

Two new species of Rainbowfishes (*Melanotaenia*: *Melanotaeniidae*), from the Kikori River system, Papua New Guinea

Gerald R. ALLEN*

Abstract

Two new species of melanotaeniid rainbowfishes were collected by the author during a 1995 World Wildlife Fund Survey of the Kikori River system in Papua New Guinea. *Melanotaenia caerulea* sp. nov. is described from 106 specimens, 21.5-61.5 mm SL, from the lower and middle Kikori system at elevations between 20 and 400 m above sea level.

It belongs to the "maccullochi group" of *Melanotaenia*, and appears to be most closely related to *M. ogilbyi*. It differs from other members of the group in having a largely blue colouration, and is separated from *M. ogilbyi* by significant modal differences in the number of soft dorsal, anal, and pectoral rays.

Melanotaenia mubiensis, sp. nov. is described on the basis of 36 specimens, 18.7-96.5 mm SL, collected from tributaries of the Mubi River in the middle Kikori system.

It is most similar to *M. lacustris*, which inhabits Lake Kutubu farther upstream. Adults of *M. mubiensis* are more slender than those of *M. lacustris* and have a smaller eye (shorter than or equal to snout length in *M. mubiensis* and longer than snout in *M. lacustris*).

Although the two species have overlapping counts for dorsal, anal, and pectoral fin rays, there are significant modal differences.

Introduction

Rainbowfishes are common freshwater inhabitants of New Guinea and Australia.

They are small (usually under 12 cm SL), brightly coloured fishes, believed to have evolved in relatively recent times from marine atherinoids (Allen 1980) and having a sister-group relationship with the Pseudomugilidae (Saeed *et al.* 1989).

Approximately 60 species, including several that remain undescribed, belonging to six genera, have been recorded to date (Allen 1995). About 80 percent of the species occur in New Guinea, which has been particularly fertile for new discoveries.

The present paper describes two new melanotaeniids collected by the author while participating in a recent

World Wildlife Fund (WWF) biological survey of the Kikori River system in Papua New Guinea.

The Kikori River rises in the central mountains of southwestern Papua New Guinea and flows southward for nearly 250 km before forming a major delta at the head of the Gulf of Papua. The river mouth is situated about 340 km northwest of Port Moresby, and approximately 140 km northeast of the Fly River entrance.

Perhaps the most notable feature of the Kikori system is its extensive karst topography, which includes some of the most scenic and remote areas of Papua New Guinea.

The fish fauna of the region, except for Lake Kutubu, was poorly documented prior to the 1995 WWF survey. However, as a result of that expedition, the known fauna of the Kikori system consists of 87 species belonging to 55 genera and 34 families (Allen, in press).

The drainage is home to 14 endemic fishes. No other region in New Guinea of comparable size possesses so many unique species.

This remarkably high percentage of endemism is largely due to the presence of Lake Kutubu, which is the home of ten endemics (see Allen and Hoes 1986).

Methods

Collection Stations. - Collections were made by the author with seine nets and powdered rotenone at the localities listed below.

Station 1 - Ponds and adjacent tidal creek beside Kopi-Kikori Road, about 2 km south of Kopi Chevron camp (approx. 7°20'S, 144°12'E), about 0.5 km from Kikori mainstream and 45 km from river mouth, elevation approximately 20 m, one-person seine over well-vegetated mud bottom, water relatively clear with minimal flow through open section of rainforest; depth to 1.5 m; water temperature 24°C; 27 February 1995.

Station 2 - Small tidal creek near Station 1, except about 1.5 km south of Chevron camp, 0.5 km of rotenone over mud bottom littered with logs, water clear and slow flo-

* Department of Aquatic Zoology, Western Australian Museum, Francis Street, Perth, Western Australia 6000.

wing through rainforest; depth at low tide to 1.0 m; water temperature 24°C; 7 March 1995.

Station 3 - Au Creek, at junction with Mubi River next to Wasi Falls Lodge boat landing (approx. 6°44.2'S, 143°35.8'E), about 7 km from Kikori mainstream and 157 km from river mouth, elevation approximately 380 m, 0.5 kg rotenone over mud bottom, water turbid and slow flowing through open section of rainforest; depth to 3.0 m; water temperature 22°C; 8 March 1995.

Station 4 - Spring along side of Digimu River, about 1 km upstream from Sorotage Village (approx. 6°39'S, 143°31'E), about 25 km from Kikori mainstream and 175 km from river mouth, elevation approximately 400 m, 0.5 kg rotenone over rocky bottom, water clear with slow to moderate flow through rainforest; depth to 0.3 m; water temperature 23.5°C; 10 March 1995.

Station 5 - Limestone grotto along side of Mubi River, near junction with Digimu River (approx. 6,40'S, 143°30.4'E), about 21 km from Kikori mainstream and 171 km from river mouth, elevation approximately 400 m, 0.5 kg rotenone over rock and mud bottom littered with fallen logs and branches, water clear and slow flowing through rainforest; depth to 3.0 m; water temperature 23.5°C; 10 March 1995.

Station 6 - Ofake Creek, about 0.5 km from junction with Mubi River, 2 km upstream from Kantobo (approx. 6°42.5'S, 143°31.7'S), about 15 km from Kikori mainstream and 165 km from river mouth, elevation approximately 380 m, one-person seine over bedrock bottom, water clear and slow flowing through closed canopy rainforest; depth to 0.5 m; water temperature 23.5°C; 11 March 1995.

Station 7 - Small tributary creek of Mubi River about 1 km east of Wasi Falls Lodge (approx. 6°44'S, 143°36'E), about 8 km from Kikori mainstream and 158 km from river mouth, elevation approximately 400m, one-person seine over gravel and mud bottom covered with dead leaves, water clear with minimal flow through closed canopy rainforest; depth to 0.3 m; water temperature 23.5°C; 11 March 1995.

The methods of counting and measuring are as follows: *dorsal and anal 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 corner of gill cover to caudal-fin base, excluding the small scales posterior to the hypural junction; *transverse scales* - number of scales in vertical row 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 the suborbital and preoperculum; *standard length (SL)* - measured from the tip of the upper lip to the caudal-fin base; *head length* - measured from the tip of the upper lip to the upper rear edge of the gill opening; *caudal peduncle depth* is the least depth and *caudal peduncle length* is measured between two vertical lines, one passing through the base of the last anal ray and the other through the caudal-fin base.

Counts and measurements that appear in parentheses refer to the range for paratypes if different from the holotype.

Blue Rainbowfish
Melanotaenia caerulea sp. nov.
(Figures 1-2)

Melanotaenia sp. Allen 1995: 75 (Kikori River, Papua New Guinea).

Holotype. WAM P. 30986-001, 61.5 mm SL, tributary of Mubi River near Wasi Falls Lodge, Station 7.

Paratypes. WAM P. 30966-001, 23 specimens, 23.8-46.6 mm SL, pond near Kopi Chevron Camp, Station 1; WAM P. 30980-001, 26 specimens, 23.5-39.7 mm SL, creek near Kopi Chevron Camp, Station 2; WAM P. 30981-005, 6 specimens, 22.2-31.8 mm SL, Au Creek near Wasi Falls, Station 3; WAM P.30984-002, 47 specimens, 21.5-57.1 mm SL, side channel of Mubi River, Station 5; WAM P.30985-002, 4 specimens, 29.6-36.2 mm SL, Ofake Creek, near Kantobo, Station 6; WAM P. 30986-002, 6 specimens, 38.3-51.7 mm SL, collected with holotype at Station 7.

Description

Dorsal rays VI-I,9 (V to VII,7 to 11); anal rays I,16 (I,14 to 17); pectoral rays 11 (11 to 13); pelvic rays I,5; branched caudal rays 15; lateral scales 35 (34 or 35); transverse scales 11 (10 or 11); predorsal scales 16 (13 to 17); cheek scales 14 (11 to 16); gill rakers on first arch 2+12 = 14 (2 or 3 + 12).

Body depth 2.9 (2.7-3.2), head length 3.8 (3.6-3.9), both in SL. Greatest width of body 2.7 (2.4-2.7) in greatest body depth. Snout length 3.6 (3.2 -3.8), eye diameter 2.9 (2.9 -3.2), interorbital width 2.9 (2.6-2.9), depth of caudal peduncle 2.3 (2.3-2.6), length of caudal peduncle 1.2 (1.2-1.4), all in head length.

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends at level of front border of eye or slightly anterior; lips thin; teeth conical with slightly curved tips, extending on to outer surface of lips; teeth of upper jaw in 4-5 irregular rows anteriorly, reduced to a single row posteriorly, where they are exposed when mouth is closed; teeth in lower jaw in about 6 irregular rows anteriorly, reduced to 1 or 2 rows posteriorly; narrow row containing several small, conical teeth on vomer and palatines.

Scales relatively large, arranged in regular horizontal rows; most of body scales with crenulate margins; predorsal scales extending to posterior half of interorbital; preopercle with 2 scale rows between its posterior angle and eye.

First dorsal fin originates about one-half to two thirds pupil diameter in front of level of anal fin origin; longest spines (second to fourth) of first dorsal fin 1.5 (1.4-2.3) in head length, its depressed tip not reaching spine of second dorsal fin in females and first or second soft ray in mature males. Longest rays (variable, rays sometimes subequal, but generally anterior ones longest in females, posterior rays longest in males) of second dorsal fin 1.9 (1.8-2.1) in head length, the depressed posterior rays extending less than one-half length of caudal peduncle in females and one-half to two-thirds length of caudal peduncle in mature males. Longest (middle rays in females, last 2 or 3 rays in males) anal rays 1.8 (1.8-2.3) in head length. Pelvic fin tips when depressed reaching to about anal fin origin; length of pelvic fins 1.5 (1.5-1.9), of pectoral fins 1.7 (1.4-1.9), of caudal fin 1.1 (1.0-1.1), all in head length. Caudal fin moderately forked.

Colour in life: bright iridescent blue on sides and back, becoming whitish or pink ventrally; faint, darker blue midlateral stripe on posterior half of body, about one scale wide; each horizontal scale row on blue portion of body separated by narrow pinkish-orange stripe; short brown stripe, about pupil width from rear of eye to area just above pectoral fin, frequently continued as pair of narrow brown stripes on upper and lower edge of midlateral scale row, and linking posteriorly with dark blue midlateral stripe mentioned above; fins bluish to translucent, anterior edge of first dorsal fin and outer portion of second dorsal and anal fins sometimes reddish or dusky blackish in males; pelvic fins mainly translucent, but sometimes slightly dusky grey to reddish; pectoral fins translucent.

Colour in alcohol: upper half of body brown, lower half yellow-tan to whitish; scales of body, particularly on upper half, with narrow dark outline; blackish midlateral stripe from preopercular margin to base of caudal fin, most distinct on posterior half of body, and more intense in males; fins translucent to dusky grey, anterior edge of first dorsal fin and outer portion of second dorsal and anal fins sometimes dusky blackish in males.

Sexual dimorphism: typical of most members of the genus; males are generally deeper bodied and have a more elongate, somewhat pointed shape posteriorly on the soft dorsal and anal fins. In addition, the depressed first dorsal fin of adult males overlaps the second dorsal fin in males, but does not usually reach it in females. The body depth (as percentage of the standard length) of six males, 43.0-57.1 mm SL, ranged from 32.6-37.3 with an average of 34.9; that of 12 females, 34.3-53.0 mm SL, was 30.2-33.3 with an average of 32.5. The smallest gravid female examined was 29.5 mm SL.

Intra-specific variation: two significant meristic differences were noted between the downstream (Kopi) and upstream (Kantobo) populations (see Table 1). Fish from the Kantobo area most frequently have 6 spines in the first dorsal fin and 11 pectoral rays, compared with 5 spines and 12 pectoral rays for Kopi fish. Further studies, utilising

mitochondrial DNA analysis, would be desirable to determine the status of these two populations. Genetic exchange between the areas does not seem likely due to a series of large, spectacular waterfalls and rapids immediately downstream from Kantobo. The river loses approximately 350 m of elevation over a distance of 6-7 km.



Fig. 1. - *Melanotaenia caerulea*, male holotype, 61.5 mm SL, tributary of Au Creek, near Wasi Falls, Papua New Guinea.
Melanotaenia caerulea, mâle holotype, 61,5 mm LS, affluent de Au Creek, près des Wasi Falls, Papua New Guinea.

Distribution and habitat

The species was collected at several sites in the lower and middle Kikori drainage system, spanning a distance of approximately 125 km, between elevations of about 20 and 400 metres above mean sea level. It was not collected in the Kikori mainstream, but rather in small tributary creeks, flowing through rainforest, except in one case (Station 1), it was taken from a small tidal creek-fed pond (about 6 m in diameter) in open sunlight. The habitat in the vicinity of Kantobo village (Stations 6-7) consisted mainly of narrow streams in closed-canopy forest, flowing through limestone hills. The stream bed at Station 7 was mainly dry, except for several pools, 2-3 metres in length.

Table 1

Summary of dorsal, anal, and pectoral fin-ray counts for members of the "maccullochi group" of *Melanotaenia*.

Separate counts are given for the upstream (U) and downstream populations (D) of *M. caerulea*.

Récapitulatif des comptes des rayons des nageoires dorsale, anale et pectorale de membres du "groupe maccullochi".

Les comptes sont donnés séparément pour les populations de l'amont (U) et celles de l'aval (D) de *M. caerulea*.

	First Dorsal Fin Spines				Soft Dorsal Rays					
	IV	V	VI	VII	7	8	9	10	11	12
<i>caerulea</i> (U)		3	20	1		1	14	8	1	
<i>caerulea</i> (D)		26	9		2	13	17	3		
<i>maccullochi</i>	4	71	40	1	3	36	44	30	2	
<i>ogilbyi</i>		5	14	3			2	10	10	
<i>papuae</i>	6	58	8				28	36	11	1
<i>sexlineata</i>		4	6	1				1	7	3

	Soft Anal Rays						Pectoral Rays				
	13	14	15	16	17	18	19	11	12	13	14
<i>caerulea</i> (U)		2	7	11	4			22	2		
<i>caerulea</i> (D)		6	22	7				3	19	2	
<i>maccullochi</i>	1	14	48	42	8			3	69	42	1
<i>ogilbyi</i>					11	8	3		7	12	3
<i>papuae</i>		1	12	37	25	2			28	42	7
<i>sexlineata</i>				2	6	1	2			10	1

Table 2
 Proportional measurements of selected type specimens
 of *Melanotaenia caerulea* expressed as percentage of the standard length.
 Dimensions relatives de spécimens types choisis
 de *Melanotaenia caerulea* exprimées en pourcentage de la longueur standard.

	Holotype WAM P.30986 -001 male	Paratype WAM P.30984 -002 male	Paratype WAM P.30984 -002 female	Paratype WAM P.30984 -002 male	Paratype WAM P.30984 -002 male	Paratype WAM P.30984 -002 female
Standard length (mm)	61.5	57.1	53.0	50.7	45.9	44.8
Body depth	38.9	34.2	31.3	36.7	34.6	32.4
Body width	14.6	12.4	12.8	13.4	13.1	12.9
Head length	25.5	26.3	25.7	27.2	26.1	27.5
Snout length	7.3	7.4	6.8	7.7	7.2	7.8
Eye diameter	8.1	8.9	8.1	8.7	9.2	8.9
Bony interorbital width	9.6	9.1	10.0	9.7	10.2	9.6
Depth of caudal peduncle	12.2	11.6	10.4	11.2	10.9	10.9
Length of caudal peduncle	19.5	21.4	20.0	19.7	21.8	19.0
Predorsal distance	44.4	43.1	45.1	45.4	46.8	46.9
Preanal distance	50.7	51.8	54.3	53.6	53.4	54.5
Prepelvic distance	36.4	37.0	39.4	38.1	39.7	40.0
2nd dorsal fin base	22.3	19.8	17.5	21.3	18.7	18.5
Anal fin base	36.3	32.7	30.9	34.7	32.2	33.5
Pectoral fin length	17.1	15.4	16.8	18.1	19.0	14.3
Pelvic fin length	15.6	17.5	13.6	16.6	15.3	15.2
Longest ray 1st dorsal fin	18.2	17.9	10.9	18.9	16.8	12.3
Longest ray 2nd dorsal fin	18.5	13.5	13.2	13.8	13.1	13.2
Longest anal ray	16.1	14.4	12.6	12.6	13.5	12.1
Caudal fin length	24.1	23.3	23.4	25.0	24.4	24.8



Fig. 2. - *Melanotaenia caerulea*, male paratype, 46.5 mm SL (WAM P.30966-001), pond near Kopi Chevron Camp, Papua New Guinea.
Melanotaenia caerulea, mâle paratype, 46,5 mm LS (WAPP.30966-001), mare près de Kopi Chevron Camp, Papua New Guinea.



Fig. 3. - *Melanotaenia ogilbyi*, male, 51.7 mm SL (WAM P.31057-010), near Timika, Irian Jaya.
Melanotaenia ogilbyi, mâle, 51,7 mm LS (WAM P.31057-010), près de Timika, Irian Jaya.

Comparisons

Melanotaenia caerulea belongs to a species complex known as the "maccullochi group" (Allen 1981), which includes *M. maccullochi* (N. Australia and Fly River delta), *M. ogilbyi* (Lorentz River region of Irian Jaya), *M. papuae* (vicinity of Port Moresby, Papua New Guinea), and *M. sexlineatus* (Upper Fly River). The group is characterised by a relatively small maximum size, similar shape, and a relatively low number of dorsal, anal, and pectoral rays (7-11, 14-19, and 11-14 respectively), as well as a low number of cheek and predorsal scales (11-16 and 13-17 respectively).

Fin rays counts are contrasted in Table 1. Although the members of the group have similar patterns, each is clearly distinct (see Allen 1995). *Melanotaenia caerulea* is the only species that is mainly blue (in contrast to white, yellow, or mauve backgrounds). The overall appearance is closest to that of *M. ogilbyi* (Fig. 3), but the two species have significant modal differences in the number of soft dorsal, anal, and pectoral rays (Table 1), and their known geographic distributions are separated by a distance of approximately 200 km. Specimens deposited at WAM were utilised for comparisons of members of the "maccullochi group".

Etymology

The species is named *caerulea* (Latin: "blue") with reference to the characteristic colour pattern.



Fig. 4. - Habitat of *Melanotaenia caerulea* near Kopi Chevron Camp, Papua New Guinea (Station 1).
Habitat de *Melanotaenia caerulea*, près de Kopi Chevron Camp, Papua New Guinea (Station 1).

Mubi Rainbowfish

Melanotaenia mubiensis sp. nov.

(Figure 5)

Melanotaenia sp. Allen, 1995: 75 (Kikori River, Papua New Guinea).

Holotype. WAM P. 30984-001, 92.6 mm SL, side channel of Mubi River, Station 5.

Paratypes. WAM P. 30981-002, 5 specimens, 19.2-72.7 mm SL, Au Creek near Wasi Falls, Station 3; WAM P. 30983-001, 8 specimens, 18.7-96.5 mm SL, spring next to Digimu River, Station 4; WAM P.30984-006, 20 specimens, 23.4-80.0 mm SL, collected with holotype at Station 5; WAM P. 30985-001, 2 specimens, 45.7-55.1 mm SL, Ofake Creek near Kantobo, Station 6.

Description

Dorsal rays V-I,14 (IV to VII,13 to 15); anal rays I,21 (I,21 to 23); pectoral rays 16 (13 to 15); pelvic rays I,5; branched caudal rays 15; lateral scales 36 (36 or 37); transverse scales 12 (11 or 12); predorsal scales 19 (17 to 19); cheek scales 20 (15 to 20); gill rakers on first arch 2+14 = 16 (2 +12 to 14).

Body depth 2.4 (2.5-3.3), head length 3.7 (3.5-3.8), both in SL. Greatest width of body 2.8 (2.2-2.7) in greatest body depth. Snout length 3.1 (3.1 -3.5), eye diameter 3.6 (3.2-3.5), interorbital width 2.8 (2.8-3.1), depth of caudal peduncle 2.6 (2.5-3.0), length of caudal peduncle 1.7 (1.5-1.7), all in head length.

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends slightly anterior to level of front border of eye; lips thin; teeth conical with slightly curved tips, extending on to outer surface of lips; teeth of upper jaw in about 6 irregular rows anteriorly, reduced to a single row posteriorly, where they are exposed when mouth is closed; teeth in lower jaw in about 8 irregular rows anteriorly, reduced to 1 or 2 rows posteriorly; narrow row of small, conical teeth on vomer and palatines.

Scales relatively large, arranged in regular horizontal rows; most of body scales cycloid or with slightly crenulate margins; predorsal scales extending to posterior half of interorbital; preopercle with 3 (2-3) scale rows between its posterior angle and eye.

First dorsal fin originates about one-half to two thirds pupil diameter in front of level of anal fin origin; longest spines (second to fourth) of first dorsal fin 2.0 (1.6-2.7) in head length, its depressed tip barely reaching spine of second dorsal fin in females and reaching first or second soft ray in mature males. Longest rays (variable, rays sometimes subequal, but generally anterior ones longest in females, posterior rays longest in males) of second dorsal fin 2.5 (2.1-2.9) in head length, the depressed posterior rays extending less than one-half length of caudal peduncle in females and one-half to two-thirds length of caudal peduncle in mature males. Longest (generally middle rays in both males and females) anal rays 3.0 (2.3-3.0) in head length. Pelvic fin tips when depressed just reaching anal fin origin in males and falling short of this point in females; length of pelvic fins 1.6 (1.6-1.9) in males and 1.9-2.7 in females, of pectoral fins 1.5 (1.4-1.5), of caudal fin 1.3 (1.2-1.5), all in head length. Caudal fin moderately forked.



Fig. 5. - *Melanotaenia mubiensis*, male paratype, 55.1 mm SL (WAM P.30985-001), near, Ofake Creek, near Kantobo, Papua New Guinea.

Melanotaenia mubiensis, mâle paratype, 55,1 mm LS (WAM P.30985-001), près de Ofake Creek, près de Kantobo, Papua New Guinea.



Fig. 6. - *Melanotaenia lacustris*, male, approximately 85.0 mm SL, Lake Kutubu, Papua New Guinea.

Melanotaenia lacustris, mâle, environ 85,0 mm LS, Lake Kutubu, Papua New Guinea.

Table 3

Summary of dorsal, anal, and pectoral fin-ray counts
for *Melanotaenia mubiensis*, *M. lacustris*, and *M. monticola*.
Récapitulatif des comptes des rayons des nageoires dorsale, anale et pectorale
de *Melanotaenia mubiensis*, *M. lacustris* et *M. monticola*.

	First Dorsal Fin Spines				Soft Dorsal Rays					
	IV	V	VI	VII	12	13	14	15	16	17
<i>mubiensis</i>	3	11	5	1		2	9	9		
<i>lacustris</i>	3	9	1		8	4	1			
<i>monticola</i>	18	20						10	20	8

	Soft Anal Rays						Pectoral Rays			
	18	19	20	21	22	23	13	14	15	16
<i>mubiensis</i>				11	6	2	2	16	1	1
<i>lacustris</i>	5	5	2	1			1	2	10	
<i>monticola</i>	4	11	18	5			1	19	16	2

Table 4

Proportional measurements of selected type specimens
of *Melanotaenia mubiensis* expressed as percentage of the standard length.
Dimensions relatives de spécimens types choisis
de *Melanotaenia mubiensis* exprimées en pourcentage de la longueur standard.

	WAM P.30984 -001 male	WAM P.30983 -001 male	WAM P.30981 -002 male	WAM P.30984 -001 female	WAM P.30984 -001 male	WAM P.30984 -001 female
Standard length (mm)	92.6	96.5	88.0	80.0	72.7	61.9
Body depth	40.9	36.5	40.5	33.0	36.7	30.2
Body width	14.5	13.6	15.0	14.8	14.7	13.7
Head length	27.0	28.0	26.5	26.8	27.0	28.6
Snout length	8.6	9.1	8.0	8.6	8.8	9.4
Eye diameter	7.5	8.3	7.8	7.8	8.5	8.9
Bony interorbital width	9.5	9.7	9.4	9.4	9.6	9.4
Depth of caudal peduncle	10.5	10.8	10.7	9.9	10.0	9.5
Length of caudal peduncle	13.7	17.8	15.9	17.5	16.5	18.6
Predorsal distance	50.0	48.2	49.4	50.0	5.0	47.8
Preanal distance	55.4	50.4	52.7	53.1	53.1	51.7
Prepelvic distance	40.7	38.2	38.2	39.3	39.9	38.4
2nd dorsal fin base	28.6	30.2	25.9	24.4	26.4	24.2
Anal fin base	39.6	37.7	38.4	36.6	39.9	35.5
Pectoral fin length	17.7	18.9	18.2	17.5	17.6	19.9
Pelvic fin length	16.4	15.0	9.7	12.3	13.9	15.3
Longest ray 1st dorsal fin	13.7	11.3	15.2	11.0	12.0	10.7
Longest ray 2nd dorsal fin	10.8	9.9	12.8	9.6	11.3	11.0
Longest anal ray	8.9	10.6	11.6	9.3	10.2	9.5
Caudal fin length	20.7	20.7	21.4	20.4	18.8	19.7

Colour in life: blue-green on upper half of head and back, frequently with golden sheen anteriorly, lower side whitish; dark blue midlateral stripe extending from rear edge of eye to base of caudal fin, about one scale wide anteriorly and two scales wide on caudal peduncle; 6-7 pale orange stripes between each horizontal scale row on upper half of body; yellowish stripe, one scale wide, immediately below dark midlateral stripe, from pectoral fin base to level of

middle anal rays; pupil-sized orange spot on upper part of operculum; iris of eye golden yellow; first dorsal fin pale green or bluish; second dorsal and anal fins dusky blackish, except bluish basally; caudal fin bluish to translucent, upper and lower edges narrowly dusky; pelvic fins translucent with dusky anterior edge; pectoral fins mainly translucent. Female colouration generally less intense and all fins mainly translucent or bluish.

Colour in alcohol: holotype dusky charcoal on upper half of body with narrow black scale outlines, lower half yellow-tan to whitish with diffuse dark scale outlines; black midlateral stripe apparent only from eye to pectoral region and faintly visible on caudal peduncle; first dorsal fin whitish with blackish tip; caudal fin yellow-white; pectoral fins translucent; remaining fins dusky blackish. Most of paratypes brown on back and yellow-white on lower half, with prominent, blackish midlateral stripe; fins similar to holotype, except mainly whitish to translucent in females.

Sexual dimorphism: typical of most members of the genus; males are generally deeper bodied than females. The body depth (as percentage of the standard length) of four males, 72.7-92.6 mm SL, ranged from 36.7-40.9 with an average of 38.4; that of five females, 54.5-80.0 mm SL, was 29.6-32.1 with an average of 30.7. The difference is not as noticeable as in many other *Melanotaenia*, but males tend to have slightly more elongate posterior rays on the second dorsal fin compared to females. In addition, the depressed first dorsal fin of adult males overlaps the second dorsal fin in males, but barely reaches it or falls short of the second dorsal fin in females.

Distribution and habitat

The species was collected from a relatively small section of the middle Kikori drainage system, spanning a distance of approximately 20 km, between elevations of about 380 and 400 metres above mean sea level. All sites were tributaries of the Mubi River, one of the primary mountain tributaries of the Kikori, and the outlet for Lake Kutubu, which lies approximately 70 km farther upstream from the collecting sites. The habitat consists of narrow, crystal clear streams in closed-canopy forest, flowing through limestone hills. The holotype was collected from a spectacular series of sinkholes linked by short tunnels to the main channel of the Mubi River.

Comparisons

Melanotaenia mubiensis is most closely related to *M. lacustris* Munro (Fig. 6) from Lake Kutubu. Large adults of the two species have very similar colouration. However, they differ in several features, including body depth, eye size, and modal fin ray counts (Table 3). Adults of *M. mubiensis* are much more slender than those of *M. lacustris*; the four largest male types of *M. mubiensis* had an average depth as percent of the SL of 38.4 compared to an average of 47.2 for *M. lacustris* ($n = 6$, 82-97 mm SL). The eye diameter of *M. lacustris* is larger than the snout length, but in *M. mubiensis* it is shorter or equal to the snout length. Although the two species have overlapping counts for dorsal, anal, and pectoral fin rays, there are significant modal differences. *M. mubiensis* most frequently has 14 or 15 dorsal rays, 21 or 22 anal rays, and 14 pectoral rays compared to usual counts of 12 or 13, 18 or 19, and 15 respectively for *M. lacustris*.

The new species is also similar in general appearance to *M. monticola* Allen (Fig. 7), which occurs in the middle Kikori and adjacent Puari River system. The two species were collected together at Station 6. Besides differing in colour pattern they also have differences in soft dorsal and anal fin rays (Table 3); *M. monticola* has 15 to 17 dorsal rays and 18 to 21 (usually 19 or 20) anal rays. Specimens of *M. lacustris* and *M. monticola* in the WAM collection were utilised for comparison.



Fig. 7. - *Melanotaenia monticola*, male, approximately 85.0 mm SL (WAM P.30988-001), near Moro, Papua New Guinea. *Melanotaenia monticola*, mâle, environ 85,0 mm LS (WAP P.30988-001), près de Moro, Papua New Guinea.



Fig. 8. - Habitat of *Melanotaenia mubiensis* and *M. caerulea*, near Kantobo, Papua New Guinea (Station 5). Habitat de *Melanotaenia mubiensis* et *M. caerulea*, près de Kantobo, Papua New Guinea (Station 5).

Etymology

The species is named *mubiensis* with reference to the general locality where the type specimens were collected; all were taken from tributaries of the Mubi River.

Acknowledgments

Field work in the Kikori system was facilitated by the generous support of WWF and the Chevron Oil Company.

I am particularly grateful to the expedition leader, Dr. **Gary Hartshorn** of WWF, Washington, D.C.

The success of the expedition was largely due to the efforts of WWF employees **Rex Naug**, **Mark Forney**, and **Tanya Leary**.

I am also appreciative of field assistance received by Dr. **Dan Polhemus** of the Bishop Museum, Honolulu and professional wildlife photographer **Gerry Ellis** of Portland, Oregon.

REFERENCES

- Allen (G.R.) 1980. - A generic classification of the rainbowfishes (family Melanotaeniidae). *Rec. West. Aust. Mus.* **8** (3): 449-490.
- Allen (G.R.), 1981. - The *maccullochi* species group of rainbowfishes (Melanotaeniidae) with the description of *Melanotaenia papuae*, new species. *Revue fr. Aquariol.* **8** (2): 47-56.
- Allen (G.R.), 1995. - *Rainbowfishes in Nature and in the Aquarium*. Tetra Verlag, Melle, Germany.
- Allen (G.R.) & D.F. Hoese, 1986. - The eleotrid fishes of Lake Kutubu, Papua New Guinea with descriptions of four new species. *Recs. West. Aust. Mus.* **13** (1): 79-101.
- Saeed (B.), W. Ivantsoff & G.R. Allen, 1989. - Taxonomic revision of the family Pseudomugilidae (Order Atheriniformes). *Aust. J. Mar. Freshwater Res.* **40**: 719-787.

RÉSUMÉ

Deux nouvelles espèces de Poissons Arc-en-Ciel (*Melanotaenia*: Melanotaeniidae) du système de la Rivière Kikori, Nouvelle-Guinée Papouasie.

Les Poissons Arc-en-Ciel sont des habitants réguliers des eaux douces de Nouvelle-Guinée et d'Australie. Petits (moins de 12 cm LS) et vivement colorés, on pense qu'ils ont évolué, à des époques relativement récentes, à partir d'Arthérinoides marins. Ils seraient le groupe-frère des Pseudomugilidae.

Environ 60 espèces, parmi lesquelles plusieurs restent à décrire, appartenant à 6 genres, ont été répertoriées à ce jour. Environ 80% des espèces se trouvent en Nouvelle-Guinée, territoire qui a été particulièrement fertile en nouveautés.

La Kikori River prend naissance dans les montagnes centrales du Sud-Ouest de la Papouasie et coule vers le Sud sur près de 250 km avant de former un grand delta au fond du Golfe de Papouasie. Le caractère le plus notable du système de la Kikori est peut-être sa vaste topographie karstique qui recèle quelques-uns des sites les plus pittoresques et sauvages de la Papouasie.

La faune piscicole de la région, sauf celle du lac Kutubu, était peu connue avant la mission du WWF de 1995. Toutefois, à la suite de cette expédition, la faune inventoriée compte 87 espèces appartenant à 55 genres et 34 familles (sous presse). Le bassin abrite 14 espèces endémiques et ce haut pourcentage d'espèces uniques est dû en très grande partie à l'existence du lac Kutubu qui en possède 10.

Les deux espèces nouvelles décrites ici ont été récoltées par l'auteur au cours de l'enquête du Fond Mondial pour la Nature (WWF) sur la biologie du système de la Kikori River, en Papouasie. *Melanotaenia caerulea* n.sp. est décrit sur 106 spécimens 21,5-61,5 mm LS) du bas et moyen système de la Kikori, à des altitudes de 20 à 400 m. Il appartient au « groupe maccullochi » et semble être le plus proche de *M. ogilbyi*. Il diffère des autres membres du groupe par une coloration à dominante bleue et il est distinct de *M. ogilbyi* par des divergences modales significatives du nombre des rayons dorsaux, anaux et pectoraux.

Melanotaenia mubiensis n.sp. est décrit sur 36 spécimens (18,7-96,5 mm LS) récoltés dans des affluents de la Rivière Mubi qui appartient au système moyen de la Kikori. Il est le plus semblable à *M. lacustris* qui habite le lac Kutubu, situé plus loin en amont. Les adultes de *M. mubiensis* sont plus élancés que ceux de *M. lacustris* et ont de plus petits yeux (inférieurs ou égaux à la longueur du museau chez *mubiensis* et plus grands chez *lacustris*). Bien que les comptes des rayons des nageoires se chevauchent, les différences modales sont significatives.