



***Platycephalus orbitalis*, a new species of flathead (Teleostei: Platycephalidae) collected from western Australia**

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Abstract

A new platycephalid, *Platycephalus orbitalis*, is described on the basis of specimens collected in the Indian Ocean off the coast of Western Australia at depths of 50–144 m. The new species had been mistakenly identified as *P. marmoratus*, which is now known to be restricted to eastern Australia. Several morphological characters (e.g. 65–68 pored scales in lateral line, snout and interorbit naked, and caudal fin blackish with white posterior margin) can separate *Platycephalus orbitalis* **sp. nov.** and *P. marmoratus* from the other 14 congeners. In addition, *Platycephalus orbitalis* **sp. nov.** differs from *P. marmoratus* in having the margin of the interopercle scalloped, skinny sensory tubes on the infraorbitals, the preopercle well developed and mostly covering the cheek region, and the body and head lacking distinct large spots and bands dorsally.

Key words: *Platycephalus orbitalis*, **sp. nov.**, *Platycephalus marmoratus*, Platycephalidae, western Australia

Introduction

The platycephalid genus *Platycephalus* Bloch, 1795 (*sensu* Imamura, 1996, who synonymized *Neoplatycephalus* Castelnau, 1872 with *Platycephalus*) is characterized by having pored scales in the lateral line more than 60 and a single tooth plate on the vomer (Imamura, 1996; Knapp, 1999). Recently 15 species of the genus are known in Australian waters (Imamura, 2006). Among them, *Platycephalus marmoratus* was originally described by Stead (1908) based on two specimens collected from Port Stephens and Coffs Harbour, eastern Australia (see also Imamura, 2006). After the original description, this species was also reported from western Australia (e.g., Hutchins & Thompson, 1983; Hutchins & Swainston, 1986; Paxton & Hanley, 1989; Hutchins, 2001; Hoese *et al.*, 2006). Recently Imamura (2006) redescribed *P. marmoratus* and compared it with other known congeners based on specimens, including the holotype, collected from eastern Australia. Our detailed comparison of the specimens from western and eastern Australia showed that the western Australian population is a distinct new species. The new species is described here and the morphological differences between the two species are discussed.

Materials and methods

Counts and measurements were made according to Hubbs & Lagler (1958) and were routinely taken from the left side, with the exception of gill rakers which were counted on the right side. Isolated small dorsal spines are expressed by using plus sign. Measurements were made with calipers to the nearest 0.1 mm. Length of the

first dorsal fin base excludes the isolated spine between the dorsal fins. Terminology of head spines follows Knapp et al. (2000). Institutional acronyms are from Leviton *et al.* (1985). Standard and head lengths are abbreviated as SL and HL, respectively.

***Platycephalus orbitalis*, sp. nov.**

Proposed common name: Western-Australian flathead

(Figures 1–5)

Platycephalus marmoratus (not Stead, 1908): Hutchins & Thompson, 1983: 78, fig. 112 (Western Australia) (in part); Hutchins & Swainston, 1986: 127, fig. 204 (Western Australia) (in part); Paxton & Hanley, 1989: 469 (Rottneest Islands to Direction Bank, Western Australia) (in part); Knapp, 1991: 29 (off Rottneest Island and Cape Cuvier, Western Australia) (in part); Hutchins, 2001: 28 (Western Australia); Hoese *et al.*, 2006: 943 (Rottneest Island to Direction Bank, Western Australia) (in part).

Holotype: CSIRO H 6349-04, 267.4 mm SL, northwest of Rottneest Island, Western Australia (31°52.56'S, 115°18.30'E–31°52.60'S, 115°18.49'E), 100–102 m depth, 10 Apr. 2006.

Paratypes: 6 specimens, all from Western Australia. CSIRO H 6350-02, 236.3 mm SL, northwest of Rottneest Island (31°53'S, 115°16'E), 124 m depth, 10 Apr. 2006; CSIRO H 6381-03, 277.9 mm SL, southwest of Shark Bay (27°03.12'S, 113°04.86'E–27°02.88'S, 113°04.80'E), 106 m depth, 6 Dec. 2005; CSIRO T 615, 304.6 mm SL, south of Cape Leeuwin (34°35'S, 114°53'E), 144 m depth, 23 Feb. 1981; WAM P.22098-001, Cape Cuvier (24°10'S, 113°20'E), 29 July 1972; WAM P.17451-001, 2 specimens, 266.0, 333.4 mm SL, Rottneest Island (32°00'S, 115°30'E), 50 m depth, 30 Dec. 1981.

Diagnosis. A species of *Platycephalus* with margin of the interopercle scalloped, skinny sensory tubes on infraorbitals and preopercle well developed, mostly covering cheek region, except for anteroventral region, and body and head lacking distinct large spots and bands dorsally.



FIGURE 1. Dorsal (upper) and lateral (lower) views of *Platycephalus orbitalis*, sp. nov., CSIRO H 6349-04, 267.4 mm SL, holotype, northwest of Rottneest Island, Western Australia.

Description. Counts and proportional measurements are shown in Table 1.

Body greatly depressed, mostly covered with ctenoid scales, but some cycloid scales on undersurface. Head greatly flattened, length 3.2 (3.1–3.4) in SL; snout and interorbit naked; nape, and occipital, postorbital, and opercular regions mostly scaled. Snout robust, length 3.2 (3.1–3.3) in HL, longer than orbital diameter.

Upper surface of eye without papillae. Iris lappet broad, well expanded and simple dorsally, and small (broad in one paratype), simple, and weakly convex ventrally (Fig. 2A). Interorbital width 7.2 (6.9–8.4) in HL, becoming wider with growth, shorter than orbital diameter. Spines and ridges weakly developed on top and side of head (Fig. 2B). Nasal lacking spines. Lachrymal with two (or one in five paratypes) antrorse spines. Single preocular spine present. Suborbital ridge entirely smooth. Single postorbital spine present. Frontal ridges lacking spines. Supracleithrum with spine. Preopercle with two spines; lower spine slightly longer than upper one, not reaching posterior margin of opercle; upper lacking supplementary spine. Opercle with two spines, lacking prominent ridge. Interopercular flap absent; margin of interopercle scalloped (Fig. 3A). Maxilla reaching beyond anterior margin of pupil, length 2.7 (2.6–2.7) in HL. Teeth in bands on jaws and palatine, and in shallowly V-shaped (or crescent in a paratype) patch on vomer; tooth band on upper jaw lacking distinct notch medially. Upper jaw with several small canine teeth anteriorly; remainder of jaw with small- to moderate-size conical teeth. Lower jaw mostly with two tooth rows, partially arranged in four rows (or partially arranged in three rows in some paratypes); inner row with longer conical teeth; outer row(s) with small-size conical teeth. Palatine with two tooth rows: inner row with longer and stouter conical teeth, outer row with small conical teeth. Vomer with small- to moderate-size canine teeth anteriorly and a few canine teeth posteriorly. Lip margins without papillae. Skinny sensory tubes on infraorbitals and preopercle well developed, mostly covering cheek region, except for anteroventral region (Fig. 3A). Pored scales in lateral line each with one exterior opening posteriorly; opening in most pored scales directed posteroventrally, in several scales posterodorsally. First dorsal fin originating posterior to opercular margin. First and second dorsal fin narrowly separated. Pectoral fin rounded posteriorly, length 2.2 (2.0–2.3) in HL. Posterior tip of pelvic fin reaching to third anal fin ray, length 1.2 (1.1–1.3) in HL. Caudal fin slightly rounded (or mostly flat in some paratypes) posteriorly, length 1.8 (1.7–1.9) in HL.

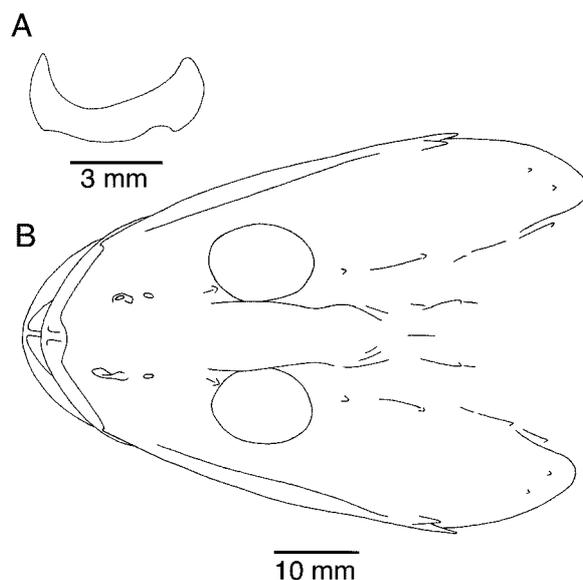


FIGURE 2. Lateral views of iris lappet (right eye) (A) and dorsal view of head (B) in *Platycephalus orbitalis*, **sp. nov.**, CSIRO H 6350-02, 236.3 mm SL, paratype, northwest of Rottnest Island, Western Australia.

Color in alcohol. Body and head pale brown, lacking distinct large spots and bands dorsally, whitish ventrally. Head densely covered with very small brownish spots. First and second dorsal fins with small brown spots along rays. Pectoral fin pale brown with white lower margin and scattered small darker brown spots. Pelvic fin dark brown with pale brown basal portion and whitish outer margin. Anal fin with brownish pigments along rays; membranes of posterior portion of anal fin dusky. Caudal fin blackish, with pale brownish basal area and white posterior margin; upper margin with several blackish short oblique bands continuous with middle blackish area.

TABLE 1. Counts and proportional measurements of *Platycephalus orbitalis* sp. nov.

	Holotype CSIRO H 6349-04	Paratypes 6 specimens
SL (mm)	267.4 [±]	236.3–333.4
Counts:		
First dorsal fin rays	I+VIII	I+VIII (4 specimens) or I+VII+I (2)
Second dorsal fin rays	13	13
Anal fin rays	13	13
Pectoral fin rays (upper, unbr.+middle, br.+lower, unbr.)	1+13+6=20	2+11–12+5–7=19–21
Pelvic fin rays	I,5	I,5
Branched caudal fin rays	12	11 (2 specimens) or 12 (4)
Pored scales in lateral line (with spine)	67 (1)	65–68 (0–1)
Scale rows above lateral line slanting downward and backward	108	101–105
Scale rows above lateral lineslanting downward and forward	117	104–111
Gill rakers	2+4=6	2+7–8=9 (5 specimens) or 10 (1)
Proportional measurements (% SL):		
HL	31.1	29.7–32.1
Predorsal length	32.8	31.8–34.6
Length of first dorsal fin base	20.5	18.4–22.2
Length of second dorsal fin base	34.6	33.0–35.3
Length of anal fin base	37.4	37.3–38.3
Caudal peduncle length	7.8	7.2–8.3
Caudal peduncle depth	3.9	3.8–4.2
Snout length	9.6	9.2–9.8
Orbital diameter	5.8	5.3–6.2
Upper jaw	11.6	11.0–12.3
Lower jaw	16.5	16.0–17.5
Interorbital width	4.3	3.6–4.6
Postorbital length	15.9	15.3–17.0
Suborbital width	2.8	2.4–2.9
Pectoral fin length	14.4	14.4–15.1
Pelvic fin length	26.4	24.3–27.1
Caudal fin length	17.5	16.8–17.6
Length of first spine of first dorsal fin	3.6	2.9–3.7
Length of second spine of first dorsal fin	Broken	13.9–15.7
Length of first ray of second dorsal fin	11.0	8.2–15.0
Length of first anal fin ray	6.8	6.5–7.2
Proportional measurements (% HL):		
Snout length	31.0	30.5–32.0

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TABLE 1. (continued)

	Holotype CSIRO H 6349-04	Paratypes 6 specimens
Orbital diameter	18.7	17.5–20.3
Upper jaw	37.4	36.7–38.2
Lower jaw	53.2	53.2–54.9
Interorbital width	13.8	11.9–14.6
Postorbital length	51.3	49.9–53.4
Suborbital length	8.9	8.1–9.2

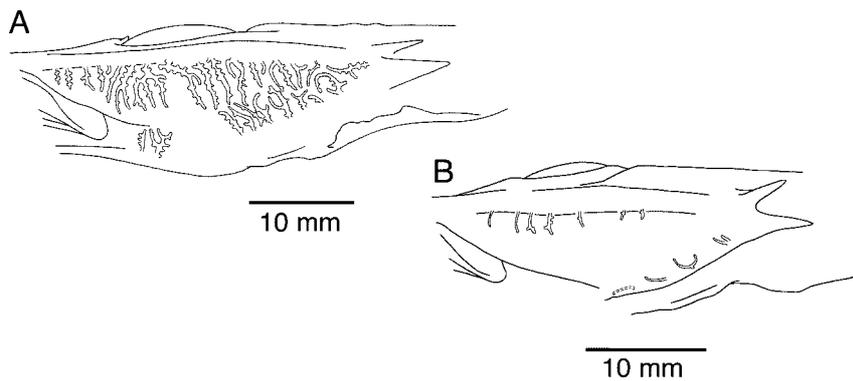


FIGURE 3. Ventrolateral views of head of *Platycephalus orbitalis*, **sp. nov.**, CSIRO H 6350-02, 236.3 mm SL, paratype, northwest of Rottnest Island, Western Australia (A) and *Platycephalus marmoratus*, AMS I.25665-026, 184.6 mm SL, northeast of Yamba, New South Wales, Australia, showing the interopercle and the skinny sensory tubes arising from the infraorbitals and preopercle.

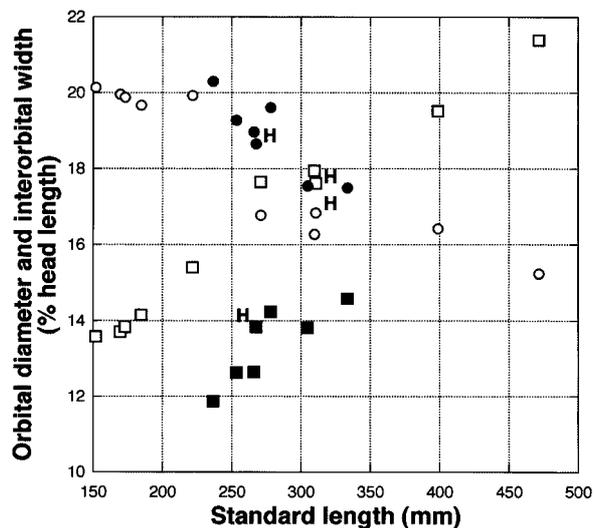


FIGURE 4. Relationships of orbital diameter (circle) and interorbital width (square) (% head length) versus standard length (mm). Solid symbol, *Platycephalus orbitalis*, **sp. nov.**; open symbol, *P. marmoratus*. “H” indicates holotype.

Color when fresh (based on color photographs of holotype): Color mostly similar to that in alcohol.

Distribution. Known only from western Australia, ranging from Cape Cuvier (24°S) to south of Cape Leeuwin (34°S) (e.g., Hutchins, 2001; this study).

TABLE 2. Comparison of numbers of pectoral fin rays in *Platycephalus orbitalis*, **sp. nov.** and *P. marmoratus*. Asterisks indicate numbers including holotype.

Pectoral fin rays	19	20	21	22
<i>P. orbitalis</i> (n=7)	1	5*	1	
<i>P. marmoratus</i> (n=9)		2	5*	2

Etymology. The specific name of this new species is derived from Latin for “eye”, based on its characteristic feature of a narrower interorbit.

Remarks. *Platycephalus orbitalis* belongs to the genus *Platycephalus* in having pored scales in the lateral line more than 60 and a single tooth plate on the vomer (Imamura, 1996; Knapp, 1999). *Platycephalus orbitalis* is most similar to *P. marmoratus* in having a combination of following the characters: 13 second dorsal and anal fin rays; 65–68 pored scales in lateral line, each with one exterior opening posteriorly; snout and interorbit naked; lower opercular spine slightly longer than upper one; interopercular flap absent; no strong canine teeth on jaws, palatine, or vomer; skinny sensory tubes from infraorbitals and preopercle extending cheek region; and caudal fin blackish with white posterior margin. Other members of the genus *Platycephalus* do not possess this combination of characters (Knapp, 1991; Imamura, 2006). For example, a naked snout and interorbit are found only in *P. marmoratus*, *P. chauliodous* Knapp, 1991 and *P. laevigatus* Cuvier in Cuvier & Valenciennes, 1829, and the blackish caudal fin with the white posterior margin is only present in *P. marmoratus* among known members of *Platycephalus* (e.g., Imamura, 2006). However, *P. orbitalis* is easily separable from *P. marmoratus* in having the margin of the interopercle scalloped (vs. smooth in *P. marmoratus*) (Fig. 3). In addition, there is a difference in the degree of the development of the skinny sensory tubes from the infraorbitals and preopercle covering cheek region; they mostly cover the cheek region, except for the anteroventral region in *P. orbitalis*, whereas they only partially cover it in *P. marmoratus* (Fig. 3). The coloration is also helpful separating these two species; viz. the body and head lack distinct large spots and bands dorsally in *P. orbitalis*, while they are marbled with dark brown, brown, and pale irregular bands and spots in *P. marmoratus*. *Platycephalus orbitalis* is also distinguished from *P. marmoratus* in having a larger orbital diameter (17.5–20.3% HL) and narrower interorbit (11.9–14.6% HL), the former larger than the latter in examined material (vs. orbital diameter smaller, 15.2–20.1% HL, and interorbit wider, 13.6–21.4% HL, the former becoming smaller than latter by 270 mm SL in *P. marmoratus*) (Fig. 4), although the ranges of the orbital diameter and interorbital width of the two species are partly or mostly overlapping. Finally, the range and mode of the number of the pectoral fin rays differ in *P. orbitalis* and *P. marmoratus*, and this difference is statistically significant (Mann-Whitney’s *U* test; $P < 0.01$), although the ranges of these species also overlap (Table 2).

Comparative materials. *Platycephalus marmoratus* (10 specimens, all collected from eastern Australia): AMS I.15279 (471.6 mm SL); AMS I.15260 (holotype, 310.4 mm SL); AMS I.20721-002 (270.9 mm SL); AMS I.20870-001 (178.0 mm SL, dissected by Imamura, 1996); AMS I.22129-004 (309.5 mm SL); AMS I.25663-013 (169.5 mm SL); AMS I.25665-026 (184.6 mm SL); AMS I.27322-006 (173.0 mm SL); QM I.17021 (221.6 mm SL); QM I.2842 (398.8 mm SL).

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