

Melanotaenia iris, a New Freshwater Rainbowfish (Melanotaeniidae) from Papua New Guinea with Notes on the Fish Fauna in Head Waters

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Abstract A new melanotaeniid rainbowfish, *Melanotaenia iris*, is described from mountain tributaries of the Strickland River in west-central Papua New Guinea. It is most closely related to *M. goldiei* of southern New Guinea, but differs in colour pattern, a distinctive high number of scales on the suborbital-preopercle bones, and a greater number of soft dorsal fin rays. Notes are also included on the poorly developed fish fauna of head waters in the Fly-Strickland and Sepik river systems. Most streams thus far investigated have less than 4 species. The plotosid catfish *Tandanus equinus* appears to be the most successful colonizer of fast-flowing highland streams in the Fly-Strickland system and is sometimes the only species present.

The atherinoid family Melanotaeniidae contains small, minnow-like fishes that are restricted to fresh (occasionally brackish) waters of Australia and New Guinea. The group was most recently reviewed by Allen and Cross (1982), who included 49 species in eight genera. Since their work was published an additional 12 species and one new genus, all from New Guinea, have been described (Allen 1982a, b, 1983a, b, c, 1985a, b; Allen and Ivantsoff, 1982, 1986; Allen and Sarti, 1983; Ivantsoff and Allen, 1984). Many areas of New Guinea, particularly in remote western sections of the western half (Irian Jaya) remain unsampled and will certainly yield additional new taxa in the future.

The present paper describes a new *Melanotaenia* that was collected by D. Gwyther during a recent environmental survey of the Strickland River and several of its upper tributaries in western-central Papua New Guinea. A discussion of the fish fauna of head water streams in the Fly-Strickland and Sepik drainage systems is also included.

The methods of counting and measuring are the same as those of Allen and Cross (1982). Standard length is abbreviated as SL. Counts and measurements in parentheses refer to the range for paratypes if differing from the holotype. Type specimens have been deposited at the Kanudi Fisheries Research Station, Port Moresby, Papua New Guinea (KFR) and the Western Australian Museum, Perth (WAM).

Melanotaenia iris sp. nov.

(Figs. 1, 2; Tables 1, 2)

Holotype. WAM P28480-001, male, 95.1 mm SL, Logatyu River, near Wankipe, Papua New Guinea (approximately 5°11'S, 142°23'E), headline by D. Gwyther, 8 October 1984.

Paratypes. KFR unregistered, 2 specimens, female and male, 83.0–87.7 mm SL, collected with holotype; WAM P28480-002, 2 specimens, male and female, 78.6–81.5 mm SL, collected with holotype.

Diagnosis. A member of the melanotaeniid genus *Melanotaenia* allied to a group of species characterized by a broad, dark midlateral stripe and a relatively high number of soft dorsal rays (10 to 19, usually more than 12). It is most closely related to *M. goldiei* (Macleay), a widely distributed species in southern New Guinea, but differs in having more soft rays in the second dorsal fin (17 to 20 versus 12 to 17, usually 14 to 16) and more scales covering the suboperculum-preoperculum (about 30 to 40 versus 15 to 25; see Fig. 2). The nature of the midlateral stripe also differs between the two species. It is continuous and uniformly broad along the middle of the side in *M. iris*, but in *M. goldiei* it is generally absent or very faint anteriorly over a space covering about 8–10 scales, the stripe then recommences below the soft dorsal fin origin, becoming broadest on the caudal peduncle.

Description. Dorsal rays IV-I, 20 (IV or V-I, 17 to 19); anal rays I, 24 (I, 21 to 23); pectoral rays 15 (14 or 15); pelvic rays I, 5; branched

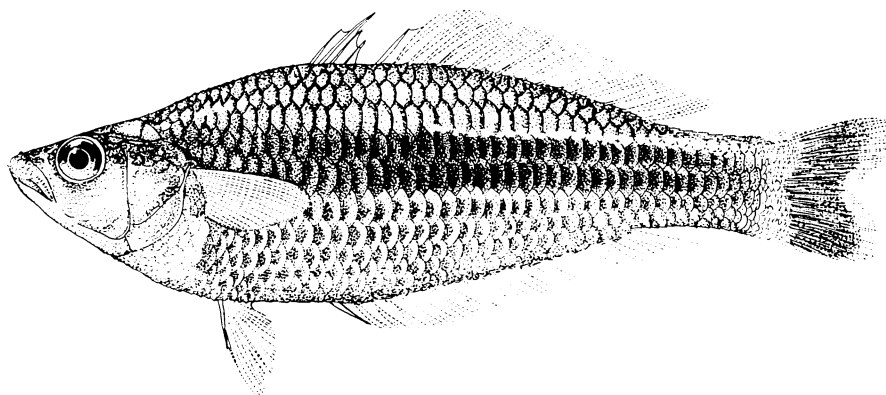


Fig. 1. *Melanotaenia iris*, 95.1 mm SL, drawing of male holotype.

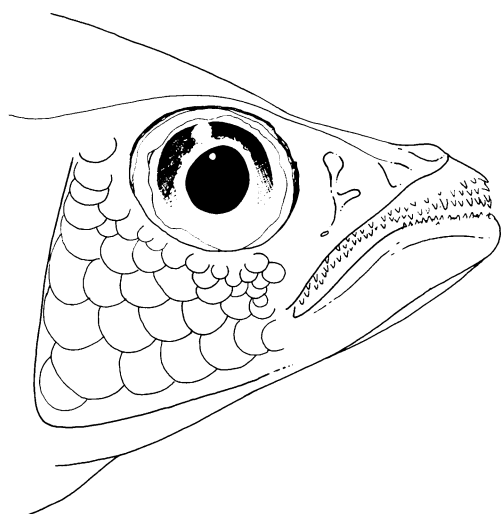


Fig. 2. Head of *Melanotaenia iris* showing scalation on preopercular and suborbital region.

caudal rays 15; vertical scale rows from rear edge of operculum to caudal fin base 40 (38 or 39); horizontal scale rows from base of anal fin origin to base of first dorsal fin 11 (10 or 11); predorsal scales 16 (16 or 17); preopercle-suborbital scales about 40 (about 30 to 35); gill rakers on first arch 4+15=19 (3 to 5+13 to 15=17 to 19).

Body depth 2.9 (3.0 to 3.4); head length 3.8 (3.7 to 3.9), both in standard length. Greatest width of body 2.8 (2.2 to 2.5) in body depth. Snout length 3.5 (3.2 to 3.7), eye diameter 3.6 (3.0 to 3.4), interorbital width 2.9 (2.7 to 2.8), depth of caudal peduncle 2.0 (2.0 to 2.3), length of caudal peduncle 1.7 (1.6 to 2.1), all in head length.

Jaws about equal, oblique, premaxilla with

abrupt bend between anterior horizontal portion and lateral part; maxilla ends below level of anterior part of pupil; lips thin; teeth villiform with slightly curved tips, in dense bands tapering in width posteriorly. Teeth exposed when mouth closed, particularly those of upper jaw; edentulous space between outer jaw teeth and those inside absent; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales relatively large, arranged in regular horizontal rows; most of body scales with slightly crenulate margins; predorsal scales extending to posterior portion of interorbital; preopercle scale rows from posterior angle to edge of eye 4.

First dorsal fin originates about one half eye diameter ahead of level of anal fin origin; longest spine (2nd or 3rd) of first dorsal fin 2.6 (2.2 to 2.8) in head length, its tip reaching base of first soft ray of second dorsal fin in females and second soft ray in mature males if depressed. Longest ray (penultimate in males, about seventh in females) of second dorsal fin 2.5 (2.2 to 2.6) in head length, the depressed posterior rays extending about one-half length of caudal peduncle in females and about two-thirds length of caudal peduncle in mature males. Longest (about 7th or 8th ray in both sexes) anal rays 2.5 (2.5 to 2.7) in head length. Soft dorsal and anal fins rectangular in outline, posteriormost corner somewhat elongate and pointed, particularly in males. Pelvic fin tips when depressed reaching anal fin origin or beyond; length of pelvic fin 1.9 (1.8 to 1.9), of pectoral fin 1.5 (1.5 to 1.6), of caudal fin 1.4 (1.3 to 1.4), all in head length; caudal fin moderately forked.

Table 1. Proportional measurements of selected type specimens of *Melanotaenia iris* expressed as a percentage of the standard length.

	Holotype		Paratypes		
	WAM P28480-001 male	KFR unreg. male	KFR unreg. female	WAM P28480-002 female	WAM P28480-002 male
Standard length (mm)	95.1	87.7	83.0	81.5	78.6
Depth	34.3	33.8	32.4	29.8	30.5
Width	12.3	13.7	13.5	13.6	12.7
Head length	26.3	27.4	25.5	27.0	26.1
Snout length	7.6	8.4	7.8	7.4	7.9
Orbit diameter	7.4	8.0	8.4	8.0	8.1
Bony interorbital width	9.0	9.7	9.3	9.9	9.2
Depth of caudal peduncle	12.9	13.1	12.3	11.7	12.8
Length of caudal peduncle	15.5	13.3	13.4	16.6	15.6
Snout to 1st dorsal fin origin	43.2	44.2	43.1	42.3	42.7
Snout to anal fin origin	47.4	47.3	52.2	49.9	47.5
Snout to pelvic fin origin	34.9	34.3	37.8	36.6	36.0
Length of 2nd dorsal fin base	37.1	34.2	31.6	33.1	35.2
Length of anal fin base	41.3	37.9	35.9	35.1	38.2
Length of pectoral fin	17.5	17.3	17.6	18.4	16.5
Length of pelvic fin	14.2	15.3	13.7	14.1	13.5
Longest ray of 1st dorsal fin	10.3	10.8	11.4	9.7	10.6
Longest ray of 2nd dorsal fin	10.5	11.4	10.8	10.4	11.7
Longest anal ray	10.5	10.6	9.9	10.1	10.6
Length of caudal fin	18.6	19.4	20.0	20.2	19.8

Table 2. Fin ray counts of type specimens of *Melanotaenia iris*.

1st dorsal fin spines		2nd dorsal fin soft rays		
IV	V	17	19	20
3	2	1	3	1
Soft anal fin rays				
20	21	22	23	24
1	1	1	1	1
Pectoral fin rays				
14	15			
2	3			

Color in life (from Ektachrome print): upper back and dorsal portion of head brownish with darker scale margins; lower half of body and head white; vivid blue stripe across side of snout and upper portion of operculum, becoming broader behind pectoral fin base and extending along middle of side between brown and white areas described above, and terminating at base of caudal fin; series of red-orange longitudinal stripes, one between each longitudinal scale row on upper half of body, those bordering blue mid-lateral stripe and one bisecting midlateral stripe most prominent; median fins dusky blue-grey with white outer margin; pelvic fins white; pectoral

fins translucent.

Color of holotype in alcohol: upper portion of body light brown with darker brown scale margins, lower portion white with dusky brown scale centers; broad, blackish stripe along middle of side from snout to base of caudal fin; interorbital and top of snout dark brown; lower half of head whitish or silvery; dorsal fins with dense covering of pepper-like melanophores; remaining fins mainly whitish or translucent. Smallest paratype with faint indications of pale stripes, one per scale row, on upper half of body.

Remarks. *M. iris* is allied to a large complex of species containing *M. trifasciata* (Rendahl) of northern Australia, *M. goldiei* (Macleay), *M. herbertaxelrodi* Allen, *M. lacustris* Munro, *M. monticola* Allen, *M. oktediensis* Allen et Cross, and *M. pimaensis* Allen, from southern New Guinea, *M. affinis* (Weber) and *M. maylandi* Allen, from northern New Guinea, *M. catherinae* (de Beaufort), *M. japonensis* Allen et Cross, and *M. misoolensis* Allen from offshore islands (Waigeo, Japen, and Misool respectively) adjacent to western New Guinea. Most of these species occur in hilly or mountainous terrain, and except for the wide ranging *M. affinis* and *M. goldiei*, are endemic

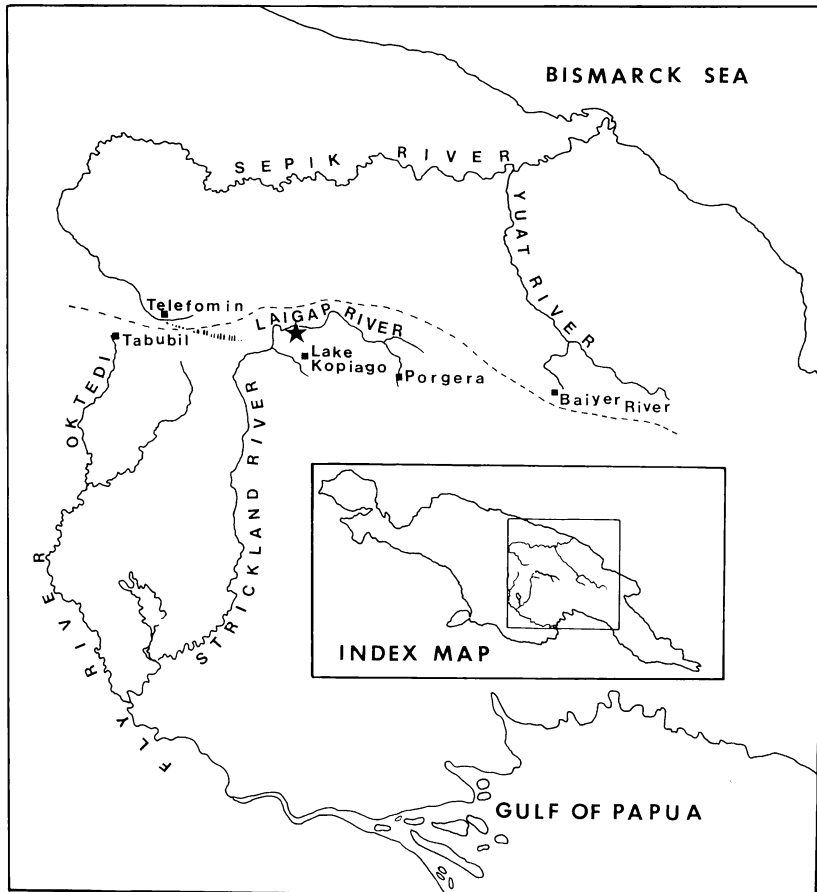


Fig. 3. Map of western Papua New Guinea showing type locality of *Melanotaenia iris* (star) and localities mentioned in text. The central dividing range is indicated by the dashed line.

to islands, lakes or upper tributaries of major drainages.

The type locality (see map, Fig. 3) near Wankipe Village is situated in mountainous terrain at the head waters of the Strickland River, about 850 km upstream from the sea (Toro Pass of the Fly River). The specimens were caught with hand-lines from the Logatyu River within a few hundred meters of the junction of the Laigap River, one of the major headwater streams of the Strickland River system. The rainbowfish were taken from boulder-bottom pools that were interspersed between shallow rapids. Other fishes collected at this site by Gwyther and his local assistants included the teraponid *Hephaestus trimaculatus* (Macleay), and a gudgeon, *Mogurnda* sp.

Etymology. The species is named *iris* (Latin: goddess of the rainbow) with reference to the common appellation for the family to which it

belongs.

Notes on the fish fauna in head waters of the Fly-Strickland and Sepik river systems

There is scant information on the fish fauna of the mountainous head waters of New Guinea's longest rivers, the Fly-Strickland and Sepik. Based on personal experience gained on a number of visits over several years (1978–1983) the mountain fish fauna appears to be depauperate, particularly that of the Sepik system. For example, in spite of suitable habitats fishes appear to be unknown in the vicinity of Telefomin (5°09'S, 141°38'E; see map in Fig. 3 for localities mentioned in this discussion) where extensive collecting was carried out by the author in 1983. A number of streams near the village at an elevation of approximately

1,500 m were sampled as well as the main channel of the Sepik (about 1,200 m elevation) which at that point is about 900 km upstream from the sea. A maximum of four species was encountered in a mountain tributary of the Yuat River near Baiyer River (5°33'S, 144°09'E), about 450 km upstream from the sea at an elevation of approximately 1,200 m. These included the plotosid *Tandanus gjellerupi* (Weber), the rainbowfish *Melanotaenia affinis*, the teraponid *Hephaestus transmontanus* (Mees et Kailola), and the eleotrid *Mogurnda bloodi* Whitley.

A much greater number of fishes have been recorded from the head waters of the Fly-Strickland system. Roberts (1978) recorded 16 species from the Ok Tedi, a highland tributary of the Fly River, at distances between 901 and 966 km upstream. However, there was a rapid decrease in the number of fish species from about 940 km upstream with only the plotosid catfishes *Tandanus equinus* (Weber) and *Oloplotosus luteus* Gomon et Roberts, the atherinid *Craterocephalus* sp., the teraponid *Hephaestus habbema* (Weber), and the gobiid *Glossogobius* sp. being collected or observed (with face mask). These same species, with the addition of the rainbowfish *Melanotaenia oktediensis* were collected by the author from a torrential sidestream of the Ok Tedi near Tabubil (5°17'S, 141°13'E) about 970 km upstream from the sea and at an elevation of approximately 560 m. In addition, the eleotrid *Oxyeleotris fimbriata* Weber was taken from Lake Wangbin, situated near Tabubil at an elevation of 1,400 m.

Until recently, there was nothing known about the ichthyofauna of the Upper Strickland. A collection by the author from a fast flowing tributary of the Tumbudu River about 4 km west of Lake Kopaigo and 30 km south of the type locality of *Melanotaenia iris*, yielded only *Tandanus equinus*, which according to local inhabitants was the only fish present. Further information for this region was provided by D. Gwyther during his 1984 survey of the Lagaip River and its tributaries. At the farthest point sampled upstream (about 950 km from the sea) near Porgera (5°29'S, 143°08'E) at an elevation of approximately 2,000 m only the rainbow trout (*Salmo gairdneri* Richardson) was present. It was introduced by the Department of Fisheries in the early 1970's and is apparently self sustaining. Local inhabitants stated it was the only fish present.

Approximately 50 km downstream at an elevation of about 1,500 m on the main Laigap River only *Tandanus equinus* was present and approximately another 60 km downstream near the type locality of *M. iris*, at an elevation of 1,200 m, this catfish was found in addition to *M. iris*, *Hephaestus habbema*, and *Mogurnda* sp. (specimens not retained from these localities). On the basis of this limited data it appears that the plotosid catfish *Tandanus equinus* is the most successful species in penetrating relatively steep gradient, montane streams. This species is widespread in central southern New Guinea (Allen, 1985b).

Faunal impoverishment in head waters of both the Sepik and Fly-Strickland systems may be at least partly due to unstable environmental conditions that have prevailed up until recent geological time. There is evidence of concurrent volcanism and glaciation as recently as 300,000 years before present and widespread glaciation with greatly lowered temperatures persisted until about 15,000 years ago (Löffler, 1977). Even today, steep gradients coupled with high rainfall and cool temperatures tend to render many streams unsuitable for most types of fishes.

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パプアニューギニアの山間から得られた *Melanotaeniidae* の 1 新種 *Melanotaenia iris* と採集地の魚類相

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パプアニューギニア中西部の山間の川から得られた *Melanotaeniidae* の 1 新種 *Melanotaenia iris* を記載した。本種はニューギニア南部に広く分布する *M. goldiei* に最も近縁であるが、斑紋が異なること、眼下一前鰓蓋骨域の鱗の数が多く、背鰭軟条数が多いこと等で区別される。本種の住む Fly-Strickland および Sepik 両河川系の上流の魚類相は貧しく、4 種以上が見られる場所は稀である。