On a New Genus of Fishes of the Family Galaxiidae

By

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One Plate and Two Text Figures

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Family Galaxiidae.

Paragalaxias, gen. nov.

Diagnosis.—Differs from *Galaxias* and *Neochanna* in having the teeth in the jaws biserial; also differs from the members of both genera, except *Galaxias dissimilis* Regan (see *Remarks*), in having the dorsal fin inserted well forward, at about level of ventrals. Vertebrae fewer than in other members of the family. Ventrals six-rayed. Size apparently small.

Orthotype.—*Paragalaxias shannonensis*, sp. nov.

Habitat.—Tasmania. Fluviatile.

Paragalaxias shannonensis, sp. nov.

(Plate III)

General form moderately stout, subcylindrical anteriorly, somewhat compressed posteriorly. Head moderately depressed; snout obtuse; interorbital region gently convex. Size small. Jaws equal anteriorly [lower sometimes projecting very slightly]. Maxillary extending almost [usually quite] to vertical from anterior margin of eye. Branchiostegals [8–9]. Gill rakers on lower part of anterior arch [12–13]. Vertebrae [22 + 22 = 44 + urostyle].

Dimensions. Total length 40·7 mm. [25·5 mm.–39·2 mm.]; length to base of middle caudal rays 33·8 mm. [21·3 mm.–32·8 mm.].

Proportions. Depth of body 7·6 [6·3–7·9] in total length, or 6·3 [5·4–6·6] in length to base of middle caudal rays. Head 4·4 [4·2–4·7] in total length, or 3·7 [3·6–3·9] in length to base of middle caudal

[1] *Conventions.*—Definitive numerical characters are in general those of the holotype; items in square brackets relate throughout to paratypes. Dimensions and proportions have been determined with an a_2 (35 mm.) Zeiss objective, and Leitz No. 0 ocular with ocular micrometer. *Total length* means length from tip of snout to end of caudal rays. *Emargination-index*: this term, proposed in the belief that it will be found generally useful, is defined thus:—the difference in backward horizontal extension of the median and lateral caudal rays, measured from the base of the former, and expressed as a decimal of the latter; the fin being in the normal expanded condition.

rays. Snout 3·8 [3·7–4·1] in head; eye 4·2 [3·7–4·6] in same, or 1·1 [1·0–1·2] in snout, or 1·1 [1·0–1·3] in interorbital width.

Teeth. Biserial in both jaws: arranged in each premaxilla (Text fig. 1A) and each ramus of the mandible (Text fig. 1C) in an outer series of about 20, subequal, subconical, bluntly pointed, somewhat recurved, averaging one to one and a half times as long as their interspaces; and in an inner series of about 14, directed inwards and slightly upwards, larger, more compressed, more sharply pointed

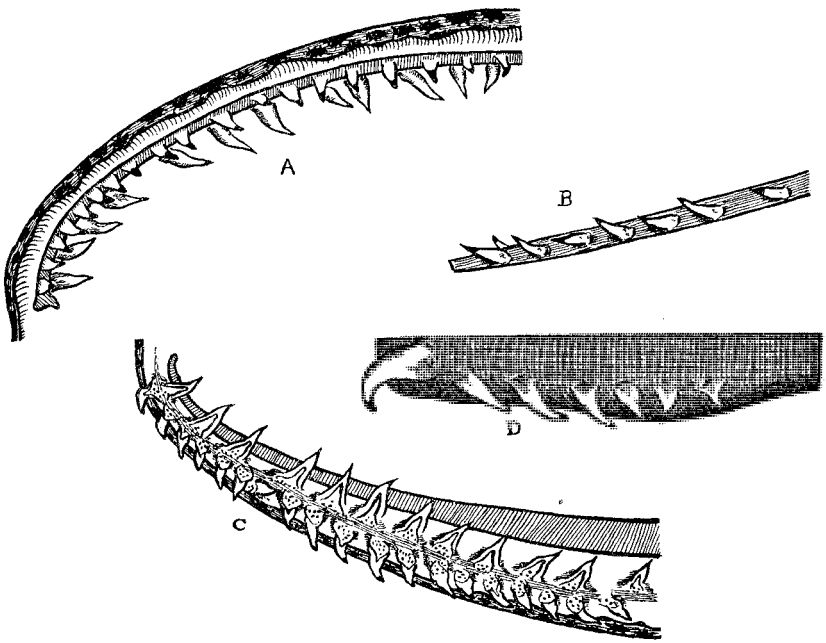

Fig. 1.—*Paragalaxias shannonensis*, sp. nov. Teeth enlarged.
A.—premaxillary. B.—entopterygoid. C.—mandibular. D.—lingual.

than those of the outer series, their interspaces about equal to, or less than, their length. On each entopterygoid (Text fig. 1B) a single series of about 8, fairly comparable with those of the inner series in the jaws, their interspaces, which progressively increase backwards, averaging rather more than their length. On the tongue (Text fig. 1D) two lateral series, each of 6–8, diverging posteriorly, the anterior pair, which are almost or quite contiguous basally, usually the largest, three to four times as large as those of the outer series in the jaws, bluntly pointed, much recurved.

Nostrils and Mucus-pits (Text fig. 2). Nostrils large, the anterior nearer to tip of snout than to orbit, the posterior about twice as

far from anterior as from orbit. Mucus-pits most evident on dorsal surface of head, where there are six, relatively very large.

Dorsal fin. Large; fourteen [fourteen–fifteen] rays, thus, II + 11 + I [II–III + 11 + I]: in several of the smaller paratypes all rays remain unbranched, their stems quite uncleft, and the pencillate extremities that characterise all rays and ray-branches scarcely, or not, distinguishable into two tufts. Originates virtually above base of ventral, being behind level of latter by 1·4% [0·9%–1·4%] of total length without caudal: distance from its origin to base of caudal 2·7 [2·5–2·7] in total length, or 2·2 [2·2–2·3] in length without caudal. Its largest, 5th [5th or 4th], ray with its membrane 1·8 [1·6–2·1] in the head; its base 1·4 [1·1–1·5] in the same, or 1·3 [1·0–1·5] in its distance from caudal. Laid back, reaches level of base [base-middle] of last anal ray laid back, its total horizontal extension being between one-third and one-fourth total length without caudal.

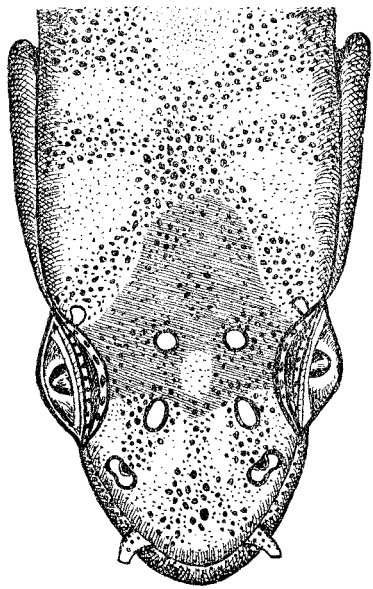

Fig. 2.—*Paragalaxias shannonensis*, sp. nov. Dorsal aspect of head, showing anterior and posterior nostril, and mucus-pits; enlarged.

Anal fin. Moderate; nine rays, thus, II + 6 + I [II + 6 + I]: in several of the smaller paratypes all rays remain unbranched, as in dorsal. Originates below 12th [11th–12th] dorsal ray. Its longest, 4th [4th or 5th], ray with its membrane 2·1 [2·0–2·4] in the head; its base 2·7 [2·3–2·7] in the same, or 1·8 [1·5–1·8] in its

distance from caudal. Laid back, virtually reaches caudal ridge [usually fails to do so by ½–⅔ length of its last ray].

Pectoral fins. Large, distinctly pedunculated; 12 [11–13]; extending 0·8 [0·7–0·9] of the distance from their origin to origin of ventrals.

Ventrals. Six-rayed, thus, I + 4 + I [I + 4 + I]; originating very slightly in advance of dorsal, at a point about equidistant from anterior margin of eye and base of caudal; extending 0·8 [0·7–0·9] of the distance from their origin to origin of anal.

Caudal fin. $13 + \frac{c.\ \text{IX}}{c.\ \text{XI}}\left[12\text{–}13 + \frac{c.\ \text{VIII–XI}}{c.\ \text{VIII–XI}}\right]$; its length 5·9 [6·1–6·4] in total length; emargination-index 2·4 [2·3].

Caudal peduncle. 2·3 [2·1–2·4] times as long as deep; its length 0·6 [0·5–0·6] in postorbital portion of head.

Life-Colours. General colour translucent greenish, blotched or barred with greenish brown. The pattern varies considerably, but characteristically, as in the holotype, consists of 10–12 large blotches tending to form subvertical bars, from once to twice as wide as their interspaces, in linear series along the side, and of similar blotches, sometimes forming well-marked saddles, on the back. No special scapular bar. Under surface paler than sides and back, minutely punctuated with darker behind vent, and usually also, though more lightly, in a narrow cross-zone near level of base of pectorals. Head in general concolorous with body; a dark blotch near occiput; no dark streak beneath eye. Iris golden, heavily spotted, especially superiorly, with blackish; pupil blackish. Operculum with briliant metallic green-gold blotch. Fins pale, immaculate (macroscopically), often with distinct greenish tinge basally. Through the transparent body-wall the enteric canal shows metallic greenish gold, and the vertebral column is seen to arch slightly over the silver air-bladder, which is embraced by about 10 pairs of ribs, while the dorsal aorta and its backward extension as the caudal artery are traceable as a dark blue, almost black, line.

Under a lens the body exhibits numerous black chromatophores, subcircular or stellate, the latter type much resembling those of *Galaxias attenuatus*, and chiefly constituting the body-bars; there are also scattered small subcircular orange spots. In all fins rays are white, with, occasionally, some orange spots near the base, these being few except on the caudal, where they extend thickly over the proximal two-thirds, or more, of the ray; rays with a row of black chromatophores along either border. Membrane in all fins mainly white, sometimes somewhat greenish basally, with scattered orange and black spots, much more abundant and conspicuous on caudal than on any other fin.

Material Examined. Described from the holotype (figured), seven paratypes, and paratypic microscopical preparations (from which teeth are figured). Holotype (Regd. No. HT939a), a paratype (Regd.

No. PT939b), and slides of paratypic material (Regd. Nos. PT. sl. 939c-n) in the collection of the Queen Victoria Museum, Launceston, Tasmania. Paratypes will be offered to the British Museum (Natural History), London; Australian Institute of Anatomy, Canberra; Australian Museum, Sydney; National Museum, Melbourne; Tasmanian Museum, Hobart; and Museum of the Biology Department, University of Tasmania, Hobart.

Locality. Shannon River, Tasmania. Three specimens collected on 3rd December, 1933, remainder (about a score) between 29th March and 2nd April, 1934: all from two small beds of water-weed (*Potamegeton* sp.), one situated about two or three yards, the other about forty yards, below the road-bridge over the Shannon between the Great Lake hydro-electric dam at Miena and the Shannon Lagoon. Secured with a hand-net (a method by which, in my experience, members of the genus *Galaxias* are very rarely obtained), along with half a dozen two-four inch specimens of *Salmo irideus* Gibbons.

As pointed out by Tillyard (1933), this stretch of fast-running water, about half a mile in length, has a well-marked ecological character. It is famous among anglers for its phenomenal rises of the so-called Shannon Moth, a handsome undescribed snowflake-caddis of the genus *Smicridea*, on which the introduced Salmonidae feed voraciously.

Remarks. The presence of ventral fins and of teeth on the entopterygoid, and in addition the general appearance and habits indicate a closer affinity with *Galaxias* than with *Neochanna.*

Except for *Galaxias dissimilis* Regan (1906), believed to be from New South Wales, and *G. cleaveri* Scott (1934), from Tasmania, each of which rests on a single specimen, the present is the only known Australian member of the family with six-rayed ventrals.

The anomalous *G. dissimilis*, for the reception of which the traditional concept of *Galaxias* as a genus with the dorsal in a markedly posterior position had to be modified, has long been a puzzle. McCulloch (1921, p. 28) went so far as to suggest that 'The unique holotype of this species is perhaps merely an abnormal specimen'; while Whitley (1933) in making available the first figure (Pl. XII, Fig. 2), a sketch by Regan, remarked (p. 61) that it 'may not be congeneric with' a species of *Galaxias (G. o'connori)* just discussed. The present form may perhaps shed light on this long-standing problem, as a comparison of its characters, apart from the dentition, with those of *G. dissimilis*, as described and figured, suggest the two are probably congeneric.

Should a re-examination of the dentition of *Galaxias dissimilis* show that this species should enter the present genus, it would be distinguishable from *P. shannonensis* by, among others, the following characters:—snout in *dissimilis* 'much longer than eye,' in *shannonensis* subequal to eye; maxillary extending in *dissimilis* to below anterior ¼ of eye, in *shannonensis* not so far as, or just to, level of anterior margin of eye; one to two more dorsal rays in

shannonensis than in *dissimilis*; caudal *peduncle* in *dissimilis* $1\frac{2}{3}$ as long as deep, in *shannonensis* more than twice (average, 2·2 times) as long as deep.

The collection of the greater part of the material here dealt with has been made possible by the granting by the University of Tasmania of a research scholarship for an investigation of the Tasmanian Galaxiidae: grateful acknowledgment is made of this assistance, also of permission to submit the present paper, as a separate section of the report, to this Society. To Mr. V. V. Hickman, B.Sc., B.A., Ralston Lecturer in Biology, in whose Department the administration of the grant lay, thanks are tendered for much kind encouragement and assistance.

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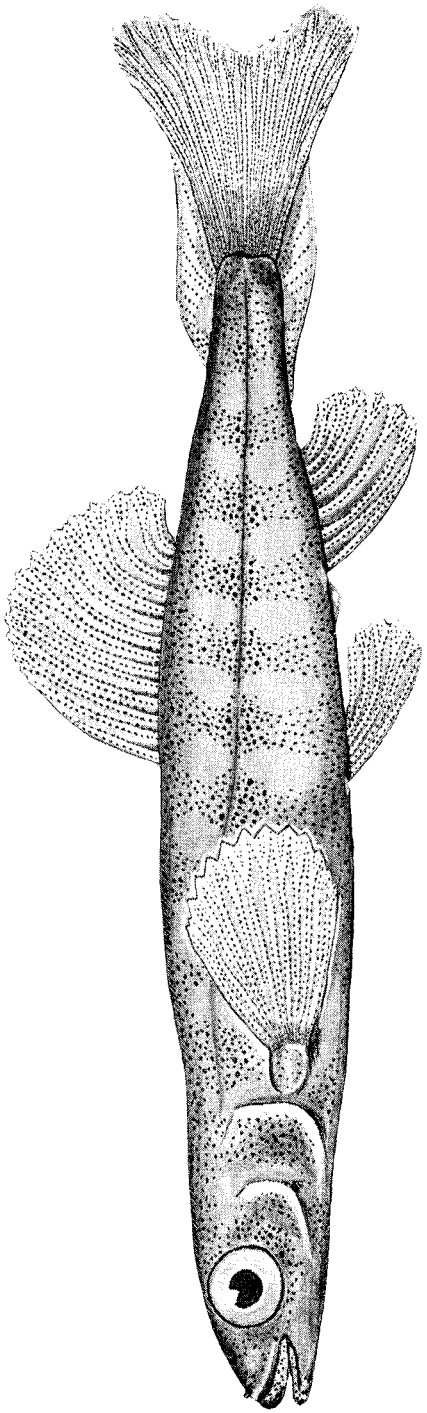
Explanation of Plate

Plate III.—*Paragalaxias shannonensis*, sp. nov. Holotype. Locality, Shannon River, Tasmania. Total length 40·7 mm.



Paragalaxias shannonensis, sp. nov. [E.O.G.S. del.]