

Glossolepis wanamensis, a new species of freshwater rainbowfish (Melanotaeniidae) from New Guinea

by G.R. ALLEN * and P.J. KAILOLA **



Fig. 1. - *Glossolepis wanamensis* (approximately 70 mm SL), male photographed in an aquarium.
Glossolepis wanamensis (environ 70 mm LS), mâle, photographié en aquarium.

G. Schmid.

The rainbowfishes of the family Melanotaeniidae inhabit freshwater streams, swamps, and lakes of northern Australia and New Guinea. The group is comprised of nine genera containing approximately 35 species (Allen, in press). All of these are small fishes closely related to the marine hardyheads (Atherinidae). Sexual dimorphism is common among the group with males often exhibiting more elongate dorsal and anal fins, and possessing brighter colors, frequently comprised of various shades of red, orange, yellow, purple, and green.

The senior author is currently engaged in the study of rainbowfish systematics with plans for an eventual monograph of the family. In connection with this work he visited Papua-New Guinea for two weeks during October 1978. A collection of fishes at Lake Wanam, near Lae, during this visit resulted in 46 specimens of an undescribed rainbowfish belonging to the genus *Glossolepis* which is described herein. This same fish had attracted the attention of the junior author nearly two years earlier when she was presented with specimens by Mr. Brian Parkinson during her former employment with the Fisheries Research Station at Konedobu, Papua-New Guinea.

We have deposited type specimens of the new *Glossolepis* at the following institutions : Australian Museum, Sydney (AMS) ; Kanudi Fisheries Research Laboratory, Port Moresby, Papua-New Guinea (PNG) ; Rijksmuseum van Natuurlijke Historie, Leiden (RMNH) ; U.S. National Museum of Natural History, Washington, D.C. (USNM) ;

Western Australian Museum, Perth (WAM) ; and Zoologisch Museum, Amsterdam (ZMA).

Data in parentheses in the description below apply to paratypes when different from the holotype. Additional counts and measurements are summarized in Tables 1-4.

Standard length (SL) was taken from the most anterior point of the upper lip to the midbase of the caudal fin (end of hypural plate). Head length was measured from the front of the upper lip to the end of the opercular membrane. The depth of the body was the maximum depth from the base of the first dorsal fin. The width of the body was measured just behind the gill opening. The diameter of the orbit is the horizontal fleshy diameter. The interorbital width is the bony width. The depth of the caudal peduncle is the least depth. The length of the caudal peduncle is the horizontal measurement connecting two vertical lines, one passing through the base of the last dorsal ray and the other through the base of the middle caudal rays. Pre-dorsal scales were counted on the dorsal mid-line between the origin of the first dorsal fin and the interorbital. Preopercle scale counts refer to the total number of scales overlying the preopercle bone. Pectoral ray counts include the tiny, rudimentary upper and lowermost rays. Gill-raker counts include rudiments ; the raker at the angle was incorporated into the lower-limb count.

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LAKE WANAM RAINBOWFISH

Glossolepis wanamensis, new species

figs. 1, 2.

Holotype. WAM P26420-001, male, 80.5 mm SL, Lake Wanam, Papua-New Guinea (approximately 6°39'S, 146°46'E), 10 m seine, G. Allen, B. Parkinson, G. and J. Tait on 7 Octobre 1978.

Paratypes (collected with holotype unless indicated otherwise) : AMS 1.20718-001, 4 specimens, 60.8-68.7 mm SL ; PNG F.4432.01., 3 specimens, 62.5-66.0 mm SL, Lake Wanam, C. Ellway, November 1975 ; RMNH 27819, 2 specimens, 64.1 and 71.8 mm SL ; USNM 219380, 2 specimens, 59.0 and 74.5 mm SL ; WAM P26420-002, 35 specimens, 57.0-82.8 mm SL ; ZMA 116.050, 2 specimens, 71.2 and 75.0 mm SL.

Description

Spines in first dorsal fin VI (V to VII) ; a single spine at beginning of second dorsal and anal fins ; soft rays in second dorsal fin 10 (9 to 11) ; soft anal rays 19 (18 to 21) ; pectoral rays 16 (15 or 16) ; vertical scale rows from upper edge of gill opening to base of caudal fin 43 (39 to 44) ; horizontal scale rows from base of anal fin origin to base of first dorsal fin 15 (15 to 17) ; predorsal scales 28 (23 to 35 ; $\bar{x} = 29$, $n = 27$) ; preopercle scales 32 (21 to 30 ; $\bar{x} = 25$, $n = 27$) ; gill rakers on first arch 4 to 5 + 19 to 23.

The following proportional ranges (except body depth data) are based on the holotype and 11 paratypes, 57.0-82.8 mm SL. Greatest body depth 2.3 (1.9 to 3.1) in standard length - males 57-69 mm SL : 28.5-43.1 % of standard length ($\bar{x} = 40.5$, $n = 12$), males 70-87 mm SL : 38.4-52.0 %

of standard length ($\bar{x} = 41.9$, $n = 17$) ; females 59-69 mm SL : 32.3-38.8 % of standard length ($\bar{x} = 36.8$, $n = 12$) ; females 72-79 mm SL : 34.7-40.5 % of standard length ($\bar{x} = 36.8$, $n = 4$). Greatest width of body 3.3 (2.7 to 3.9) in maximum depth. Head length 3.5 (3.3 to 3.7), snout length 3.0 (3.3 to 3.6), orbit diameter 3.1 (2.8 to 3.2), bony interorbital width 3.1 (2.9 to 3.2), least depth of caudal peduncle 2.6 (2.4 to 2.7), length of caudal peduncle 1.8 (1.5 to 2.1), all in length of head.

Jaws (fig. 4) about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part ; maxilla ends opposite front border of eye ; lips thin ; teeth conical with slightly curved tips, those in outer row stouter ; teeth in upper jaw arranged in 2 to 4 rows anteriorly, reduced to a single row posteriorly, where they are most stout and extend outside the mouth onto the lip ; about 15-25 teeth in outer row of upper jaw ; teeth in lower jaw in 3 to 5 rows, outer row consisting of 4 to 8 strong curved teeth on each side of symphysis ; no edentulous space between outer row teeth and those inside which are arranged in 2 to 4 irregular rows ; a narrow edentulous space at symphysis of lower jaw ; several rows of small, conical teeth on vomer ; palatines with a narrow band of similar teeth arranged in a single row.

Scales relatively large, arranged in more or less regular horizontal rows, but with some irregularity, particularly in antero-dorsal quadrant of body (see remarks below) ; most of body scales with distinctly crenulate margins ; predorsal scales extending to posterior portion of interorbital ; preopercle scale rows from lower angle to edge of eye 3 to 4.

Otolith (fig. 5d) rounded to ovate, usually with pronounced hump and lack of denticulations on dorsal margin ; ventral margin with distinct denticulations and associated grooves ; rostrum distinct ; ostium relatively broad, its width about 2.3-2.5 in length of cauda.

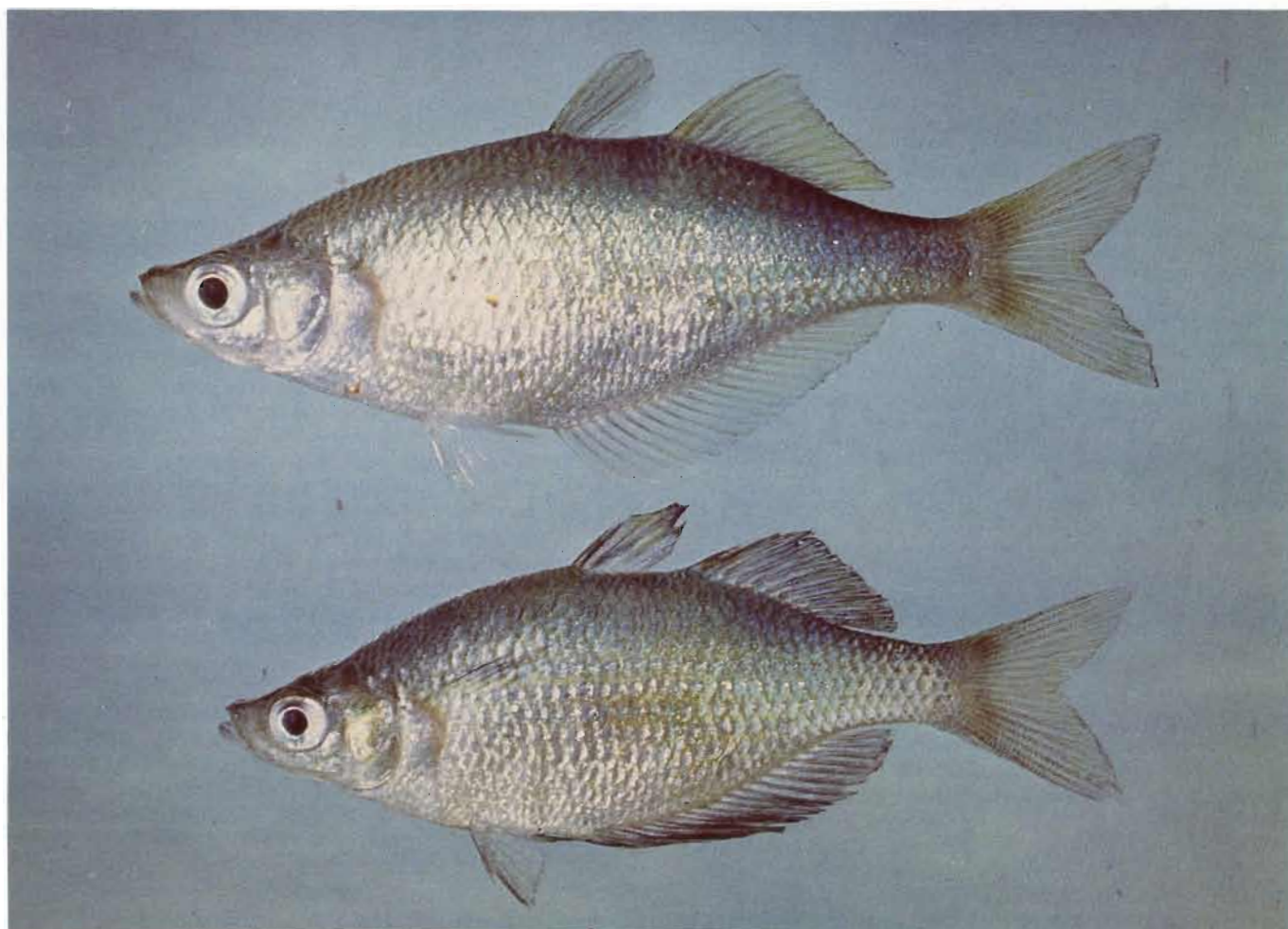


Fig. 2. - *Glossolepis wanamensis*, paratypes : femelle (upper), 75 mm SL, and male, 65 mm SL.
Glossolepis wanamensis, paratypes : femelle (en haut), 75 mm LS et mâle, 65 mm LS.

First dorsal fin originates opposite first to third anal ray ; first dorsal spine fits 2.0 (1.6 to 2.1) in head length, its length is slightly (in females) to distinctly (in males) shorter than longest (usually third) spine ; longest spine of first dorsal fin 1.5 (1.4 to 1.8) in head, its tip reaching base of first soft ray of second dorsal fin in females and third or fourth soft ray in males when depressed. Spine of second dorsal fin 2.5 (1.5 to 2.7) in head ; longest (first in females, fourth to seventh in males) soft ray of second dorsal fin 1.5 (1.1 to 1.9) in head ; adpressed posterior rays of second dorsal fin reaches to middle of caudal peduncle in females and to the base of the caudal fin in males. Anal fin spine 3.1 (2.2-4.3) in head ; longest (fourth to seventh) anal rays 1.0 (1.1 to 2.0) in head length. Soft dorsal and anal fin rectangular in outline, elongated (particularly the anal fin) in males. Pelvic fin tips when depressed not quite reaching base of anal spine in females and extending to the base of the fourth or fifth soft anal ray in males ; length of pelvic fin 1.3 (1.3 to 1.9) in head length. Pectoral fin pointed, its length 1.2 (1.1 to 1.4) in head length. Caudal fin moderately forked, its length 1.0 (1.0 to 1.1) in head.

Color in life : females are mainly silvery with transparent fins (fig. 2) ; males exhibit a wide range of colors : small (under about 65 mm) individuals are frequently similar to females, but larger fish are primarily greenish (fig. 1) to golden yellow. The dorsal and anal fins of mature males are darkly pigmented, except the anal fin may have a golden sheen along its base. The caudal fin is dusky yellow.

Color in alcohol : extremely variable overall from uniform whitish or silvery to olive or blackish above and silvery on ventral half. Fins pale to dusky, the dorsal and anal fins blackish in mature males.

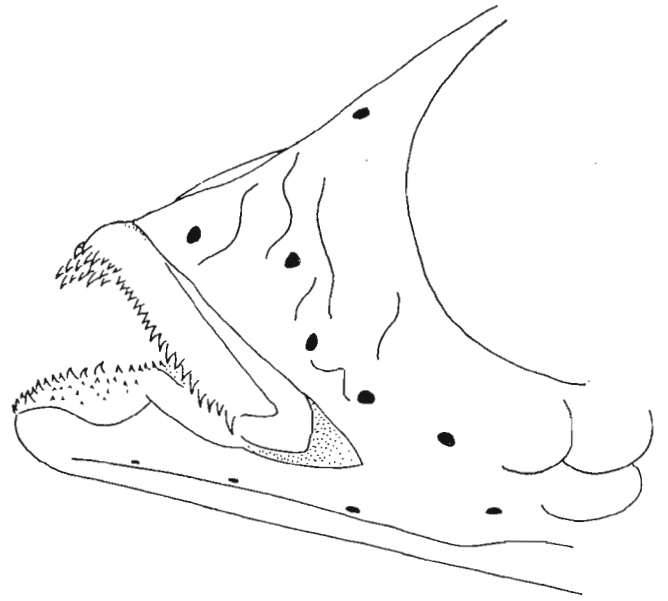


Fig. 4. - Camera lucida drawing showing outer jaw teeth of *Glossolepis wanamensis*, paratype (WAM P26420-002), 70 mm SL.

Fig. 4. - Dessin à la chambre claire montrant les dents externes de la mâchoire de *Glossolepis wanamensis*, paratype (WAM P26420-002) de 70 mm LS.

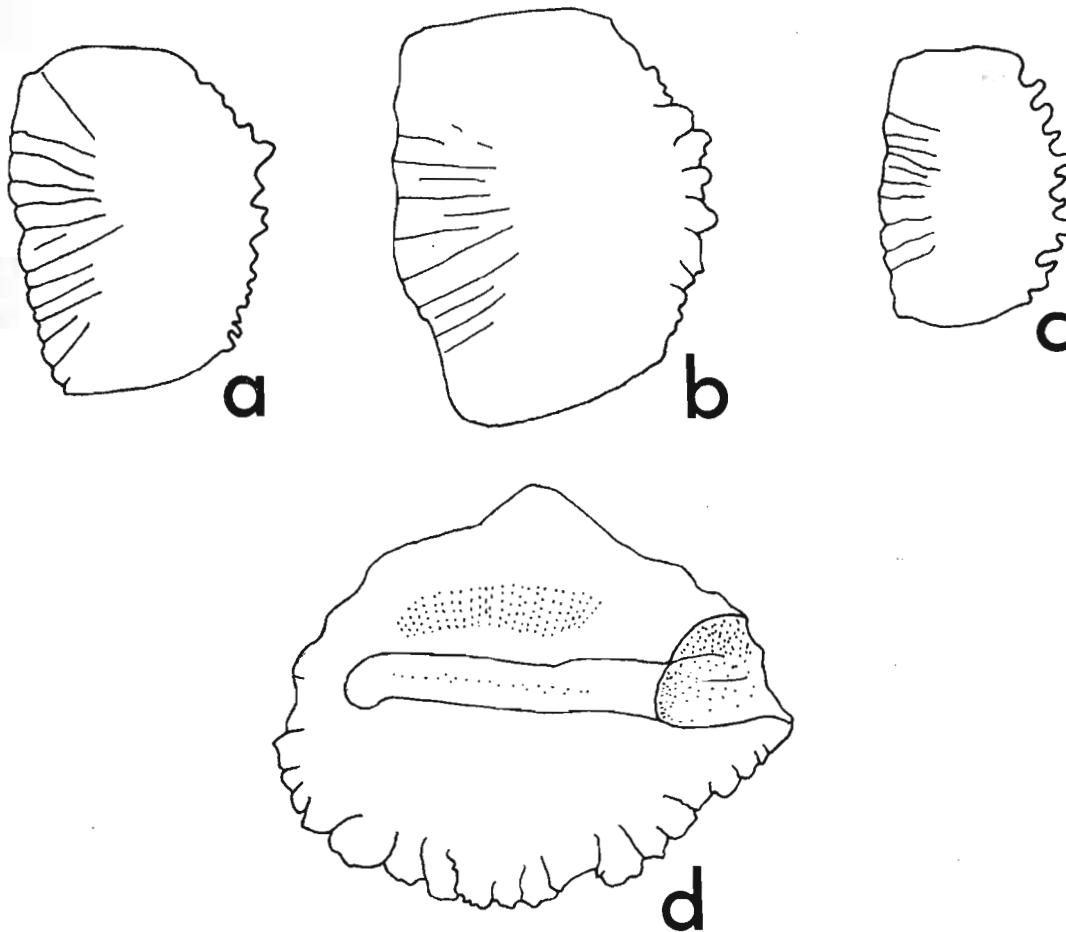


Fig. 5. - Camera lucida drawings of scales (upper row) and otolith (below) of *Glossolepis* : (a) *G. wanamensis*, 78 mm SL ; (b) *G. multisquamata*, 87 mm SL ; (c) *G. incisus*, 79 mm SL ; (d) *G. wanamensis*, 74 mm SL. Scales were taken from the same location on each fish, approximately 3 scale rows below base of first dorsal spine.

Fig. 5. - Dessins à la chambre claire d'écaillés (rangée supérieure) et d'un otolithe (au dessous) de *Glossolepis* : (a) *G. wanamensis*, 78 mm LS ; (b) *G. multisquamata*, 87 mm LS ; (c) *G. incisus*, 79 mm LS ; (d) *G. wanamensis* 74 mm, LS. Les écaillés ont été prélevées au même endroit sur chaque Poisson, approximativement 3 rangs d'écaillés au dessous de la base du premier rayon épineux de la dorsale.

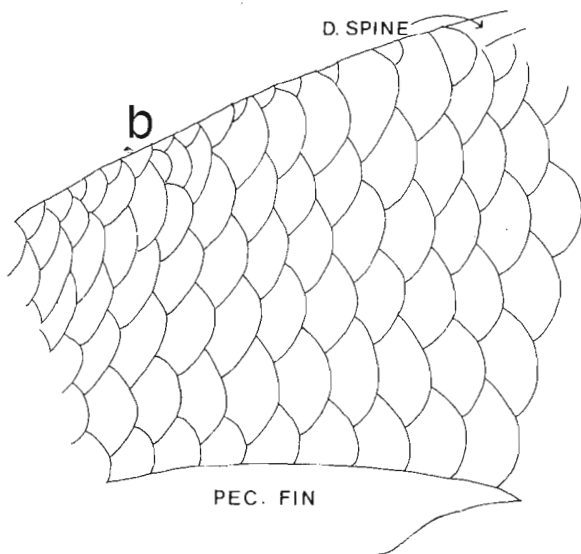
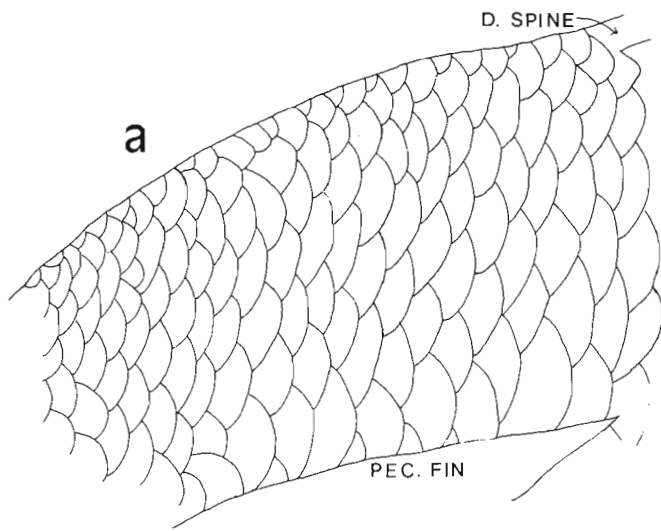


Fig. 6. - Camera lucida drawings showing arrangement of scales in region above pectoral fin : (a) *G. wanamensis*, 82 mm SL (WAM P26420-002) and (b) *G. multisquamata* (Amer. Mus. Nat. Hist. 15031). The typical crenulations on the scale margins of both species are not shown.

Fig. 6. - Dessins à la chambre claire montrant la disposition des écailles dans la région située au dessus de la pectorale : (a) *G. wanamensis*, 82 mm LS (WAM P26420-002) et (b) *G. multisquamata* (Amer. Mus. nat. Hist. 15031). Les denticulations du bord des écailles, caractéristiques des deux espèces, ne sont pas représentées.

Remarks

The genus *Glossolepis* Weber was previously thought to be monotypic containing only the type species, *G. incisus* Weber known from the Lake Sentani District of northern Irian Jaya (West New Guinea). However, recent investigations by the senior author (Allen, in press) reveal that the genus contains three species including *G. wanamensis*. The third member of this group is *G. multisquamata* (Weber and de Beaufort) known from the Sepik and Idenburg Rivers of northern New Guinea. *Glossolepis* is closely related to the genus *Melanotaenia* but differs from it by possessing distinctly crenulate scale margins (fig. 5) over much of the body and a higher gill raker count (19 to 32 rakers on the lower limb of the first arch compared with 13-15 in most *Melanotaenia*). In addition, the dorsal profile of the head and nape is very distinctive.

The following key will serve to separate the species of *Glossolepis*.

Key to the species of *Glossolepis*

- 1 a. Gill rakers on lower limb of first gill arch usually 26 to 32 ; scales arranged in irregular rows (similar to condition shown in fig. 6 a) over entire body, approximately 55 to 60 scales horizontally from upper edge of gill opening to caudal fin base ; longest anal ray of adult males about 1.8 to 2.1 in head length (Lake Sentani District of Irian Jaya) *G. incisus*
- 1 b. Gill rakers on lower limb of first gill arch usually 19 to 23 ; scales arranged in more or less regular, parallel rows, at least on sides posterior to pectoral fin, approximately 35 to 44 scales horizontally from upper edge of gill opening to caudal fin base ; longest anal ray of adult males about 1.0 to 1.4 in head length. 2
- 2 a. Scales above pectoral fin arranged in regular parallel rows (fig. 6 b) ; horizontal scale rows from base of anal spine to base of first dorsal fin 13 or 14 ; maximum size to about 120 mm SL (Idenburg and Sepik Rivers) *G. multisquamata*
- 2 b. Scales above pectoral fin arranged irregularly, not in parallel, horizontal rows (fig. 6 a) ; horizontal scale rows from base of anal spine to base of first dorsal fin 15 to 17 (usually 16) ; maximum size to about 90 mm SL (Lake Wanam) *G. wanamensis*

G. wanamensis is closely related to *G. multisquamata* ; these species share similar fin-ray and gill raker counts. However, the scalation of the body is significantly different with the former species possessing smaller, more numerous scales, which are not arranged in regular rows in the area immediately above the pectoral fin (fig. 6). We have made comparisons with 18 specimens, 65-115 mm SL, of *G. multisquamata* and 58 specimens, 36-79 mm SL, of *G. incisus*.

G. wanamensis appears to be restricted in its distribution to Lake Wanam which is situated 24 km east of Lae, Papua-New Guinea. The senior author did not find this species in a small outlet stream of the lake, nor in other ponds and streams in the nearby Markham River Valley. The lake is roughly circular with a diameter of 2-3 km, and is located on a small plateau about 100-200 metres above the Markham Valley.

Table 1.

PROPORTIONAL MEASUREMENTS OF SELECTED TYPE SPECIMENS OF GLOSSOLEPIS WANAMENSIS
EXPRESSED AS A PERCENTAGE OF THE STANDARD LENGTH

	Holotype WAM P26420-001	Paratypes WAM P25420-002				
	male	male	female	female	female	male
Standard length (mm)	80.5	82.8	74.4	67.5	59.6	57.0
Depth	44.7	51.9	37.6	40.0	35.2	40.3
Width	13.7	13.3	13.4	13.3	13.1	14.0
Head length	28.6	30.2	26.9	28.1	26.8	28.1
Snout length	8.4	9.1	7.4	8.1	7.6	7.9
Orbit diameter	9.3	10.6	8.7	8.9	8.9	9.6
Bony interorbital width	9.2	9.7	9.4	8.9	8.4	9.3
Depth of caudal peduncle	11.2	12.1	10.8	11.9	10.1	11.4
Length of caudal peduncle	15.7	14.5	16.4	17.8	18.1	17.5
Snout to 1st dorsal fin origin	54.7	58.0	52.4	51.8	53.7	50.9
Snout to anal fin origin	50.9	54.3	52.2	51.8	52.0	52.6
Snout to pelvic fin origin	38.5	39.9	36.3	38.5	38.6	38.6
Length of 2nd dorsal fin base	21.1	21.7	21.5	19.2	18.5	19.3
Length of anal fin base	39.8	43.5	36.3	38.8	35.2	37.7
Length of pectoral fin	23.6	22.9	20.2	22.2	20.1	22.5
Length of pelvic fin	22.4	18.1	14.8	14.8	15.1	17.4
Longest ray of 1st dorsal fin	18.6	21.5	14.1	14.5	14.3	16.7
Longest ray of 2nd dorsal fin	21.9	19.3	16.1	16.0	16.8	17.5
Longest anal ray	28.6	24.2	13.4	15.1	14.8	24.6
Length of caudal fin	27.3	26.5	25.5	26.7	26.8	28.0

Table 2.

DORSAL FIN RAY COUNTS OF TYPE SPECIMENS
OF GLOSSOLEPIS WANAMENSIS

1st Dorsal fin spines			2nd Dorsal fin soft rays		
V	VI	VII	9	10	11
12	14	1	1	17	9

Table 3.

ANAL AND PECTORAL FIN RAY COUNTS OF TYPE
SPECIMENS OF GLOSSOLEPIS WANAMENSIS

Anal fin soft rays				Pectoral fin rays	
18	19	20	21	15	16
2	14	7	4	7	20

Table 4.

GILL RAKER COUNTS OF TYPE SPECIMENS
OF GLOSSOLEPIS WANAMENSIS

Upper Limb			Lower Limb				
4	5	6	19	20	21	22	23
14	11	2	5	7	7	6	2

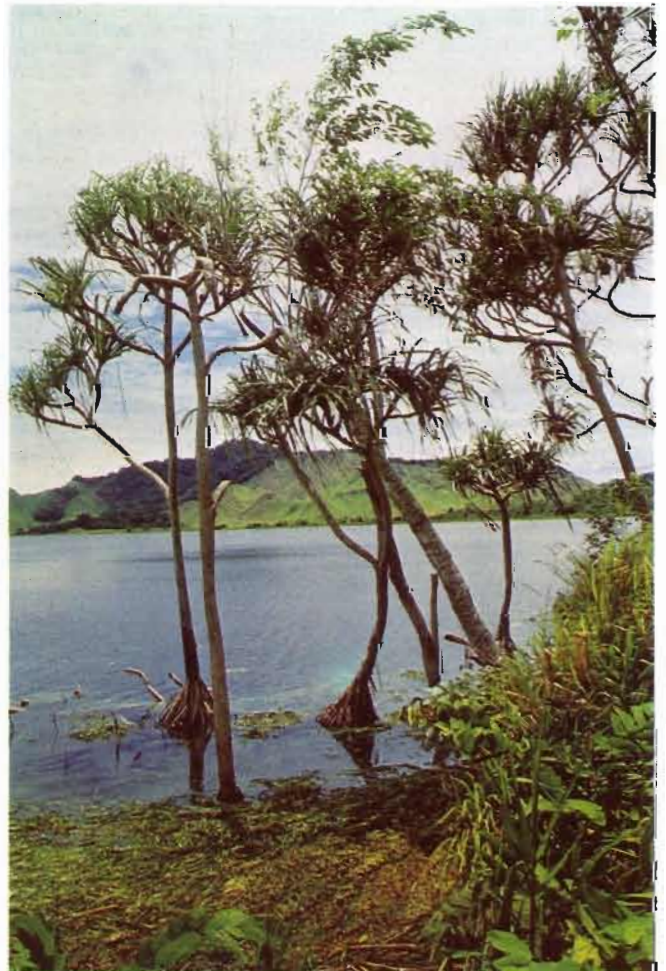


Fig. 3. - The type locality at Lake Wanam, Papua-New Guinea.
Fig. 3. - La localit  typique sur le lac Wanam, Nouvelle-Guin e-Papoue.

G. wanamensis is common around the lake margin, particularly in areas of abundant vegetation. It shares this habitat with another melanotaeniid, *Chilatherina fasciata*, which is far less common. The lake is a favorite fishing spot of the local populace. *Tilapia*, an introduced cichlid fish, is taken for food by net fishermen and divers who use spears. The latter occupation is not without its hazards, however, as the lake is inhabited by the Estuary Crocodile (*Crocodylus porosus*). A fatal crocodile attack on a diver occurred only two weeks prior to the senior author's visit to the lake.

It is interesting to note that nearly all male specimens of *G. wanamensis* captured or observed underwater at Lake Wanam possessed a damaged anal fin (see fig. 1). It seems likely that this damage is inflicted during intra-specific agonistic encounters, although there is also a possibility that these wounds are caused by *Tilapia* bites.

The water of Lake Wanam is remarkably clear, even during rainy periods which are frequent over much of the year. A water temperature of 28.5 °C and pH of 7.8 were recorded on 7 October 1978.

The species is named *wanamensis* with reference to the type locality.

Acknowledgments

We are grateful for the assistance of Mr. Brian Parkinson who accompanied the senior author during the 1978 visit to Papua-New Guinea. Special thanks are also due Mr. Gordon Tait, his wife Jenny, and children, Jim and Lynn for providing accommodation, transportation, and companionship during the senior author's visit to Lae. Because of their efforts the trip to Lake Wanam was made possible. We also thank Mr. Dick Dunham for helping to ship live specimens to Australia and Mr. Fred Parker, Director of the Wildlife Division, Department of Lands and Environment (Government of Papua-New Guinea) for assisting with collection permits. Drs. M. Boeseman and D. Rosen of RMNH and the American Museum of Natural History respectively, sent valuable loan specimens of *G. incisus* and *G. multisquamata*. Mr. G. Schmida provided the excellent aquarium photograph of *G. wanamensis*. Finally, we thank Mrs. C. Allen for her careful preparation of the typescript.

References

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Résumé

Glossolepis wanamensis, une nouvelle espèce
de Poisson Arc-en-Ciel d'eau douce
(Melanotaeniidae) de Nouvelle-Guinée

Les Poissons Arc-en-Ciel (Melanotaeniidae) habitent les eaux douces d'Australie septentrionale et de Nouvelle-Guinée. Ils comprennent 9 genres et environ 35 espèces (Allen, sous-pressé). Ce sont de petits Poissons, voisins des formes marines de la famille des Atherinidae. Un dimorphisme sexuel est fréquent, les mâles montrant souvent des nageoires dorsale et anale plus allongées, et des couleurs plus brillantes (rouge, orange, jaune, violet, vert). Au cours d'une visite en Nouvelle-Guinée, en octobre 1978, G. Allen récolta dans le lac Wanam, près de Lae, 46 spécimens d'une espèce nouvelle du genre *Glossolepis* qu'il décrit ici. Près de deux ans auparavant, cette même espèce avait déjà attiré l'attention de Patricia J. Kailola.

Poisson Arc-en-Ciel du Lac Wanam

Glossolepis wanamensis n. sp.

Holotype. WAM P26420-001, mâle, 80,5 mm LS, Lac Wanam, Nouvelle-Guinée Papoue. G. Allen, B. Parkinson, G. et J. Tait, 7 octobre 1978.

Paratypes. 48 spécimens de 57 à 82,8 mm LS déposés dans diverses institutions scientifiques en Australie, Nouvelle-Guinée, Pays-Bas et Etats-Unis.

Description

Se reporter au texte anglais et aux tableaux.

Couleurs en vie. Femelles argentées, nageoires transparentes. Mâles vivement colorés (figs. 1 et 2).

Remarques

Glossolepis fut considéré jadis comme monotypique, sa seule espèce étant *G. incisus* Weber, du lac Sentani (Nouvelle-Guinée occidentale). Toutefois, des recherches récentes de Allen (sous-pressé) révèlent que le genre renferme 3 espèces,

G. wanamensis inclus, la troisième espèce étant *G. multisquamata* (Weber et de Beaufort), des rivières Sepik et Idenburg de Nouvelle-Guinée septentrionale.

Glossolepis est très voisin de *Melanotaenia*, mais en diffère par le bord des écailles distinctement crénelé (fig. 5) et un plus grand nombre de branchiospines. De plus, le profil dorsal de la tête et du museau est très différent.

Une clef permet la détermination des 3 espèces.

G. wanamensis est très voisin de *G. multisquamata*, mais l'écaillage du corps est caractéristique, la nouvelle espèce ayant des écailles plus petites et plus nombreuses qui ne forment pas des rangées régulières dans l'espace situé immédiatement au dessus de la pectorale (fig. 6).

G. wanamensis est inconnu hors du lac Wanam ; il est abondant près des rives, surtout là où la végétation est dense. Il partage ce biotope avec un autre Mélanoténiide, *Chilatherina fasciata* qui est beaucoup moins commun. L'introduction de *Tilapia* attire de nombreux pêcheurs (filet et chasse subaquatique), occupation qui n'est pas sans danger, car le lac est habité par le Crocodile d'estuaire (*Crocodylus porosus*) dont les attaques peuvent être fatales.

Presque tous les mâles de *G. wanamensis* ont une anale endommagée (fig. 1), ces blessures pouvant avoir pour cause des combats entre rivaux ou peut-être des morsures de *Tilapia*.

L'eau du lac est très claire, même pendant les périodes pluvieuses. La température était de 28,5 °C et le pH de 7,8 le 7 octobre 1978.

Note aquariologique

G. Allen conserve quelques spécimens de cette magnifique espèce dans son aquarium familial (*in litt.*, janvier 1979).