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Eleotrid Fishes of the Triton Lakes, Irian Jaya, with descriptions of four new species

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Abstract

Five species of eleotrid fishes are reported from the Triton Lakes of western Irian Jaya, including three *Mogurnda* and a species of *Oxyeleotris*, which are described as new species. *Mogurnda magna,* new species is described from 61 specimens, 22.0-191.0 mm SL, collected at Lake Aiwaso and Lake Laamora. It is most similar to *M. kutubuensis* from the Kikori and Purari river systems of Papua New Guinea, but the latter differs in having a smaller maximum size (about 85 mm SL) and fewer predorsal scales (22-25 for *M. magna* versus 16-20 in *M. kutubuensis*). *Mogurnda pardalis*, new species is described from six specimens, 55.0-127.2 mm SL, from Lake Kamakawaiar. It resembles *M. variegata* from Lake Kutubu, Papua New Guinea and *M. aiwasoensis* from nearby Lake Aiwaso. It differs from *M. variegata* in usually having 16 rather than 15 pectoral rays, 42-47 instead of 36-40 midlateral scales, and 28-32 versus 19-24 predorsal scales. It has a different adult colour pattern (spots instead of bars) than *M. pardalis* and there is also a difference in the number of soft dorsal rays (13 for *M. aiwasoensis* and usually 11 in *M. pardalis*). *Mogurnda aiwasoensis*, new species is described on the basis of two juvenile specimens, 38.0-40.6 mm SL, collected at Lake Aiwaso, and from a photograph of an adult. *Oxyeleotris altipinna*, new species is described from 15 specimens, 18.5-43.4 mm SL, collected from Lake Aiwaso, Lake Laamora, and Werfyang Creek, near Lake Kamaka. It is closely related to *O. nullipora* from southern New Guinea and northern Australia. These two species differ from other members of the genus in lacking head pores. *Oxyeleotris altipinna* differs from *O. nullipora* primarily on the basis of its longer second dorsal fin and greater standard length, at least 43 mm compared to about 30 mm. A fifth species of eleotrid, the widely distributed *Oxyeleotris fimbriata*, was also collected. The Triton Lakes population is characterised by a relatively low lateral scale count of 52-57.

Introduction

Eleotrids, commonly known as gudgeons, are small bottom-dwelling fishes found mainly in estuarine and freshwater environments, although some species occur in shallow seas. Most inhabit tropical latitudes, but they also occur in subtropical and temperate regions, particularly in Australia and New Zealand. **Nelson** (1994) estimated a worldwide species total of 150 species in 35 genera, the vast majority of which occur in the Indo-Pacific region. These fishes are close relatives of the predominantly marine gobiids. The two groups greatly resemble one another, but eleotrids generally have separate pelvic fins and six branchiostegal rays, whereas the two pelvics are frequently fused into a disk-like structure in gobiids, which have five branchiostegal rays. **Hoese** and **Gill** (1993) included eleotrids as a subfamily of the Gobiidae, but pending further studies we prefer to recognise the family status of this assemblage.

The family is well represented in fresh waters of the New Guinea-Australia region. Approximately 65 species belonging to 14 genera have been recorded to date. New Guinea has been a particularly fertile region for new discoveries . The present paper is the sixth in a series describing new species from both New Guinea and Australia (**Hoese** and **Allen** 1983,1987, and 1991; **Allen** and **Hoese** 1986; **Allen** and **Coates** 1990)

The present paper describes the eleotrid fauna of the Triton Lakes, consisting of four undescribed species and the widely distributed *Oxyeleotris fimbriata*. The Triton Lakes (Fig. 1) are situated on the southern coast of Irian Jaya, immediately east of the Bomberai Peninsula, and about 50 km due east of the seaport of Kaimana. The lakes are surrounded by high, limestone hills and lie just inland from Triton Bay. There are three main lakes: Kamakawaiar, Laamora, and Aiwaso. Kamakawaiar (usually referred to as Kamaka, Fig. 2) lies less than 5 km from the coast and is separated from the second lake, Laamora (Fig. 3), by a distance of about 7 kilometres, which takes 5-6 hours to negotiate on foot. The third lake, Aiwaso (Fig. 4), lies only a few hundred metres from Laamora. The lakes do not appear to have any outlet streams and drainage is presumably subterranean. Lake Kamakawaiar is approximately 55 m above sea level, compared to an altitude of about 210 m for the other lakes. The maximum depth of the lakes is unknown, but probably does not exceed 30-40 m.

The first author visited Lake Kamakawaiar for a few hours on 14 May 1991 with David Price and Gary Friesen. A small collection was make with a seine net in shallow water. **Heiko Bleher**, a German aquarium fish collector and photojournalist, visited this lake and also Lake Laamora over a two day period in June 1995. He collected several fishes, including the holotype of *Mogurnda magna*, which is described below. The present authors made collections in the area over a five-day period in July 1995. We visited all three lakes, and also collected at a small creek, about 2 km from Lake Kamakawaiar, along the walking track leading to Lake Laamora.

The fish fauna of the Triton Lakes is relatively small. Each lake contains approximately 4-6 species, and there is a total of about 10 species for the combined lakes. Typically there are 1-2 species of *Mogurnda*, 1-2 species of *Oxyeleotris*, 1-2 species of *Craterocephalus* (Atherinidae) and a single species of *Melanotaenia* (Melanotaeniidae) in each lake. Several of the fishes are shared between various lakes, particularly between Lakes Laamora and Aiwaso, which are very close to one another. All of the fishes represent new taxa, except for the widely distributed gudgeon, *Oxyeleotris fimbriata*.

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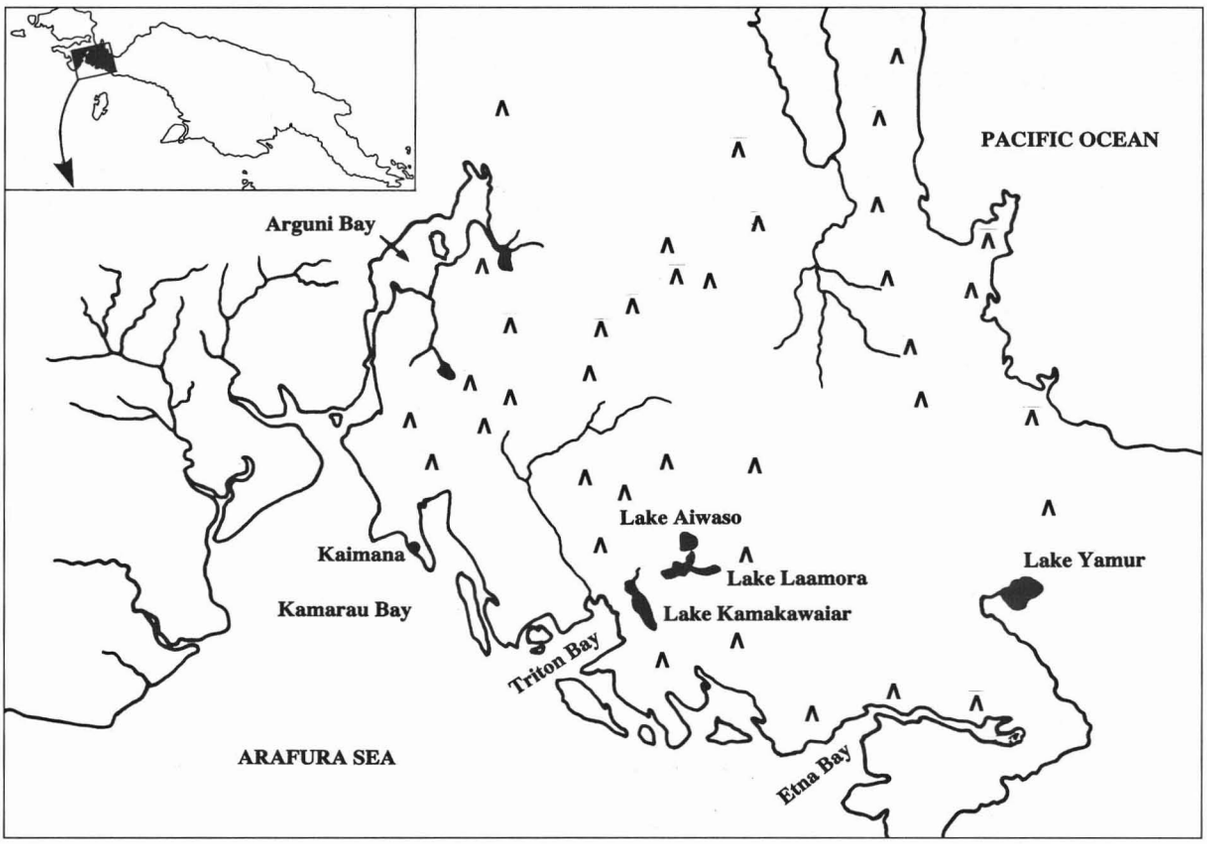

Fig. 1. - Map of Triton Lakes, Irian Jaya. Mountain peaks higher than 900 metres above sea level are indicated by an inverted "v". Carte des Triton Lakes, Irian Jaya. Les sommets de plus de 900 m sont indiqués par des v renversés.

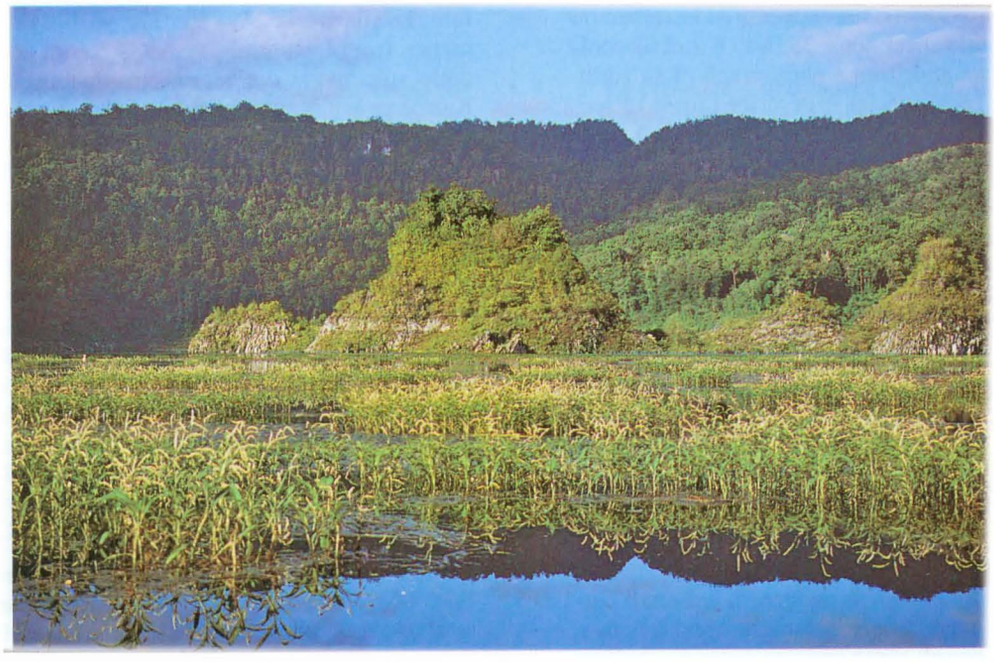

Fig. 2. - Lake Kamakawaiar, Irian Jaya.

One of these, *Craterocephalus fistularis* from Lake Kamakawaiar, was recently described by **Crowley** *et al.* (1995), and descriptions of *Melanotaenia* are in progress by the present authors.

There are two very interesting aspects to the fauna of the Triton Lakes. Firstly, is the tendency of gigantism in two of the species. *Mogurnda magna*, described herein, grows to several times the size of the largest *Mogurnda* recorded previously. Similarly, an undescribed species of *Craterocephalus* from Lake Laamora is by far the largest member of the genus, and one of the largest atherinids. The second point of interest is the great similarity of several of the Triton fishes, notably *Melanotaenia* spp, *Craterocephalus fistularis*, and *Mogurnda* spp., to species occurring in Lake Kutubu, Papua New Guinea. The latter site is 1000 km southeast of the Triton Group. In view of the considerable distance between these areas, it is difficult to account for what appears to be a close faunal relationship. Ecological conditions are very similar for the two areas. Therefore, one might hypothesize that similar

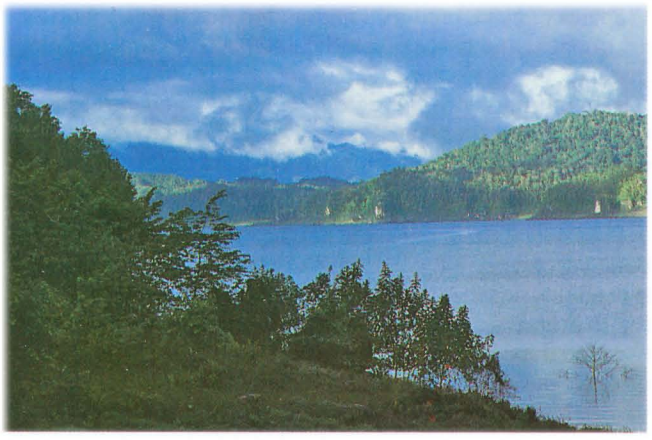

Fig. 3. - Lake Laamora, Irian Jaya.

Fig. 4. - Lake Aiwaso, Irian Jaya.

selection pressures have resulted in convergent evolution between the two.

Methods

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 scale count* - number of scales from upper pectoral base to caudal-fin base, excluding the small scales posterior to the hypural junction; *transverse scale rows*- number of scales from anal spine obliquely upward and backward to second dorsal-fin base; *predorsal scales* - number of scales along midline of nape in front of first dorsal fin; *standard length (SL)* - measured from the tip of the upper lip to the caudal-fin base; *head length (HL)* - 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 new species descriptions refer to the range for paratypes. Type specimens are deposited at the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB) and the Western Australian Museum, Perth (WAM).

Collection Stations. - Collections were made with seine nets, hook and line, and powdered rotenone at the localities listed below.

Station 1. - Lake Kamakawaiar (3° 47'S, 134° 14'E); southeastern side of lake, seine net in 0.5-1.5 m depth, **G. Allen, D. Price** and **G. Friesen,** 14 May 1991.

Station 2. - Lake Laamora (3°41'S, 134°17'E); southwestern end of lake, seine net in 0.5-1.5 m depth, **H. Bleher,** June 1995.

Station 3. - Lake Aiwaso (3°39'S, 134°16'E); water slightly turbid over limestone boulder bottom on margin of lake; dense aquatic vegetation; altitude 210 m; water temperature 28.9°C; pH 8.0; fishes collected with seine and 0.25 kg of rotenone powder by **G. Allen** on 17 July 1995.

Station 4. - Lake Laamora (3°41'S, 134°17'E); creek-like extension of shoreline on middle of north side of lake; water slightly turbid over mud bottom; patchy aquatic vegetation; altitude 210 m; water temperature 27.9°C; pH 8.4; fishes collected with seine, hook and line, and 0.25 kg of rotenone powder by **G. Allen** and **S. Renyaan** on 17 July 1995.

Station 5. - Small (1-2 m wide) tributary of Werfyang Creek, about 1 km NE of Lake Kamakawaiar (3°42.6'S, 134°11.7'E); water clear and slow flowing over mud, rock, and leaf-covered bottom; sparse aquatic vegetation; altitude 110 m; water temperature 24.8°C; pH 7.4; fishes collected with 0.25 kg of rotenone powder by **G. Allen** and **S. Renyaan** on 18 July 1995.

Mogurnda magna new species
Figs. 5-7

Holotype. MZB 6184, female, 191.0 mm SL, Lake Laamora, Station 2.

Paratypes. MZB 6815, 15 specimens, 26.7-92.8 mm SL, Lake Laamora, Station 4; MZB 0000, 21 specimens, 23.1-74.2 mm SL, Lake Aiwaso, Station 3; WAM P.31042-001, 14 specimens, 22.0-86.1 mm SL, Lake Aiwaso, Station 3; WAM P.31043-002, 10 specimens, 23.0-79.7 mm SL, Lake Laamora, Station 4.

Diagnosis

A species of *Mogurnda* with the following combination of characters: soft dorsal rays 11 or 12 (rarely 10 or 13); soft anal rays 11 or 12; pectoral rays 16 (rarely 15 or 17); scales in lateral series 37 to 45; predorsal scales 22-25; vertebrae 14 or 15 + 16-18 = 31-33; snout profile slightly concave to slightly convex; young specimens with a series of about nine dark bars on upper two-thirds sides, becoming increasingly melanistic with age, adults entirely blackish (sometimes with hint of darker bars) with narrow white margin on dorsal and anal fins; maximum size to at least 190 mm SL.

Description

Dorsal rays VIII-I,11 (VII or VIII-I,10 to 13); anal rays I,11 (11 or 12); pectoral rays 16 (15 to 17); segmented caudal rays 15 (15 or 16); branched caudal rays 13 (13 to 15); scales in lateral series 45 (37 to 42); transverse scale rows 13 (13 to 15); predorsal scales 22 (22 to 25); circumpeduncular scales 21 (20 to 23); gill rakers on first arch 2 + 9 = 11 (2 + 8 to 10 = 10 to 12); vertebrae 15 + 17 = 32 (usually 15 + 17 = 32, occasionally 14 + 17, 15 + 16, or 15 + 18)).

Fig. 5. - *Mogurnda magna*, paratype, 71.0 mm SL, Lake Aiwaso, Irian Jaya.

Fig. 6. - *Mogurnda magna*, paratype, 68.5 mm SL, Lake Laamora, Irian Jaya.

Body elongate, laterally compressed, more strongly posteriorly; body depth at pelvic fin origin 32.5 (24.8-29.0) % of SL; body depth at anal fin origin 25.2 (23.8-26.8) % of SL. Head somewhat pointed with relatively short, convex (slightly concave to convex in paratypes) snout; nape gently arched. Head length 37.2 (36.9-38.7), snout length 12.2 (9.4-11.1), eye diameter 4.5 (6.1-7.9), fleshy interorbital width 16.4 (11.0-13.8), upper jaw 15.3 (12.4-14.5), all as percentage of SL.

Lower jaw protruding slightly, mouth forming an angle of about 33 (35-42) degrees with longitudinal axis of body; jaw extending to level of about middle of eye (front of pupil in paratypes); teeth of jaws numerous, in dense bands, outer row enlarged; palate edentulous; tongue, palate, and floor of mouth generally pale with faint melanophores. Gill opening extends just forward of posterior margin of preopercle.

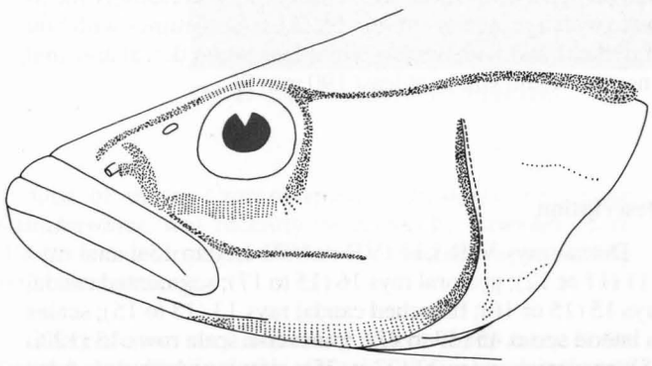

Fig. 7. - Camera lucida drawing of head of *Mogurnda magna*, showing tracks of sensory papillae.
Dessin à la chambre claire de la tête de *Mogurnda magna*, montrant les trajets des papilles sensorielles.

Scales of head, predorsal region, breast, belly, uppermost part of back, and bases of caudal and pectoral fins cycloid, remainder of body scales ctenoid. Head entirely scaled except lips, snout tip, preorbital region, lower jaw, and chin; preopercle scales smaller than body scales and tend to be embedded; sensory pores absent on head, but tracks of well developed papillae as shown in Fig. 7.

First dorsal fin about same height as second dorsal fin in young specimens, but conspicuously lower than second dorsal in adults; depressed posterior rays of first dorsal fin extending to origin of second dorsal fin; depressed posterior rays of second dorsal fin extending just beyond caudal-fin base in holotype, but generally well short of this point in paratypes; 5th to 7th spine of first dorsal fin tallest, 10.5 (9.9-12.4) % of SL; last 2-3 rays of second dorsal fin tallest, 16.0 (11.7-17.9) % of SL; last 2-3 rays of anal fin tallest, 15.2 (11.2-15.9) % of SL pectoral fin length 22.5 (19.7-23.9)% of SL; pelvic fins 19.4 (19.7-21.5)% of SL; depressed pelvic fin tips reaching anus in most paratypes, but falling well short of this point in holotype. Caudal peduncle relatively elongate, its length 21.6 (19.8-23.7) % of SL, and depth 14.4 (12.6-15.8) % of SL. Caudal fin rounded, its length 24.6 (21.0-26.5) % of SL.

Colour in life: holotype entirely dark brown to blackish with narrow white margin on both dorsal fins and anal fin. Juveniles yellowish tan with midlateral golden sheen, becoming whitish on ventral parts; a series of 9-10 brown bars on upper two-thirds of side, several of the anterior ones forming « doubles »; brown spots and botches on upper surface of head and along back, including several intense, dark brown blotches just below dorsal fin base; a pair of oblique dark bands with whitish area between them, from lower rear corner of eye to lower margin of operculum; a diffuse dark brown blotch on upper half of operculum; fins translucent to dusky with spotting or blotching on basal half of dorsal fins. Larger individuals (approximately 65-100 mm SL) are much darker overall, the ground colour more or less light purple or brownish. The dark bars on the sides become less distinct with increased growth, eventually forming a maze of blotches. A series of up to 5-6 large dark brown blotches may be evident on the upper back. Several of these blotches may extend on to the base of the dorsal fins. There are also a few smaller brown spots on these fins, which are faintly dusky with a white margin. In addition to the pair of oblique dark bands radiating from the lower corner of the eye, there is an additional band above crossing the operculum and forming a prominent mark on the pectoral-fin base.

Colour in alcohol: holotype overall charcoal, including fins, except for narrow white margin on both dorsal fins and anal fin. Paratypes larger than about 65 mm SL mainly brown to blackish, paler ventrally, some with faint markings on sides as indicated in description of live colouration. Juveniles similar to live coloration, but without golden sheen midlaterally on body.

Comparisons

Mogurnda magna is most similar to *M. kutubuensis* from the Kikori and Purari river systems of Papua New Guinea. They are similar shaped and exhibit a remarkable similarity in colour pattern as juveniles and adults. They also share similar fin-ray counts. However, the two species differ greatly with respect to the maximum length attained, about 85 mm SL for *M. kutubuensis* and nearly 200 mm SL for *M. magna*. There is also a significant difference in the number of predorsal scales (22-25 for *M. magna* versus 16-20 in *M. kutubuensis*).

Distribution and Abundance

Apparently restricted to Lake Laamora and Lake Aiwaso. It is very common among aquatic plants and over rocky bottom along the shoreline.

Etymology

The species is named *magna* (Latin: "large") with reference to its size, which far exceeds that of any other *Mogurnda*.

Mogurnda pardalis new species
Figs 8-10

Holotype. MZB 6187, female, 126.3 mm SL, Lake Kamakawaiar, Station 1.

Paratypes. MZB 6188, 2 specimens, 55.0-96.9 mm, collected with holotype; WAM P.30519-003, 3 specimens, 55.5-127.2 mm SL, collected with holotype.

Diagnosis

A species of *Mogurnda* with the following combination of characters: soft dorsal rays usually 11 (occasionally 12); soft anal rays 11 (occasionally 11 or 13); pectoral rays 16 (occasionally 15); scales in lateral series 42-47; predorsal scales 28-32; vertebrae 15 + 17 or 18 = 32 or 33; snout profile concave; colour overall tan, brownish dorsally, covered with detailed maze of dark brown spots and blotches that extend on to nape and rear part of head; juveniles and subadults overall creamy yellow to tan with intricate pattern of dark spots and blotches; maximum size to at least 127 mm SL.

Description (based on holotype and two adult paratypes, 126.3-127.2 mm SL)

Dorsal rays VIII-I,12 (VIII-I,11 or 12, except one paratype with VII-I,11); anal rays I,11 (11 to 13); pectoral rays 16 (one paratype with 15); segmented caudal rays 15; branched caudal rays 13 (14 or 15); scales in lateral series 42 (44-47); transverse scale rows 15 (15 or 16, but one paratype with 13); predorsal scales 30 (28 to 32); circumpeduncular scales 23 (20 to 23); gill rakers on first arch 3 + 9 = 12 (2-3 + 9 = 11 or 12); vertebrae 15 + 18 = 33 (one paratype with 15 +17 = 32).

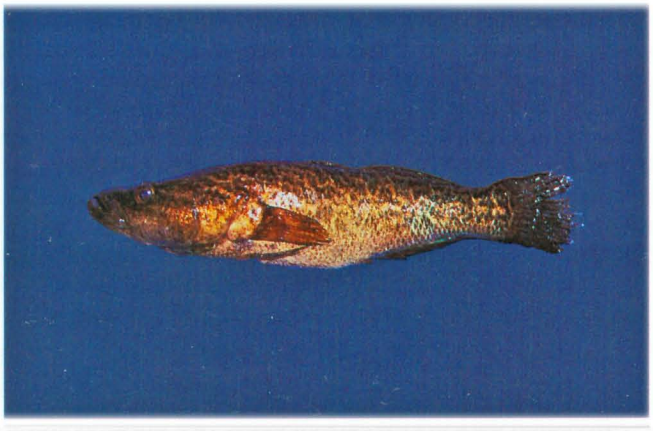

Fig. 8. - *Mogurnda pardalis*, holotype, 126.3 mm SL, Lake Kamakawaiar, Irian Jaya.

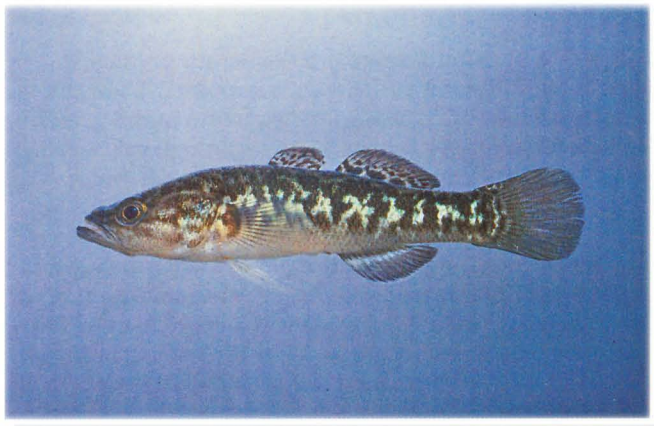

Fig. 9. - *Mogurnda pardalis*, paratype, 58.9 mm SL, Lake Kamakawaiar, Irian Jaya.

Body elongate, laterally compressed, more strongly posteriorly; body depth at pelvic fin origin 24.4 (19.7-23.5) % of SL; body depth at anal fin origin 21.9 (17.9-21.9) % of SL. Head somewhat pointed with relatively elongate, concave snout; nape gently arched. Head length 40.1 (39.0-40.9), snout length 10.8 (10.7-11.5), eye diameter 7.0 (6.9-7.7), fleshy interorbital width 9.0 (9.4-10.3), upper jaw 15.2 (12.9-15.7), all as percentage of SL.

Lower jaw noticeably protruding, mouth forming an angle of about 43 (36-43) degrees with longitudinal axis of body; jaw extending to level of front of pupil; teeth of jaws numerous, in dense bands, outer row enlarged; palate edentulous, except for an aberrant patch of about 8 conical teeth on left side of vomer on holotype ; tongue, palate, and floor of mouth generally pale with faint melanophores. Gill opening extends well forward of posterior margin of preopercle, but not reaching level of eye.

Scales of head, predorsal region, breast, belly, uppermost part of back, and bases of caudal and pectoral fins cycloid, remainder of body scales ctenoid. Head entirely scaled except lips, snout tip, preorbital region, lower jaw, and chin; preopercle scales smaller than body scales and tend to be embedded; sensory pores absent on head, but tracks of papillae as shown in Fig. 10.

First dorsal fin about same height as second dorsal fin in young specimens, but conspicuously lower than second dorsal in adults; depressed posterior rays of first dorsal fin extending to origin of second dorsal fin; depressed posterior rays of second dorsal fin extending nearly to caudal-fin base; 5th to 7th spine of first dorsal fin tallest, 9.9 (10.4-10.6) % of SL; last 2-3 rays of second dorsal fin tallest, 14.4 (12.4-16.1) % of SL; last 2-3 rays of anal fin tallest, 13.8 (11.9-14.4) % of SL pectoral fin length 21.3 (20.0-21.4) % of SL; pelvic fins 16.2 (17.7-18.9) % of SL; depressed pelvic fin tips falling well short of anus. Caudal peduncle relatively elongate, its length 19.2 (19.0-21.3) % of SL, and depth 12.3 (9.5-12.2) % of SL. Caudal fin rounded, its length 22.2 (21.4-23.9) % of SL.

Colour in life: tan on side of body, becoming brownish dorsally, covered with detailed maze of dark brown spots and blotches that extend on to nape and rear part of head; side of head mainly brown, except yellowish on operculum and a pair of faint brown oblique bands from rear lower corner of eye to edge of preoperculum; dorsal fins dusky brown with diffuse dark spotting; caudal fin dark brown; remainder of fins dusky, but pectorals with yellowish tinge. Juveniles and subadults overall creamy yellow to tan with intricate pattern of dark spots and blotches as shown in Fig. 9.

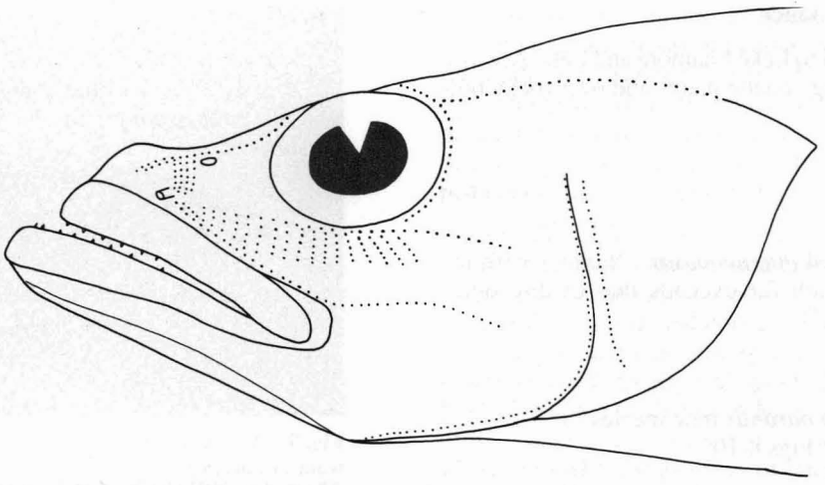

Fig. 10. - Camera lucida drawing of head of *Mogurnda pardalis*, showing tracks of sensory papillae.
Dessin à la chambre claire de la tête de *Mogurnda pardalis*, montrant les trajets des papilles sensorielles.

Colour in alcohol: similar to live coloration, but maze of dark brown spots and blotches on head and body of holotype and adult paratypes somewhat obscure.

Comparisons

Mogurnda pardalis is most similar to *M. variegata* Nichols from Lake Kutubu, Papua New Guinea and *M. aiwasoensis* from nearby Lake Aiwaso (description of this species appears below). The general shape of the head and body and overall colour pattern of these three species are similar. *Mogurnda pardalis* differs from *M. variegata* in usually having 16 rather than 15 pectoral rays, 42-47 instead of 36-40 midlateral scales, and 28-32 versus 19-24 predorsal scales. The reader is referred to the *M. aiwasoensis* Comparisons section below for differences between it and *M. pardalis*.

Distribution and Abundance

The species is apparently restricted to Lake Kamaka. It is common among aquatic plants and over rocky bottom adjacent to shore.

Etymology

The species is named *pardalis* (Greek: « spotted ») with reference to its dominant colour pattern feature.

Mogurnda aiwasoensis new species
Figs 11, 12

Holotype. MZB 6189, 40.6 mm SL, Lake Aiwaso, Station 3.

Paratype. WAM P.31042-005, 38.0 mm SL, collected with holotype.

Diagnosis

A species of *Mogurnda* with the following combination of characters: soft dorsal rays usually 13; soft anal rays 12 or 13; pectoral rays 16; scales in lateral series 46-47; predorsal scales 28-29; vertebrae 15 + 17 or 18 = 32 or 33; snout profile concave; colour yellowish tan on side of head and body becoming brown dorsally and whitish ventrally; a series of 9 irregular, dark brown bars on upper two-thirds of sides; maximum size to at least 130 mm SL.

Description (based on juvenile holotype and paratype)

Dorsal rays VIII-I,13; anal rays I,13 (12); pectoral rays 16; segmented caudal rays 15; branched caudal rays 14 (13); scales in lateral series 46 (47); transverse scale rows 15; predorsal scales 28 (29); circumpeduncular scales 20; gill rakers on first arch 4 + 9 = 13 (3 + 10 = 13); vertebrae 15 + 18 = 33 (15 + 17 = 32).

Body elongate, laterally compressed, more strongly posteriorly; body depth at pelvic fin origin 20.4 (18.9) % of SL; body depth at anal fin origin 18.7 (17.4) % of SL. Head somewhat pointed with relatively elongate, concave snout; nape gently arched. Head length 36.7 (37.4), snout length 8.4, eye diameter 8.6 (9.5), fleshy interorbital width 6.7 (8.4), upper jaw 11.6, all as percentage of SL.

Lower jaw noticeably protruding, mouth forming an angle of about 33 degrees with longitudinal axis of body; jaw extending to level of front of eye; teeth of jaws numerous, in dense bands, outer row enlarged; palate edentulous; tongue, palate, and floor of mouth generally pale. Gill opening extends well forward of posterior margin of preopercle, but not reaching level of eye.

Scales of head, predorsal region, breast, belly, uppermost part of back, and bases of caudal and pectoral fins cycloid, remainder of body scales ctenoid. Head entirely scaled except lips, snout tip, preorbital region, lower jaw, and chin; preopercle scales smaller than body scales and tend to be embedded; sensory pores absent on head, but tracks of papillae as shown in Fig. 12.

First dorsal fin about same height as second dorsal fin; depressed posterior rays of first dorsal fin extending to origin of second dorsal fin; depressed posterior rays of second dorsal fin extending only onto anterior third of caudal peduncle, falling well short of caudal-fin base; 5th to 7th spine of first dorsal fin tallest, 12.3 (11.6) % of SL; last 2-3 rays of second dorsal fin tallest, 14.4 (12.4-16.1) % of SL; last 2-3 rays of anal fin tallest, 15.3 (14.7) % of SL; pectoral fin length 21.4 (20.5) % of SL; pelvic fins 20.7 (22.4) % of SL; depressed pelvic fin tips extending to anus. Caudal peduncle relatively elongate, its length 23.4 (22.9) % of SL, and depth 11.3 (10.8) % of SL. Caudal fin rounded, its length 25.1 (24.7) % of SL.

Colour in life: yellowish tan on side of head and body becoming brown dorsally and whitish ventrally; a series of 8-9 irregular, dark brown bars on upper two-thirds of sides; a pair of narrow, dark brown bands slanting across cheek from lower rear corner of eye; fins generally pale, except 2-3 large

brown spots at base of second dorsal fin and smaller brown spots on middle portion of both dorsal fins. dusky to brownish. An adult specimen, 130.0 mm SL was photographed (Fig. 11), but unfortunately the specimen was subsequently lost. Its colours were similar to the juvenile types, but the bars were less solid, each being composed of several segments. In addition the fins were much darker, generally dusky to brownish and the pair of bands on the cheek were broader.

Colour in alcohol: similar to live coloration.

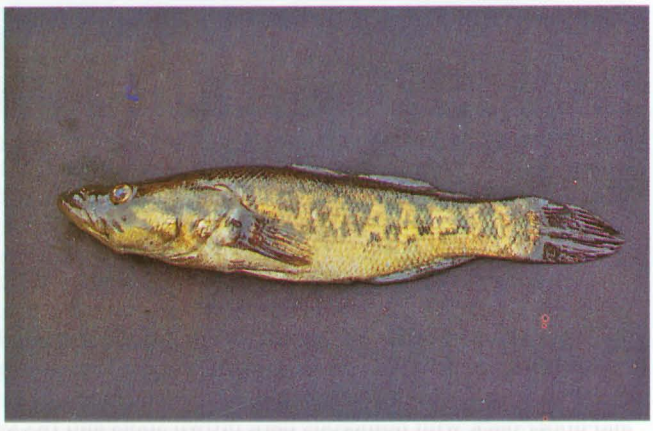

Fig. 11. - *Mogurnda aiwasoensis*, adult specimen, approximatley 130 mm SL, Lake Aiwaso, Irian Jaya.

Comparisons

Mogurnda aiwasoensis is most similar to *M. pardalis* from Lake Kamakawaiar. Adults, however, differ noticeably with regards to colour pattern. Those of *M. aiwasoensis* have distinct bars in contrast to the spotted pattern of *M. pardalis*. Moreover, there is a difference in the number of soft dorsal rays (13 for *M. aiwasoensis* and usually 11 in *M. pardalis*). It would be desirable to obtain a larger sample of both species to facilitate a more accurate comparison. There also appears to be a difference in the number of anal rays. The two type specimens of *M. aiwasoensis* have 12-13 rays compared with the usual count of 11 in *M. pardalis*, although counts of 12 and 13 were recorded for two specimens.

Distribution and Abundance

The species is known only from Lake Aiwaso, although it would not be surprising to eventually find it in nearby Lake Laamora, as other fishes are shared by both lakes. It was far less abundant than *Mogurnda magna* and *Oxyeleotris altipinna*, at least in the shallow waters that were sampled.

Etymology

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

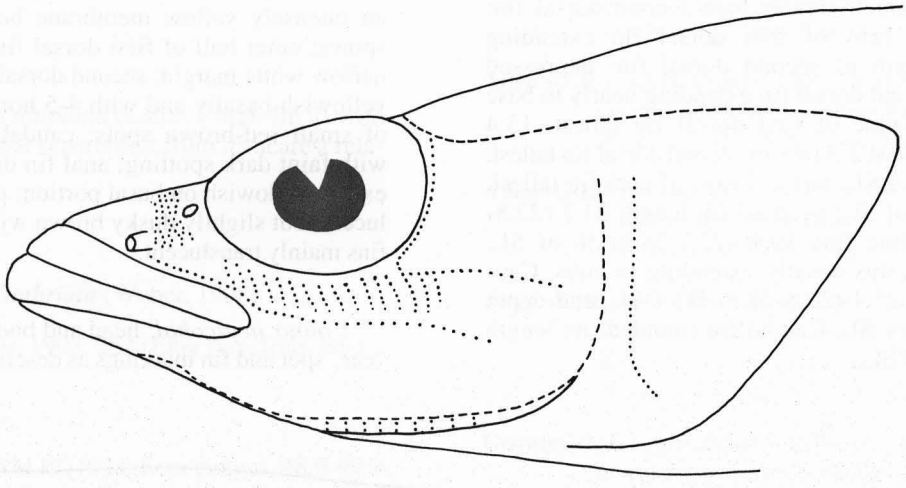

Fig. 12 - Camera lucida drawing of head of *Mogurnda aiwasoensis*, showing tracks of sensory papillae.
Dessin à la chambre claire de la tête de *Mogurnda aiwasoensis*, montrant les trajets des papilles sensorielles.

Oxyeleotris altipinna new species
Figs 13, 14

Holotype. MZB 6190, female, 43.4 mm SL, Lake Aiwaso, Station 3.

Paratypes. MZB 6191, 5 specimens, 18.9-34.9 mm SL, collected with holotype; WAM P.31042-002, 5 specimens, 18.6-37.8 mm SL, collected with holotype; MZB 6192, 36. 5 mm SL, Lake Laamora, Station 4; MZB 6193, 3 specimens, 18.5-42.9 mm SL, Werfyang Creek, Station 5.

Diagnosis

A species of *Oxyeleotris* with the following combination of characters: cephalic sensory pores absent; dorsal rays VI-I,11 (occasionally 10 or 12); anal rays I, 9 (rarely 8); pectoral rays 11-13; scales in lateral series 31-39; predorsal scales 21-27; vertebrae 13 or 14 + 13 -15 =26-28; longest dorsal rays about equal to greatest depth of body in adults; colour in life generally brown with darker chevron markings along sides; a prominent black "ear" spot immediately behind upper edge of gill cover; both dorsal fins and caudal fin with several rows of red-brown spots; maximum size to at least 43 mm SL.

Description

Dorsal rays VI-I,11 (VI-I,10-12); anal rays I,9 (one paratype with I,8); pectoral rays 12 (11-13); segmented caudal rays 17 (paratypes rarely with 15 or 16); branched caudal rays 15 (one paratype with 14); scales in lateral series 39 (31-39); transverse scale rows 13 (12-14); predorsal scales

27 (21-25); circumpeduncular scales 18 (16-17); gill rakers on first arch 3 + 8 = 11; vertebrae 13 + 15 = 28 (13 or 14+ 13 or 14 = 26-28).

Body elongate, laterally compressed, more strongly posteriorly; body depth at pelvic fin origin 21.7 (20.9-24.1) % of SL; body depth at anal fin origin 20.5 (20.9-23.5) % of SL. Head rounded with blunt snout; interorbital flattened; nape gently sloped. Head length 31.6 (32.7-34.1), snout length 6.5 (6.1-7.0), eye diameter 7.6 (7.0-8.3), fleshy interorbital width 6.5 (5.4-7.4), upper jaw 10.8 (8.0-10.6), all as percentage of SL.

Lower jaw slightly protruding, mouth forming an angle of about 42 (38-43) degrees with longitudinal axis of body; jaw extending to level of front of pupil; teeth of jaws numerous, in dense bands, outer row enlarged; palate edentulous; tongue, palate, and floor of mouth generally pale, except scattered melanophores on tip of tongue and at front of jaws, directly behind teeth. Gill opening extends forward to level of rear preopercular margin.

Scales of head, predorsal region, breast, belly, uppermost part of back, and bases of caudal and pectoral fins cycloid, remainder of body scales ctenoid. Head entirely scaled except lips, snout, preorbital region, lower jaw, and chin; preopercle scales smaller than body scales and tend to be embedded; sensory pores absent on head, but tracks of papillae as shown in Fig. 14.

First dorsal fin much shorter than second dorsal fin; depressed posterior rays of first dorsal fin extending slightly beyond origin of second dorsal fin; depressed posterior rays of second dorsal fin extending nearly to base of caudal fin; 4th spine of first dorsal fin tallest, 13.4 (12.0-15.6) % of SL; last 2-3 rays of second dorsal fin tallest, 21.4 (14.1-22.6) % of SL; last 2-3 rays of anal fin tallest, 18.7 (12.3-20.1) % of SL; pectoral fin length 21.2 (23.8-26.0) % of SL; pelvic fins 19.6 (22.7-24.6) % of SL; depressed pelvic fin tips usually extending to anus. Caudal peduncle length 22.4 (22.8-28.3) % of SL, and depth 14.5 (12.7-14.3) % of SL. Caudal fin rounded, its length 30.1 (30.6-33.1) % of SL.

Fig. 13. - *Oxyeleotris altipinna*, holotype, 43. 4 mm SL, Lake Aiwaso, Irian Jaya.

Colour in life: generally reddish-brown with series of about 12 darker chevron-shaped marks on sides; head also brown with pair of yellow-white, oblique, bands below eye; middle of opercle with yellow-white area overlaid with dense melanophores; dorsal surface of head and upper back with numerous dark brown spots and flecks; a prominent, eye-sized black "ear" spot with anterior white margin immediately behind upper edge of gill cover; a pupil-sized dark brown to black spot at upper edge of caudal-fin base; first dorsal fin with whitish ground colour on basal half and double row of small red-brown spots, also an intensely yellow membrane between first two dorsal spines; outer half of first dorsal fin broadly blackish with narrow white margin; second dorsal fin similar, but slightly yellowish basally and with 4-5 horizontal to oblique rows of small red-brown spots; caudal fin slightly yellowish with faint dark spotting; anal fin dusky brown to blackish except yellowish on basal portion; pelvic fins mainly translucent, but slightly dusky brown with whitish tips; pectoral fins mainly translucent.

Colour in alcohol: head and body generally brown with "ear" spot and fin markings as described above.

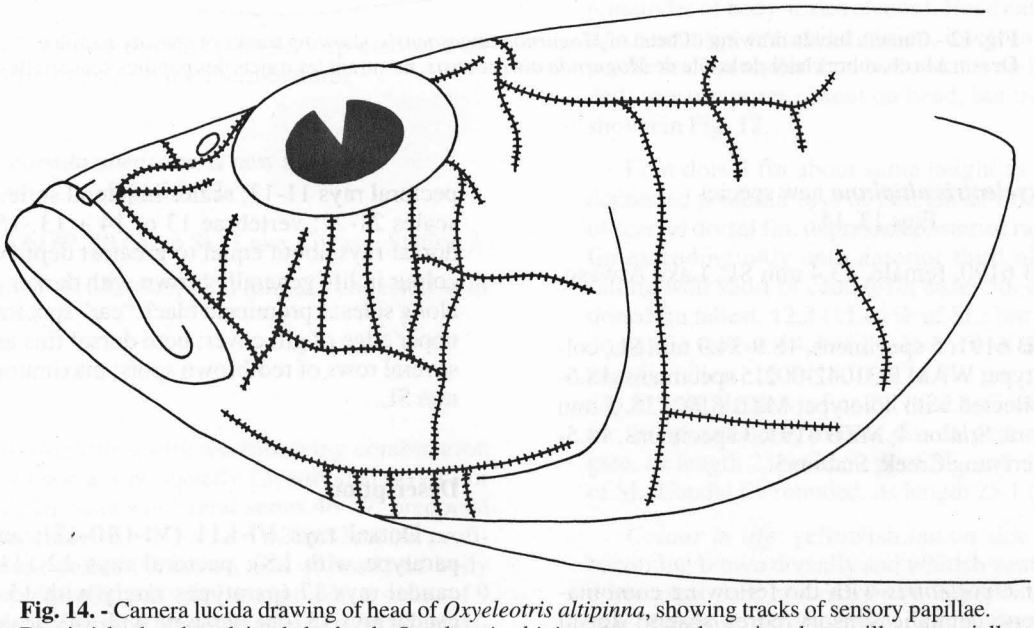

Fig. 14. - Camera lucida drawing of head of *Oxyeleotris altipinna*, showing tracks of sensory papillae.
Dessin à la chambre claire de la tête de *Oxyeleotris altipinna*, montrant les trajets des papilles sensorielles.

Comparisons

Oxyeleotris altipinna closely resembles *O. nullipora* Roberts from southern New Guinea and northern Australia. They possess similar colour patterns and are the only members of the genus lacking cephalic sensory pores. The height of the second dorsal fin and maximum size are the main characters for separating these two species. The second dorsal of *O. altipinna* is nearly twice as high as that of *O. nullipora*. This difference is readily apparent when comparing the relationship of dorsal fin height and body depth. The second dorsal fin height in *O. altipinna* is about equal to the body depth, but only about half the depth in *O. nullipora*. This difference is also reflected in the distance reached by the depressed posterior rays of the second dorsal fin. They extend nearly to the caudal fin base in *O. altipinna*, but only on to the basal third of the caudal peduncle, well short of the caudal base, in *O. nullipora*. Finally, there is a substantial difference in the maximum standard length, at least 43 mm for *O. altipinna*, compared with only 30 mm in *O. nullipora*.

Distribution and Abundance

The species is known from Aiwaso and Laamora lakes, and also occurs in Werfyang Creek near Lake Kamakawaiar. It was relatively common amongst dense vegetation next to shore in Lake Aiwaso, but apparently rare at the other localities.

Etymology

The species is named *altipinna* (Latin: « high-fin ») with reference to the feature that separates it from its nearest relative, *O. nullipora*.

Oxyeleotris fimbriata (Weber, 1908)

Eleotris fimbriatus Weber, 1908: 254 (Etna Bay, Irian Jaya)

Material examined. WAM P.31044, 5 specimens, 48.0-92.0 mm SL, Werfyang Creek, Station 5.

Diagnosis

Dorsal rays VI-I, 11-12; anal rays I,9-10; pectoral rays 15-16; scales in lateral series 52-57; predorsal scales 36-42; colour medium to dark brown with whitish belly and underside of head; frequently with series of narrow, dark brown chevron markings on side and 2-3 dark lines radiating from eye across cheek; a dark spot or ocellus at base of upper caudal fin rays usually present, at least in specimens under 100 mm SL; maximum size to 160 mm SL.

Remarks

The species was collected at Lake Kamakawaiar in 1991 (specimen subsequently lost) and nearby Werfyang Creek during the 1995 visit. It probably occurs in all three lakes. This is one of the few purely freshwater species that occurs in both northern and southern drainages of New Guinea's central dividing range (**Allen** 1991). It is also present on the Cape York Peninsula of Australia. The species is common in a wide range of habitats and is sometimes the only fish present in fast flowing streams at higher altitudes. There is an unusually wide range of scale counts (about 50-80) depending on geographic locality. Further study may result in the recognition of at least 2-3 valid species. Our specimens have a low lateral scale count (52-57), which agrees well with the type specimen from Etna Bay, which lies about 40 km to the east of the Triton Lakes.

Acknowledgments

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RÉSUMÉ

Eléotridés des Triton Lakes, Irian Jaya, avec la description de quatre espèces nouvelles

Cinq espèces d'Eléotridés sont signalées des trois principaux Triton Lakes, voisins de Triton Bay, sur la côte sud-occidentale de Irian Jaya : Aiwaso, Laamora et Kamakawaiar (= Kamaka). Trois espèces de *Mogurnda* et une de *Oxyeleotris* sont nouvelles, la cinquième, *Oxyeleotris fimbriata,* étant une espèce à vaste répartition : *Mogurnda magna* (lacs Aiwaso et Laamora), *pardalis* (lac Kamaka), *aiwasoensis* (lac Aiwaso) et *Oxyeleotris altipinna* (lacs Aiwaso, Laamora et Werfyang Creek, près du lac Kamaka).

Les Eléotridés (vulgairement « goujons ») sont de petits poissons de fond, vivant principalement dans des biotopes d'eaux saumâtres (estuaires) ou douces, quoique quelques espèces se trouvent en mer à faible profondeur. La plupart sont tropicales, mais on en trouve aussi dans des régions subtropicales et tempérées, en particulier en Australie et Nouvelle-Zélande. Une estimation de la faune mondiale se monte à 150 espèces en 35 genres, la plupart dans la région Indo-Pacifique (**Nelson** 1994). Ils sont proches des Gobiidés, essentiellement marins, mais leurs pelviennes sont généralement séparées et il est préférable de les considérer comme une famille distincte.

La faune de ces lacs est relativement réduite, 4 à 6 espèces par lac et un total de 10 espèces pour l'ensemble ; on rencontre dans chaque lac : 1-2 espèces de *Mogurnda,* 1-2 de *Oxyeleotris,* 1-2 de *Craterocephalus* (Athérinidés) et une seule de *Melanotaenia.* A l'exception de *O. fimbriata,* toutes les espèces sont nouvelles : *Craterocephalus fistularis,* du lac Kamaka, a été décrit récemment (**Crowley** *et al.* 1995) et les descriptions des *Melanotaenia* progressent par les soins des deux présents auteurs.

Deux aspects de la faune de ces lacs sont très intéressants. D'abord une tendance au gigantisme chez deux espèces : *Mogurnda magna* atteint plusieurs fois la taille du plus grand *Mogurnda* conu jusqu'ici (191 mm LS) et une espèce non décrite de *Craterocephalus,* du Lac Laamora, est de loin le plus grand représentant du genre et l'un des plus grands Athérinidés. En second lieu, les grandes ressemblances de plusieurs poissons des Triton Lakes, notamment *Melanotaenia* spp., *Craterocephalus fistularis* et *Mogurnda* spp., avec ceux du Lake Kutubu, en Papouasie, à 1000 km au Sud-Est du groupe des Triton. Cette distance considérable rend difficile d'invoquer une étroite parenté entre les deux groupes d'espèces et, comme les conditions écologiques sont très semblables dans les deux zones, on peut supposer une évolution convergente liée à des pressions sélectives semblables.