |
| Eye diameter | 3.6 | 2.5 | 3.02 | 3.06 | 3.12 | 3.28 |
| Interorbital space | 3.75 | 4 | 4.32 | 4.09 | 4.07 | 4.07 |
| A black blotch on dorsal fin | present | absent | absent | absent | absent | absent |
| Sex | — | — | female | female | female | female |

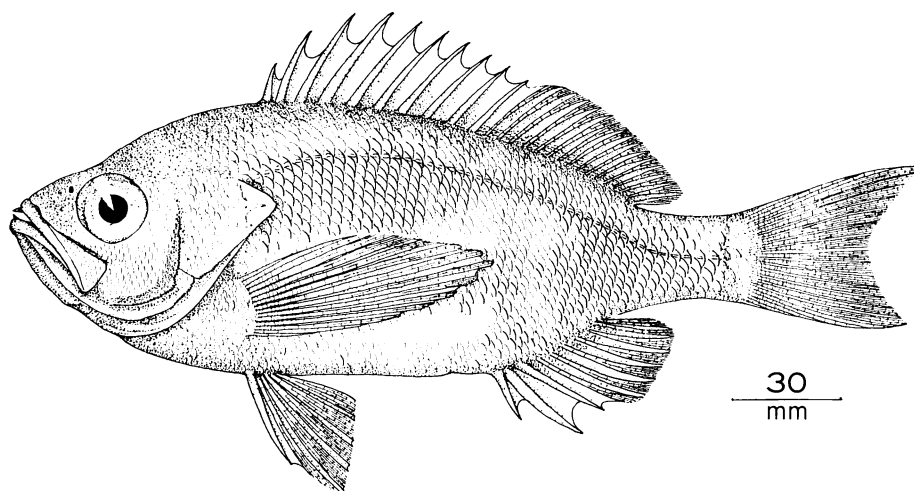


Fig. 6. Holotype of *Lepidoperca brochata*, NSMT-T 21438, 196 mm SL, southeastern Australia.

last dorsal spine 3.29 (2.82~3.81); length of longest (4th) dorsal soft ray 2.76 (2.54~2.90). Anal fin originating below base of second dorsal soft ray; second anal spine stouter and longer than the third; length of first anal spine 4.76 (4.18~4.59), second anal spine 2.46 (2.26~2.65), third anal spine 2.56 (2.34~2.77) in head; longest (1st) anal soft ray 2.03 (2.06~2.26) in head; posterior tip of dorsal fin and anal fin rounded. Pectoral fin subsymmetrical, about as long as head, reaching vertical through origin

of anal fin, its length 2.88 (2.73~2.93) in SL; the rays mostly branched. Pelvic fin inserted slightly anterior to lower end of pectoral fin base, its length 4.45 (4.33~4.79) in SL. Caudal fin slightly emarginate, branched rays 15.

Scales large, ctenoid; 6 in a series from origin of dorsal to lateral line 3 in a series from middle of spinous dorsal to lateral line and 14 from origin of anal fin to lateral line; head closely scaled except for lips; axil of pectoral fin naked; spinous dorsal naked; soft dorsal and anal

Regan and *Lepidoperca pulchella* (Waite), and our specimens of *L. pulchella*.

| specimens | | | | | | | | | |
|---------------|-----------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ZUMT 54318 | NSMT-P 21467 | ZUMT 54323 | NSMT-P 21459 | NSMT-P 21463 | NSMT-P 21461 | NSMT-P 21468 | NSMT-P 21457 | NSMT-P 21464 | NSMT-P 21462 |
| 157.0 | 177.0 | 183.0 | 189.5 | 193.5 | 194.0 | 196.5 | 198.5 | 202.0 | 220.0 |
| 191.0 | 224.0 | 235.0 | 239.0 | 251.0 | 246.0 | 252.0 | 250.0 | 257.0 | 278.0 |
| X, 17 | X, 17 | X, 16 | X, 16 | X, 16 | X, 17 | X, 16 | X, 16 | X, 17 | X, 16 |
| III, 8 | III, 8 | III, 8 | III, 8 | III, 8 | III, 8 | III, 8 | III, 8 | III, 8 | III, 8 |
| 16 | 16 | 16 | 16 | 16 | 17 | 16 | 16 | 16 | 16 |
| 28 | 28 | 27 | 28 | 29 | 27 | 25 | 27 | 28 | 26 |
| 44 | 46 | 45 | 45 | 43 | 44 | 45 | 44 | 46 | 44 |
| 2.66 | 2.77 | 2.69 | 2.71 | 2.71 | 2.72 | 2.66 | 2.70 | 2.66 | 2.93 |
| 2.34 | 2.52 | 2.33 | 2.51 | 2.45 | 2.60 | 2.43 | 2.53 | 2.32 | 2.72 |
| 3.28 | 3.32 | 3.24 | 3.26 | 3.25 | 3.56 | 3.22 | 3.34 | 3.49 | 3.41 |
| 3.93 | 3.83 | 3.58 | 3.74 | 3.58 | 3.83 | 3.44 | 3.59 | 4.00 | 3.57 |
| absent | absent | present | present | present | present | present | present | present | present |
| female | female | male | male | male | male | male | male | male | male |

covered with small scales basally. Lateral line normally curved; tubes on lateral line scales bifurcate.

Color in formalin pale yellowish. Color when fresh: Upper side of body red, middle side orange; lower jaw pink; fin yellow.

Internal characters: First infraorbital finely serrated on lower border; subocular shelf developed on 3rd infraorbital. Upper edge of ceratohyal deeply concave; branchiostegals 7; length of urohyal about equal to hyoid body. Cranium (Fig. 4C) rather high, its base strongly curved; frontal with a large anterior excavation; interorbital region rather wide and flat, its width 3.31 in cranium length; sensory canal of frontal on each side runs rather closely; a median depression bordered by the very short lateral branch of the sensory canal; occipital crest very high; a transverse ridge in front of the crest indistinct; posterior opening of myodome large; exoccipital condyles for first vertebra slightly separate. Vertebrae 10+16. Predorsal bones 3. Pyloric caeca 5.

Remarks. The present new species is closely related to *L. occidentalis*, but differs from it in having a higher body, a greater number of dorsal soft rays, no scales on axil of pectoral fin, longer pectoral fin and no dark blotch on tip of anterior soft dorsal.

Distribution and collection data. Southeastern Australia. Specimens were collected by a bottom trawl off New South Wales (T69).

Etymology. The Latin *brochata* means having projecting teeth.

Lepidoperca magna sp. nov.
(Fig. 7)

Holotype. NSMT-P 21443, 221 mm, Norfolk Ridge (29°35'S, 168°05.8'E) 308 m depth, 17 Jan. 1976 (Trawl no. T82).

Paratypes. NSMT-P 21444, 227 mm (T80); NSMT-P 21445, 237.5 mm, AMS I. 23358-001, 222 mm, ZUMT 54319, 221 mm, NSMT-P 21446, 237 mm, NSMT-P 21447, 263 mm (T82); NSMT-P 21448, 268 mm, NSMT-P 21449, 239 mm (T1); NSMT-P 21450, 206 mm (T3).

Diagnosis. Dorsal fin rays X, 15~16, mostly 16; anal fin rays III, 7; pectoral fin rays 15; pored lateral line scales 45~50; gill rakers 8~10+21~25. Body ovate, compressed; greatest body depth 2.29~2.60 in SL. Lower jaw

well projecting beyond the upper when mouth is closed. First infraorbital finely serrated on lower border. Maxillary with a rudimentary supramaxilla. Caudal fin truncate to slightly concave; pectoral fin long, about equal to head length. Spinous dorsal fin naked; axil of pectoral fin naked. Body yellowish red; lateral line black; fins yellow.

Description. Dorsal fin rays X, 16 (15~16, mostly 16); anal fin rays III, 7; pectoral fin rays 15; pelvic fin rays I, 5; pored lateral line scales 48 (45~50); gill rakers 9+24=33 (8~10+21~25=29~33).

Body ovate, compressed; greatest body depth 2.60 (2.29~2.60) in SL; width just behind gill opening 5.66 (5.24~5.63) in SL; dorsal profile of head slightly concave above eye, ventral profile gently curved; head length 2.70 (2.57~2.75) in SL; diameter of orbit 3.04 (2.89~3.17) in head; snout 4.10 (3.72~4.18) in head; interorbital space flat and shorter than eye diameter, 3.94 (3.77~4.40) in head; length of caudal peduncle 1.82 (1.64~1.96), depth of the same 2.83 (2.77~2.94) in head.

Mouth large, oblique and slightly protractile; lower jaw well projecting beyond the upper when mouth is closed; upper jaw length 2.22 (2.09~2.24) in head; maxilla reaching below middle of orbit; a rudimentary supramaxilla present. Nostrils close together, directly in front of eye; anterior nostril with an elevated rim and a produced posterior flap; posterior one larger, ovoid in shape. Upper jaw with a band of villiform teeth, outermost ones much larger and canine-like; a pair of large strong canines on tip of upper jaw, directed anteriorly; teeth on lower jaw also villiform; a pair of large strong canines on tip of lower jaw, directed anteriorly; a few canines on each side of jaw posteriorly; vomer and palatines with narrow bands of villiform teeth, the band on vomer v-shaped; tongue smooth. Preopercle with round angle, finely serrated along margin; opercle with three flat spines, middle one longest; subopercle and interopercle serrated along their margins, near point of their union. Gill rakers numerous, longer than gill filaments.

Dorsal fin inserted slightly before hind margin of operculum; dorsal spines strong, 4th one longest, 2.10 (1.89~2.12) in head; no distinct notch between the spinous and soft parts,

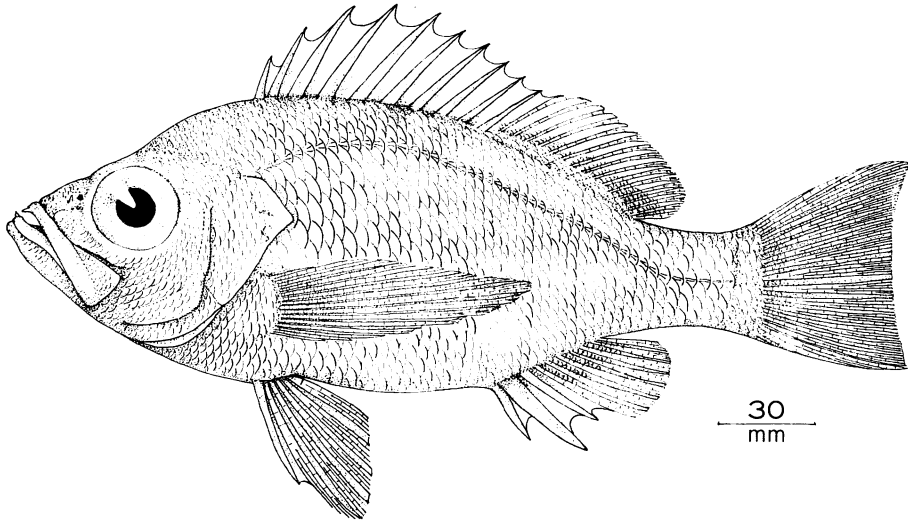


Fig. 7. Holotype of *Lepidoperca magna*, NSMT-P 21443, 221 mm SL, Norfolk Ridge.

though first soft ray is a little longer than last spine; longest (5th) dorsal soft ray 2.56 (2.36~2.82) in head. Anal fin originating below base of second dorsal soft ray; second anal spine stouter and longer than third; length of first anal spine 3.73 (3.74~4.59), second anal spine 2.41 (2.21~2.37), third anal spine 2.73 (2.35~2.77) in head; longest (2nd) anal soft ray 2.10 (1.96~2.28) in head; posterior tip of dorsal fin and anal fin rounded. Pectoral fin subsymmetrical, about as long as head, reaching vertical through middle of anal base, its length 2.68 (2.60~2.85) in SL; the rays mostly branched. Pelvic fin inserted slightly anterior to lower end of pectoral fin base, its length 3.98 (3.73~3.98) in SL; caudal fin truncate, branched rays 15.

Scales large, ctenoid; 7 in a series from origin of dorsal to lateral line, 4 in a series from middle of spinous dorsal to lateral line and 19 from origin of anal to lateral line; head closely scaled except for lips; axil of pectoral fin naked; spinous dorsal naked, soft dorsal and anal covered with small scales basally. Lateral line high, concurrent with back forming an angle under last dorsal rays; tubes on lateral line scales bifurcate.

Color in formalin pale yellowish. Color when fresh: Body yellowish red; lateral line black; fins yellow.

Internal characters: First infraorbital finely

serrated on lower border; subocular shelf developed on 3rd infraorbital; upper edge of ceratohyal deeply concave; branchiostegals 7; urohyal slightly shorter than hyoid body. Cranium (Fig. 4D) rather high, its base strongly curved; frontals with a large anterior excavation; interorbital region rather wide and flat, its width 2.88 in cranium length; sensory canal of frontal on each side runs rather closely; a median depression bordered by the very short lateral branch of the sensory canal; occipital crest very high; a transverse ridge in front of the crest; a lateral wing on each side of the anterior part of parasphenoid; posterior opening of myodome large; exoccipital condyles for first vertebra slightly separate. Vertebrae 10+16. Predorsal bones 3. Pyloric caeca 6.

Remarks. The present new species is closely related to *L. brochata* sp. nov., but differs from it in having a higher body, a small number of gill rakers, much projecting lower jaw, a rudimentary supramaxilla and black lateral line. From *L. pulchella* (Waite) it is distinguished by fewer anal soft rays and pectoral fin rays, larger number of lateral line scales, no scales on spinous dorsal fin and axil of pectoral fin, much projecting lower jaw, a rudimentary supramaxilla and different coloration.

Distribution and collection data. Eastern Australia; Norfolk Ridge; Kermadec Ridge. Specimens were collected by bottom trawls, a

bottom long line, and vertical lines on the Derwent-Hunter Guyot (T1, T2, T3, and T4), the Gifford Seamount (T6), the Norfolk Ridge (T15, T78, T80, and T82), and the Kermadec Ridge (LL3, L6, and L7).

Etymology. The Latin *magna* means large. The present new species attains large size (270 mm in SL).

Acknowledgments

We are grateful to Dr. P. C. Heemstra, J. L. B. Smith Institute of Ichthyology, Rhodes University, Dr. Teruya Uyeno, National Science Museum, Tokyo, and Dr. Yoshiaki Tominaga, Tokyo University, for their comments on the manuscript. We also thank Dr. Tetsuya Sato and Mr. Shigeyuki Kawahara of the Far Seas Fisheries Research Laboratory, Dr. Hideo Kono, the Japan Marine Fishery Resource Research Center, and the crew of the R/V Kaiyo-maru, for obtaining specimens and allowing us examine them, Dr. T. Adamson, Natural History Museum, Los Angeles County, for copies of literature and Mr. Yutaka Fuzioka, Yamaguchi University, for his skilful help in taking various kinds of photographs.

Literature cited

- Hubbs, C. L. and K. L. Lagler. 1964. Fishes of the Great Lakes Region. Univ. Michigan Press, Ann Arbor, 213 pp.
- McCulloch, A. R. 1929~30. A check-list the of fishes recorded from Australia. Aust. Mus. Mem., 5(1~4): 1~534.
- McCulloch, A. R. 1934. The fishes and fish-like animals of New South Wales. Roy. Zool. Soc. N. S. W., Sydney, XXVI+104 pp., 43 pls.
- Munro, I. S. R. 1961. Family Anthiidae. Handbook Austr. Fishes, 42: 170~172. In Aust. Fish. Newsletter, 20(12): 41, figs. 1004~1013.
- Regan, C. T. 1914a. Diagnosis of new marine fishes collected by the British Antarctic ("Terra Nova") Expedition. Ann. Mag. Nat. Hist., ser. 8, 13: 11~17.
- Regan, C. T. 1914b. British Antarctic ("Terra Nova") Expedition 1910. Fishes. Brit. Antarct.

Exped. Nat. Hist., Rep. Zool., London, 1, 1: 1~54, 13 pls, 8 figs.

- Waite, E. R. 1899. Scientific results of the traveling expedition of H.M.C.S. "Thetis" off the coast of New South Wales in February and March 1898. Aust. Mus. Mem., 4: 27~128, pls. 1~31.
- Whitley, G. P. 1951. Studies in ichthyology, No. 15. Rec. Aust. Mus., 22 (4): 389~408, figs. 1~14.
- Whitley, G. P. 1959. More ichthyological snippets. Proc. Roy. Zool. Soc. N. S. W., 1958/9: 11~26, figs. 1~9.
- Whitley, G. P. 1964. A survey of Australian ichthyology. Proc. Linn. Soc. N.S.W., 89(1): 11~127.
- Whitley, G. P. 1968. A check-list of the fishes recorded from the New Zealand Region. Aust. Zoologist, 15(1): 11~127.

(MK: 2-11-22 Tataru, Hofu 747, Japan; EF: 4-44-11 Koenji Kita, Sugunami-ku, Tokyo 166, Japan)

オーストラリア・ニュージーランド産 ハナダイ 亜科 *Lepidoperca* 属の2新種

片山正夫・藤井英一

水産庁調査船開洋丸によって、オーストラリア西岸、南岸、南東岸沖およびノーフォーク海嶺、ケルマデック海嶺で採集された *Lepidoperca* 属のハナダイ4種類について記載した。その中の2種は *L. occidentalis* Whitley および *L. pulchella* (Waite) に同定された。前種は原記載が極めて簡単で図も示されていないので詳しく記載した。後種の雄は、従来 *Anthias pulchellus* Waite, 1899 とされており、背びれ軟条部前部に黒斑をもつ。また、*Lepidoperca* 属の模式種である *L. inornata* Regan, 1914 は背びれに黒斑のない雌個体と考えられる。従って、本研究では *A. pulchellus* を *Lepidoperca* 属に移し、*L. inornata* をその junior synonym とした。他の2種は新種で、*Lepidoperca brochata* および *Lepidoperca magna* と命名し記載した。*L. brochata* は *L. occidentalis* に極めて近縁であるが、胸びれ腋部に鱗のないこと、体高がやや高いこと、胸びれがやや長いこと、および体色などで区別される。*L. magna* は体高が高いこと、腎びれが7軟条であること、下顎が上顎よりはるかに突出していること、上主上顎骨があること、側線鱗数が多いこと、黒色の側線をもつことなどで他の本属の種類と区別される。

(片山: 747 防府市多々良 2-11-22; 藤井: 166 東京都杉並区高円寺北 4-44-11)