

# *Popondetta connieae*, a new Species of Rainbowfish (Melanotaeniidae) from Papua New Guinea

by Gerald R. ALLEN\*



Fig. 1. - *Popondetta connieae*, an adult male.  
*Popondetta connieae*, mâle adulte.

Gunther Schmid

The wild interior of New Guinea has been the focal point for a host of natural history studies involving diverse groups such as insects, reptiles, birds, and mammals. Surprisingly few investigations have concentrated on the extremely interesting freshwater fish fauna. Relatively few collections of any significance have been made since the first decade of this century when the area was visited by Dutch naturalists. If my specialized fieldwork on the rainbowfishes of New Guinea over the past three years is any indication, there remains an incredible wealth of yet undiscovered fishes inhabiting this primal wilderness. They are likely to remain undiscovered for many years due to the extremely rugged terrain, impenetrable jungle, and lack of a road network. This holds true particularly for Irian Jaya, the Indonesian controlled western half of the island. Although my attention has focused on just a single family, the eastern part of the island has yielded rich collections over the past three years, including at least 10 new rainbowfishes. The present article describes a strikingly handsome species which was first collected near Popondetta, a village at the eastern end of the island on the northern side of the central dividing range. I first identified it as *Pseudomugil furcatus*, a species described by Nichols in 1955 from the Colling-

wood Bay district, some 160 km down the coast from Popondetta. Because of various anatomical peculiarities I eventually placed this fish in a separate genus, *Popondetta* (see Allen, 1980). Subsequent examination of Nichols type specimens and field collections of additional specimens in 1980 from Safia, a locality intermediate to Popondetta and the type locality of *furcatus*, revealed there are two distinct species in the genus. The species collected in the vicinity of Popondetta differs significantly from Nichols types, the latter which agree with the Safia fish.

Type specimens of *Popondetta connieae* have been deposited at the following institutions: Australian Museum, Sydney (AMS); Kanudi Fisheries Research Laboratory, Port Moresby, Papua New Guinea (PNG); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); United States National Museum of Natural History, Washington, D.C. (USNM); Western Australian Museum, Perth (WAM); and Zoologisch Museum, Amsterdam (ZMA).

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*Popondetta connieae*, new species

Popondetta Rainbowfish

(Figures 1 and 2)

**Holotype.** WAM P26409-003, male, 43.2 mm SL, Auga Creek, about 5 km S. of Popondetta, Papua New Guinea (approximately 8°48'S, 148°13'E), small shrimp seine, G. Allen, 4 October 1978.

**Paratypes.** AMS. I.21983-001, 8 specimens, 14.9-31.3 mm SL, Avindo Creek, about 15 km south of Popondetta, seine, G. Allen, 5 October 1978 ; PNG unregistered, 16 specimens, 14.5-29.4 mm SL, same data as AMS paratypes ; RMNH 28295, 9 specimens, 16.7-30.8 mm SL, same data as AMS paratypes ; USNM 224782, 8 specimens, 16.1-35.0 mm SL, same data as AMS paratypes ; WAM P26409-001, 32 specimens, 18.0-40.0 mm SL, collected with holotype ; WAM P26410-001, 12 specimens, 13.8-29.0 mm SL, Ahaemo Creek, about 10 km S. of Popondetta, seine, G. Allen, 5 October 1978 ; WAM P26411-001, 30 specimens, 13.1-35.4 mm SL, Evundo Creek, about 8 km S. of Popondetta, seine, G. Allen, 4 October 1978 ; WAM P26412-001, 10 specimens, 13.0-19.8 mm SL, Embi Creek near Popondetta, seine, G. Allen, 4 October 1978 ; WAM P26416-001, 34 specimens, 11.8-32.2 mm SL, Endehi Creek, about 28 km W. of Popondetta on Kokoda Road, seine, G. Allen, 5 October 1978 ; WAM P26417-001, 22 specimens, 14.5-33.4 mm SL, Hunete Creek, about 33 km W. of Popondetta on Kokoda Road, seine, G. Allen, 5 October 1978 ; WAM P26418-001, 51 specimens, 16.4-33.6 mm SL, same data as AMS paratypes ; ZMA 116.438, 10 specimens, 14.8-27.0 mm SL, same data as AMS paratypes.

*Description*

Counts and proportions which appear in parentheses refer to the range for paratypes (based on 15 specimens, 26-40 mm SL) if different than the holotype. Proportional measurements are presented as percentages of the standard length (SL).

Dorsal rays VI-I,10 (V to VIII-I,8 to 11) ; anal rays I,19 (I,16 to 19) ; pectoral rays 12 (10 to 12) ; vertical scale rows from upper edge of gill opening to base of caudal fin 33 (30 to 33) ; horizontal scale rows from base of anal fin origin to base of first dorsal fin 6 ; scales between dorsal fins 2 (2 to 4) ; predorsal scales 14 (13 to 15) ; preopercle-suborbital scales 4 (3 or 4) ; gill rakers on first arch 1 + 8 (0 to 2 + 8 or 9) ; vertebrae 31 or 32 (4 paratypes examined).

Body depth 30.6 (21.4-29.5) ; head length 23.1 (21.8-25.7) ; snout length 6.9 (5.8-7.2) ; eye diameter 7.2 (7.3-9.9) ; interorbital width 9.3 (8.2-10.0) ; caudal peduncle depth 13.0 (11.8-12.8) ; caudal peduncle length 20.4 (20.0-21.6) ; predorsal distance 45.6 (44.8-46.3) ; preanal distance 50.2 (49.4-53.2) ; prepelvic distance 36.8 (34.5-40.2).

Jaws oblique ; upper and lower jaw about equal ; maxilla extends posteriorly to about level of anterior border of eye or slightly forward ; premaxilla protrusible ; upper jaw with about 6-7 rows of teeth, narrowing to 1-2 rows posteriorly, teeth conical to villiform including a series of conical, thorn-like teeth on lips which are exposed when mouth is closed ; lower jaw with a dense band of villiform teeth arranged in 5-6 rows and tapering to 1-2 rows posteriorly ; vomer and palatines toothless.

Scales cycloid, relatively large and arranged in regular horizontal rows ; predorsal scales extending to anterior portion of interorbital (anteriormost scales may be embedded) ; 3-4 scales below eye covering cheek ; a small scale frequently present over infraorbital ; 6 large infraorbital pores on each side of interorbital region.



Fig. 2. - *Popondetta connieae*, male holotype (upper), 43 mm SL and female paratype, 35 mm SL, Auga Creek near Popondetta.

*Popondetta connieae*, mâle holotype (en haut), 43 mm LS et femelle paratype, 35 mm LS, Auga Creek près de Popondetta.

First dorsal fin originates about 1/2 to full pupil diameter anterior to level of anal fin origin ; longest ray of first dorsal fin 31.5 (12.9-30.5), that of males elongate and filamentous ; longest ray of second dorsal fin 17.4 (10.1-15.5) ; of anal fin 14.6 (12.6-14.3). First ray of second dorsal and anal fins a flexible, unsegmented spine. All soft (segmented) rays of second dorsal and anal fins branched except first ray of anal fin. Pelvic fin tips just reaching origin of anal fin in males and not quite reaching this point in females ; innermost pelvic ray connected along most of length by membrane (usually damaged during collecting or examination) ; uro-genital openings positioned on mid-ventral line about one-half distance between origin and posterior tip of depressed pelvic fins ; length of pelvic fin 14.6 (13.0-15.0). Pectoral fins pointed, longest rays 20.4 (16.0-18.9). Caudal fin moderately forked, its length 30.1 (23.7-34.0).

*Colour in alcohol* : overall yellowish or tan ; dorsalmost portion of head and body brownish ; numerous pepper-like melanophores on upper half of head and body, concentrated to form reticulated pattern which follows edge of scales particularly those of uppermost horizontal scale row ; melanophores also present on lips and chin, and scattered on side of head ; a narrow blackish line along middle of side from pectoral region to middle of caudal fin base, expanded to form triangular marking posteriorly (i.e., just before caudal fin) ; first dorsal fin of males translucent except black basal portion, that of females mainly translucent with dusky band across middle ; second dorsal fin mainly translucent with narrow blackish band across middle, more prominent in males ; anal fin translucent with broad blackish band across outer portion (narrower and much less distinct in females) ; caudal fin yellowish or translucent with middle portion blackish ; pelvic fins translucent, outer half dusky in males ; pectoral fins translucent.





Fig. 3. - *Popondetta furcata*, mâle, 39 mm SL, Safia, Papua New Guinea.  
*Popondetta furcata*, mâle, 39 mm LS, Safia, Nouvelle-Guinée Papouasie.

#### Comparisons

The two species of *Popondetta* are easily distinguished on the basis of colour (compare figs. 1-3) and there are significant differences in modal counts for the second dorsal and anal fins (Table 1). The most apparent differences involve fin coloration of mature males. The dorsal and anal fins of *P. furcata* are mainly transparent to slightly dusky with a relatively narrow outer margin of yellow. Those of *P. connieae* have broad, whitish outer margins with a bold black band across the middle of each fin; the outer portion of the first dorsal fin is yellow as in *P. furcata*, however. The caudal fin of *P. furcata* has pale yellow lobes with thin black dorsal and ventral margins, whereas that of *connieae* has whitish lobes, a dusky central portion, and lacks dark margins. The pelvic fins of *connieae* are largely dusky or blackish and the pectoral fins are whitish on the upper edge. By contrast the pelvics of male *furcata* are yellow and this same colour is present on the upper edge of the pectoral fins. The females of *P. connieae* are basically similar to males except the dark bands in the middle of the dorsal and anal fins are less distinct and narrower, the outer edge of the second dorsal is broadly yellow (as in *P. furcata*), the caudal fin lobes are yellowish and the pelvic and pectorals are uniformly transparent. Comparisons are based on 26 specimens of *P. furcata*, 14-39 mm SL, from Safia (WAM P 26979-001) and the four syntypes, 27-34 mm (American Museum of Nat. History, 20148).

Table 1

Fin Ray Counts for Species of *Popondetta*

	1st Dorsal fin spines				2nd Dorsal fin soft rays					
	V	VI	VII	VIII	7	8	9	10	11	12
<i>connieae</i>	1	8	10	1			4	7	8	1
<i>furcata</i>	12	11	1		1	15	8			

  

	Anal fin soft rays						Pectoral fin rays		
	15	16	17	18	19	20	10	11	12
<i>connieae</i>			6	6	4	4	1	14	5
<i>furcata</i>	6	13	3	2			4	18	2

#### Habitat

The type specimens were collected within a 25 km radius of Popondetta. This area is situated a short distance inland from the Solomon Sea and is primarily a low river plain dissected by a number of meandering streams. Much of the area is virgin rainforest, but there are also large patches of cleared grassland. Most specimens were taken from small, relatively swift tributary streams in very clear water (fig. 4). Temperature and pH in these streams ranged from 24<sup>o</sup>-27<sup>o</sup>C and 7.7-7.9 respectively. The stomach contents of several paratypes indicate a diet consisting primarily of minute crustaceans and insect larvae with a small amount of algal matter. There are no other species of rainbowfishes in the streams occupied by *P. connieae*.



Fig. 4. - Ahaemo Creek, near Popondetta, Papua New Guinea. This stream is abundantly populated with the Popondetta Rainbow. Ahaemo Creek, près de Popondetta, Nouvelle-Guinée Papouasie. Le cours d'eau est abondamment peuplé par le Poisson Arc-en-ciel Popondetta.

#### Etymology

The species is named in honour of my wife, **Connie (Lagos) Allen**, as a small token of appreciation for her invaluable assistance over the years.



The *Popondetta* rainbow is highly recommended as an aquarium fish. Because of the small size (maximum about 50 mm SL or slightly less than 2 inches) it should be kept alone or with similar sized fishes with a peaceful disposition. Ideal tankmates are the smaller species of Blue-eyes (*Pseudomugil*), such as *P. gertrudae*, or the Threadfin Rainbow, *Iriatherina werneri*. The tank should be at least 40 litres and well planted including some floating-type vegetation. Once or twice a day feedings of live baby brine shrimp and finely pulverised dry food such as Tetramin are recommended. For spawning a small tank measuring approximately 38 x 25 x 25 cm can be utilised. A thin layer of sand, a clump of Java Moss, a slow bubbling airstone, and 2-3 rafts of *Riccia*, a floating plant, will provide the necessary environment. The water depth should be about 15-20 cm. Either group spawning, with several members of each sex present, or pair spawning may be attempted with this set-up. With pair spawning it may be necessary to try several pairings until a compatible couple are found. Another female should be substituted if the male appears overly aggressive, otherwise injury may result and the chances of spawning will be slim. During courtship the male rapidly darts around the tank, periodically chasing the female and displaying its erected dorsal, anal, and pelvic fins. Eventually the male darts in among the floating plants followed closely by the female. The spawning usually occurs in the morning and only a few eggs are produced each day. These are suspended by tiny threads from the floating plants and can be seen at close inspection. The incubation period lasts 15-20 days at about 25-28°C. The eggs and fry can be left in the spawning tank with the parents or the adults may be transferred to another tank. Initially several feedings per day of a protozoan culture and a «dust» type fry food should be

given. When properly cared for the fry grow rapidly. At an age of only 3-4 months the young fish are large enough to spawn. At this stage the males are about 25 mm SL and females measure 15-20 mm SL.

#### Acknowledgements

I am grateful for the assistance of Brian Parkinson who accompanied me on the 1978 and 1980 trips to Papua New Guinea. Collection of the type specimens would have been impossible without his many contacts and excellent knowledge of the country. I thank the Wildlife Division, Department of Lands and Environment (Government of Papua New Guinea) for providing collection and exportation permits. I first became aware of this species through the efforts of Patricia Kailola. Dr. Tyson Roberts' examination of the type specimens of *P. furcata* prior to my own study was largely responsible for alerting me of the possibility that two species were involved. Dr. Walter Ivantsoff allowed me to examine the type specimens of *P. furcata* (on loan to him) during a visit to his laboratory at Macquarie University, Sydney, Australia. Dick Dunham of Port Moresby assisted with the shipment of live specimens of *P. connieae*. I am greatly indebted to Gunther Schmida for his superb photographs of this species, and to Barry Crockford, a Melbourne, Australia aquarist, for providing information on aquarium care and breeding. The typescript was prepared by Connie Allen.

#### References

- Allen (G.R.), 1980. - A generic classification of the rainbowfishes (Melanotaeniidae). *Rec. West. Austral. Mus.*, 8 (3) : 449-490.
- Nichols (J.T.), 1955. - Results of the Archbold Expeditions. No. 71. Two new freshwater fishes from New Guinea. *Am. Mus. Novit.* no. 1735 : 1-6.

### RÉSUMÉ

#### *Popondetta connieae* une nouvelle espèce de Poisson Arc-en-Ciel (Mélano-téniidés) de Nouvelle-Guinée Papouasie

L'intérieur de la Nouvelle-Guinée est une région sauvage qui a fait l'objet d'études nombreuses sur divers groupes zoologiques ; paradoxalement, les Poissons ont été relativement négligés, malgré leur extrême intérêt. De nombreuses espèces restent à découvrir, surtout dans la partie occidentale de l'île (Irian Jaya), sous contrôle indonésien, mais les conditions matérielles (terrain accidenté, jungles impénétrables, pas de réseau routier) y demeurent très défavorables.

Bien que mon attention ne se soit portée que sur une seule famille, la moitié orientale de l'île a fourni, au cours des trois dernières années, un riche matériel renfermant au moins 10 nouveaux Poissons Arc-en-Ciel.

Dans cette note est décrite une espèce d'une beauté frappante, récoltée pour la première fois près du village de Popondetta, à l'extrémité orientale de l'île, sur le flanc Nord de la chaîne médiane. Elle fut d'abord prise pour *Pseudomugil furcatus* Nichols, 1955, espèce décrite du district de Collingwood Bay, à quelque 160 km de Popondetta, vers la côte. En raison de diverses particularités anatomiques, j'avais placé ce Poisson dans un genre à part, nommé *Popondetta* (voir Allen, 1980). Un nouvel examen des spécimens types de Nichols et des récoltes faites en 1980 à Safia - localité intermédiaire entre Popondetta et la localité typique de *furcata* - montra l'existence de deux espèces distinctes : *Popondetta furcata* (à qui se rapportent les Poissons de Safia) et *P. connieae*.

#### *Popondetta connieae* n. sp.

Poisson Arc-en-Ciel de Popondetta

**Holotype.** WAM P26409-003, mâle, 43,2 mm LS, Auga Creek ca. 5 km S de Popondetta.

**Paratypes.** 242 spécimens de 11,8 à 40 mm LS de Auga Creek et d'autres ruisseaux situés dans un rayon de 25 km autour de Popondetta.

**Description.** Se reporter au texte anglais et aux figures 1 et 2.

#### Comparaisons

*P. connieae* et *P. furcata* se distinguent facilement par la coloration, principalement celle des nageoires des mâles adultes (comparer les figs 1 et 3) et les comptes de la 2<sup>e</sup> dorsale et de l'anale (tableau I).

#### Biotope

L'aire de répartition se trouve à peu de distance du rivage de la Mer des Salomon ; c'est une plaine basse, coupée de nombreux cours d'eau sinueux, couverte en majorité par la forêt hygrophile, mais comportant aussi de vastes prairies. Eau très claire, t° = 24 - 27 °C, pH = 7,7 - 7,9. Le contenu stomacal composé de petits Crustacés, de larves d'Insectes et d'une petite quantité d'Algues. Aucune autre espèce de la famille ne cohabite avec *P. connieae*.

#### Conditions d'élevage

Hautement recommandé comme Poisson d'aquarium. En raison de sa petite taille, on le tiendra seul ou avec des Poissons paisibles de mêmes dimensions (petites espèces de *Pseudomugil*, comme *P. gertrudae*, ou *Iriatherina werneri*). Bac d'au moins 40 l, bien planté, avec des végétaux flottants. Nourrir d'Artémias (nauplies et jeunes) et de nourriture sèche pulvérisée une ou deux fois par jour. Pour la ponte, on peut utiliser un petit bac (38 x 25 x 25) ; hauteur d'eau : 15-20 cm ; mince couche de sable, mousse de Java et *Riccia* ; diffuseur à lent débit. Soit un groupe de ponte (plusieurs individus de chaque sexe), soit un couple, mais il faut alors rechercher deux individus accordés ; changer de femelle si le mâle est trop agressif car des blessures peuvent compromettre les chances de succès. Pendant la parade nuptiale, le mâle se précipite dans toutes les directions, prenant la femelle en chasse à intervalles, nageoires, dorsale, anale et pelviennes dressées. A l'occasion, le mâle s'élance parmi les plantes flottantes, suivi de peu par la femelle. La ponte a lieu le matin en général et peu d'œufs sont pondus chaque jour, suspendus aux plantes flottantes par de fins fils. Incubation : 15-20 jours à 25-28 °C. Les parents peuvent demeurer dans le bac de ponte ou être transférés au choix. Donner au début plusieurs repas par jours (Infusoires, nourriture sèche pulvérisée). Bien traités les alevins grandissent rapidement ; vers 3-4 mois les mâles ont environ 25 mm LS, les femelles 15-20 mm LS et sont capables de se reproduire.

#### Ethymologie

L'espèce est dédiée à Mme Connie (Lagos) Allen.