

## A new species of freshwater eleotridid fish from northern Papua New Guinea

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### Abstract

A new species of the family Eleotrididae is described from the Sepik and Ramu river systems of northern Papua New Guinea. *Eleotris aquadulcis* is described from 26 specimens, 61-226 mm SL, collected by the authors between 1981 and 1987. It is the largest known member of the genus and is further distinguished by a combination of characters including 36-40 scales in the lateral series, 13 in the transverse series, a relatively deep caudal peduncle (13.7-14.9 per cent of SL), and an overall dark colour pattern with 1-2 whitish stripes on the head behind the eye; juveniles have pale blotches and bars on a brownish ground.

### Introduction

The gudgeon family Eleotrididae contains about 120 species belonging to approximately 30 genera. They mainly occur in brackish and freshwater habitats of tropical and subtropical regions. The largest number of species inhabit the Indo-Pacific region. The group has experienced extensive speciation in fresh waters of the Australia - New Guinea region; about 60 per cent of all eleotridids are found there.

The present paper is the fourth in a series dealing with the exclusively freshwater eleotridids of Australia - New Guinea. Earlier articles treated Western Australian *Hypseleotris* (Hoese and Allen 1983), the eleotridid fauna of Lake Kutubu in central Papua New Guinea (Allen and Hoese 1986), and a description of *Kimberleyeleotris* Hoese and Allen (1987), a new genus from north-western Australia. We now describe a new species of the genus *Eleotris* Schneider collected during an extensive ichthyological survey of the Sepik River between 1981-1983 (see Allen and Coates 1989) and a visit in 1987 to the adjacent Ramu River.

The Sepik and Ramu river systems are populated by several species of eleotridids and there has been some confusion concerning their identity by field workers. Therefore we include a key to the species below.

### Methods

Methods for counts and measurements mainly follow those of Hubbs and Lagler (1958). The longitudinal scale count or scales in lateral series was taken from

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the upper pectoral base obliquely to the midline and then horizontally to the end of the hypural. The transverse scale row count was taken from the origin of the second dorsal fin downward and backward to the anal base. The post-dorsal count is taken from the end of the second dorsal fin to the caudal base mid-dorsally. Gill raker counts include all rudiments. The last ray of the anal and second dorsal fins is split at the base and is counted as a single element.

Sex was determined by examination of the genital papilla. Colour when fresh was taken from Ektachrome transparencies of dead specimens photographed within 30-60 minutes of capture. The abbreviation SL refers to standard length. Counts and measurements that appear in parentheses refer to the range for paratypes if differing from the holotype.

Institutional abbreviations are as follows: AMS — Australian Museum, Sydney; CAS — California Academy of Sciences, San Francisco; WAM — Western Australian Museum, Perth. The holotype and several paratypes at WAM are being held in trust for the Papua New Guinea government and will eventually be returned when permanent storage facilities are available.

### Systematics

#### Key to the freshwater eleotridid fishes of the Sepik-Ramu river systems.

- |    |  |                                      |
|----|--|--------------------------------------|
| 1a | Spines in first dorsal fin 7-9 .....   | 2                                    |
| 1b | Spines in first dorsal fin 6 .....   | 3                                    |
| 2a | Greatest body depth about 6 in SL; dorsal rays usually VII-I, 10 or 11; predorsal scales 13-20; colour generally pale (yellowish) with black mid-lateral stripe (sometimes broken into spots) ... <i>Mogurnda nesolepis</i> (Weber)                                      |                                      |
| 2b | Greatest body depth about 4 in SL; dorsal rays usually VIII or IX-I, 11 to 14 (usually 13); predorsal scales 20-27; colour overall reddish-brown to purple with 8-9 brown bars on upper half of side and scattered red spots on sides and basal half of caudal fin ..... | <i>Mogurnda bloodi</i> Whitley       |
| 3a | Scales in longitudinal series less than 32 .....   | 4                                    |
| 3b | Scales in longitudinal series more than 35 .....   | 5                                    |
| 4a | Snout pointed; lower jaw protruding; bony crests present above eye; a broad dark bar from snout to eye continuing behind eye across cheek and opercle .....  | <i>Butis amboinensis</i> (Bleeker)   |
| 4b | Snout rounded, jaws about equal; bony crests above eye absent; 3-4 diagonal stripes on head behind eye .....   | <i>Ophieleotris aporos</i> (Bleeker) |
| 5a | Scales in longitudinal series 36-40; a downward projecting spine near lower corner of preopercle   |                                      |

- margin (evident by dissecting overlaying skin) ..... *Eleotris aquadulcis* n. sp.
- 5b Scales in longitudinal series about 55-65; no spine on preopercular margin .....6
- 6a Dorsal rays in second dorsal fin I, 11 or 12; 2-3 relatively broad, diagonal stripes across cheek ..... *Oxyeleotris fimbriata* (Weber)
- 6b Dorsal rays in second dorsal fin I, 8 or 9; cheek without 2-3 broad, diagonal stripes .....7
- 7a Scales in longitudinal series about 55-60; lower part of head with irregular pale spots and blotches; fins spotted ..... *Bunaka gyrimoides* (Bleeker)
- 7b Scales in longitudinal series about 62-65; lower part of head without pale spots or blotches; fins without spots ..... *Oxyeleotris heterodon* (Weber)

*Eleotris aquadulcis* sp. nov.

Figures 1 and 2

**Holotype**

WAM P. 29608-006, female, 205 mm SL, 20 Mile Island Roundwater, about 5km north of Bunapas Village, Ramu River system, Papua New Guinea (approximately 4°13'S, 144°40'E), 1-3m, gill net, D. Coates, 17 October 1987.

**Paratypes**

AMS I. 24301-002, 5 specimens 160-215 mm SL, collected with holotype; CAS 63552, 6 specimens, 187-226 mm SL, collected with holotype; WAM P. 28206-007, 9 specimens, 61-183 mm SL, roundwaters (floodplain lakes) of Sepik River in vicinity of Angoram, Papua New Guinea (approximately 4°12'S, 143°11'E), gill net, D Coates, September 1983; WAM P. 29608-002, 5 specimens 160-215 mm SL, collected with holotype.

**Diagnosis**

A species of *Eleotris* Schneider characterised by relatively large scales (36-40 in longitudinal series and 13 in transverse series) and a mainly dark brown to blackish colour pattern in adults with a diagonal white stripe below eye across cheek. It differs from other *Eleotris* by having 9 soft anal rays (8 in other species), its low number of longitudinal scales (41-76 in other species) and is the largest member of the genus, attaining a maximum size of at least 246 mm SL, compared with about 100-160 mm for other species, except *E. oxycephala* Temminck and Schlegel from China and Japan, which reaches at least 216 mm SL. *Eleotris aquadulcis* is known only from fresh water, whereas most other *Eleotris* are partially estuarine dwellers.

### Description

Dorsal rays VI-I,8 (one paratype with 7) anal rays 1,9; pectoral rays 16 (rarely 17); segmented caudal rays 14 (14 or 15); 9-10 accessory rays on dorsal and ventral edge of caudal fin; scales in lateral series 38 (36-40); transverse scale rows 13; predorsal scales 36 (35-42); gill rakers on first arch  $2 + 10 = 12$  ( $2 + 9$  to  $11 = 11$  to 13); vertebrae 25 (6 specimens).

Body elongate, laterally compressed, more strongly posteriorly; body depth at pelvic fin origin 25.3 (23.0-27.7) per cent of SL; body depth at anal fin origin 22.4 (20.5-24.9). Head flattened with protruding lower jaw, rounded, concave snout, flat interorbital, and strongly arched nape. Head length 40.4 (37.4-42.3), snout length 10.2 (8.4-10.7), eye width 3.5 (3.6-4.4), interorbital width 12.2 (11.8-13.0), all as percentage of SL. Mouth forming an angle of about 50 (45-54) degrees

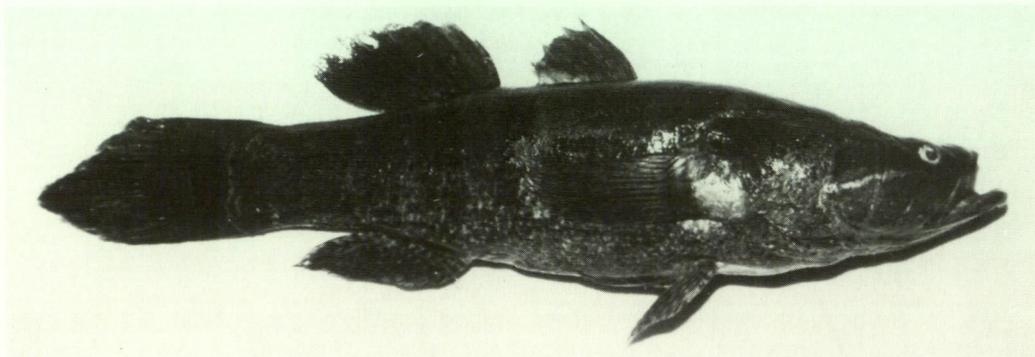


Figure 1 *Eleotris aquadulcis*, female paratype (WAM P. 29608-002), 215 mm SL, Ramu River, Papua New Guinea.

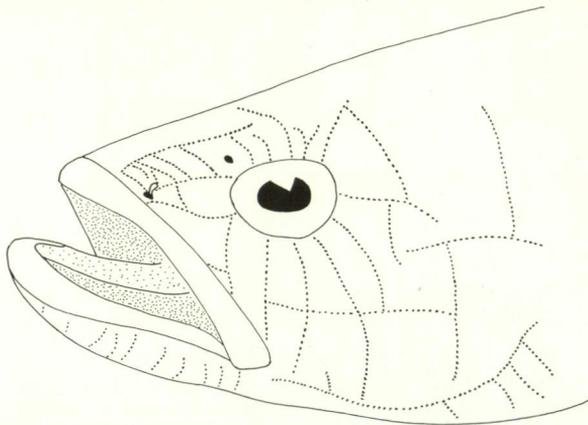


Figure 2 Camera lucida drawing of head of *Eleotris aquadulcis*, holotype, showing tracks of sensory papillae (stippled).

with longitudinal axis of body; posterior end of jaws under rear part of eye; anterior mouth opening in line with middle of eye or slightly above; teeth of jaws numerous, small, and villiform, arranged in dense bands, those on outer perimeter not enlarged; an edentulous space at symphysis of upper and lower jaws; palate edentulous; tongue tip truncate. Gill opening extends well forward of posterior margin of preopercle; a downward-projecting blunt spine at lower corner of preopercle margin (revealed by dissecting overlaying skin). Head pores absent or at least widely scattered and inconspicuous except nostrils; anterior nostril at tip of snout near lip in a thin-walled, short tube; posterior nostril a rounded opening above and slightly forward of anterior edge of eye. Head with numerous sensory papillae (pit organs) arranged in tracks as illustrated in Figure 2.

Scales of head, predorsal region, breast, ventral surface of body, and bases of caudal and pectoral fins cycloid, remainder of body scales finely ctenoid. Head entirely scaled except lips, snout, preorbital region, lower jaw and chin; predorsal scales reaching forward to above front of eyes; but sometimes partially or completely embedded; cheek scales smaller than those of body and operculum and sometimes embedded.

Second dorsal fin taller than first dorsal fin; third spine of first dorsal fin tallest 13.0 (12.7-14.0) per cent of SL; second dorsal and anal fins nearly equal in height 17.6 and 16.6 (16.7-19.2 and 16.2-18.6) per cent of SL respectively; pectoral fins somewhat wedge-shaped, 23.9 (22.8-25.8) per cent of SL; pelvic fins pointed 21.0 (20.5-23.2) per cent of SL. Caudal peduncle relatively short and deep, its length 22.4 (21.3-24.9) and depth 13.7 (13.7-14.9) per cent of SL; caudal fin rounded, shorter than head length.

*Colours when fresh:* overall dark brown, nearly blackish; a diagonal white stripe extending below eye to lower corner of preopercle margin, a second horizontal stripe often present behind eye to rear edge of opercle; fins mainly dusky brown, except pelvic and pectoral fins lighter with faint brown spotting; fleshy outer base of pectoral fin with two large dark brown spots, frequently surrounded by whitish or light brown area. Juveniles have a pattern of irregular light brown to whitish bars and blotches, especially pronounced on the lower sides, and have a light brown or tan breast and ventral part of head. In addition small brown spots are evident on all fins. The fin spotting and light bars and blotches may faintly persist in specimens up to 170 mm SL.

*Colour in alcohol:* similar to live colouration except pale stripes on head may be faint or absent.

Male and female sexes are similar in appearance, but are easily distinguished by the shape of the genital papilla. The papilla of females has a wrinkled appearance with cirri along the posterior margin; that of the male is smooth, flattened and leaf-shaped without cirri, but with a central notch in the posterior margin.

## Remarks

*Eleotris* contains at least six other species, which were reviewed by Akihito (1967). Most occur in the far western Pacific, particularly the Indo-Australian Archipelago. However, *E. fusca* (Schneider) and *E. melanosoma* Bleeker are widely distributed from eastern Africa to the central and south Pacific Ocean.

The pattern of pit organs on the head (Figure 2) is a useful character for distinguishing the species of *Eleotris*. Of the six species discussed and illustrated by Akihito (1967) *E. aquadulcis* is most similar to *E. melanosoma*, particularly with regards to the pit organ pattern on the cheek (infraocular region). Following the numbering system of Akihito, both species have identical patterns for pit organ rows 2-9, which are vertical and intersect row 13 (see Figure 7 and Table 16 in Akihito 1967).

Herre (1936) and Munro (1958 and 1967) erroneously referred to *E. aquadulcis* as *E. macrolepis* (Bleeker), a brackish water species from the western Pacific. Herre's work included an illustration of a specimen from the Sepik River.

Allen and Coates (1989) reported on the biology of these species based on 124 specimens taken during a gill net survey on the lower Sepik River between 1981-1983. Spawning occurs throughout the year with a possible peak between December to May during the flood season. Stomach contents indicate a diet of larger insect larvae (eg Odonata, Isoptera), snails, and fish.

The species is known only from fresh water in the lower Sepik and adjacent Ramu River systems of Papua New Guinea. It appears to be most common in shallow lakes where there is abundant shoreline vegetation. The farthest upstream record is Chambri Lake, about 300 km from the sea in the Sepik system.

We name this species *aquadulcis* (Latin "fresh water") with reference to the purely freshwater habitat.

## Acknowledgements

We thank the Papua New Guinea Biological Foundation for providing funds for the senior author's visit to the Sepik River in 1982. The 1987 collections were facilitated by a grant to the senior author from the Christensen Research Institute. We are also grateful to the Department of Primary Industry, Fisheries Division of the Papua New Guinea Government and the United Nations (UNDP) Fisheries Development Project for sponsoring the junior author's work on Sepik River fishes. Douglass F. Hoese offered valuable suggestions and informed the author about the work of Akihito. Special thanks are also due to Lynne R. Parenti, John Mizu, and Terry Frohm, for their assistance with the Ramu River collections.

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