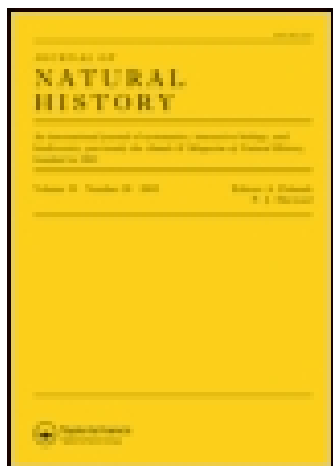


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Annals and Magazine of Natural History: Series 7

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/tnah13>

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Published online: 28 Sep 2009.

To cite this article: C. Tate Regan B.A. (1902) XL.—On the systematic position of *Luvarus imperialis*, Rafinesque , *Annals and Magazine of Natural History: Series 7*, 10:58, 278-281, DOI: [10.1080/00222930208678672](https://doi.org/10.1080/00222930208678672)

To link to this article: <http://dx.doi.org/10.1080/00222930208678672>

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This species is larger and less parallel than *T. pulex*, Fairm., and the pygidium is more distinctly convex, but the sterna are constructed very similarly in both species.

Hab. Central Province, India, "from the galleries of bark-boring species, Oct. 1901" (*E. P. Stebbing*, No. 7).

Tretius distinctus, sp. n.

Cylindricus, piceus, nitidus; prosterno conspicue marginato, striis obscuris, brevibus; mesosterno tenuiter marginato; abdomine segmento 5^o in medio prominulo.

L. $1\frac{3}{4}$ mill.

Cylindrical, piceous, shining; the head convex, lateral stria rather strong, surface with that of thorax rather coarsely but not closely punctured; the elytra are rather less strongly punctate; the thorax is reddish at the anterior angles and the marginal stria complete and well-marked; the pygidia are equally but not densely punctured; the prosternum is markedly marginate, truncate anteriorly, oblique laterally, surface evenly and clearly punctate, striæ short and obscure; the mesosternum rather sharply acuminate, with a fine marginal stria, surface and also that of the metasternum punctate like that of the prosternum; the abdomen, the segment next to the pygidium has an overlapping semicircular projection in the middle of its posterior edge; the antennæ have long flavous hairs on the scape; the legs, anterior tibiæ 5-dentate.

I only know the male of this species, so that the projection in the abdominal segment may be a masculine character.

Hab. Algoa Bay (*Dr. H. Brauns*).

XL.—On the Systematic Position of *Luvarus imperialis*, *Rafinesque* *. By C. TATE REGAN, B.A.

THIS rare fish, an inhabitant of the Mediterranean and the neighbouring parts of the Atlantic and an occasional visitor to our coasts, was placed by Günther in the Coryphænidæ,

* For the synonymy, see Day, *Fishes Gt. Britain*, i. p. 121, and Goode and Bean, 'Oceanic Ichthyology,' p. 222.

The following short diagnosis may be useful:—Depth of body about 3 to $3\frac{1}{2}$ times in total length, length of head 3 (young) to 5 times. Eyes placed in the middle of the height of head, their diameter $4\frac{1}{2}$ (young) to 7 times in the length of head. Snout $\frac{2}{3}$ to $\frac{3}{4}$ as long as the postorbital part of head. Posterior nostril minute. Maxillary about as long as eye. D. 21–23, commencing above the eye, the rays increasing in height to

and although Gill has separated it from them as the type of a distinct family, he has still retained the Luvaridæ among the Scombroïd fishes, near the Coryphænidæ.

I have arrived at the conclusion that the Luvaridæ are closely allied to the Acanthuridæ. A comparison shows that in both families the body is oblong and compressed, the dorsal and anal fins long, the caudal peduncle slender, the caudal fin deep, the scales small, rounded, and usually rough, covering the head and body, and the lateral line concurrent with the dorsal profile. In both also the gill-membranes are broadly united to the isthmus, there are four gills, with a slit behind the fourth, five branchiostegals, well-developed pseudobranchiæ, and short gill-rakers.

In *Luvarus*, as in the Acanthuridæ, the mouth is small, the premaxillaries are not protractile, and the maxillaries are attached to them and not independently movable. The toothless palate, the palatine arch attached only to the pre-ethmoid, the coalescent pelvic bones, the separate lower pharyngeals, and the upper pharyngeals much compressed antero-posteriorly, are further points of agreement between the two families.

Luvarus, like the Acanthuridæ, is a vegetable feeder, and exactly resembles them in its visceral anatomy*. The stomach is large and thick-walled, the pyloric appendages short, simple, and few in number, and the intestine very long and much coiled; the air-bladder is large.

The skeleton† of *Luvarus* resembles that of the Acanthuridæ in many features. The most striking correspondence is seen in the vertebral column, the vertebrae numbering twenty-two in both cases, the first being very short and more

about the fourteenth, which is as long as the head in the young, shorter in the adult, the last 10 rays branched, the anterior rays wider apart than the rest. A. 17-18, similar to the dorsal. In large specimens, D. 12-14, A. 13-15, the anterior rays having disappeared, their interneurals and interhæmals forming bony ridges in the dorsal and ventral middle lines respectively; some specimens (? males) with the first ray of the reduced fins more or less elongate. Pectorals elongate, nearly $\frac{1}{3}$ the length of body. Ventrals I 4, slightly in front of the pectorals, the soft rays elongate in the young and absent in the adult. Caudal peduncle slender, keeled in the adult, caudal deeply lunate. Scales very small, rough, shagreen-like. Bluish above, silvery below and on the sides. Fins red. The young with 5 or 6 longitudinal series of round black spots on the sides and dark dorsal and anal fins.

* For the visceral anatomy see Cuv. & Val. ix. p. 358, and compare with Acanthuridæ described in vol. x. Also Nardo, 'De Proctostego,' 1827, and Haller, in Krukenberg, *Vergl. Physiol. Stud.* iv. 1881, p. 1.

† Günther (*Proc. Zool. Soc.* 1866, p. 336) gives a short description of the skeleton, with a plate (not well executed).

or less regularly convex anteriorly, fitting the concavity formed by the facets of the basi- and exoccipitals, the second without ribs, as usual in Perciform fishes, the next seven bearing ribs, and succeeded by thirteen caudals. The ribs are very similar in each case, but in *Luvarus* they are more blade-like. A notable difference is that in the Acanthuridæ the præcaudals have well-developed parapophyses, to which epipleurals are attached, and subsessile ribs; *Luvarus*, on the contrary, has only rudimentary parapophyses, apparently no epipleurals, and sessile ribs.

According to Siebenrock* in *Luvarus* the post-temporal is attached above to the skull, and lower down emits a short rounded process which joins the squamosal, whilst its distal end is long and attached to the clavicle, there being no supra-clavicle, unless this bone represents the co-ossified post-temporal and supra-clavicle. As this bone is attached distally to the clavicle and proximally to the same parts of the skull as the post-temporal in Acanthuridæ, the probability that it represents both supra-clavicle and post-temporal is very great; in having this latter bone forked *Luvarus* is less specialized than the Acanthuridæ, in which family the post-temporal is simple, owing to the reduction of the process which joins it to the squamosal. It is worth noting that in many characters *Luvarus* approaches more closely to *Naseus* than to any other genus, notably in the long anal fin extending to the vent, which is situated just behind the origin of the ventrals, and in the physiognomy of the head. *Naseus* is the only genus of Acanthuridæ with pointed teeth in the jaws, and in some species these are quite feeble, so that in this character also it approaches *Luvarus*, the young of which have a single series of small pointed teeth in the jaws. The similarity of the keel-like plates on the caudal peduncle in both genera is evident, and the posterior nostril is noticeably small in *Naseus* and minute in *Luvarus*.

Apparently the remarkable feature of the loss of the anterior rays of the dorsal and anal fins during growth is peculiar to *Luvarus*, and not paralleled in the Acanthuridæ.

The Luvaridæ may be defined thus:—

Similar to the Acanthuridæ, but with feebly ossified skeleton, very weak dentition, and post-temporal forked. Præcaudal vertebræ with rudimentary transverse processes; ribs sessile, blade-like, inserted at the middle of the length of the centrum; epipleurals absent. Anterior rays of dorsal

* Ann. Hofmus. Wien, xvi. 1901, pp. 119 & 125.

and anal unbranched, but not forming pungent spines. Ventrals with one spine and four soft rays.

The Luvaridæ may be considered as ultra-specialized Acanthuridæ, and it is generally agreed that the Plectognathi are descendants of the same family, the origin of which is by no means so settled a question. Jordan and Evermann place them near the Chætodonts, with the Zanclidæ as a connecting family; but this arrangement has recently been criticized by Swinnerton*, in his valuable paper on the morphology of the Teleostean head-skeleton. He considers the mode of attachment of the palatine arch to be a character of great importance, and shows that most Acanthopterygii have the palatine attached to the ethmoid region at two points—the pre-ethmoid and par-ethmoid cornua—whilst the Plectognathi, with the allied Zanclidæ and Acanthuridæ, have only the pre-ethmoid attachment. This leads him to the conclusion that the origin of the Acanthuridæ is not to be sought within the Acanthopterygii, but lower down, and that they may be more nearly allied to the Scombresoces, which have a single palatine attachment. This position would require strong arguments to substantiate it, as the Acanthuridæ are typically Acanthopterygii in all other characters, and, judging by what we know of the fossils, are not a family of great antiquity.

I have not the least doubt that the Teuthididæ are closely allied to the Acanthuridæ, and on examination I find that in *Teuthis* the palatine is attached to pre-ethmoid and par-ethmoid by two facets. Moreover, the author above mentioned, in the same paper, describes the attachment of the palatine in *Chætodon* in these words:—"The palatine lies against the par-ethmoid, it is united to that bone exclusively by ligaments, and the articular surfaces have aborted." Here, then, we have an intermediate condition between the mode of attachment in the typical Acanthopterygii and that of the Acanthuridæ, and it only needs the elongation of the ethmoid region, thus removing the par-ethmoid from contact with the palatine, to produce the arrangement which characterizes that family. It seems therefore that the position of the Acanthuridæ near the Chætodonts is by no means weakened by the consideration of the ethmo-palatine attachment, and, as the two families approach each other in many characters of importance, that they have been rightly placed near together in the system.

* Quart. Journ. Micr. Sci. xiv. 1901, pp. 555, 582, & 583.