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A new species of rainbowfish, *Melanotaenia garylangei*. G.L.

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A New Species of Rainbowfish (Melanotaeniidae), *Melanotaenia garylangei*, from Western New Guinea (Papua Province, Indonesia)

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Abstract

A new species of rainbowfish, *Melanotaenia garylangei*, is described on the basis of 15 specimens, 42–78 mm SL, from Brazza River (Eilanden River system) at Dekai village in the central southern part of Papua Province, Indonesia. The new species belongs to the "Maccullochi" group, a clade inhabiting southern New Guinea and parts of northern Australia. It is most similar to *M. ogilbyi* from the adjacent Unir river drainage, a species that shares most meristic and morphometric features and parts of the colour pattern. *Melanotaenia garylangei* is however clearly distinguished by having more rays in the second dorsal fin, and by conspicuous iridescent blue coloration of adult males along the upper lateral body between the head and first dorsal fin. This brings the number of described species in the "Maccullochi" group to seven.

Key words. Taxonomy, rainbowfish, New Guinea, *Melanotaenia*, freshwater.

INTRODUCTION

Rainbowfishes of the family Melanotaeniidae are well known among aquarium hobbyists for their mostly colourful male coloration. A total of 86 species are known from freshwater habitats in New Guinea and Australia, many additional species are known but remain formally undescribed, and new species are continuously being discovered (Allen et al. 2008, Allen & Unmack 2008, Kadarusman et al. 2010, Allen & Hadiaty 2011, Kadarusman et al. 2011, Allen & Unmack 2012, Kadarusman et al. 2012a,b, Allen & Hadiaty 2013, Unmack et al. 2013, Allen et al. 2014, 2015). Recent phylogenetic work suggests that the traditional taxonomy does not reflect monophyletic generic groups in all cases, including the most species-rich genera *Melanotaenia* Gill 1862, *Chilatherina* Regan 1914, and *Glossolepis* Weber 1907 (Unmack et al. 2013, largely confirmed by Stelbrink et al. 2014). Essentially, the diversification of rainbowfishes is correlated with three main biogeographic regions: western New Guinea, northern New Guinea, and southern New Guinea plus Australia (Unmack et al. 2013).

The "Maccullochi" group belongs to the southern clade of rainbowfish species, and was first revised by Allen 1981. At that time, it consisted of *Melanotaenia maccullochi* Ogilbyi 1915, *M. ogilbyi* Weber 1910, *M. sexlineata* (Munro 1964), and *M. papuae* Allen 1981. Since then, the group was enlarged with the addition of *M. caerulea* Allen 1996, *M. sylvatica* Allen 1997, and *M. mairasi* Allen & Hadiaty 2011; however, the latter species appears to be unrelated to the "Maccullochi" group based on genetic results (Kadarusman et al. 2012a). The species in the "Maccullochi" group share similar morphological appearance and small size, ranging typically between 60 and 70 mm SL for adult specimens. The basic colour pattern includes reddish stripes between the scale rows of the upper half of the body, and three mid-lateral longitudinal dark lines between two scale rows of which the scales are often of a different colour. The three midlateral stripes are difficult to see on pictures because of the photo flash, but it can be clearly seen in life. All of the species occur only in southern New Guinea, except *M. maccullochi* which also occurs in northern Australia. Typical habitats are rainforest creeks and small rivers.

New Guinea, in particular West Papua Province of Indonesia, contains a large proportion of rainbowfish diversity (Unmack et al. 2013), and new fish species are being described at a rapid rate, including 14 species of rainbowfishes in only the last four years: *Chilatherina pagwiensis* Allen & Unmack 2012; *Melanotaenia arguni* Kadarusman et al. 2012b; *M. ericrobertsi* Allen

Fig. 1. Map of the Sungai Unir (Eilanden River) system. The type locality of *Melanotaenia garylangei*, new species, is denoted by a triangle (© map Wikimedia commons, Johannes Graf).

et al 2014; *M. fasinensis* Kadarusman et al. 2010; *M. flavipinnis* Allen et al. 2014; *M. laticlavia* Allen et al. 2014; *M. mairasi* Allen & Hadiaty 2011; *M. multiradiata* Allen et al 2014; *M. rubrivittata* Allen et al. 2015; *M. salawati* Kadarusman et al. 2011; *M. sneideri* Allen & Hadiaty 2013; *M. urisa* Kadarusman et al. 2012b; *M. veoliae* Kadarusman et al. 2012b and *M. wanoma* Kadarusman et al. 2012b. Several other species are known, but remain undescribed (Unmack et al. 2013; GR Allen, pers. comm. 2014).

This paper describes a new species of rainbowfish, the seventh member of the "Maccullochi" group. It was collected in the vicinity of Dekai village on the Brazza River in the Sungai Pulau (Eilanden River) system (Fig. 1), south-western Papua Province, and is apparently endemic to that area.

MATERIAL AND METHODS

Specimens were collected with hand nets and beach seines on 24 August 2010 and were preserved in 70% ethanol. Photographs were taken in the field and in the aquarium to document live coloration, including nuptial displays. Specimens are deposited at the Museum Zoologicum Bogoriense, Cibinong, Indonesia (MZB), the Western Australian Museum, Perth, Australia (WAM), and the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK). Comparative material from the Zoological Museum, Amsterdam (ZMA, now housed at the Naturalis Biodiversity Center, Leiden) and the Australian Museum, Sydney (AMS) was also examined.

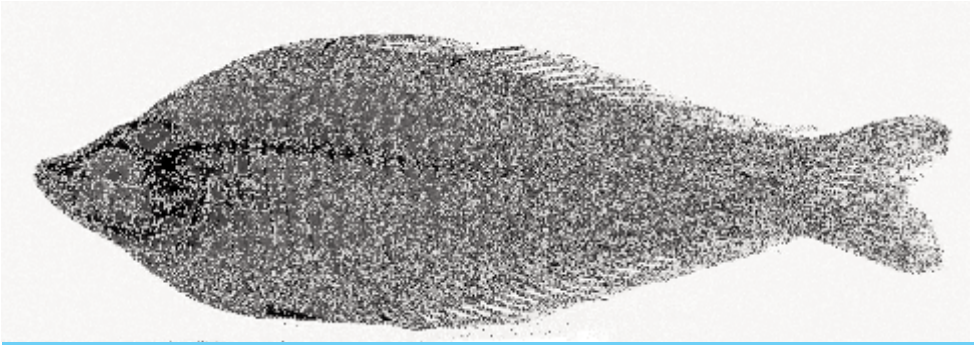

Fig. 2. *Melanotaenia garylangei*, new species, radiograph of MZB 22255, the male holotype (photograph ZFMK).

Counts and measurements that appear in parentheses refer to the range for paratypes if different from the holotype. The methods of counting and measuring are as follows: dorsal and anal fin rays – the last ray of the anal and second dorsal fins is divided at the base and counted as a single ray; lateral scales – number of scales in horizontal row from upper edge of pectoral-fin base to caudal-fin base, excluding the small scales posterior to the hypural junction; transverse scales – number of scales in vertical row (excluding small truncated scales along base of fins) between anal-fin origin and base of first dorsal fin; predorsal scales – number of scales along midline of nape in front of first dorsal fin; cheek scales – total number of scales covering suborbital and preoperculum; gill rakers – the total number on the first branchial arch; standard length (SL) – measured from tip of upper lip to caudal-fin base; snout length – the least distance measured from the tip of the upper lip to the fleshy anterior border of the eye; head length (HL) – measured from tip of upper lip to upper rear edge of gill opening; interorbital width – the least width between eyes anteriorly; eye diameter – the maximal horizontal width of the orbital cavity; body depth – measured from the base of the first dorsal spine to the base of the first anal spine; body width – maximal width measured posteriorly just behind the pectoral-fin base; caudal peduncle depth is least depth and caudal peduncle length is measured between two vertical lines, one passing through base of last anal ray and the other through caudal-fin base; predorsal length – measured from the tip of the upper lip to the base of the spine at the origin of the first dorsal fin; prepelvic length – measured from the tip of the upper lip to the base of the spine at the origin of the pelvic fin; preanal length – measured from the tip of the upper lip to the spine at the origin of the anal fin; pectoral fin length – measured from the anteriormost part of the pectoral-fin base to the tip of the longest soft ray; pelvic fin length – measured from the anteriormost part of ventral-fin base to the tip of the longest soft ray; spine length of first dorsal fin – measured from the base to the tip of the first spine on the first dorsal fin; spine length of second dorsal fin – measured from the base to the tip of the spine on the second dorsal fin; spine length of anal fin – measured from the base to the tip of the single anal spine; total dorsal fin length – measured from the anterior base of the first spine of first dorsal fin to the posterior base of last soft ray of second dorsal fin; second dorsal fin length – measured on the second dorsal fin from the anterior base of the first spine to the posterior base of last soft ray; anal-fin length – measured from the anterior base of the spine to the posterior base of the last soft ray. All measurements are taken from point to point, recorded to the nearest 0.1 mm with a digital caliper. Abbreviations used: SL – standard length, HL – head length. Counts were taken using a stereo microscope. Counts of the unpaired fins were confirmed from radiographs, using a digital X-ray device (Faxitron LX-60).

SPECIES ACCOUNT

Melanotaenia garylangei sp. nov.

Gary Lange's Rainbowfish

(Figures 2–5, Tables 1–3)

Melanotaenia sp. Dekai – Unmack et al. 2013, p. 21.

Holotype. MZB 22255, male, 61 mm SL, unnamed rainforest creek in the vicinity of Dekai, a tributary of Brazza River, Eilanden River system. 04° 47.790 S, 139° 30.515 E, West Papua Province, Indonesia, depth 0.2 m, seine net, G. Lange, D. Dority and J. Graf, 24 August 2010.

Paratypes. MZB 22256, 5 specimens, 3 males and 2 females, 42–78 mm SL, collected at same location as Holotype and at an unnamed rainforest creek at 04° 52.817 S, 139° 36.133 E. ZFMK 68042-68047, 6 specimens, 5 males and one female, 42–63 mm SL, same data as MZB 22256. WAM P. 34291-001, 3 specimens, 2 males and one female, 49–67 mm SL, same data as MZB 22256.

Comparative material examined. Melanotaenia ogilbyi, ZMA 103110 (Lectotype), ZMA 103111 (2 specimens), 51–57 mm SL; *Melanotaenia sexlineata*, AMS I.20726-001 (holotype), AMS IA.7249 (3 specimens), IA.7246 (1 specimen), IA.7278 (2 specimens), 55–73 mm SL.

Diagnosis. A species belonging to the "Maccullochi" group of rainbowfishes, distinguished by the following combination of characters: dorsal fin rays IV–VI + I,12–15; anal fin rays I, 16–20; colour in life for adult males with a blue nape and an olive green upper side, a mid-lateral blackish stripe covering two rows of scales of which the line above the upper scale row is regularly broken and the scales are of greenish colour, 1–2 red stripes above and below the mid-lateral stripe; second dorsal, pectoral, anal and middle portion of caudal fin red. Dorsal and anal fins of males elongated.

Table 1. Frequency table of meristic counts of *Melanotaenia garylangei* (15 specimens, asterisk marks holotype).

First dorsal fin rays	4 2	5 11*	6 2			
Second dorsal fin rays	12 6	13 6	14 2*	15 2		
Anal fin rays	15 1	17 2	18 6*	19 5	20 1	
Pectoral fin rays	9 1	10 3	11 6*	12 5	13 1	
Pelvic fin rays	5 3	6 10*	7 2			
Branched caudal fin rays	15 1	16 1	17 12*	18 1		
Lateral scales	34 1	35 4	36 2	37 4*		
Transverse scales	10 5	11 5	12* 5			
Predorsal scales	11 1	12 1	13 4	14 5	15 3*	16 1
Cheek scales	10 1	11 3	12 4*	13 4	14 2	15 1
Total gill rakers on first arch	12 1	13 2	14 3	15 8*	16 3	17 1

Table 2. Measurements of the type specimens of *Melanocaesio parayagyi* also expressed as percentage of the standard length. MZB 2225 is the holotype.

	MZB 2225 male		WAMP 34291-001 male		MZB 2225 male		MZB 2225 male		ZRMK 68048 male		MZB 2225 female		ZRMK 68048 male		WAMP 34291-001 female	
	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL
Standard length	95.0		97.0		70.0		51.0		63.0		60.0		54.0		49.0	
Snout length	5.0	5.3	4.5	5.7	5.5	7.9	4.0	7.8	4.5	7.1	4.0	6.7	4.5	8.3	3.5	7.1
Head length	13.5	22.1	11.0	22.4	13.5	21.3	11.0	20.5	14.0	22.2	13.5	22.9	12.0	22.2	12.0	24.5
Interorbital width	6.0	9.2	6.0	6.0	7.0	9.0	5.5	10.8	5.0	7.9	5.0	8.5	5.5	10.2	5.5	10.2
Eye diameter	4.5	7.4	3.5	9.2	5.5	7.1	4.0	5.3	5.0	7.5	5.0	9.5	5.0	9.5	5.5	10.2
Body depth	52.0	58.1	28.0	30.1	28.0	43.5	16.5	32.4	21.5	34.1	20.5	33.3	20.0	37.0	15.5	30.4
Body width	7.3	11.3	9.0	11.2	8.5	10.8	7.0	16.7	7.0	11.1	7.5	11.5	7.0	13.0	8.0	15.9
Caudal peduncle depth	7.5	12.5	8.0	11.8	9.0	11.6	5.5	12.7	7.5	11.9	7.0	11.4	7.0	13.0	5.5	11.2
Caudal peduncle length	19.0	21.2	16.0	22.4	16.5	21.2	10.0	19.6	12.0	19.0	11.0	18.6	10.0	18.5	8.0	16.4
Predorsal length	35.0	41.0	27.5	41.0	30.0	38.6	20.0	42.1	25.0	39.7	23.0	40.7	22.0	42.8	21.0	42.9
Prepelvic length	21.5	25.2	23.0	34.2	23.0	33.8	16.0	33.8	19.0	34.8	21.0	35.8	20.0	37.0	17.4	35.7
Preanal length	30.5	35.8	32.0	47.8	30.0	46.2	27.0	57.9	31.0	49.2	29.0	49.2	27.0	50.0	24.5	50.0
Pectoral fin length	16.0	16.8	11.0	16.4	12.0	16.6	9.0	17.6	10.0	15.9	9.0	15.3	8.0	14.8	7.5	15.3
Ventral fin length	15.0	15.4	13.0	14.9	10.0	12.8	5.0	10.7	10.5	16.7	8.0	13.6	8.0	13.2	8.0	16.2
Spine length of first dorsal fin	7.5	12.9	7.5	11.2	8.0	10.9	5.3	10.7	5.5	10.9	8.0	10.2	5.5	10.2	5.0	10.2
Spine length of second dorsal fin	5.0	8.2	5.5	9.2	6.0	10.3	5.0	11.3	6.5	10.3	5.0	8.5	4.5	8.3	5.0	10.2
Spine length of anal fin	5.0	5.9	5.0	7.5	6.0	8.4	3.5	6.9	4.0	6.3	4.0	6.8	3.5	6.5	3.5	7.1
Total dorsal fin length	23.5	48.4	24.0	48.3	26.0	46.2	21.0	41.2	24.0	54.0	25.0	49.2	23.0	46.5	20.5	40.6
Second dorsal fin length	16.0	26.3	19.5	27.5	25.0	28.9	14.5	28.4	16.5	26.4	16.0	26.5	15.5	28.7	12.0	24.5
Anal fin length	24.0	39.5	23.5	35.8	21.0	37.5	13.0	31.4	23.5	37.3	22.5	35.1	21.0	37.0	16.5	32.7

Description. Dorsal fin rays V (IV–VI) + I,14 (I,12–15); anal fin rays I,18 (I,16–20); pectoral fin rays 11 (9–13); pelvic fin rays I,6 (I,5–7); branched caudal fin rays 17 (15–18); lateral scales 37 (34–37); transverse scales 12 (10–12); predorsal scales 15 (11–16); cheek scales 12 (10–15); gill rakers on first branchial arch 15 (12–17). Snout length 2.7 (2.4–3.4) in HL; head length 4.5 (3.8–4.7) in SL; interorbital width in head length 2.3 (2.1–2.9); *eye* diameter in head length 3.0 (2.4–3.0); body depth 2.8 (2.7–3.4) in SL; greatest width of body 3.1 (2.2–3.1) in greatest body depth; caudal peduncle depth in head length 1.8 (1.7–2.4); caudal

(Table 2 continued)

	WAMP 34291-001 male		ZRMK 68044 male		MZB 2225 female		ZRMK 68048 male		MZB 2225 female		ZRMK 68048 male		ZRMK 68047 female	
	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL	mm	% of SL
Standard length	49.0		48.0		42.0		42.0		44.0		42.0		48.0	
Snout length	4.0	8.2	4.5	9.5	4.0	9.5	3.5	8.3	3.5	8.0	3.0	7.1	4.0	8.3
Head length	11.0	22.4	11.0	23.9	11.0	26.2	11.0	26.2	11.5	26.1	11.0	26.2	12.0	25.0
Interorbital width	5.0	10.2	4.5	9.7	5.0	11.9	5.0	11.9	4.5	10.1	4.5	10.7	5.0	10.4
Eye diameter	4.0	8.2	4.0	8.7	4.0	9.5	4.0	10.7	4.5	10.2	4.0	9.5	4.0	8.3
Body depth	16.0	32.7	14.0	30.4	14.0	33.3	13.0	31.0	13.0	29.5	12.0	28.5	14.0	29.1
Body width	6.0	12.2	5.0	10.9	5.5	13.1	5.5	13.1	6.0	13.6	5.0	11.9	6.0	12.5
Caudal peduncle depth	6.0	12.2	6.5	12.0	5.5	11.9	5.0	11.9	5.0	11.4	5.0	11.9	6.0	12.5
Caudal peduncle length	9.0	18.4	7.0	15.2	9.5	21.4	7.0	16.7	7.5	17.0	10.0	23.8	10.0	21.7
Predorsal length	21.0	42.9	18.5	40.2	19.0	44.2	20.0	47.5	19.0	43.2	20.0	47.6	20.0	41.7
Prepelvic length	18.0	36.7	17.0	37.0	16.0	38.1	17.0	40.5	16.5	37.5	17.0	40.5	18.0	38.1
Preanal length	28.0	57.1	24.0	52.2	23.0	54.8	24.0	57.1	22.0	50.0	23.0	54.8	24.0	50.0
Pectoral fin length	8.0	16.3	8.0	16.8	8.0	19.0	8.0	19.0	7.5	17.0	8.0	19.0	7.0	14.6
Ventral fin length	6.5	13.3	7.0	15.2	6.0	14.3	6.5	15.5	6.5	14.8	6.0	14.3	6.0	12.5
Spine length of first dorsal fin	5.5	11.2	5.0	10.9	6.0	14.3	5.5	13.1	5.0	11.4	7.0	16.7	7.0	14.6
Spine length of second dorsal fin	5.0	10.2	4.0	8.7	5.0	11.9	5.0	11.9	4.5	10.2	5.0	11.9	5.0	10.4
Spine length of anal fin	3.5	7.1	3.5	7.6	4.5	10.7	4.5	10.7	3.5	8.0	4.0	9.5	4.0	8.3
Total dorsal fin length	24.0	49.0	21.0	45.7	20.0	47.6	20.0	47.6	20.0	45.5	20.0	47.6	19.0	39.6
Second dorsal fin length	12.0	24.5	14.0	30.4	12.0	28.6	12.0	28.6	12.0	27.3	13.0	31.0	13.0	27.1
Anal fin length	17.5	35.7	16.0	34.8	17.0	40.5	15.0	35.7	14.5	33.0	13.0	31.0	14.0	29.2

peduncle length in head length 1.0 (1.0–1.6). Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends opposite front border of eye or slightly posterior; lips thin, teeth conical with slightly curved tips; extending to outer surface of lips, teeth of upper jaw in 4 or 5 irregular rows anteriorly, reduced to a single row posteriorly where they are exposed when mouth is closed; teeth in lower jaw in 5–6 irregular rows, reduced to 1 or 2 rows posteriorly, palatines edentate. Vomerine teeth small and conical, sometimes embedded in congealed mucous. Scales of body large and arranged in regular horizontal rows; scale margins crenulate; predorsal scales extending to posterior portion of interorbital; preopercle with 2–3 scale rows between posterior angle to edge of eye. Predorsal length 2.4 (2.1–2.6) in SL; prepelvic length 2.8 (2.5–4.1) in SL; preanal length 2.0 (1.8–2.2) in SL; pectoral fin length 1.4 (1.4–2.2) in HL; ventral fin length 1.4 (1.3–2.2) in HL. First dorsal fin originates opposite anus, first dorsal spine 1.8 (1.6–2.3) in HL; longest rays (2nd or 3rd) of males extending beyond origin of second dorsal fin when depressed; first spine of second dorsal fin 2.7 (2.0–3.0) in HL; first spine of anal fin 4.5 (2.4–4.5) in HL; total dorsal fin length 2.1 (1.9–2.6) in SL; second dorsal fin length 3.4 (3.2–4.1) in SL; anal fin length 2.5 (2.5–3.6) in SL. Dorsal and anal fins of males elongated, data are shown in Table 2. Fig. 2 shows a radiograph of the holotype.

(Table 2 continued)

Melanotaenia parylangei					
Summary table	Median	Min	Max	Holotype	
first dorsal rays	5	4	6	5	
second dorsal rays	13	12	15	14	
anal rays	18	16	20	19	
pectoral rays	11	9	13	11	
pelvic rays	6	5	7	6	
branched caudal rays	17	15	18	17	
lateral scales	36	34	37	37	
transverse scales	11	10	12	12	
predorsal scales	14	11	16	15	
cheek scales	12	10	16	12	
total gillrakers on first arch	15	12	17	15	
mm	Mean	Min	Max	Holotype	SD
Standard length (SL)		42	78	61	
Snout length	4.3	3.5	5.5	5.0	0.6
Head length	12.8	11.0	16.5	13.5	1.7
Interorbital width	5.2	4.0	7.0	6.0	0.9
Eye diameter	4.7	4.0	5.5	4.5	0.5
Body depth	18.0	13.0	26.0	22.0	4.3
Body width	6.7	5.0	8.5	7.0	1.0
Caudal peduncle depth	6.5	5.0	9.0	7.5	1.3
Caudal peduncle length	10.5	7.0	16.5	13.0	2.8
Predorsal length	22.5	18.5	30.0	25.0	3.4
Prepelvic length	13.1	15.5	25.0	21.5	2.9
Preanal length	27.8	22.0	36.0	30.5	4.2
Pectoral fin length	8.6	5.0	12.0	10.0	1.7
Ventral fin length	7.7	5.0	10.5	10.0	1.9
Spine length of first dorsal fin	6.4	5.0	8.5	7.5	1.1
Spine length of second dorsal fin	5.3	4.0	8.0	5.0	1.0
Spine length of anal fin	3.0	3.0	5.0	3.0	0.7
Total dorsal fin length	23.0	16.0	36.0	29.5	5.7
Second dorsal fin length	15.8	12.0	22.0	18.0	3.2
Anal fin length	19.1	14.0	26.5	24.0	4.1

Colour in life (Figs. 3 & 4). Males blue on anterodorsal portion of body and olive-green on remainder of upper side; side of body generally yellowish anteriorly; belly red to orange; iris golden yellowish; mid-lateral blackish stripe covering two scale rows; narrow dark stripe above upper mid-lateral scale row regularly broken; red stripe above and 1–2 red stripes below the mid-lateral stripe; first dorsal light blue, second dorsal, pectoral, anal and middle portion of caudal fin red. A lateral row of 5–12 red scales behind the pectoral fin in the scale row below the dark midlateral stripe. Females with same stripe pattern, but generally light brown overall on body except whitish ventrally and without blue nape and red fins.

Colour in alcohol (Fig. 5). Males with dark brown coloration on back; mid-lateral blackish stripe covering two scale rows with centre of each scale lighter brown; lower half of body light brown with faint dark lines between horizontal scale rows and scales with dark margins; fins translucent with dark margins. Females with paler brown colour on upper side; centre of scales with lighter colour compared to males; blackish midlateral stripe less intense than in males; lower half of body silver to light brown.

(Table 2 continued)

% of SL	Mean	Min	Max	Holotype	SD
Snout length	8.0	6.7	9.0	8.2	0.9
Head length	25.6	23.2	26.7	25.1	1.2
Interorbital width	9.8	7.6	11.5	9.6	1.2
Eye diameter	8.6	7.1	10.3	7.4	1.1
Body depth	32.9	29.5	37.0	36.1	2.2
Body width	12.4	10.9	13.7	11.5	1.0
Caudal peduncle depth	12.6	10.9	13.0	12.5	0.6
Caudal peduncle length	19.2	15.2	22.4	21.3	2.1
Predorsal length	42.6	38.5	47.5	41.0	2.7
Prepelvic length	35.6	24.6	40.5	36.2	3.3
Preanal length	51.2	49.2	57.1	50.2	2.3
Pectoral fin length	19.5	16.9	19.9	19.4	2.0
Ventral fin length	14.8	11.9	16.7	16.4	1.3
Spine length of first dorsal fin	12.8	10.2	15.2	12.3	1.5
Spine length of second dorsal fin	10.0	7.5	13.0	8.2	1.6
Spine length of anal fin	7.4	4.9	10.7	4.9	1.7
Total dorsal fin length	46.9	39.1	54.0	48.4	3.6
Second dorsal fin length	28.7	24.5	31.9	29.4	1.8
Anal fin length	35.2	27.5	40.5	39.3	3.7
Snout length in Head length	3.0	2.4	3.4	2.7	0.3
Head length in SL	4.2	3.8	4.7	4.5	0.2
Interorbital width in Head length	2.4	2.1	2.9	2.9	0.2
Eye diameter in Head length	2.7	2.4	3.9	3.0	0.2
Body depth in SL	3.0	2.7	3.4	2.8	0.2
Body width in Body depth	2.7	2.2	3.1	3.1	0.3
Caudal peduncle depth in Head length	2.0	1.7	2.4	1.8	0.2
Caudal peduncle length in Head length	1.3	1.0	1.5	1.5	0.2
Predorsal length in SL	2.4	2.1	2.6	2.4	0.1
Prepelvic length in SL	2.8	2.5	4.1	2.8	0.4
Preanal length in SL	2.0	1.8	2.2	2.0	0.1
Pectoral fin length in Head length	1.3	1.1	2.2	1.1	0.2
Ventral fin length in Head length	1.7	1.3	2.2	1.4	0.3
Spine length of first dorsal fin in Head length	2.0	1.8	2.8	1.8	0.2
Spine length of second dorsal fin in Head length	2.4	2.0	3.9	2.7	0.3
Spine length of anal fin in Head length	3.3	2.4	4.5	4.5	0.5
Total dorsal fin length in SL	2.2	1.9	2.6	2.1	0.2
Second dorsal fin length in SL	3.5	3.2	4.1	3.4	0.2
Anal fin length in SL	2.8	2.5	3.6	2.6	0.3

Fig. 3. *Melanotaenia garylangei*, new species, captive specimens: male (lower left fish) showing courtship display to female (upper right fish). G.L.

Sexual dimorphism. Sexual maturity is reached at a size of approx. 25 mm SL and 6 months of age, based on aquarium observations. Males develop a deeper body than females, and have moderately elongated and pointed unpaired fins, compared with short and rounded in females. Colour of the unpaired fins in males red, fading to yellowish orange towards the body, those of females translucent with faint dark margin. In males, the tip of the first dorsal fin is coloured whitish blue and extends posteriorly past the origin of the second dorsal fin, which is not the case in females. Depth of the body in adult males (over 50 mm SL) ranges from 32–37% of SL, and for females from 30–33% of SL. Males below 50 mm SL show the same proportions as females. Data are shown in Table 3. Males develop elongated dorsal and anal fins from approx. 25 mm SL, based on aquarium observations.

Comparisons. The new species is most similar to *Melanotaenia ogilbyi* from Sungai Unir/Lorentz River, which is the next river system west of the Sungai Pulau/Eilanden River. *Melanotaenia garylangei* and *M. ogilbyi* share similar meristic and morphometric characters and colour pattern, with red stripes between the scale rows, and a blackish midlateral stripe. *Melanotaenia garylangei* differs from *M. ogilbyi* in having blue colour on the anterodorsal

Table 3. SL to body depth relations in *M. garylangei*.

Body depth in SL [%]		Mean	Min	Max	SD
All	n = 15	33	30	37	2.2
Males > 50 mm	n = 7	35	32	37	1.5
Males < 50 mm	n = 4	31	30	33	1.0
Females	n = 4	31	30	33	1.6

portion of the body of mature males and the red colouration of the second dorsal – and anal – fins. There is also a notable and non-overlapping difference in the number of segmented rays in the second dorsal fin, with 9–11 for *M. ogilbyi*, vs. 12–15 in *M. garylangei*.

The new species has more segmented rays (12–15) in the second dorsal fin than *Melanotaenia papuae* (9–12), *M. maccullochi* (7–11), *M. mairasi* (11-13) and *M. sexlineata* (10–12). Geographically, *M. sexlineata* is the closest known species to the east (upper Fly River system in Papua New Guinea). However, this species exhibits 6 dark stripes on the side (Munro 1964). *Melanotaenia sylvatica* from the Lakekamu basin in Papua New Guinea has fewer second dorsal rays (9–11) than *M. garylangei* and fewer soft anal rays (16 or 17 vs. 16–20) (Allen 1997). *Melanotaenia caerulea* from the Kikori River system in Papua New Guinea has 7–11 second dorsal rays and has a bright iridescent blue colour on the side of the body (Allen 1996). Data on second dorsal fin rays are shown in Table 4.

Genetic analyses based on seven mitochondrial genes and the first two introns of the nuclear S7 gene of nearly all described species of rainbowfishes and several undescribed populations (Unmack, et al. 2013), showed a clear distinction between *Melanotaenia garylangei* (listed in Unmack et al. 2013 as *M.* sp. Dekai) and the other members of the "Maccullochi" group. Based on that study, *M. sylvatica* and *M.* sp. NT (*M. maccullochi* "Burton Creek") are the closest relatives to the new species.

Fig. 4. *Melanotaenia garylangei,* new species, male captive specimen. G.L.

Table 4. Frequency table of segmented dorsal fin ray counts of species in the "Maccullochi" group. Data (except *M. garylangei*) provided by G.R. Allen.

Species	7	8	9	10	11	12	13	14	15
M. garylangei						6	5	2	2
M. caerulea	1	10	24	8	1				
M. maccullochi	3	36	44	30	2				
M. ogilbyi			2	10	10				
M. papuae			28	36	11	1			
M. sexlineata				1	7	3			
M. sylvatica			5	15	6				

Zoogeography and habitat. The new species was found in several small rainforest creeks crossing the road that was just recently built to the east and west of Dekai. The village of Dekai (04° 51.347 S, 139° 28.920 E) is located approximately 190 km inland from the southern coast of New Guinea on the Brazza River in the Eilanden River system, at the foothills to the mountains of the Great Dividing Range. The water at the collection sites (Fig. 6) was clear and tannin-stained (picture taken after sampling). Typical habitats were characterized by muddy substrate; submerged aquatic vegetation (*Barclaya* sp.) was present only at one site. Undisturbed habitats were partially covered by forest canopy, whereas disturbed sites were open to sunlight.

Fish species co-occurring with *Melanotaenia garylangei* include *Melanotaenia goldiei*, *Melanotaenia rubrostriata*, *Pseudomugil* sp., and *Ambassis agrammus*. All three *Melanotaenia* species recorded in this area occur in close proximity; in some cases all the species mentioned above were present in the same net haul. However, it appears that *M. goldiei* predominantly lives in faster flowing, open water, whereas *M. rubrostriata* is found closer to

Fig. 5. *Melanotaenia garylangei*, new species, photograph of MZB 22255, the male holotype after 24 months in 70% ethanol (photograph ZFMK).

Fig. 6. Type locality of *Melanotaenia garylangei*, new species, in the vicinity of Dekai village, Brazza River in the Eilanden River system, West Papua Province, Indonesia). G.L.

the stream edges. *Melanotaenia garylangei* apparently prefers shallow (10–20 cm depth) areas frequently covered with floating grass, as opposed to *Pseudomugil* sp., which was recorded predominantly in very shallow (5–10 cm depth) water.

Remarks. Melanotaenia garylangei is already introduced into the aquarium hobby under the name "*Melanotaenia* spec. "Dekai Village". Like other closely related species, *M. garylangei* reproduces well in soft, slightly acid (pH 6.5) water using a mop of acrylic yarn as egg-deposition substrate. Eggs are clear after deposition and turn light brown during development. Depending on water temperature, eggs need 8–10 days to hatch. Freshly hatched larvae feed on infusoria.

Etymology. The new species is named in honour of Gary William Lange, a well-known rainbowfish enthusiast who first discovered this species.

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