

# A new genus and species of Rainbowfish (Melanotaeniidae) from fresh waters of Irian Jaya, Indonesia

Gerald R. ALLEN\*

## Abstract

A new genus and species of melanotaeniid, *Pelangia mbutaensis*, is described on the basis of 52 specimens, 30.3-55.5 mm SL, collected in 1997 in the Mbuta Basin near Etna Bay, Irian Jaya. The new genus is the apparent sister group of *Glossolepis*, which is restricted to northern New Guinea. It differs from *Glossolepis* with regards to several important features including a lack of teeth on the vomer and palatines, a larger mouth and eye, reduced crenulations on the scale margins, and fewer anal rays. The new genus also differs in having the anal fin origin closer to the caudal fin base than to the snout tip, which is the opposite situation compared to *Glossolepis*. Additionally, the origin of the first dorsal fin is well ahead of the anal fin origin, but in *Glossolepis* it is either even with the anal fin origin or behind it. Finally, the second dorsal fin origin is approximately level with the third soft anal ray in *Pelangia*, but in *Glossolepis* it is usually level with the middle rays.

## Introduction

Rainbowfishes of the family Melanotaeniidae are small, often colourful inhabitants of fresh water in Australia and New Guinea. Knowledge of the group has increased considerably over the past few decades as a result of extensive field work by the author. Prior to 1975 the family contained only 26 species compared to the 53 species that are currently recognized. New Guinea has provided the most fertile ground for new discoveries with 23 species having been described from there since 1980. The family was summarised by Allen and Cross (1982) and more recently by Allen (1995). These works provide colour illustrations and a brief synopsis of the known species.

The present paper describes an unusual rainbowfish that was collected on a recent expedition to the Etna Bay region (Figs 1-2) of Irian Jaya. This part of New Guinea is poorly explored and lies in an interesting region straddling two major zoogeographic sub-provinces - the central mainland to



Fig. 1. - Aerial view of type locality, Mbuta Basin, Etna Bay District of Irian Jaya, Indonesia.  
Vue aérienne de la localité typique, Mbuta Basin, Etna Bay District de Irian Jaya, Indonesia.

G. Allen

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

the east and Vogelkop Peninsula to the west. The author had a rare opportunity to collect fishes around Etna Bay for several days in April 1997, while visiting Freeport Indonesia Company's exploratory mineral drilling camp. Of special interest was a helicopter flight to the previously unexplored Lake Mbuta Basin (Fig. 2), lying approximately 8 km inland from Etna Bay's northern shore. Due to logistical problems and bad weather it was only possible to spend about three hours at the site, just enough time for one small collection. Seven species were obtained, including an unknown rainbowfish, which the author initially believed to be a member of *Glossolepis*, a genus confined to northern New Guinea. Subsequent laboratory examination revealed that separate generic status is justified.

Methods of counting and measuring are as follows: *dorsal and anal rays* - the last ray of the anal and second dorsal fins is frequently 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 mid-line 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 in the description refer to the range for paratypes if different from the holotype. Type specimens are deposited at the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB) and the Western Australian Museum, Perth (WAM).

*Pelangia* new genus

**Type species**, *Pelangia mbutaensis* Allen (see description below)

**Description**

A genus of melanotaeniid with the following combination of characters: oblong, laterally compressed body; body depth generally increasing with age and slightly greater in adult males compared to similar-sized females; body depth 3.0-3.4 in standard length; premaxillaries with an abrupt bend between the anterior horizontal portion and lateral part; jaw teeth conical to caniniform with curved tips, several rows extending outside of mouth; a single row of enlarged teeth on expo-

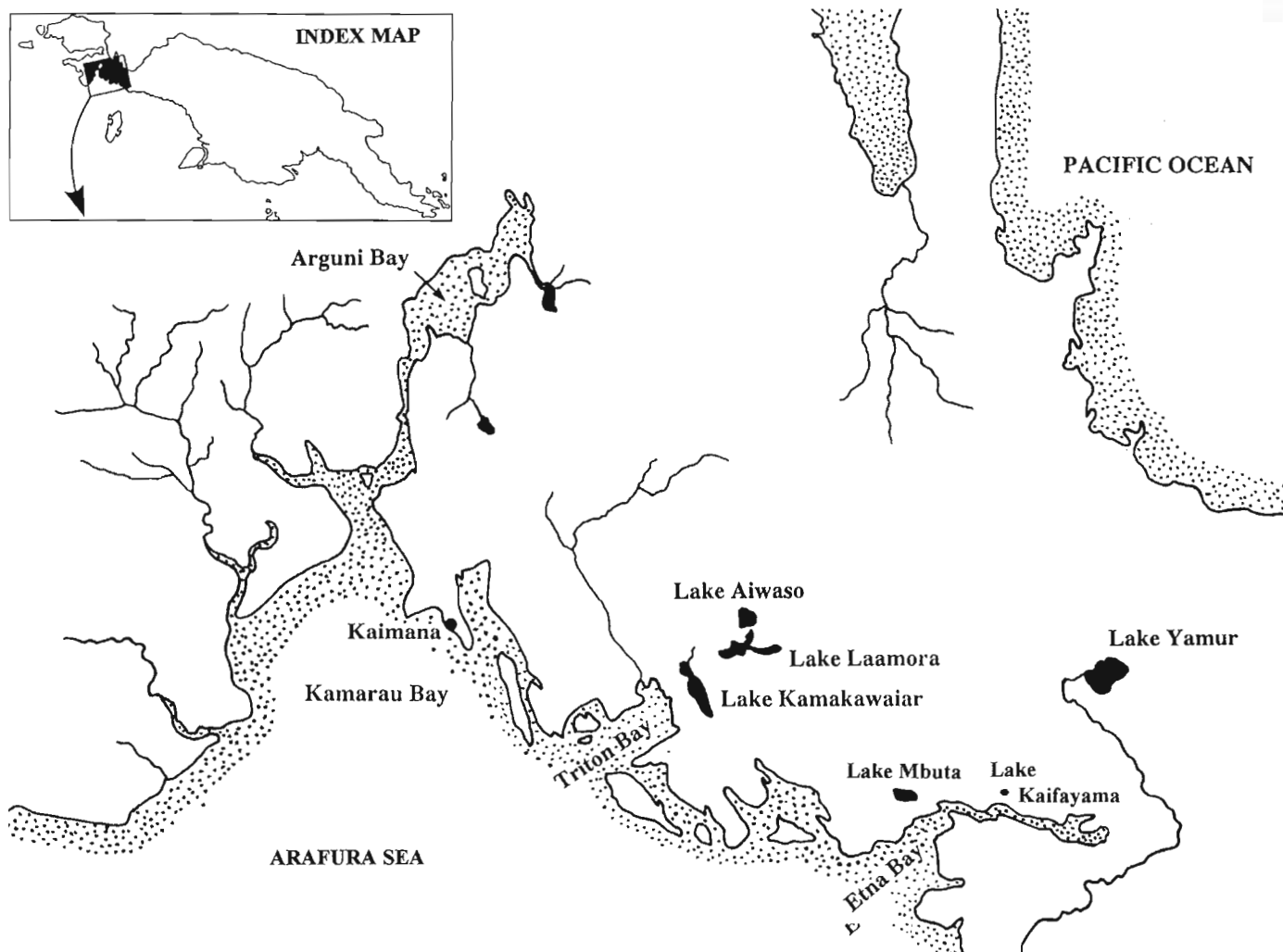
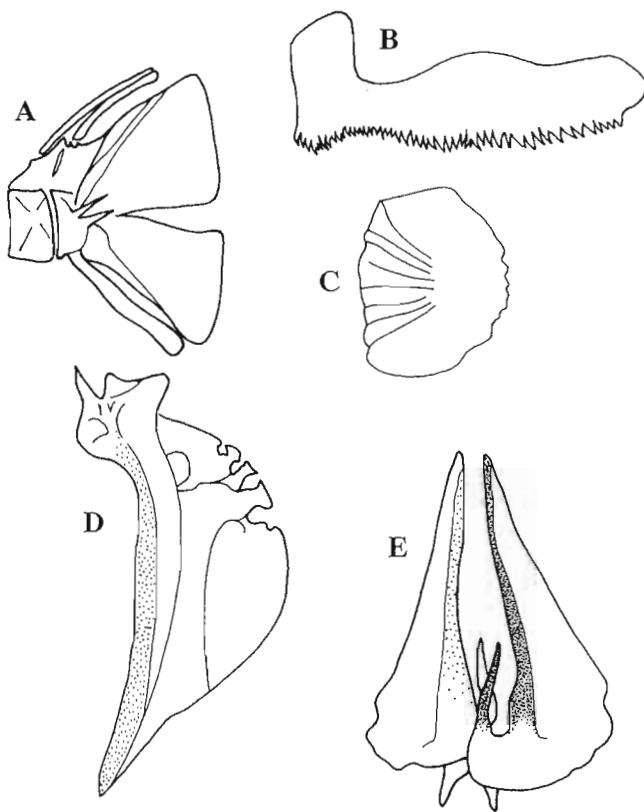


Fig. 2. - Map of Etna Bay region of Irian Jaya. Carte de la région d'Etna Bay en Irian Jaya.

sed lateral edge of premaxillary (Fig. 3B); teeth absent on vomer and palatines; inter-dorsal pterygiophores 2; first dorsal fin with a stout spine and 4-6 slender flexible spines; second dorsal fin with a stout spine and 9-12 segmented rays; anal fin with a stout spine and 14-18 segmented rays; anal fin originates on posterior half of body; soft segmented dorsal and anal fin rays branched except first ray of each fin; branched caudal rays 15; parahypural fused to lower hypural plate (Fig. 3A); pelvic girdle with well developed finger-like projections anteriorly at ventral mid-line (Fig. 3E); lateral "wing" of pelvic girdle anchored to third pleural rib; head of cleithrum with well developed posteriorly-directed projection (Fig. 3D); scales moderately crenulate with well-developed radii (Fig. 3C), horizontal rows on body at level of anal origin 13-15, vertical rows from upper corner of gill opening to caudal-fin base 37-39; gill rakers on lower limb of first gill arch 18-19; vertebrae 35; sexual dimorphism poorly developed, although adult males deeper-bodied than females.



**Fig. 3.** - Camera lucida drawings of selected features of *Pelangia mbutaensis*: (A) caudal skeleton, (B) premaxillary bone, (C) body scale (taken from side, three rows directly below dorsal-fin origin), (D) pectoral girdle (lateral view), and (E) pelvic girdle (ventral view). All drawings from cleared and stained specimens, 45.5 mm SL, except body scale taken from holotype.

Dessins à la chambre claire de caractères choisis de *Pelangia mbutaensis*: (A) Squelette caudal. (B) Os prémaxillaire. (C) Écaille du corps (prélevée du flanc, troisième rangée sous l'origine de la nageoire dorsale). (D) Ceinture pectorale en vue latérale et (E) Ceinture pelvienne en vue ventrale. Tous les dessins à partir de spécimens éclaircis et colorés, 45,5 mm LS, sauf l'écaille empruntée à l'holotype.

#### Remarks

*Pelangia* is the apparent sister group of *Glossolepis* Weber, judging from external appearance and osteological features, particularly with regards to dentition, and morphology of the premaxillary, pelvic girdle, and pectoral fin (see

Allen 1980 for more details about these features). However, it differs from *Glossolepis* with regards to several important features including a lack of teeth on the vomer and palatines, a larger mouth (jaws extend to below front of eye, but fails to reach eye in *Glossolepis*), a larger eye (horizontal diameter exceeds caudal peduncle depth; equal to or less than depth in *Glossolepis*), reduced crenulations on the scale margins, and fewer anal rays (14-18, usually 16 compared with 18-22 in *Glossolepis*). There are also differences in the positions of the fins. The anal fin origin is closer to the caudal fin base than to the snout tip, which is the opposite situation compared to *Glossolepis*. Moreover, the origin of the first dorsal fin is well ahead of the anal fin origin, but in *Glossolepis* it is either even with the anal fin origin or behind it. Finally, the second dorsal fin origin is approximately level with the third soft anal ray in *Pelangia*, but in *Glossolepis* it is usually level with the middle rays.

The ancestral stock of the proposed *Glossolepis-Pelangia* sister grouping probably inhabited the Etna Bay region during the early Miocene when this area initially formed a cape at the western end of the original New Guinea land mass. The Mbuta Basin population would have been eventually isolated from the northern population (from which *Glossolepis* originated) when the Vogelkop land mass (a detached piece of the Australian continental craton) was finally reintegrated with New Guinea proper in the Miocene (Pigram and Davies 1987).

The genus is named *pelangia* after the Indonesian name for rainbow ("pelangi") with reference to the common name for the family Melanotaeniidae. The gender is considered to be feminine.

#### *Pelangia mbutaensis* new species (Figs 4-5, Tables 1-2)

**Holotype.** MZB 9298, male, 54.8 mm SL, Lake Mbuta Basin (3°58.1'S, 134°57.4'E), about 8km NW of Etna Bay, Irian Jaya, to 1.5 m depth; rotenone, G. Allen, T. Tabuni, and M. Warus, 28 April 1997.

**Paratypes.** MZB 9299, 34 specimens, 30.3-45.8 mm SL, collected with holotype; WAM P.31300-001, 13 specimens, 44.3-55.5 mm SL, collected with holotype.

**Other material.** WAM unregistered, 4 cleared and stained specimens, 40.0-45.5 mm SL, collected with holotype.

#### Description

Dorsal rays V-I,10 (V to VII-I,9 to 12); anal rays I,17 (I,14-18); pectoral rays 14 (13 to 15); pelvic rays I,5; branched caudal rays 15; lateral scales 38 (37 to 39); transverse scales 14 (13 to 15); predorsal scales 26 (23 to 28); cheek scales 18 (17 to 21); gill rakers on first arch 5+ 18 = 23 (2 to 4 + 18 or 19).

Body depth 3.3 (3.0-3.4), head length 3.4 (3.2-3.4), both in SL. Greatest width of body 2.3 (2.1-2.4) in greatest body depth. Snout length 3.7 (3.5-4.2), eye diameter 3.0 (2.5-2.9), interorbital width 3.6 (3.4-3.7), depth of caudal peduncle 2.9 (2.9-3.3), length of caudal peduncle 1.8 (1.5-1.8), all in head length.

Lower jaw slightly protruding; jaws 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 posterior; jaw teeth conical, relatively slender with inward-curved tips; upper jaw with 4-5 rows of teeth anteriorly, narrowing to a single row on exposed (when mouth closed) edge of premaxillary; lower jaw with 7-8 rows of teeth at symphysis, narrowing to 1-2 rows posteriorly; teeth absent on vomer and palatines.

Scales relatively small, arranged in regular horizontal rows over most of body, but in irregular rows on lower half of body in region between pectoral fin base and anal fin origin; scales cycloid; predorsal scales extending to posterior half of interorbital; preopercle with 2 or 3 scale rows between its posterior angle and edge of eye.

First dorsal fin originates about in front of level of anal fin origin by a distance equal to about pupil diameter; longest (usually second or third) spine of first dorsal fin 1.9 (1.8-2.3) in head length, its depressed tip reaching first soft ray of second dorsal fin in males and barely reaching origin of second dorsal fin or falling short of this level in females; longest (third to fifth) rays of second dorsal fin 2.0 (1.9-2.3) in head length, the depressed posterior rays relatively short in both sexes, extending on to about one-third distance of caudal peduncle; longest (middle) anal rays 2.1 (1.9-2.4) in head length; length of pelvic fins 1.9 (1.8-2.1); pelvic fin tips of the largest males reaching slightly beyond anal fin origin when depressed and failing to reach anal fin origin in females and smaller males; length of pectoral fins 1.6 (1.5-1.7), of caudal fin 1.6 (1.2-1.5), both in head length. Caudal fin moderately forked.

**Table 1**  
Proportional measurements of selected type specimens of *Pelangia mbutaensis*  
expressed as percentage of the standard length  
Dimensions relatives de spécimens types choisis de *Pelangia mbutaensis*  
exprimées en pourcentage de la longueur standard

	Holotype MZB 9298 male	Paratype WAM P.31300 -001 male	Paratype WAM P.31300 -001 female	Paratype WAM P.31300 -001 female	Paratype WAM P.31300 -001 female	Paratype WAM P.31300 -001 male
Standard length (mm)	54.8	55.5	51.5	49.4	47.5	45.6
Body depth	30.7	31.5	30.1	29.6	30.9	32.9
Body width	13.5	13.3	12.6	13.6	14.9	14.0
Head length	29.7	30.3	31.1	29.4	31.2	29.4
Snout length	8.0	8.6	7.4	8.3	8.6	8.1
Eye diameter	10.0	11.4	11.5	11.9	11.6	11.4
Bony interorbital width	8.2	8.6	8.7	8.7	8.4	8.3
Depth of caudal peduncle	10.2	10.3	10.7	10.1	10.7	10.1
Length of caudal peduncle	16.8	17.1	19.4	19.8	18.9	18.2
Predorsal distance	48.0	47.2	48.3	46.2	49.5	47.6
Preanal distance	55.3	55.3	58.3	57.7	58.5	57.0
Prepelvic distance	42.0	42.3	41.7	42.1	43.4	40.8
2nd dorsal fin base	19.2	18.6	18.1	18.0	18.3	18.4
Anal fin base	29.6	29.5	25.8	25.1	28.8	27.9
Pectoral fin length	18.8	17.5	19.8	19.6	19.4	18.0
Pelvic fin length	15.7	16.9	16.9	15.6	15.4	15.4
Longest ray 1st dorsal fin	15.5	14.8	14.4	13.0	13.3	15.4
Longest ray 2nd dorsal fin	14.6	14.8	14.4	15.2	13.5	15.8
Longest anal ray	14.1	13.5	14.2	15.8	12.8	13.2
Caudal fin length	18.6	23.2	22.3	21.7	23.6	21.9

**Table 2**  
Fin ray counts for type specimens of *Pelangia mbutaensis*  
Comptes des rayons des nageoires de spécimens types de *Pelangia mbutaensis*

Spines on 1st Dorsal Fin			Soft Rays - 2nd Dorsal Fin				Pectoral Rays		
V	VI	VII	9	10	11	12	13	14	15
25	19	1	11	30	3	1	7	33	5
Anal Rays									
14	15	16	17	18					
2	4	29	8	2					



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Fig. 4. - *Pelangia mbutaensis*, male holotype, 54.8 mm SL, Mbuta Basin, Irian Jaya.

*Pelangia mbutaensis*, mâle holotype, 54,8 mm LS, Mbuta Basin, Irian Jaya.



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Fig. 5. - *Pelangia mbutaensis*, female paratype, 42.0 mm SL, Mbuta Basin, Irian Jaya

*Pelangia mbutaensis*, femelle paratype, 42,0 mm LS, Mbuta Basin, Irian Jaya.

*Colour when fresh*: relatively dull compared to most other members of the family. The ground colour is yellowish tan grading to silvery white on lower half of sides (at least in larger individuals). The largest males have scattered yellow flecks along the middle of the side. Fins are mainly translucent except for dusky grey pigmentation on the first dorsal.

*Colour in alcohol*: light brown on upper half of head and body, grading to whitish on lower half; a faint greyish stripe along middle of side, more evident on posterior half; fins dusky; also traces of a silvery mid-lateral stripe underlying the aforementioned greyish stripe; a large silvery blotch on lower half of operculum; iris silvery.

*Sexual dimorphism*: The difference between sexes is far less evident in this species than in most rainbowfishes. Males have a slightly longer first dorsal fin, which slightly overlaps the second dorsal fin origin when depressed. By contrast, the depressed first dorsal fin of females fails to reach the dorsal fin origin or barely reaches it. In addition, males generally have a deeper body than females (compare Figs 4 and 5). The average body depth as percentage of the SL for eight mature males, 45.2-55.5 mm SL (average = 49.3 mm SL) was 31.3 compared with an average of 28.0 for six females, 43.0-51.4 mm SL (average = 47.9 mm SL).

## Remarks

The type locality (Fig. 2) is uninhabited by humans. It is invariably represented on published maps and charts as a lake, but is actually a swampy basin surrounded by low mountains. Although a lake was probably present in former times there is no indication of recent inundation. The basin, which is roughly circular and measures up to 7-8 km in width, is mainly covered by swamp overgrown with 3-4 m tall grass with numerous small ponds, creeks, and at least one small river. It is not known if there is surface drainage from the basin to Etna Bay (about 8 km away) or whether the drainage is subterranean, as is the case for several other small lakes in the area.

The type specimens were collected with rotenone in a small creek measuring approximately 2-3 m in width, with depths to about 2 m. The collection was made over a 50 m-long section immediately above its confluence with a small turbid river. The water was very clear, but darkly stained (tea-coloured), with relatively fast flow through forest that formed a nearly closed canopy. The bottom consisted mainly of mud with occasional rocks and log debris with sparse aquatic vegetation. A water temperature of 25.8°C and pH of 6.4 were recorded. Other inhabitants of the creek included a rainbowfish (*Melanotaenia goldiei*), a plotosid catfish (*Neosilurus brevidorsalis*), an atherinid (*Craterocephalus* sp.), a gobiid (*Glossogobius* sp.), two eleotrids (*Mogurnda* sp. and *Oxyeleotris fimbriata*), and a parastacid crayfish (*Cherax* sp.). The new species was relatively common, but outnumbered by *M. goldiei* (the most abundant species) by a 3:1 ratio.

## Etymology

Named *mbutaensis* with reference to the type locality for this species and only known location of its occurrence.

## Acknowledgments

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## RÉSUMÉ

Un nouveau genre et espèce de Poisson Arc-en-Ciel  
(Melanotaeniidae) des eaux douces de Irian Jaya, Indonésie

*Pelangia mbutaensis* n. gen., n. sp. est décrit d'après 52 spécimens de 30,3 à 55,5 mm LS, récoltés en 1997 dans le Bassin du Lac Mbuta, près d'Etna Bay, en Irian Jaya. Le nouveau genre est le groupe frère présumé de *Glossolepis* qui est limité au Nord de la Nouvelle-Guinée. Il diffère de *Glossolepis* par plusieurs caractères importants, parmi lesquels l'absence de dents au vomer et aux palatins, une bouche et des yeux plus grands, des crénelures réduites sur la marge des écailles et moins de rayons à la nageoire anale. L'origine de l'anale est plus proche de la base de la caudale que de la pointe du museau, ce qui est l'inverse chez *Glossolepis*. En outre, l'origine de la première dorsale est bien en avant de celle de l'anale, alors que chez *Glossolepis*, elle est en face ou en arrière. Enfin, l'origine de la seconde dorsale est approximativement au niveau du 3<sup>e</sup> rayon mou de l'anale chez *Pelangia*, tandis qu'elle est en général au niveau des rayons médiaux chez *Glossolepis*.

Les représentants de la famille sont de petites espèces, souvent très colorées, qui peuplent les eaux douces d'Australie et de Nouvelle-Guinée.

La connaissance du groupe a fait des progrès considérables au cours des dernières décades, grâce aux travaux de terrain de l'auteur. Avant 1975, 26 espèces seulement étaient connues, contre les 53 actuellement décrites. La Nouvelle-Guinée a été le territoire le plus favorable avec 23 espèces décrites depuis 1980.

La famille a été résumée et illustrée récemment par l'auteur (Allen 1995).

L'espèce décrite ici fut récoltée lors d'une récente (1997) et brève expédition dans la région d'Etna Bay, en Irian Jaya, une région peu explorée jusqu'ici, le bassin du Lac Mbuta en particulier. En 3 heures seulement, 7 espèces furent récoltées

dont une inconnue, prise d'abord pour un *Glossolepis*, mais qu'un examen au Laboratoire a conduit à la description du genre nouveau *Pelangia* (nom féminin) d'après « pelangi », le nom indonésien de l'arc-en-ciel.

Le stock ancestral du groupe frère proposé *Glossolepis-Pelangia* peuplait probablement la région d'Etna Bay au Miocène inférieur, quand cette région formait un cap à l'extrémité occidentale de la masse continentale primitive de la Nouvelle-Guinée. La population du Mbuta Basin aurait pu être isolée de la population septentrionale (d'où provient *Glossolepis*) quand la masse continentale de Vogelkop (un fragment détaché du continent australien) a été finalement rattachée à la Nouvelle-Guinée au Miocène.

Couleurs relativement ternes et dimorphisme sexuel moins marqué que chez la plupart des autres membres de la famille.

La localité typique, qui est inhabitée, est invariablement représentée sur les cartes comme un lac, mais c'est en réalité un bassin marécageux, entouré de basses montagnes, grossièrement circulaire (7-8 km de diamètre), couvert de végétation herbacée haute (3-4 m) avec de nombreuses petites mares, ruisseaux et au moins une petite rivière. Les eaux étaient très claires, mais couleur thé, à cours relativement rapide, sous une canopée presque fermée. Fond boueux, avec des pierres éparses, des débris ligneux et une végétation aquatique clairsemée. T = 25,8 °C, pH = 6,4.

Autres habitants : *Melanotaenia goldiei* (le plus abondant), le Plotoside *Neosilurus brevidorsalis*, un Athérinide (*Craterocephalus* sp.), un Gobiide (*Glossogobius* sp.), deux Eléotrides (*Mogurnda* sp. et *Oxyeleotris fimbriata*) et une Ecrevisse Parastacide (*Cherax* sp.).