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NEW AUSTRALIAN FISHES PART 10. A NEW GENUS AND TWO NEW SPECIES OF FRESHWATER ELEOTRIDID FISHES (GOBIOIDEI) FROM THE KIMBERLEY REGION OF WESTERN AUSTRALIA

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Abstract

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A new genus and two new species of freshwater gudgeons (Family Eleotrididae) are described from the Kimberley region of north-western Australia. *Kimberleyeleotris*, gen. nov., is closely allied to *Hypseleotris* Gill, but differs in having vomerine teeth, reduced scales, a slightly larger mouth, and different pattern of head papillae. The two new species, *K. hutchinsi* and *K. notata* are thus far known only from the Mitchell and Drysdale rivers respectively. They differ from each other in the pelvic and pectoral rays (branched in *K. notata*, mostly unbranched in *K. hutchinsi*), in vertebral counts, in shape of the head and first dorsal fin, in extent of the gill opening and in colour pattern.

Introduction

The family Eleotrididae is represented by about 200 to 300 species in 40 genera. Most of the species are relatively small (usually less than 20 cm) fishes that usually dwell in brackish or freshwater habitats, primarily in tropical and subtropical regions. The largest number of species inhabits the Indo-Pacific fauna province. There has been extensive speciation in fresh waters of Australia and New Guinea, with about 60 to 70 species in the region and many of them endemic.

The present paper describes a new genus and two new species obtained by J.B. Hutchins of the Western Australian Museum during expeditions to the Kimberley region of north-western Australia during 1975 and 1976. Previous treatment was given to the genus *Hypseleotris* of Western Australia (Hoese and Allen, 1983) and the eleotridid fauna of Lake Kutubu, Papua New Guinea (Allen and Hoese, 1986).

The genus shows several specialisations common to a group of eleotridid genera recognised here as the subfamily Eleotridinae.

Methods

Methods for most counts and measurements mainly follow Hubbs and Lagler (1958). The longitudinal scale count was taken along the midline from behind the pectoral base to the end of the hypural. The transverse scale count was taken from the origin of the second dorsal fin ventroposteriorly to the anal base (TRDB). Caudal ray counts are given as upper/lower. Gill raker counts include all rudiments. Counts for vertebrae, fin rays, scales and gill rakers and measurements of types are presented in Tables 1-6. Head depth and width were taken at the posterior preopercular margin. The postdorsal length is the distance from the base of the last ray in the second dorsal fin to the posterior tip of the hypural plate. The urogenital papilla width was taken at the base of the papilla. Terminology for bones follows Springer (1983). The ptyygiophore formula follows Birdsong (1975).

Types are deposited in: Australian Museum, Sydney (AMS); Western Australian Museum, Perth (WAM). Comparative material of other eleotridid genera is deposited in the Australian

Museum.

Head papilla drawings were basd on camera lucida outlines, with papilla patterns a composite based on two or more specimens.

Kimberleyeleotris gen. nov.

Type species. Kimberleyeleotris hutchinsi sp. nov.

Diagnosis. No head pores. No scales on head. Body scales reduced, with large naked areas on belly and below first dorsal fin. Anterior nostril a simple pore above middle of upper lip, posterior nostril a simple pore above anterodorsal margin of eye. Gill opening broad, extending anteroventral to preoperculum or eye. First dorsal fin VI, origin well posterior to pectoral insertion. Anal fin original immediately below second dorsal origin. Pelvic origin well posterior to pectoral insertion, but before first dorsal origin. Vomer with few minute conical, pointed, loosely attached teeth. Head papillae in transverse pattern.

Osteology. Typical eleotridid features. Dorsal and ventral postcleithra present; palatine L-shaped, articulating dorsally with medial base of lateral ethmoid; branchiostegal rays 6; urohyal with very slender transverse shelf on ventral margin (broad in most eleotridids); pelvic intrecleithral and ventral intercleithral cartilages present.

Eleotrinine specialisations. Inner adductor mandibulae tendon attaching about to middle of maxilla; outer tendon or connective tissue attaching on groove on upper third of maxilla. Caudal fin with 8 upper and 7 lower segmented rays, uppermost articulates with hypural 5, 7 segmented rays articulating with upper hypural plate, 6 segmental rays articulating with lower hypural plate, lowermost segmented caudal ray articulating with parhypural; first upper procurrent caudal ray separated from posterior epural by upper procurrent cartilage; lower procurrent cartilage extending over tip of haemal arch of penultimate vertebra, surrounded by base of first lower procurrent ray, which also extends over tip of haemal arch.

Other features. No mesopterygoid. Basihyal spatulate. Scapula ossified. Epurals 2; lower hypural plate not fused with urostyle. First dorsal pterygiophore formula 3(12210) or 3(12211). Preoperculum with short process adjacent to, but not connecting to upper end of symplectic. Symplectic slender. Metapterygoid slender, separated by cartilaginous rod from quadrate. Lacrimal triangular, overlapping about one-half of premaxilla. Anterior tip of vomer broad, below and in front of ethmoid. Dorsal flange of sphenotic short not reaching supraoccipital.

Etymology. From Kimberley, referring to the type locality region, and *Eleotris*, a genus of Eleotrididae.

Relationships. The genus is most similar in general appearance to *Hypseleotris* Gill, in position of fins (posterior placement of pelvic fin and first dorsal fin and beginning of anal fin immediately below second dorsal origin), slender body, narrow ventral shelf of urohyal, slender metapterygoid separated by long catrilage from quadrate and in the lateral placement of eyes. *Kimberleyeleotris* differs from *Hypseleotris* in the papilla pattern, in possessing vomerine teeth, in having reduced scales and with a slightly larger mouth. Although species of *Hypseleotris* may be deeper bodied, species from the Kimberley Region of Western Australia are very slender and easily confused with this new genus. Only some species of *Hypseleotris* lack a mesopterygoid.

The attachment of the adductor mandibulae tendon, number of and attachment of segmented caudal rays are characteristic of eleotridine genera, apparently representing a specialiscd condition. In the primitive butine eleotridids the inner adductor maxillae tendon attaches anteriorly on maxilla, often attaching to a bony process off the maxilla. In butines and most gobiids there are 17 (rarely 14, 15 or 16 in butines) segmented caudal rays and the uppermost ray articulates directly with the posterior or single epural and is not displaced by cartilage (Hoese, unpubl.), suggesting that eleotridines have probably lost the upper segmented ray and probably the ventralmost ray as well. Butines with 14-16 segmented caudal rays typically have lost rays from the hypural plates.

Kimberleotris hutchinsi sp. nov.

Figures 1, 2

New genus and species B.–Allen, 1982: 61, pl. 13, fig. 7 (Mitchell River).

Material examined. Holotype. Western Australia, tributary

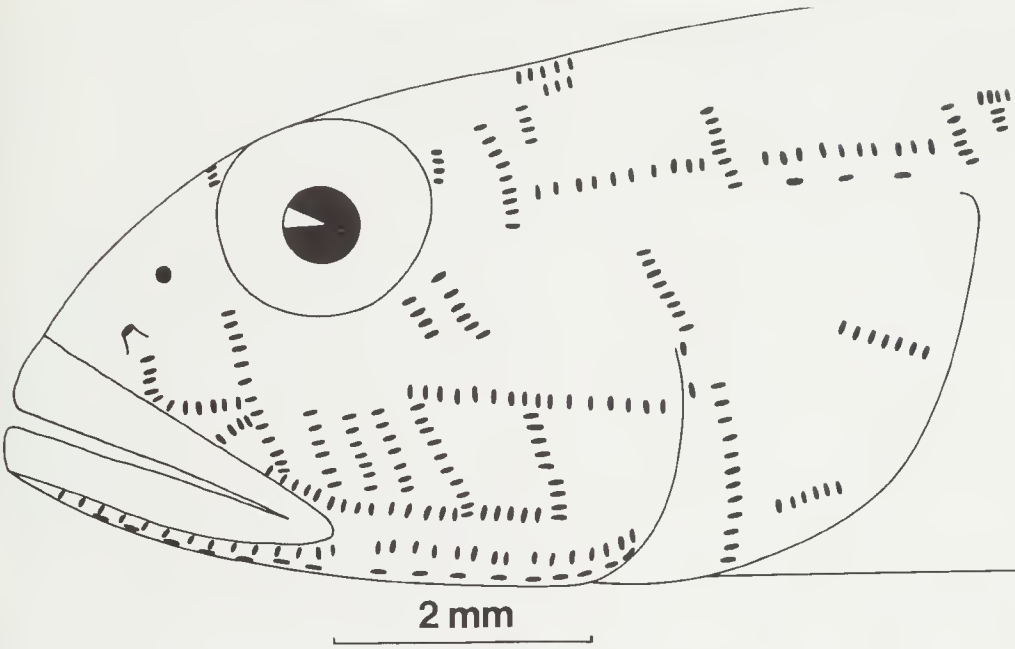

Figure 1. Sensory papilla pattern of *Kimberleyeleotris hutchinsi* based on holotype and several paratypes.

Figure 2. Paratype of *Kimberleyeleotris hutchinsi*, AMS I.26255-001, based largely on a 31 mm SL specimen.

of Mitchell River (14°49′S, 125°42′E), J.B. Hutchins and T. Dryker, 31 Oct 1976, WAM P.25684-009 (30.8 mm SL male).

Paratypes. Taken with holotype, AMS I.26322-001, 2(25-29), cleared and stained, AMS I.26255-001, 8(26.9-31 mm SL) and WAM P.25684-007, 14(25-30 mm SL).

Western Australia, Pool 5km above falls, Mitchell River (14°49′S, 125°41′E), J.B. Hutchins and T. Dryker, 30 Oct 1976, WAM P.25683-008, 2(22-24 mm SL).

Diagnosis. Pelvic rays and most pectoral rays unbranched. Vertebrae 25; first dorsal fin elevated; body pale coloured; gill opening extends anteroventral to preoperculum (between posterior preopercular margin and posterior margin of eye). Body light brown, first dorsal fin black anteriorly between first three spines, sometimes pale in small females; second dorsal fin with margins black in males, usually pale in female, other fins clear to light grey.

Description. An asterisk indicates count of holotype (See also Tables 1 and 2). First dorsal fin VI* (in 25); second dorsal fin I, 8-9, anal fin I, 9-10, usually with 1 more anal ray than dorsal ray (2 in 5 specimens); pectoral rays 14-16 (rarely 14 or 16; segmented caudal rays 8/7* (24); branched caudal rays 6/4 (1), 6/5*, (22), 7/6 (1); unseg-

Table 1. Frequencies of fin, gill rakcr and caudal ray counts in two species of *Kimberleyeleotris*

Character	State	*K. hutchinsi*	*K. notata*
Second dorsal	1,8	18	—
	1,9	7*	2*
Anal	1,9	12	1*
	1,10	13*	1
Pectoral rays	14	4	2*
	15	20*	—
	16	1	—
Lower gill rakers (1st arch)	11	—	1*
	12	1	1
	13	1	—
	14	6	—
	15	2	—
Total gill rakers (1st arch)	14	—	1*
	15	1	1
	16	1	—
	17	4	—
	18	4	—
Lower gill rakers (outer face of 2nd) arch)	10	2	2*
	11	6	—
	12	2	—
Procurrent caudal ray counts—upper	9	—	2*
	10	—	—
	11	6*	—
	12	6	—
	13	5	—
lower	8	—	2*
	9	—	—
	10	4	—
	11	7*	—
	12	6	—

mented caudal rays 11-13/10-12; vertebrae 12+13* (11), 13+12 (14); longitudinal scale count 25(2), 28(3), 29(1), 31(1), 32(1), 32(1), 33*(4), 34(3), 35(3), 36(1); transverse scale count (TRDB); 5(1), 6(3), 7(2), 9*(3), 10(3); gill rakers on outer face of first arch 3-4/1/11-14; lowcr rakers on outcr face of second arch 10-12.

Head, slightly compressed, flat on top, length 27.3-32.5% SL; snout 7.5-8.8% SL; eyes lateral, 6.6-9.0% SL; mouth oblique forming an angle of about 40° with body axis; posterior margin of jaws below or just before anterior margin of cye, length of upper jaw 7.9-9.2% SL; body slender and compressed; depth at pelvic origin 12.5-15.4% SL depth at anal origin 10.7-14.0% SL in females, 14.1-15.4% SL in malcs; caudal peduncle slender and elongate, slightly more than twice the length of the base of the second dorsal fin. Scales ctenoid; body covered with scales posteriorly, anteriorly scales taper toward midline, extending forward to bclow middle to end of first dorsal fin; anteriormost scales usually in a single line often widely spaced and not in contact with other scales; naked patch below dorsal fin often extends to below end of second dorsal fin; area immediately above anterior half to two-thirds of anal fin base often naked; belly, pectoral base, prepelvic area and head naked. Gill rakers elongate on outer face of first arch, rakers near angle longer than gill filaments; rakers on inner facc of first arch and following arches short and denticulate, short denticulatc rakers on inner face of last gill arch.

First dorsal fin elevated in males (19.9-25.3% SL), with pointed margin, fin reaches to or well beyond second dorsal fin origin when depressed; first dorsal spine moderate in length, second to fourth spines subequal in length, fifth spine subequal in length to first spine; sixth spine short, about one-third length of fifth spine; fin of females low and pointed (height 14.5-18.0% SL) reaching to near, but before second dorsal origin; second dorsal fin well separated from first dorsal fin, fin elevated, slightly higher than first dorsal fin of female and much higher than body depth, first segmented ray unbranched, other rays branched; anal fin original below second dorsal origin; fin slightly shorter in height to second dorsal fin, but higher than body depth, first 1 or 2 segmented rays unbranched, other rays branched; pelvic fin elongate reaching to or just before anus; pectoral fin rays elongate, reaching to above or slightly beyond anus; pectoral rays typically appearing unbranched, but often 1 to 4 central rays with single branch at extreme tip; caudal fin with truncate to emarginate posterior margin.

Urogenital papilla of male slender and pointed length 2.5 to 3 times width at base; papilla of female broad and rounded, with short papilla at

Table 2. Measurements (in mm) of types of two new species of *Kimberleyeleotris*

Character	*K. notata*		*K. hutchinsi*									
	holotype	paratype	holotype	paratypes								
					males			females				
SL	37.4	34.1	30.8	29.6	30.2	28.6	26.0	27.0	25.0	26.8	24.0	24.2
Head length	10.5	10.4	8.6	8.0	8.6	8.0	7.1	7.1	7.5	7.5	7.8	7.0
Head width	5.3	5.1	3.8	3.4	3.9	3.3	2.9	3.1	3.2	3.1	2.8	2.8
Head depth	4.9	4.9	4.5	3.9	4.7	4.3	3.6	3.6	3.5	3.6	3.0	3.2
Snout length	2.8	2.8	2.6	2.3	2.3	2.3	2.0	2.2	2.2	2.1	1.8	1.9
Upper jaw length	3.6	3.6	2.7	2.5	2.7	2.6	2.2	2.3	2.3	2.1	2.0	1.9
Eye length	2.8	2.8	2.3	1.8	2.3	2.3	1.8	1.8	2.0	2.1	1.8	1.9
Body depth at pelvic origin	4.9	4.7	4.3	4.0	4.5	4.4	3.7	3.8	3.8	4.0	3.0	3.4
Body depth at anal origin	4.6	4.5	4.7	4.2	4.6	4.4	3.7	3.2	3.5	3.6	2.7	2.6
Base of second dorsal fin	6.1	6.5	4.1	3.8	4.4	4.0	3.2	3.1	2.6	3.0	3.3	3.2
Post dorsal length	10.1	9.1	10.0	9.3	9.7	9.3	8.4	8.4	8.8	8.3	7.8	7.7
Caudal peduncle length	10.5	9.7	9.7	9.4	9.7	8.9	8.0	8.3	8.3	8.0	7.7	7.5
Depressed first dorsal length	7.3	6.1	7.8	5.9	7.4	7.0	5.9	4.2	4.5	4.5	3.5	3.8
Pectoral length	8.8	9.2	6.4	–	7.3	6.0	–	5.7	5.7	5.6	4.3	4.7
Pelvic Length	6.6	6.2	5.8	6.1	6.4	6.1	5.5	5.8	4.8	4.9	4.6	5.0
Caudal length	8.6	9.4	5.8	5.3	5.6	5.1	4.5	3.8	4.2	4.9	3.6	4.3
Urogenital papilla length	1.3	1.2	0.6	0.6	0.5	0.5	0.5	0.9	1.0	1.0	0.9	0.9
Urogenital papilla width	0.8	0.7	0.2	0.2	0.2	0.2	0.2	0.6	0.7	0.7	0.6	0.6

each posterolateral margin, length 1.3 to 1.4 times width at base.

Colour of freshly collected male (figured in Allen, 1982). Head and body light greyish-brown, light purple ventrally on head, body darker on lower side. Fins as described below under alcohol coloration, except anal fin mainly reddish orange.

Colour in alcohol. Head and body pale yellowish. Scale pockets edged with melanophores and lines of melanophores on skin along myosepta; males with dense concentrations of melanophores scattered over body, often most dense ventrally on caudal peduncle; females with few scattered melanophores and chromatophores along edges of scales distinct. Large median black blotch ventrally behind urogenital papilla connecting to thin black line on either side of base of anal fin, lines join behind anal fin to form thin median black stripe extending to anterior base of procurrent caudal rays.

First dorsal fin black before fourth dorsal spine, black extending on to and along distal tip of fin; rest of fin clear, except dense concentrations of chromatophores along fifth and sixth dorsal spines. Second dorsal fin with large black blotch at base of fin anteriorly, blotch extending just anterior to third segmented ray, thin black distal margin; often with broad, black stripe on distal upper third of fin; rest of fin clear, but with some scattered melanophores. Anal fin clear with few scattered melanophores; small patch of melanophores near anterior base forming faint blotch. Caudal fin light grey with scattered melanophores. Pectoral base with few scattered melanophores; pectoral fin clear to grey with melanophores along lateral margins of rays. Pelvic fins clear to white, with few elongate melanophores along lateral margins of rays in males.

Etymology. Named after J.B. Hutchins of WAM, who collected the type specimens.

Remarks. Males of this species are typically larger than females. Of the 21 specimens for which the sex could be determined, 10 are females between 22.5 and 27 mm SL, and 11 are males between 25 and 31 mm SL. Only two males are less than 27 mm SL. In the samples males average 29.3 mm SL and females 25.3 mm SL, with the average sizes significantly different ($p < 0.001$).

Kimberleyeleotris notata sp. nov.

Figures 3, 4

Gobiid species.-Hutchins, 1977: 107, fig. 11 (Drysdale River).

New genus and species A.-Allen, 1982: 60, pl. 13, fig. 4 (Drysdale River).

Material examined. Holotype. Western Australia, Drysdale River at rapids about 4 km above junction with Forest Creek (14°38'S, 126°58'E) J.B. Hutchins (stn C5-4), 21 Aug 1975, WAM P.25427-010 (37.5 mm male).

Paratype. Taken with holotype, AMS I.26254-001, 35.5 mm SL male.

Diagnosis. Gill opening broad, extending anteroventral to posterior quarter of eye; pectoral and pelvic rays branched; vertebrae 26; first dorsal fin with low rounded margin; colour dark brown, with 3 to 5 thin vertical brown bars anteriorly and 8 to 10 chevron-shaped brown bar on midside posteriorly; all fins dusky.

Description. First dorsal fin IV (2); second dorsal fin I, 9-10; anal fin I, 9-10, number of dorsal rays equal to number of anal rays; pectoral rays 14; segmented caudal rays 8/7 (2); branched caudal rays 6/5 (2); unsegmented caudal rays 9/8; vertebrae 12/14 (2); longitudinal scale count 25-27; transverse scale count (TRDB) 8; gill rakers on outer face of first arch 3/1/10-11; lower rakers on outer face of second arch 9-10. See also Tables 1 and 2.

Head more or less square in cross section, top of head flat, length 28.1-30.4% SL; snout rounded in dorsal and side views, length 7.5-8.2% SL; eyes lateral, 7.5-8.2% SL; mouth oblique forming an angle of abut 40° with body axis; posterior margin of jaws below anterior margin of eye, length 9.6-10.6% SL; body slender and compressed; depth at pelvic origin 13.1-13.8% SL; depth at anal origin 12.3-14.1% SL; caudal peduncle slender and elongate slightly less than twice the length of base of second dorsal fin. Scales ctenoid; body covered with scales posteriorly, anteriorly scales taper toward midline, extending forward to below origin of first dorsal fin; anteriormost scales usually in single line of 1 or 2 rows, with scales widely spaced and not in contact with other scales; naked patch below dorsal fin often extends to below middle of second dorsal fin; area immediately above anal-fin base scaled; belly, pectoral base, prepelvic area

and head naked. Gill rakers elongate on outer face of first arch, rakers near angle longer than gill filaments; rakers on inner face of first arch and following arches short and denticulate, no rakers on inner face of last gill arch.

First dorsal fin low in 2 males examined (17.9-19.5% SL), with rounded margin, fin ending just before second dorsal fin when depressed, first dorsal spine moderate in length, second to fourth spines subequal in length, fifth spine slightly shorter than fourth spine, sixth spine short, slightly less than half of fifth spine; second dorsal fin well separated from first dorsal fin, second dorsal fin elevated, subequal to height of first dorsal fin and slightly higher than body depth; first segmented ray unbranched, other rays branched; anal-fin origin below second dorsal origin; fin slightly shorter in height to second dorsal fin, but higher than body depth, first segmented ray unbranched, other rays branched; pelvic fin elongate reaching to just before anus (well short of anus on one side in one specimen), length 17.2-18.2% SL; pectoral-fin rays elongate, reaching to above or slightly beyond anus, length 23.5-27.0% SL; pectoral rays branched; caudal fin apparently with a rounded to truncate posterior margin, (fin damaged in both specimens).

Urogenital papilla of male broad and flat, with smooth margin, length 1.6 to 1.7 times width at base.

Colour in alcohol (fresh coloration unknown). Head and body brown, densely covered with melanophores; melanophores most dense along margins of scales. Snout, interorbital region and cheeks dark brown. Midside with a series of vertical and chevron-shaped, dark brown bands; bands separated from mid-dorsal region by approximately length of band; first vertical band broad, below and before beginning of first dorsal fin; second vertical band broad and below second to third dorsal spine; third vertical band,

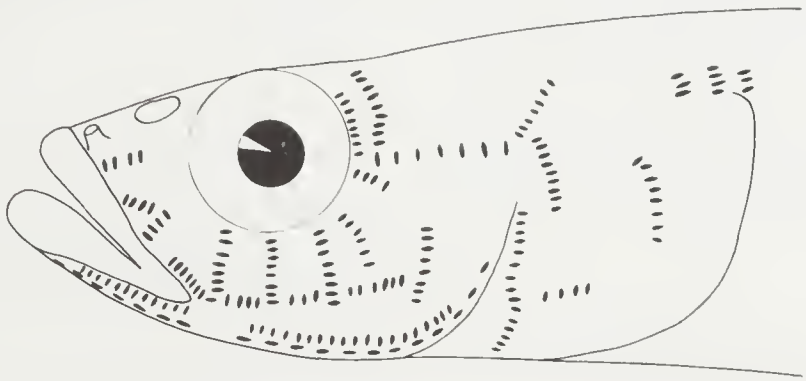

Figure 3. Camera lucida drawing showing sensory papilla of holotype of *Kimberleyeleotris notata*.

Figure 4. Holotype of *Kimberleyeleotris notata*.

narrow, below end of first dorsal fin; thin, vertical band between two dorsal fins; thin, vertical band below second dorsal origin; followed by 12 chevron-shaped bands (with apex forward) in holotype (paratype damaged); faint vertically elongate grey bar at base of caudal fin.

Median fins dark grey to black; without distinct rows of dark spots; dorsal portion of pectoral base with dark brown spot that fades ventrally, fin with melanophores along upper and lower margins of rays; pelvic fins also with melanophores along edges of rays and with some scattered melanophores on membranes. Melanophores dense around anus, but not forming an obvious dark ring; melanophores dense on urogenital papilla.

Etymology. From the latin *nota* (mark or sign) referring to the pattern of markings on the side of this species.

Acknowledgements

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