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A NEW SPECIES OF *LEPIDOTRIGLA* (SCORPAENIFORMES: TRIGLIDAE) FROM THE WATERS OFF NORTHERN AUSTRALIA.

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ABSTRACT

A new species of the family Triglidae, *Lepidotrigla russelli* sp. nov., from the waters off the Northern Territory and Queensland (Australia) is presented. The new taxon is compared with its similar relatives in the genus *Lepidotrigla* Günther, 1860: *L. faurei* Gilchrist and Thompson, 1914, and *L. cadmani* Regan, 1915. Brief comments on the genus *Lepidotrigla* are included.

KEYWORDS: Triglidae, *Lepidotrigla russelli*, sp. nov., taxonomy, new species, F.A.O. Fishing Area 71, northern Australia, eastern Australia.

INTRODUCTION

As part of a general study on the systematics of supra-specific taxa of the family Triglidae, a large number of specimens collected in different parts of the world have been examined. One parcel of material examined contained a large number of specimens coming from waters of Indonesia and Australia. Among this material was included an undescribed species clearly belonging to the genus *Lepidotrigla* Günther, 1860. The specimens used in the present study were collected in Australian waters (F.A.O. Fishing Area 71), mainly the Northern Territory (north of Cape Wessel, north of Melville Island, northeast of Goulburn Island, off Jones Shoal, Burns Shoal off Point Arrowsmith, east of van Diemen Gulf) Western Australia (York Sound), and Queensland (off Weipa). This new species, represented by 17 specimens, is described below.

METHODOLOGY

The terminology of head spines mainly follows Teague (1951), as well as Allis (1909) for placement of spines on the cranial bones. The terminology of the squamation follows Russell *et al.* (1992).

Measurements and counts of body parts are a combination of methods of Hubbs and Lagler (1958), Teague (1951), Richards (1968), and Richards and Saksena (1977), with the exception of the following characters. The length of the cleithral spine is measured from the posterior edge of the opercular flap to its rear end; the lengths of the pectoral fin and its free rays are measured from their respective superior axils to their respective posterior tips; and the length of the ventral fin is measured from the ventral axil to the posterior end of the longest ray.

None of the measurements and proportions given here include the lengths of the rostral projections which are measured separately. Their length is measured from their tips to the premaxillary symphysis and the absolute values are also given in Table 1. The head depth is measured vertically from the posterior edge of the orbit to the base of the head (preopercular bone). The body depth is measured vertically, from in front of the first anal ray and does not include the crests at the bases of the dorsal fins.

Institution abbreviations used: Northern Territory Museum, Darwin, Australia (NTM) and the Institut de Ciéncies del Mar (C.S.I.C.), Barcelona, Spain (IIPB), Muséum National de l'Histoire Naturelle, Paris (MNHN)).

Body measurement abbrevations are as follows: TL, total length; SL, standard length; HL, head length; OD, longitudinal diameter of orbit; ML, maxillary length; CH, cheek height; and IO, interorbital distance.

SYSTEMATICS

Type material. HOLOTYPE - NTM S. 11953-003, 194.1 TL (158.1 SL) mm, north-east of Goulburn Island (Northern Territory, Australia), 25 August 1986, depth 55 m.

PARATYPES - 16 specimens, size range between 102.2 TL (84.8 SL) and 189.6 TL (155.6 SL) mm: IIPB 54/1993, 163.3 TL (129.3SL) mm, 25th August, 1986, northeast of Goulburn Island (NT), depth 55 m; IIPB 55/1993, 186.9 TL (150.9 SL) mm, same data as preceding; NTM S. 11953-012, 178.9 TL (144.9 SL) mm, same data as preceding; NTM S. 10053-002, 102.2 TL (84.8 SL) mm, October 1977, off van Diemen Gulf (NT); NTM S. 638, 107.1 TL (85.8 SL mm, July 1975, York Sound (WA); NTM S. 1131, 129.5 TL (115.5 SL) mm, 12 September 1975, off Jones Shoal (NT); IIPB 56/1993, 155.3 TL (120.3 SL) mm, off Cape Wessel (NT); NTM S. 11614-007, 189.6 TL (155.6 SL) mm, 11 May, 1985, same data as preceding; NTM S.419, 155.2 TL (126.2 SL) mm, 4 October 1975, Burns Shoal, off Pt Arrowsmith (NT); NTM S.509, 144.4 TL (119.4 SL) mm, 18 May, 1983, N of Melville Island (NT), 15 September 1975; NTM S.597, 165.8 TL (134.8 SL) mm, same data as preceding; NTM S.598, 152.2 TL (123.2 SL) mm, same data as preceding; NTM S.599, 159.2 TL (130.2 SL) mm, same data as preceding; NTM S.600, 158.2 TL (126.2 SL) mm; NTM S. 578, 145.9 TL (117.9 SL) mm, September 1975, off Weipa (Qld); NTM S.579, 144.4 TL (118.4SL) mm, same data as preceding.

Other material. Other specimens used for comparison were five syntypes of *Lepidotrigla laevispinnis* Blache and Ducroz, 1960 (synonymized with *Lepidotrigla cadmani* Regan, 1915, by Richards (1968: 81)), with the following catalogue numbers: MNHN-1960-189 to MNHN-1960-193, total and standard lengths range between 212 (172) and 190 (158) mm, trawled west of Pointe Noire (Congo Republic) by Blache and Ducroz. Other capture data unknown.

Absolute measurements of the specimens studied are given in Table 1 for the new species. We have not included proportional measurements and percentages of the variables studied, leaving this job to the reader.

Lepidotrigla Günther, 1860
Lepidotrigla russelli sp. nov.
(Figs 1-4)

Diagnosis. Post-orbital groove (occipital or post-frontal groove of some authors) incomplete, reduced to form a short pit just behind the eyes. Preopercular spine and keel are present. Length of pectoral fin somewhat shorter than head length. Body covered with firmly attached cycloid scales. Throat, chest, breast and belly covered with small, firmly attached cycloid scales.

Description. General counts and measurements of holotype and paratypes are given in Table 1.

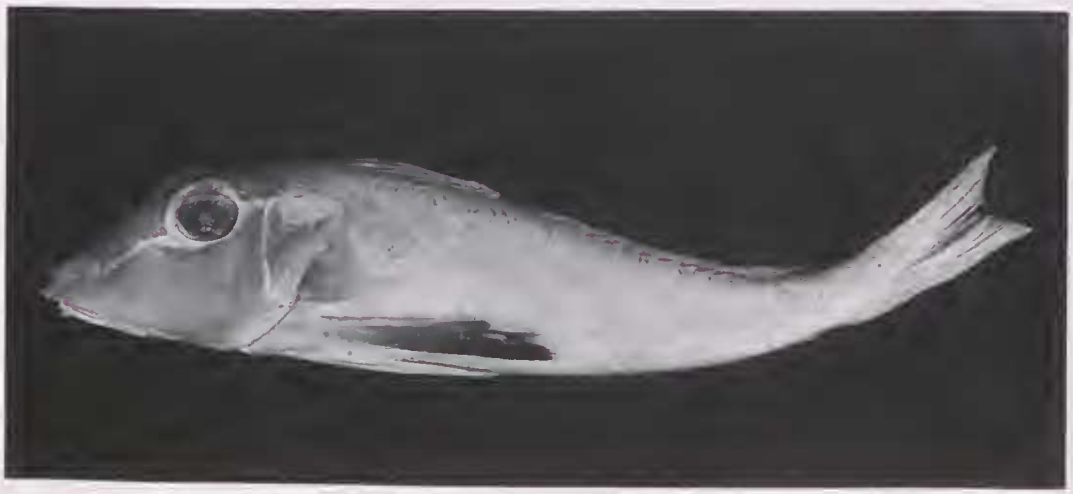

Fig. 1. Lateral view of the holotype NTM-S-11953-003 of *Lepidotrigla russelli* sp. nov..

Table 1. Absolute values of morphometric and meristic variables of the specimens of *L. russelli* sp. nov.. The meristic variable "1st. D1 Ray: Ser./Gran." indicates 0= smooth, S= serrated and G= granulated.

Catalogue Number	NTM S-11953-003	NTM-S-419	IIPB 56/1993	NTM-S-11614-007	NTM-S-578	NTM-S-579	IIPB 54/1993	IIPB 55/1993	NTM-S-11953-012	NTM-S-597	NTM-S-600	NTM-S-599	NTM-S-598	NTM-S-10053-002	NTM-S-1131	NTM-S-638	NTM-S-509
MORPHOMETRICS																	
Total Length	194.1	155.2	155.3	189.6	145.9	144.4	163.3	186.9	178.9	165.8	158.2	159.2	152.2	102.2	129.5	107.1	144.4
Standard Length	158.1	126.2	120.3	155.6	117.9	118.4	129.3	150.9	144.9	134.8	126.2	130.2	123.2	84.8	115.5	85.8	119.4
Head Length	51.8	40.9	42.1	50.7	38.7	38.1	41.8	49.2	45.5	43.1	42.6	44.0	37.5	28.4	37.5	30.0	39.4
Length Rostral Append.	1.9	1.8	1.7	1.4	2.1	0.6	0.7	2.1	2.1	1.2	1.8	0.8	0.8	1.6	1.5	0.9	2.6
Preorbital Length	19.5	14.6	14.3	16.4	14.2	15.3	16.7	19.8	17.5	15.6	16.6	16.2	15.3	12.2	14.6	12.0	14.3
Orbit Length	13.7	11.2	10.6	12.7	12.6	10.0	11.7	12.9	11.9	12.0	10.5	11.8	10.0	7.8	10.6	8.1	10.9
Interorbital Length	9.0	8.5	7.9	9.0	8.3	6.9	7.5	9.9	9.4	7.9	8.2	8.6	7.5	5.3	7.0	5.4	7.6
Postorbital Length	18.7	14.9	14.3	18.3	11.9	13.2	14.2	17.5	15.8	15.1	14.6	16.4	14.4	10.0	12.2	9.7	13.0
Maxillary Length	17.1	14.9	16.3	16.0	14.1	11.9	14.7	16.6	15.8	12.4	13.4	15.2	13.4	10.4	13.5	9.9	13.1
Cheek Heith	11.4	9.4	8.6	9.6	5.0	8.4	8.6	10.9	9.0	7.9	8.3	8.4	8.1	5.5	6.8	5.7	7.0
Pre-D1 Length	49.1	39.6	37.3	48.6	39.2	36.9	42.4	46.6	43.4	41.9	40.4	42.9	38.9	29.0	34.1	27.8	36.5
D1 Base Length	33.7	25.0	26.3	32.6	23.0	26.0	26.7	32.8	30.9	26.1	27.5	26.7	26.4	18.5	23.4	18.9	24.4
D2 Base Length	47.8	40.4	40.1	50.7	38.1	37.1	39.5	49.5	45.3	43.5	40.9	39.8	38.6	28.1	35.8	26.7	39.0
Pectoral Length	45.9	40.7	36.7	46.0	36.2	34.9	40.3	45.7	44.0	43.1	37.1	40.3	35.7	25.6	32.7	27.5	35.5
1st. Free Ray Length	41.7	35.6	31.7	38.6	31.2	29.2	35.7	41.8	37.7	38.0	33.2	33.9	34.0	21.2	30.2	22.1	32.2
2nd Free Ray Length	34.8	31.3	27.6	37.8	26.2	23.7	29.4	34.1	31.9	32.4	28.6	30.4	29.5	18.0	26.1	18.5	27.2
3rd.Free Ray Length	27.5	24.6	22.1	26.4	20.5	19.5	22.8	26.7	26.0	26.0	23.4	24.3	23.3	14.7	21.2	14.7	22.6
Pelvic Fin Length	30.5	27.5	24.1	28.7	21.8	23.6	26.3	29.8	29.0	25.6	23.1	26.4	24.3	17.0	21.8	17.2	23.6
Preanal Length	84.2	66.7	62.4	86.2	63.7	63.2	72.7	80.7	76.4	69.6	67.3	72.4	65.6	44.3	57.6	46.8	61.4
Anal Fin Base Length	49.2	39.2	38.1	47.5	36.4	38.0	41.4	47.1	45.5	41.9	39.5	39.8	35.5	24.6	35.2	27.1	36.0
Cleithral Spine Length	12.5	11.5	12.0	10.1	9.9	9.9	10.5	14.0	13.8	10.9	10.6	11.6	9.0	6.9	10.6	6.1	7.9
Head Heigth	32.0	27.9	25.8	33.5	25.3	24.4	26.9	31.7	30.3	29.4	27.7	28.5	26.3	18.3	23.9	18.9	25.4
Body Heigth	30.1	22.8	23.1	27.3	20.2	19.6	23.8	28.5	28.5	23.9	24.0	25.2	23.8	15.1	22.1	14.2	22.3
MERISTICS																	
D1 Spines	9	10	9	8	8	10	9	10	8	9	9	9	9	8	8	9	9
D2 Rays	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Anal Rays	14	14	14	14	14	14	14	15	14	14	14	14	14	13	14	14	14
Pectoral Rays	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10
Gill-rakers 1st. Arch	8 + 2R	6 + 1R	6 + 2R	6 + 2R	6 + 2R	6+2R	6 + 2R	8 + 2R	7 + 2R	6 + 2R	6 + 2R	6 + 3R	7	6+2R	6+3R	6+1R	6+2R
Spotted Rays in D1	0	0	4 - 6	0	3 - 7	3 - 7	4 - 7	0	3 - 6	0	0	0	0	0	0	3 - 8	0
1st. D1 Ray Ser./Gran.	0	0	G	0	G	G	0	G	0	G	G	G	G	G	0	G	0
Preocular Spines	0	2	1	0	2	2	2	2	2	2	2	1	2	2	2	2	2
Postocular Spines	1	2	2	1	1	2	1	1	1	2	2	1	1	1	1	2	1
Esphenotic Spines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
Parietal Spine	0	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	1
Lateral Line Scales	58	59	61	60	60	61	61	63	60	61	60	56	61	59	57	60	60
Total Dorsal Crests	22	23	23	23	22	23	23	23	23	23	23	23	23	23	23	23	22
Crests in D1 Base	8	8	8	8	8	9	9	9	8	8	8	8	8	8	7	8	8
Vomerine Teeth	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0

Fig. 2. Lateral view of the head of the holotype NTM-S-11953-003 of *Lepidotrigla russelli* sp. nov.. Arrow marks the preopercular spine and ridge.

Body robust anteriorly, slender posteriorly and covered with large, firmly attached cycloid scales, smaller on the chest, breast and belly, numbering 12 to 13 between pelvic fin bases. Lateral line scales 58 in holotype (57-63 in paratypes), with their tubes slightly branched (forming three branches); lateral line extending onto the caudal fin forming a bifurcation. Both sides of dorsal fin bases armoured with 22 erect bony crests (22-23 in paratypes), flattened in front and rising backwards, with eight erect bony crests (seven to nine in paratypes, modally eight) at the base of the first dorsal, and 14 at the base of the second dorsal fin; some specimens have one or two interdorsal crests.

Head rather large (3.1 times in SL), and slightly spinulated. Post-orbital groove incomplete, not crossing top of head, thus reduced to a pit behind eyes. Nape scaled. Snout slightly longer than orbit (2.7 in HL; 0.7 in OD), upper profile scarcely concave. Rostral projection much shorter than half length of orbit (27.3 in HL; 7.2 in OD), with outer margin rounded and armoured with several short spines. Orbit rather large, somewhat longer than cheek depth (3.8 in HL). Interorbital space deeply concave (5.8 in HL) and much narrower than orbit (1.5 in OD). Maxillary not reaching to below anterior border of orbit (3.0 in HL). Teeth in both jaws villiform; vomer edentate in holotype (two paratypes with teeth) and palatines toothless. Gill-rakers on first arch tubercle-like in shape, well separated from each other and 8+2 rudiments in number. Pseudobranchials present.

First dorsal fin with nine spines (8-10 in paratypes, modally 9), none reaching first ray of second dorsal when depressed, with anterior edge of first ray smooth (smooth or slightly granulated in paratypes, but never serrated). Second dorsal fin with 15 soft rays. Anal fin with 14 soft rays (13-15 in paratypes, modally 14), inserted opposite origin of second dorsal fin. Pectoral fin with 11 soft rays (10-11 in paratypes, modally 11), moderate in length but always shorter than head length, plus three free rays. Pelvic fin well developed with one spine and five soft rays, extending nearly to or slightly beyond the vent (5.2 in SL). Caudal fin slightly emarginate.

Spinulation. Cleithral spine stout and very long; its length measured from the posterior edge of opercular membrane to tip of spine is slightly shorter than length of the orbit (4.1 in HL) (3.3-5.0 in paratypes). Opercular spine short. Preopercular spine and keel present and conspicuous. Preocular spines absent in holotype (0, 1 or 2 in paratypes), 1 postocular spine present (1-2 in paratypes), sphenotic spine absent (0-1 in paratypes), pterotic spine present, parietal spine absent (0-1 in paratypes) and 1 nuchal spine present. Rostral, preorbital and suborbital spines absent (*sensu* Teague 1951).

Fig. 3. Dorsal view of the head of the holotype NTM-S-11953-003 of *Lepidotrigla russelli* sp. nov. Arrow marks the incomplete post-orbital groove.

Fig. 4. Ventral view of the holotype NTM-S-11953-003 of *Lepidotrigla russelli* sp. nov. showing the squamation of the chest, breast and belly. Note the size of the scales.

Coloration in alcohol. Head and body yellowish brown. Body pale yellow in scaled areas, but where the body scales are missing, the color appears pinkish. Ventral region whitish. Pectoral fin black except for the two uppermost rays which are pale, as are the free pectoral rays. In some cases there are traces of scattered dark spots on the spinous dorsal fin, spots which are lacking in the holotype. Other fins pale.

Etymology. This species is named *russelli* after Dr Barry C. Russell, Director of Research and Collections at NTM.

DISCUSSION

The spinulation of the head and other characters studied in the new species show a certain degree of variability as indicated above in the description. Nevertheless, all these data have been included here in order to follow the standardized descriptions of the family given by other authors.

Two specimens, NTM S.11614-007 and NTM S.579, have teeth on the vomer in the sense that this bone had these teeth formed by very small

spinulations, whilst specimens of different species the genus *Lepidotrigla* had papillae on the dermal tissue covering the bone, with the latter being smooth. This could have confused some authors who identified these papillae as true vomerine teeth. Thus, in our opinion, the presence or absence of teeth on vomer, as given in some works on the family, should be read with some caution.

Due to the presence of an incomplete postorbital groove and pectoral fin length being less than the length of the head, this species resembles the following species, including those considered as valid by Richards (1992: 54-55, Table 5): *L. abyssalis* Jordan and Starks, 1904; *L. alata* (Houttuyn, 1782); *L. alcocki* Regan, 1904; *L. cadmani* Regan, 1915; *L. faurei* Gilchrist and Thompson, 1914; *L. guentheri* Hilgendorf, 1879; *L. longifaciata* Yatou, 1981; *L. marisinensis* Fowler, 1938; *L. modesta* Waite, 1899; *L. oglina* Fowler, 1938; *L. spiloptera* Günther, 1880; *L. spinosa* Gomon, 1987 and *L. umbrosa* Ogilby, 1910.

The presence of scales on the throat, chest, breast and belly separates this species from all those in the list above except for *L. alata*, *L. faurei* and *L. cadmani*. The former species has the rostral appendages formed into a single, long, stout spine, which some authors have used to include *L. alata* in the genus *Pachytrigla* Fowler, 1938, and is thus easily separated from the new species. *Lepidotrigla faurei* has been confused due to the distribution of the scales on the throat, chest, breast and belly. There is no reference to this character in the original description given by Gilchrist and Thompson (1914: 75). Smith (1934: 322, 324-325) describes the species *L. faurei* as having scales on the breast and differentiates this species from *L. natalensis* Gilchrist and Thompson, 1914, by the breast squamation. The same procedure was followed by Richards (1968: 81) in his description of the new species *L. carolae*, separating this species from *L. cadmani* by the differences in breast squamation. Blache and Ducroz (1960: 208), in their description of *L. laevispinnis* (= *L. cadmani* after Richards (1968: 81) compare their new species with *L. faurei*, stating that both species have scales on the breast and in the interventral area. Richards (1992: 54, Table 5), used as a reference work for our list of valid species, writes "naked" in the column "breast squamation" for the species *L. faurei* (where he considers *L. natalensis* Gilchrist and Thompson, 1914, and *L. stigmapteron* Fowler, 1934, as synonyms of the nominal). Besides our interest in maintaining Richards (1992) as the only reference list of valid species of the genus *Lepidotrigla*, we cannot ignore clear references to breast squamation of the above mentioned species in previous works. Taking into account that Richards (1992: 54, Table 5) had no access to type material of *L. faurei*, we have not considered the data on squamation given by this author for that species.

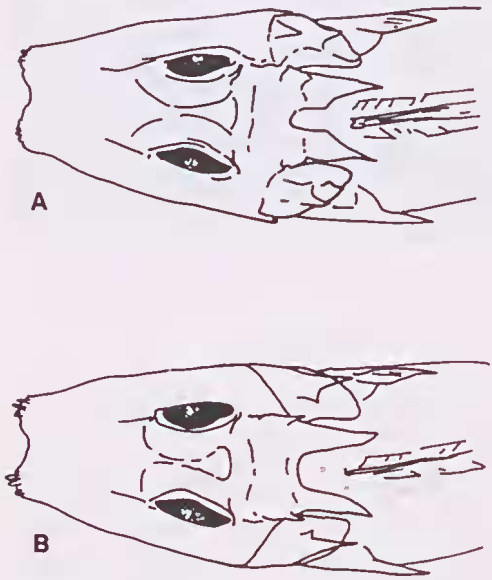

Fig. 5. Detail in dorsal view of the predorsal area of *Lepidotrigla russelli* sp. nov. (A) and *L. cadmani* (B).

Thus, *Lepidotrigla russelli* sp. nov. differs from *L. faurei* because the latter shows the following characters: the first three dorsal rays have serrations in their anterior edges (smooth or granulated in the new species); there is no spine or keel present on the preopercular bone (both are present in the new species); and the body scales are ctenoid but the ventrals are cycloid (scales always cycloid in the new species).

Lepidotrigla cadmani is very similar to the new species, both species having biometric characters which are very close, except for the cheek height and the interorbital distance versus the maxillary length. In *L. cadmani*, the height of the cheek is always greater than the maxillary length (ML= 0.8 to 0.9 in CH for the syntypes of *L. laevispinnis*) but much smaller than the maxillary length in the new species (ML= 1.4 to 2.8 in CH). The interorbital distance is greater in *L. cadmani* (ML= 1.3 to 1.5 in IO for the syntypes

of *L. laevispinnis*) than in the new species (ML= 1.6 to 2.1 in IO) There is clearly no overlap among the ranges of both species for the first character mentioncd but there may be a very slight one in the second.

From the morphological and meristic point of view, both species are easily separated. *Lepidotrigla cadmani* has no preopercular keel (present in the new species), has an inconspicuous preopercular spine (distinct preopercular spine), semi-circular predorsal area (predorsal area pinched-in, with a narrow anterior extension, (Fig. 5)), five tubules in the scales of the lateral line (three tubules in the scales of the lateral line), body scales ctcnoid, cycloid on breast (all scales cycloid), and four to five scales between pelvic fins (12 to 13 scales between pelvic fins). While reviewing literature on the Triglidae of the area, we found a particularly interesting species cited by Goerfelt-Tarp and Kailola (1983: 117) as *Lepidotrigla* sp. 4. Unfortunately, the description given by these authors is too short and incomplete to assign this or these specimens to any known species, though the meristic characters agree with thosc of the new species, as do the unusual presence of scales on the breast. These features may indicate that the new species described in this paper and *Lepidotrigla* sp. 4 could very well be the same.

Some authors give particular importance to the shape of the spines of the preorbital bones. We have been revising the genera of the family Triglidae (including Peristediidae) since 1990, and in our opinion, not too much importance should be given to this feature, though it is helpful as complementary information for differentiation of some groups. This may also be true for coloration of the first dorsal fin and the presence or absence of teeth on the vomer. We have found variation in the first feature in many specimens of different species of this family. As has been indicated in the description of the new species, the pattern of spots on the first dorsal is not constant. The same occurs with the vomerine teeth, as their presence is variable, as has been stated by several authors such as Smith (1934: 323, 327) for thc genus *Lepidotrigla*, and Hubbs (1959: 314) for the genus *Pterygotrigla* Waite, 1899, among othcrs.

Yato (1981: 263) statcs: 'Identification of the gurnards rcferable to the genus *Lepidotrigla* is extremely difficult because of the taxonomic characters vary strikingly with growth stage and individuality'. The observation perhaps also applies because the original descriptions and those given by subsequent authors often give differing information on the species treated. Such varying information is often difficult to use when making comparisons, or attempting an accurate species determination, as in some cases the characters given in various papers differ widely and are impossible to compare. We also believe that to revise all genera of the family is necessary; works of wider scope are likely to provide a better understanding of the taxonomy of the Triglidae *sensu lato*.

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We are indebted to Dr Barry C. Russell, of the Museum and Art Gallery of the Northern Territory, Darwin, who kindly loaned a large amount of triglid material to two hitherto unknown men, extended the period of loan when necessary and did his best to attend to our requests.

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