

## *Neopomacentrus aquadulcis*, a new species of Damsel fish (Pomacentridae) from Eastern Papua New Guinea

Aaron P. Jenkins<sup>1</sup> and Gerald R. Allen<sup>2</sup>

<sup>1</sup>Wetlands International-Oceania, Level 4, John Gorton Building, King Edward Terrace, Parkes, Australian Capital Territory 2600, Australia.

<sup>2</sup>Department of Aquatic Vertebrates, Western Australian Museum, Francis Street, Perth, Western Australia 6000, Australia.

**Abstract** – *Neopomacentrus aquadulcis*, new species is described from 40 specimens, 15.1–45.7 mm SL, collected from the tidal reaches of freshwater streams in Milne Bay and Morobe provinces. It is clearly separable from other members of the genus on the basis of its very dark overall coloration and characteristic, broad-lobed caudal fin shape. It is also the only *Neopomacentrus* possessing a blackish caudal fin compared to the yellow (or yellow with dark margins) caudal fin seen in other members of the genus. It is only the fourth pomacentrid species known to occur in freshwater.

### INTRODUCTION

Damsel fishes (Pomacentridae) are among the most speciose and conspicuous of all fishes inhabiting tropical and subtropical reefs. The family was reviewed by Allen (1991), who recognized 321 species in 28 genera. Since the publication of this work, 24 species have been added (see Allen and Adrim 2000 for a review), bringing the current total to 345 species, including a new taxon described herein. The present paper describes a species of *Neopomacentrus*, a genus that currently contains 14 species confined to the tropical Indo-west Pacific region. The new species was observed underwater and subsequently collected by the authors during three separate visits to eastern Papua New Guinea during 1999. It is notable in being one of only four members of this large family that is known to inhabit fresh and brackish waters.

Methods of counting and measuring are the same as those described by Allen (1972) except the length of the dorsal and anal spines are measured proximally from the base of the spine rather than from the point where the spine emerges from the scaly sheath. The gill raker at the middle of the first branchial arch is included in the lower-limb count. The last dorsal and anal soft ray is split at the base and is counted as a single element. The fraction "1/2" appearing in the scale count above the lateral line refers to a small truncated scale at the base of the dorsal fin.

Counts and proportions appearing in parentheses apply to the paratypes. Type specimens have been deposited at the Australian Museum, Sydney (AMS), and Western Australian Museum, Perth (WAM).

### SYSTEMATICS

#### *Neopomacentrus aquadulcis* sp. nov.

Figure 1; Table 1

#### Material Examined

##### *Holotype*

WAM P.31636-001, 42.6 mm SL, mouth of freshwater stream at Lawadi Village, Milne Bay Province, Papua New Guinea (10°15.81'S, 150°43.14'E), 1.0 m, spear, G. Allen, 20 November 1999.

##### *Paratypes*

WAM P.31636-002, 9 specimens, 33.5–45.7 mm SL, collected with holotype. AMS I.37954-001, 30 specimens, 15.1–45.5 mm SL, mouth of Saia River, Morobe Province, Papua New Guinea (07°21.92'S, 147°07.12'E), 1.5 m, spear, rotenone, A. Jenkins, 23 July, 22 November 1999.

#### Diagnosis

A species of the pomacentrid genus *Neopomacentrus* with the following combination of characters: dorsal rays XIII, 10 or 11; anal rays II, 10 or 11; pectoral rays 17 or 18; gill rakers on first branchial arch 5–7 + 14–16; tubed lateral-line scales 14–17; in life head and nape brown, grading posteriorly to dark charcoal grey over most of body; scales with paler centres, especially noticeable on head and anterior part of body; fins dark charcoal grey, nearly black; anterior margin of pelvic and anal fins narrowly bright blue



Figure 1 *Neopomacentrus n. sp.*, holotype, 42.6 mm SL, Lawadi, Milne Bay Province, Papua New Guinea.

#### Description

Dorsal rays XIII,10 (9–10); anal rays II,10 (10–11); pectoral rays 18 (17–18); gill rakers on first branchial arch 5 + 15 (5–7 + 14–16), total rakers 20 (20–22); tubed lateral-line scales 14 (14–17); vertical scale rows from edge of opercle to caudal-fin base 28; scales above lateral line to base of middle dorsal spines 1 1/2; scales below lateral line to anus 8.

Body depth 2.2 (2.2–2.4) in standard length; maximum body width 2.3 (2.1–2.7) in depth; head length contained 3.2 (3.0–3.3) in standard length;

snout 4.7 (4.4–5.5), eye 3.0 (3.0–3.3), interorbital space 3.4 (3.1–4.5), least depth of caudal peduncle 2.1 (2.1–2.4), length of caudal peduncle 1.9 (2.0–2.4), all in head length.

Mouth oblique, terminal, the maxilla reaching a vertical slightly beyond anterior edge of eye; teeth of jaws biserial, at least anteriorly; outer row teeth mainly incisiform with flattened or slightly notched tips, except a few conical teeth posteriorly, about 38–42 teeth in each jaw; secondary row of inconspicuous slender buttress teeth behind outer

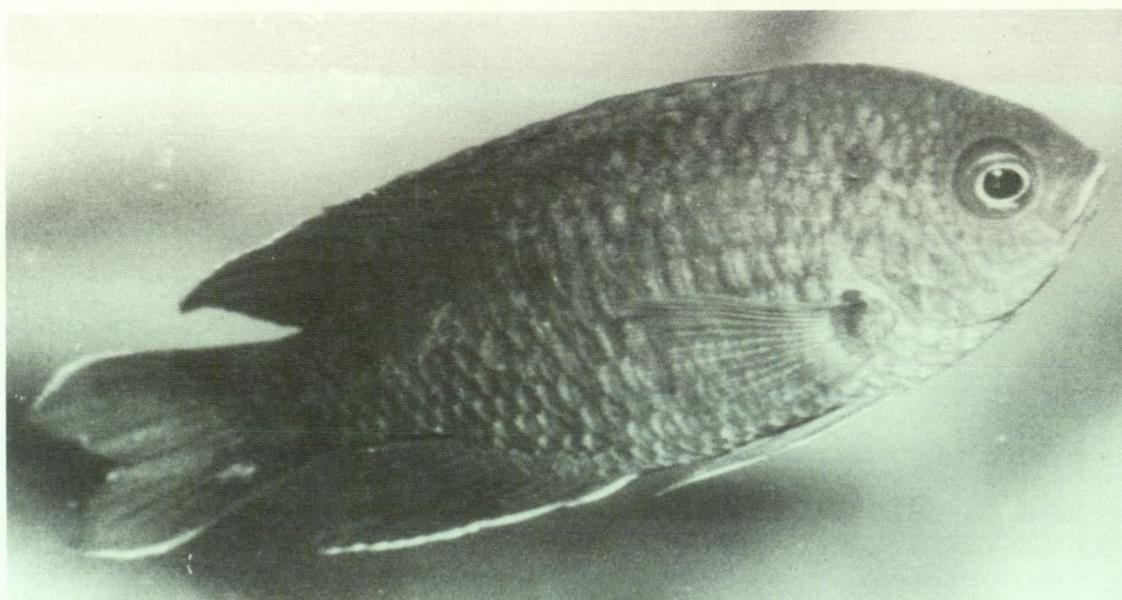


Figure 2 *Neopomacentrus n. sp.*, about , 55 mm TL, photographed underwater at Lawadi, Milne Bay Province, Papua New Guinea in 1.5 m depth.

**Table 1** Proportional measurements of selected type specimens of *Neopomacentrus aquadulcis* as percentage of the standard length.

	Holotype WAM P. 31636-001	Paratype WAM P. 31636-002					
Standard length (mm)	42.6	45.7	42.4	38.7	37.7	35.1	33.5
Body depth	44.6	43.8	45.3	42.6	41.9	43.6	43.6
Body width	19.2	20.8	18.9	18.1	17.5	16.0	17.6
Head length	31.7	30.6	31.8	31.3	33.4	32.2	32.5
Snout length	6.8	6.1	7.3	6.5	6.1	6.8	6.0
Eye diameter	10.6	9.8	9.9	10.1	10.6	10.5	10.7
Interorbital width	9.4	9.0	9.2	8.0	7.7	7.1	10.4
Depth of caudal peduncle	15.0	14.7	14.6	14.0	13.8	14.8	13.7
Length of caudal peduncle	16.4	15.1	15.6	14.0	16.7	15.1	14.3
Predorsal distance	36.4	35.4	35.1	32.8	33.2	35.9	36.1
Preanal distance	62.2	67.6	63.4	63.6	67.9	62.7	34.9
Prepelvic distance	34.5	36.3	37.7	34.6	42.2	37.0	35.8
Length of dorsal fin base	65.3	63.5	65.6	60.7	59.7	61.8	58.5
Length of anal fin base	25.6	24.7	25.9	25.3	24.7	25.6	23.9
Pectoral fin length	30.8	29.1	31.8	29.2	29.2	29.1	30.4
Pelvic fin length	33.1	33.3	35.8	34.1	32.4	35.6	34.3
Pelvic fin spine length	17.4	17.3	16.7	16.5	16.7	16.2	16.4
1st dorsal spine	6.1	6.8	7.3	5.7	5.6	6.0	5.4
6th dorsal spine	17.6	16.4	14.6	15.8	14.9	15.1	16.1
Last dorsal spine	15.3	19.0	17.7	16.3	17.2	16.8	16.1
Longest soft dorsal ray	29.3	29.8	28.3	27.4	26.0	26.5	25.7
1st anal spine	10.3	9.2	10.1	8.3	8.5	8.5	7.8
2nd anal spine	20.4	19.9	19.8	18.1	21.0	19.1	17.6
Longest soft anal ray	29.8	28.4	29.5	29.7	26.5	28.5	26.6
Caudal fin length	36.4	33.5	29.5	31.8	29.2	33.0	29.9
Caudal concavity	12.9	11.6	7.3	11.1	8.5	9.4	3.9

row in spaces between them; single nasal opening on each side of snout; nostril with a low fleshy rim; about 23–25 sensory pores on each side of snout and on circumorbitals; preorbital and suborbital relatively narrow, the greatest depth about one-fourth eye diameter, ventral margin smooth; posterior margin of preopercle smooth; opercular series smooth except a blunt, flattened spine present on upper edge of opercle, near angle, and similar, but smaller spine on uppermost edge, just below lateral-line origin.

Scales of head and body finely ctenoid; preorbital, suborbital, snout, lips, chin, and isthmus naked; predorsal scales extending to level of front of eyes; preopercle with 3 scale rows (2 primary rows and row of smaller secondary scales near lower margin), rear margin narrowly naked; dorsal and anal fins with a basal scaly sheath; proximal half of caudal fin covered by scales; base of pectoral fins scaled; axillary scale of pelvic fins less than one-half length of pelvic spine.

Tubed lateral line scales ending below posterior spines or anterior soft rays of dorsal fin; pits or pores present on 3 (3–4) scales immediately posterior to last tubed scale; a series of 6 (6–9) pored or pitted scales mid-laterally on caudal peduncle extending to caudal base.

Origin of dorsal fin above third tubed scale of lateral line; spines of dorsal fin gradually increasing in length to posteriormost; membranes between spines moderately incised with posteriorly directed, pennant-like extensions at distal tip of each spine; first dorsal spine 2.9 (2.0–3.0) in sixth dorsal spine; sixth dorsal spine 0.9 (1.0–1.5) in last dorsal spine; last dorsal spine 2.1 (1.6–2.0) in head; longest soft dorsal rays prolonged into short filament in large adults, 1.1 (1.0–1.4) in head; length of dorsal-fin base 1.5 (1.5–1.7) in standard length; first anal spine 2.0 (2.0–2.5) in second anal spine; second anal spine 1.6 (1.5–1.8) in head; longest soft anal ray 1.1 (1.0–1.4) in head; base of anal fin 2.6 (2.3–2.6) in base of dorsal fin; caudal fin emarginate with broadly pointed lobes; caudal-fin length 0.9 (0.9–1.1) in head length; pectoral fin reaching a vertical through origin of anal fin, the longest ray 1.0 (1.0–1.1) in head length; filamentous tips of pelvic fins reaching to about base of first or second soft anal-fin ray; pelvic fin-length 1.0 (0.9–1.0) in head length.

Colour of holotype in alcohol: entirely blackish, including median and pelvic fins; tips of caudal lobes noticeably paler; pectoral fins with translucent membranes and dusky rays. The paratypes have a similar colouration.

Colour in life: head and nape brown, grading

posteriorly to dark charcoal grey over most of body; scales with paler centres, especially noticeable on head and anterior part of body; a faint blackish "ear" spot sometimes evident at origin of lateral line; fins dark charcoal grey, nearly black; anterior margin of pelvic and anal fins narrowly bright blue; outer portion of caudal lobes of nest-guarding or nuptial males broadly whitish; a black spot at base of uppermost pectoral rays.

#### Remarks

The genus *Neopomacentrus* Allen contains 14 species, including *N. aquadulcis* n. sp. The group is characterised by a relatively elongate shape (greatest depth 2.2–2.8 in SL), elongate soft dorsal and anal fin rays, frequently with prolonged caudal lobes, a smooth or weakly crenulate preopercular margin, and biserial teeth, those in the outer row having flattened or slightly notched tips. Most species occur on coral reefs, in contrast to the fresh and brackish water habitat that is characteristic of *N. aquadulcis*. Indeed, only three other pomacentrids, *N. taeniurus* and *Pomacentrus taeniometopon* of the Indo-west Pacific and *Stegastes otophorus* of the western Atlantic, are known to occur in fresh and brackish waters (Allen, 1991). The new species is clearly separable from other members of the genus on the basis of its very dark overall coloration and characteristic, broad-lobed caudal-fin shape. Furthermore, it is the only *Neopomacentrus* possessing a blackish caudal fin; in most species the caudal is yellow or yellow with darkish margins. It occurs sympatrically with *N. taeniurus*, but significant colour differences provide easy differentiation: *N. aquadulcis* is overall blackish compared to the grey-brown colour of *N. taeniurus*, and the new species lacks yellow on the caudal, soft dorsal, and soft anal fins, all characteristic markings for *N. taeniurus*.

*Neopomacentrus aquadulcis* is presently known only from the north-eastern coast of mainland Papua New Guinea between the type locality (near East Cape, the easternmost extension of mainland Papua New Guinea) and Cape Roon on the Morobe coast. The typical habitat consists of the lower, tidal reaches of freshwater streams in either pure fresh or brackish water. At the type locality a population of approximately 50 fish were observed in the lowermost, 100 m-stretch of Lawadi Creek. During periods of extreme low tide the water was entirely fresh, but became gradually mixed with seawater with the rising tide. At the Saia River-collecting

locality in Morobe province, water temperature was 24.5°C, pH 8.3 and current speed 0.5 m/s. Field observations in both collecting localities indicate a probable harem-type structure with a single nuptial male in company of up to about 10 smaller fish. Nesting was evident with nuptial males showing strong whitish borders on the caudal fin and occasionally "flashing" 2–3 whitish bars on the side of the body. Nesting appears most commonly among submerged fallen trees where fish can quickly retreat to shelter. Distinct nesting groups of *N. taeniurus* were seen in close proximity to the groups of *N. aquadulcis* at both collecting locations.

#### Etymology

The new species is named *aquadulcis* from the Latin meaning "sweet-water" with reference to the freshwater habitat in which it is found.

#### ACKNOWLEDGEMENTS

We thank Environment Australia for funding the first author's field work. We also thank the Papua New Guinea Office of Environment and Conservation and the Village Development Trust for their generous field assistance during the first author's fieldwork activities. In particular, we thank Vagi Rei, John Aruga and Paul Led. We are also grateful to the people of Lababia for allowing access to their rivers. We thank Rob Vanderloos, owner and captain of the live-aboard dive vessel *Chertan*, for his generosity in providing a gratis trip for the second author, and for his excellent diving assistance and that of Chertan's crew. The second author's participation was also supported by the Marine RAP Program of Conservation International, Washington, D.C.

#### REFERENCES

- Allen, G.R. (1972). *Anemonefishes, their classification and biology*. T.F.H. Publications, Inc., Neptune, New Jersey. 288 pp.
- Allen, G.R. (1991). *Damselfishes of the world*. Mergus Publishers, Melle, Germany. 271 pp.
- Allen, G.R. and Adrim, M. (2000). *Amblypomacentrus clarus*, a new species of damselfish (Pomacentridae) from the Banggai Islands, Indonesia. *Records of the Western Australian Museum* 20: 51–55.