

Description of a new species of dwarf *Philypnodon* (Teleostei: Gobioidae: Eleotridae) from south-eastern Australia

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Abstract

Hoese D.F. and Reader S. 2006. Description of a new species of dwarf *Philypnodon* (Teleostei: Gobioidae: Eleotridae) from south-eastern Australia. *Memoirs of Museum Victoria* 63(1): 15–19.

The present paper describes a single species from the coastal drainages in the Coffs Harbour area of New South Wales. The species differs from the only previously described species, *Philypnodon grandiceps*, in having a narrower gill opening (ending under posterior preopercular margin versus under eye), more vertebrae (30–32 versus 29–30), smaller size (maximum size 60 mm SL versus 90 mm SL) and in coloration, particularly lacking the thin vertical bands on sides of the belly characteristic of *Philypnodon grandiceps*. The new species occurs in freshwater and estuarine localities in south-eastern Australia, often occurring with *Philypnodon grandiceps*.

Keywords

Fish, Gobioidae, Eleotridae, gudgeon, *Philypnodon*, new species

Introduction

We follow Nelson (2006) here in recognising the family Eleotridae as distinct from the Gobiidae. Hoese and Gill (1993) recognised two subfamilies, the Butinae and the Eleotridinae, placing them as subfamilies of the Gobiidae. Currently 18 described genera and 40 described species of eleotrid fishes are known from Australia. Most are found in estuarine environments. A number of genera of eleotrid fishes occurs in freshwaters of Australia. Some genera, such as *Bunaka* Herre, *Eleotris* Bloch and Schneider, *Giuris* Sauvage and *Ophiocara* Gill are found in estuaries and freshwaters, although often in the lower reaches of rivers. Other genera are largely confined as adults to freshwater. This group includes *Gobiomorphus* Gill, some species of *Eleotris*, most species of *Hypseleotris* Gill, *Kimberleyeleotris* Hoese and Allen, *Milyeringa* Whitley, *Mogurnda* Gill, *Oxyeleotris* Bleeker and *Philypnodon* Bleeker. *Philypnodon* and *Hypseleotris compressa* (Krefft) occur in both freshwater and estuarine environments as adults.

Philypnodon was long thought to be monotypic, with *Philypnodon grandiceps* found in temperate coastal and inland streams from south-eastern Australia. Hoese, Larson and Llewellyn (1980) first noted that a dwarf species of *Philypnodon* was found in southern Australia. Extensive collecting efforts in recent years has yielded considerable material. Studies of that material are revealing a high degree of variability both

within and between samples. Because of the high variability in the dwarf forms, it was previously uncertain how many species existed in the genus. The present paper describes a single species from the coastal drainages in the Coffs Harbour area of New South Wales in order to fix a single form for future comparison. A more detailed discussion of geographical variation and description of the other species will be treated in a separate revision.

Methods

Counts and measurements follow Hoese and Allen (1987). Institution abbreviations follow Leviton et al. (1985). The longitudinal scale count was taken from behind the pectoral base to the end of the caudal peduncle and is a count of scale rows, rather than a straight line count. The transverse scale count (TRDB) is taken from the second dorsal origin downward and backward to the anal base. In descriptions an asterisk indicates count of holotype. Measurements were taken on the holotype and the ten best preserved paratypes and are expressed as percent standard length. In the description the first length given is for the holotype followed by the range for the paratypes in parentheses. In lists of material examined the registration number is given, followed by the number of specimens, then the size range of the specimens in parentheses.

***Philypnodon* Bleeker**

Philypnodon Bleeker, 1874: 301, (type species: *Eleotris nudiceps* Castelnau, 1872, by original designation), Syntypes MNHN 1509.

Gymnobotis Bleeker, 1874: 304 (type species: *Eleotris gymnocephalus* Steindachner, 1866, by original designation and monotypy), Syntypes NMW 22519

Ophiorrhinus, Ogilby, 1897: 745 (type species: *Eleotris grandiceps* Krefft, 1864, by original designation) Syntypes BMNH 1864.7.22.40-44; AMS I.2671-2672.

The genus is distinctive in the following combination of characters: no head pores; no scales on cheek or operculum; nape naked to fully scaled; body fully scaled, largely with ctenoid scales; midline of belly sometimes without scales; anterior nostril at end of short tube above and almost in contact with middle of upper lip, posterior nostril with raised rim slightly in front of anterior margin of eye; usually seven dorsal spines; first dorsal-fin origin well posterior to pectoral-fin insertion; pelvic-fin origin well posterior to pectoral-fin insertion to almost below pectoral-fin origin; transverse papilla pattern; large mouth, longer in males than females; bulbous cheeks in adults; wide gill opening extending to below eye or preoperculum; 15 segmented caudal rays; vertebrae 29–32; an interneural gap between neural arches after the first dorsal fin and before the second dorsal fin, without a pterygiophore; vomer and palatine without teeth. The genus is easily distinguished from other eleotridine Australian genera by the combination of seven dorsal spines and transverse papilla pattern.

The genus *Philypnodon* was placed within the subfamily Eleotrinae of the Gobiidae by Hoese and Gill (1993), but did not treat relationships within the subfamily. Thacker and Hardman (2005) suggested a close relationship of *Philypnodon* with the New World genera *Microphilypnus* and *Leptophilypnus*, based on molecular studies. Both genera have features in common with *Philypnodon* including an interneural gap (a space between neural arches after the first dorsal fin and before the second dorsal fin without a pterygiophore; a derived feature within the Eleotrinae) and a transverse papilla pattern, a combination found only in these genera and in *Thalasseleotris* in the Eleotrinae (Hoese and Gill, 1993).

The genus is confined to the freshwaters and estuaries of south-eastern Australia from the Burnett R. in Queensland to South Australia and from scattered localities in the Murray-Darling River system in New South Wales and South Australia.

***Philypnodon macrostomus* sp. nov.**

Figures 1-3

Philypnodon sp: Hoese, Larson and Llewellyn, 1980: 171, fig. 31.3

Philypnodon sp. 1: Merrick and Schmida, 1984: 306, fig. 256

Philypnodon sp: Hoese and Larson, 1994: 810, fig. 715

Philypnodon species: Allen, Midgley and Allen, 2002: 317

Material examined. Holotype AMS I.20111-002, 36.5 mm SL male, creek 8 km from Glenreagh, N of Coffs Harbour, NSW, 5 May 1977, D. Hoese and J. Bell. Paratypes: AMS I.20111-016, 31(25–41), taken with holotype; AMS I.20111-003, 3(28–36), cleared and stained and-004, 4(39–40), cleared and stained, taken with holotype; AMS I.29683-008, 1(33), Karinga Creek W of Coffs Harbour, NSW, 19 Aug 1977, D. Hoese and R. McDowall; AMS I.33875-001, 1(38),

Dingo Creek, 27 km W of Coffs Harbour, 5 May 1977, D. Hoese and J. Bell; NMV A.29399-001, 4(21–36), taken with holotype; NTM S.16213-001, 3(31–39), taken with holotype; QM I.37768, 3(30–31), taken with holotype.

Diagnosis. Gill opening wide, extending anteroventral to preoperculum, but not reaching to below eye, usually ending below posterior preopercular margin, sometimes as far forward as midway between posterior preopercular margin and eye. Head papillae in transverse pattern (figs 2–3). Body generally dark brown, with darker brown mottling on sides; 1st dorsal with black stripes in adult males. Jaws reaching to behind eye in mature males, variably developed in juvenile males and females, usually reaching below middle of eye to near end of eye. Tongue tip rounded to truncate.

Description. An asterisk indicates count of holotype. 1st dorsal fin VI (in 8*), VII (23), VIII (4); 2nd dorsal-fin rays I,8 (8), I,9 (21*), I,10 (5); anal-fin rays I,8 (10), I,9 (22*), I,10 (3); pectoral rays 15 (4), 16 (21*), 17 (9). 18 (1) segmented caudal rays 8/7 (12), 8/8 (1*); branched caudal rays 7/6 (12*), 7/7 (1); procurrent caudal rays 9/8 (1), 9/9 (1), 10/8 (1), 10/10 (1), 11/10 (3); predorsal scale count 4(1), 5(1), 7(1), 8 (3), 9 (2), 10 (1), 11 (6), 12 (2), 13 (6), 14 (6*), 15 (1); longitudinal scale count 34 (5), 35 (6*), 36 (6), 37 (10), 38 (5), 39 (1), 42 (1); transverse scale count (TRDB) 9 (16*), 10 (12), 11 (7); gill rakers on outer face of 1st arch 2+1+8 (7), 3+1+8 (1), 2+1+9 (22), 2+1+10 (2); lower rakers on outer face of 2nd arch 7 (9), 8 (22), 9 (3); vertebrae 12+19 (3), 13+18 (2), 13+19 (2).

Head distinctly depressed, flat on top, length 29.5% SL in holotype (range 29.5–33.6% SL); eyes dorso-lateral, 6.8% SL (6.4–7.4% SL), interorbital wide, slightly less than eye diameter in juveniles to about 1.5 times eye diameter in adult; snout short, about equal to eye diameter, 8.1% SL (7.8–9.2% SL); cheeks distinctly bulbous in adult males; mouth slightly oblique forming an angle of about 35–45° with body axis; posterior margin of jaws below mid-eye in females, to below or just beyond posterior end of eye in males, length of upper jaw 15.4% SL (13.7–18.7% SL) in males and 10.2–14.8% SL in females; teeth in both jaws small and curved, anteriorly in 2 or rarely 3 rows, tapering laterally to a single row; posterior nostril with raised rim, approximately 1 nostril diameter in front of eye in a horizontal line between mid-eye to upper pupil margin; anterior nostril at end of short tube, just behind middle of upper lip, in a horizontal line between mid-eye to lower margin of pupil; gill rakers slender, much shorter than filament length on outer face of 1st arch, longest rakers near angle of arch about one-quarter length filament length; rakers on inner face of 1st arch and following arches short and denticulate.

Body slender, slightly compressed anteriorly, becoming very slender posteriorly; depth at pelvic-fin origin 14.6% SL (14.5–18.8% SL); depth at anal-fin origin 14.1% SL (13.1–17.7); caudal peduncle slender and elongate, length 29.8% SL (24.1–30% SL), least depth 9.2% SL (8.2–10.5% SL).

Head naked; predorsal partly scaled, midline scaled to above posterior preopercular margin to midway between posterior preopercular margin and eye (just before posterior preopercular margin in holotype), often naked in specimens less than 15 mm SL; scales on side of nape variable, sometimes with scales as far forward as midline scales (in holotype), but often reduced,



Figure 1. Holotype of *Philypnodon macrostomus*, AMS I.20111-002, 36.5 mm SL male.

sometimes naked forward of pectoral-fin base. Body scales ctenoid; body fully covered with scales, becoming cycloid above a line from upper gill attachment to below posterior quarter of 1st dorsal fin; belly covered with small cycloid scales, midline naked in specimens with reduced predorsal scales, pectoral-fin base normally covered with small scales, naked in specimens with reduced predorsal scales, prepelvic area covered with small cycloid scales, except for a triangular area behind gill opening to fully naked in specimens with reduced predorsal scales.

1st dorsal fin low, with rounded margin, fin reaching to or just short of 2nd dorsal fin when depressed; 1st dorsal spine slightly shorter than 2nd spine, 2nd to 4th spines subequal in length, 5th spine subequal in length to 1st spine; 6th spine slightly shorter than 5th spine, 7th spine shorter than 6th spine; 2nd dorsal fin separated from 1st dorsal fin, fin elevated, slightly higher than 1st dorsal fin, subequal to body depth, 1st segmented ray usually branched, other rays always branched; anal fin origin below and slightly behind 2nd dorsal-fin origin, usually below 2nd segmented dorsal ray, fin subequal in height to 2nd dorsal fin, 1st segmented rays usually branched, other rays branched; pelvic fins completely separate, pelvic fin short, reaching approximately half distance from pelvic-fin origin to anal-fin origin, length 18.4% SL (14.1–18.4% SL), pelvic-fin rays I,5, all segmented rays branched, rarely innermost ray unbranched; pectoral fin with broadly rounded margin, reaching to above or slightly before anus, length 22.8% SL (19.6–24.2% SL), pectoral rays branched, upper and lowermost sometimes unbranched; caudal fin with rounded posterior margin, caudal length 17.9% SL (17.0–25.1% SL).

Urogenital papilla of male flattened dorso-ventrally, with small lobes laterally; papilla of female broad and rounded, with an indentation posteroventrally.

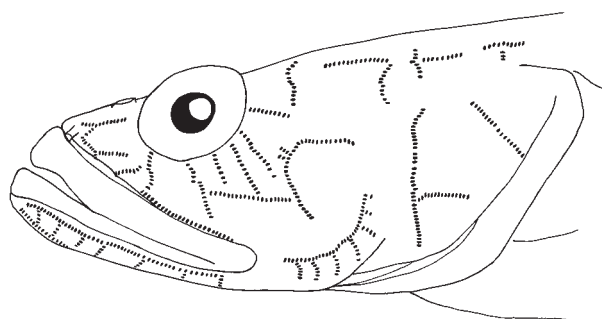


Figure 2. Lateral view of head showing sensory papillae, largely based on holotype, drawing by S. Reader.

Sensory papillae. Transverse papillate pattern; all papilla lines with papillae at right angle to axis of line. Sides of head with 6 lines radiating from eye; preopercular mandibular series with 10–14 transverse lines from chin to middle of preoperculum. Other papillae as shown in figs 2 and 3.

Coloration of freshly collected specimens. (holotype and male paratype). Head and body dark brown, lighter brown to pale orange ventrally. Lips dark brown with diffuse orange pigment on posterior half; 2 dark-brown stripes extending posteroventrally from posteroventral margin of eye onto cheeks, not reaching posterior preopercular margin; a large light-brown oval area behind tips of dark stripes; an irregularly shaped light-brown stripe extending from below eye posteroventrally to just

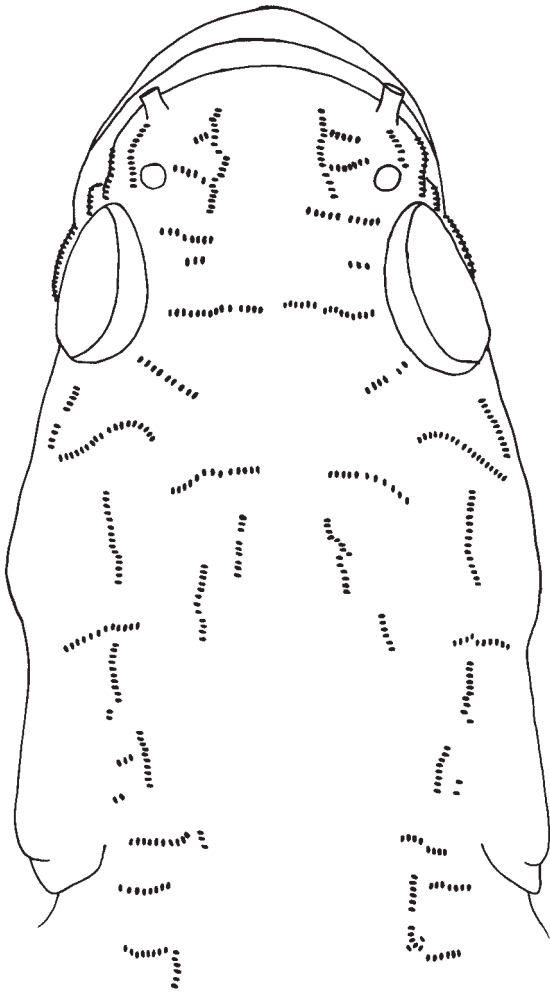


Figure 3. Dorsal view of head showing sensory papillae, largely based on holotype, drawing by S. Reader.

above posterior end of jaws; operculum with light-brown almost horizontal stripe in line with interspace between dark stripes extending from eye; a similar light-brown stripe dorsally on operculum; rest of operculum dark brown; body scales edged in dusky-brown pigment, dorsally broadly edged with dark-brown pigment, scale centres often with light thin vertical line; series of 2–3 small black spots above pectoral-fin base; pectoral-fin base black dorsally followed by white irregular bar extending full length of pectoral-fin base; caudal peduncle with dark-brown vertical bar, with a short anterior extension. Dorsal fin with 2 black curved stripes following contour of fin; distal margin of dorsal fin with broad orange band, followed by black stripe curving to meet body, followed ventrally by a lighter orange to brown stripe, followed ventrally by 2nd black stripe; anteriorly white blotches below stripe; 2nd dorsal fin with black distal

margin (about one-quarter of fin), followed ventrally by 4 curved, oblique stripes, with orange to white interspaces. Anal fin with scattered melanophores giving fin a gray appearance; base of fin lighter, followed distally by pale black stripe followed by lighter stripe, followed by dark gray stripe, distal tip lighter than rest of fin. Pectoral and pelvic fins white to dusky. Caudal fin pale orange basally, becoming dark gray posteriorly; series of 2–4 curved dark bands, extending across all, but uppermost 1 or 2 and lowermost 1 or 2 segmented caudal rays, each band formed from 2–3 rows of small black spots on fin rays, generally no spots on membranes between rays.

Coloration in alcohol. Head and body light brown, paler ventrally, males generally darker than females. 2 faint brown stripes extending posteroventrally from posteroventral margin of eye onto cheeks, not reaching posterior preopercular margin; distinct light-brown areas and stripes on head present in fresh material not visible; operculum light brown; body scales edged in light-brown pigment, dorsally broadly edged with dark-brown pigment; large black spot above pectoral-fin base with pale areas; black spot dorsally on pectoral-fin base, a thin brown band extending from spot ventrally covering pectoral-fin base, no pale band visible; large dark-brown area at posterior end of caudal peduncle forming a vertical band, a vertical band with a horizontal extension, or triangular mark. Dorsal fin with 2 black curved stripes following contour of fin as in fresh material, orange and white areas in fresh material becoming light brown; 2nd dorsal fin with black to gray distal margin (about one-quarter of fin), followed ventrally by 4 curved, oblique dark stripes, with light-brown interspaces. Anal fin with scattered melanophores giving fin a uniform gray appearance. Pectoral and pelvic fins clear, without pigment. Caudal fin pale light-brown to gray, with series of 2–4 curved dark bands, extending across all but uppermost 1 or 2 and lowermost 1 or 2 segmented caudal rays, each band formed by 2–3 rows of small dark brown spots on fin ray, generally no spots on membranes between rays.

Distribution. *Philypnodon macrostomus* is widely distributed in coastal rivers from Brisbane, Qld, throughout NSW, Vic. and eastern SA in freshwater and in brackish to full strength seawater in upper reaches of estuaries. It is also found in the Lower Murray R. system from scattered localities. The related *Philypnodon grandiceps* occurs north to the Burdekin R., Qld. Specimens of the dwarf species from the Mary R. north of Brisbane are currently under study, but do not appear to be conspecific and will be reported on later in a revision of the genus. Similarly, specimens from the Cudgegong R. in Macquarie R. drainage in central NSW lack predorsal scales and possibly represent a separate species to be treated in the revision.

Etymology. from the Latin *macro* = large and *stomus* = mouth, alluding to the large mouth that develops in males.

Remarks. *Philypnodon macrostomus* differs from *Philypnodon grandiceps* in having a narrower gill opening (below posterior preopercular margin versus below eye in *P. grandiceps*); sides of belly without vertical bands (versus 4–5 thin brown almost vertical lines); tongue tip rounded to truncate (versus bilobed); body often mottled (versus body uniformly coloured) and having more numerous vertebrae (usually 31–32, versus usually

29–30). The species also reaches a much smaller size, usually less than 50 mm SL, with the largest specimen known 60 mm SL (versus commonly reaching a size of 70 mm SL and reaching a maximum size of almost 90 mm SL).

While the species is widely distributed, it shows considerable variation over the range of the species. The intensity of coloration varies from light brown to almost black. Fin ray counts vary considerably, but without any clear geographical pattern. More detailed analysis of geographical variation will be presented in a revision by the authors at a later time.

The differences in the urogenital papilla were minor in comparison with other gobioid fishes and it was difficult to sex the species. Poor preservation can result in distortion of the papilla.

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References

- Allen, G.R., Midgley, S.H. and Allen, M. 2002. *Field Guide to the Freshwater Fishes of Australia*. Perth: Western Australian Museum: Perth 394 pp.
- Bleeker, P. 1874. Esquisse d'un système naturel des gobioides. *Archives Néerlandaises des Sciences Exactes et Naturelles* 9: 289–331
- Castelnau, F.L. de 1872. Contribution to the ichthyology of Australia. 1. The Melbourne fish market. *Proceedings of the Zoological and Acclimatization Society of Victoria* 1: 29–242.
- Hoese, D.F. and Allen, G.R. 1987. New Australian Fishes. Part 10. A new genus and two new species of freshwater eleotridid fishes (Gobioidi) from the Kimberley Region of Western Australia. *Memoirs of the Museum of Victoria* 48(1): 35–42.
- Hoese, D.F. and Gill, A.C. 1993. Phylogenetic relationships of eleotridid fishes (Perciformes: Gobioidi). *Bulletin of Marine Science* 52 (1), 415–440.
- Hoese, D.F., Larson, H.K. and Llewellyn, L.C. 1980. Family Eleotridae: gudgeons. pp. 169–185 19 figs in McDowall, R.M. (ed.) *Freshwater Fishes of South-eastern Australia*. Sydney: A.H. & A.W. Reed 208 pp.
- Hoese, D.F. and Larson, H.K. 1994. Family Eleotrididae. pp. 810–813, figs 715–717 in Gomon, M.F., Glover, C.J.M. and Kuitert, R.H. (eds) *The Fishes of Australia's South Coast*. Adelaide: State Printer 992 pp.
- Kreffit, G. 1864. Notes on Australian freshwater fishes, and descriptions of four new species. *Proceedings of the Zoological Society of London* 1864: 182–184.
- Leviton, A.E., Gibbs, R.H. Heal, E. and Dawson, C.E. 1985. Standards in Herpetology and Ichthyology: Part 1. Standard symbolic codes for institutional resource collections in Herpetology and Ichthyology. *Copeia* 1985 (3): 802–832.
- Merrick, J.R. & Schmida, G.E. 1984. *Australian Freshwater Fishes Biology and Management*. Sydney: J.R. Merrick 409 pp.
- Nelson, J.S. 2006. *Fishes of the World*. Hoboken, New Jersey: John Wiley & Sons, Inc. 4th Edn 601 pp.
- Ogilby, J.D. 1897. On some Australian Eleotrinae. *Proceedings of the Linnean Society of New South Wales* 21(4): 725–757.
- Steindachner, F. 1866. Zur Fischfauna von Port Jackson in Australien. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Wien* 53(1): 424–480.
- Thacker, C.E. and Hardman, M.A. 2005. Molecular phylogeny of basal gobioid fishes: Rhyacichthyidae, Odontobutidae, Xenisthmidae, Eleotridae (Teleostei: Perciformes: Gobioidi). *Molecular Phylogenetics and Evolution* 37: 858–871.