No. 4. — *Revision of the Species Currently Referred to Alepocephalus, Halisauriceps, Bathytroctes and Bajacalifornia With Introduction of Two New Genera*

By A. E. Parr

The discovery of a second specimen of *Bathytroctes nasutus* in the collections made by the "Atlantis" off Cuba, and now deposited in the Museum of Comparative Zoology, has provided an opportunity to re-examine more closely the relationships within the genus *Bathytroctes* as a whole, with the result that it now seems possible to effect several desirable subdivisions of the very heterogeneous assembly of species heretofore included in *Bathytroctes*.

The collections of the Museum of Comparative Zoology also contain the types of several species of both *Alepocephalus* and *Bathytroctes*, which have not been redescribed since they were first introduced into the literature by Garman in 1899, and are therefore in need of redefinition in order to bring their identification up to date in relation to the other species known today. This would seem to be most easily accomplished by the publication of new keys to the genera involved, without burdening this account with the detailed redescriptions of the species, which will form part of a monograph on the Alepocephalidae now being prepared by the writer.

In regard to *Alepocephalus asperifrons* Garman 1899 (p. 291, pl. LIX, fig. 1), type No. 28472 M.C.Z., this has already (Parr, 1951, p. 8) been made the type of a new genus, *Bruunichthys*. The other species of *Alepocephalus* described by Garman may be identified by the use of the following key, which extends to the species of this genus the revised key to the genera of the Alepocephalidae given by Parr, 1951, pp. 4–10.

The functions used to express the proportions in per cent of the length without caudal fin, identified by the letter L, are those introduced and explained by Parr, 1949. To find the indicated minimum size of the head of a specimen of *A. umbriceps* of 250 mm. L, according to the key, solve the function (39.5 – .015L) as follows:

$$39.5 - .015 \times 250 = 39.5 - 3.75 = 35.75$$

The head should be more than 35.75 per cent of L.

If the head of the specimen is less than the minimum indicated for *A. umbriceps*, e.g. 33.9 per cent of L, one may, for comparison with *umbriceps*, estimate a corresponding formula for the specimen in one of the following ways.

Either indirectly, by subtracting 33.9 from the value (35.75) which the formula gave as a minimum for *umbriceps* at 250 mm. L, and subsequently subtracting (adding if the head of the specimen had been larger than in *umbriceps*) this difference (1.85) from the constant (39.5) of the *umbriceps* formula. This gives the corresponding formula for the head of the specimen as (37.65 − .015L) per cent of L.

Or directly, by solving the function for *umbriceps* for the measurements of the specimen, treating the constant of the function as the unknown, K, as follows:

$$(K - .015 \times 250) = 33.9$$

$$K = 33.9 + .015 \times 250 = 33.9 + 3.75 = 37.65$$

which gives the head of the specimen as:

$$(37.65 - .015L) \text{ per cent of } L.$$

Note that this does not establish the actual formula for the species to which the specimen belongs. It only establishes a possible basis for comparison with *umbriceps* in purely descriptive terms. If the species is closely related, and the formula for *umbriceps* is well established empirically, either for the species (as it is not in this case), or as an approximate descriptive generalization for the genus (which applies here) it is likely that the new formula will also be approximately valid for the new species, but for one specimen it only offers a method of evaluating the difference from *umbriceps* at the size of the specimen under consideration.

Key to the genus Alepocephalus

A. Anal fin long, with 28–32 rays, 8–11 rays more than in dorsal fin. Anal fin base 20–24 per cent of L, or 5–9 per cent of L longer than dorsal fin base. Heads very small, less than (35.5 − .025 L), with an average of about (34.5 − .03 L) per cent of L. Orbits small, less than (12 − .027 L), average about (11 − .027 L) per cent of L. Snout short. Fins advanced, snout to V 46–50, snout to D 62–66, snout to A 62.5–66.5 per cent of L. 61–63 scales in longitudinal series. Only 8–11 simple pyloric caeca. . . . . *Lloydiella*, new subgenus

Genotype: *Alepocephalus bicolor* Alcock 1892

B. Anal fin moderate to short, with 16–25 rays, not in excess of 4 rays more than in dorsal fin. Anal fin base only 12–19 per cent of L, and less than 5 per cent of L longer than base of dorsal fin. Heads more than (34.4 − .025 L), generally from (35.5 − .025 L) to (44 − .015 L) per cent of L. Orbits not less than (9 − .008 L) per cent of L. Snout to V 46–61, snout to D 65–76, snout to A 66–74 per cent of L.

I. A long and pointed snout formed by the upper jaws extends beyond the point of lower jaw by more than 3 per cent of L. Length of snout about (15 − .006 L) per cent of L, or more. Vertical fins very posterior, distance from snout to both dorsal and anal fin (according to figure) about (72.5 + .01 L) per cent of L. Only 7 "rudimentary" pyloric caeca. . . . . Subgenus *Halisauriceps* (Fowler 1934)

A. longiceps Lloyd 1909

II. Snout short and blunt, its length less than (13 – .006 L) per cent of L, its tip not extending beyond the point of lower jaw by more than one per cent of L, measured horizontally. One of the distances from snout to dorsal or to anal fin always less than (70 + .01 L) per cent of L, both distances usually less than this value and always less than (72 + .01 L) per cent of L. . . . . .Subgenus *Alepocephalus* (Risso 1820)

a. Only 40–60 scales in a longitudinal series.

1. Distance from snout to anal fin 5–8 per cent of L longer than snout to dorsal. Only 9–10 simple pyloric caeca. Anal fin with 17–20 rays, its base 12–13 per cent of L. Head moderate, about (38 – .015 L) per cent of L. Orbit small, (10.2 – .008 L) per cent of L. Mouth small, upper jaws only about (11 – .008 L) per cent of L, lower jaws less than (16 – .008 L) per cent of L. . . . . *A. andersoni* Fowler 1934

2. Distance from snout to anal fin less than 3 per cent of L longer than snout to dorsal. 15–23 pyloric caeca.

x. Anal fin with 20–24 rays, its base 17–20 per cent of L. 19–23 pyloric caeca. Heads more than (36 – .018 L) but less than (38 – .15 L) per cent of L. Orbits about (12.4 – .008 L) per cent of L. Mouth moderate, upper jaws less than (12 – .002 L), lower jaws not more than about (18 – .008 L), but more than (15 – .008 L) per cent of L. . . . . *A. rostratus* Risso 1820

xx. Anal fin with 16–20 rays, its base 12–15 per cent of L. 15–17 pyloric caeca.[1]

y. Head and eyes small, head about 27–28, corresponding to (33.4 – .018 L) or (35.5 – .025 L) per cent of L, eye only about 7–7.2, corresponding to about (9.6 – .008 L) per cent of L, at 310 mm. L. . . . . *A. owstoni* Tanaka 1908

yy. Head large, more than (37 – .018 L), orbits more than (11 – .008 L) per cent of L.

z. Eyes moderate, orbits less than (12.5 – .008 L) per cent of L. . . . . . . *A. australis* Barnard 1923

1. Head large, from about (39 – .015 L) to (41 – .015 L) per cent of L. . . . . *A. australis australis* (Barnard 1923)

2. Head moderate, less than (39 – .015 L) per cent of L. . . . . *A. australis barnardi* (Norman 1930)

zz. Eyes large, orbits about (14 – .008 L) per cent of L. Head large, corresponding to about (41.5 – .015 L) per cent of L. . . . . *A. macrops* Lloyd 1909

[1] Not known for *A. owstoni*.

b. About 64–70 scales in a longitudinal series. Snout to dorsal fin from 3 per cent of L shorter to 5 per cent of L longer than snout to anal fin. 13–19 pyloric caeca.

1. Anal fin with 21–25 rays, its base 15–20 per cent of L. D, 20–23. Distance from snout to ventrals 46–51.5, snout to dorsal 65–69, and snout to anal fin 66–71.5 per cent of L. Head small, less than (39.5 – .015 L) per cent of L. . . . . *A. bairdi* Goode and Bean 1879

2. Anal fin with only 17–19 rays, its base only 12–15 per cent of L. D, 16–18. Distance from snout to ventrals 54–58, snout to dorsal 69.5–72.5, snout to anal fin 71–73 per cent of L.

x. Head small, less than (39.5 – .015 L) per cent of L. . . . . *A. blanfordi* Alcock 1892[1]

xx. Head large, more than (39.5 – .015 L) per cent of L.

y. Upper jaw reaches approximately to below the middle of the orbit, being nearly 5 per cent of L longer than the snout. Suboperculum with two distinct ridges ending posteriorly in two separate points. 18 pyloric caeca. . . . . *A. umbriceps* Jordan and Thompson 1914

yy. Upper jaws ending distinctly in advance of the centers of the orbits, being less than 3 per cent of L longer than the snouts. Suboperculum ends in a single rounded point, and has only a single ridge. 14–15 pyloric caeca. . . . . *A. productus* Gill 1883

c. 80–105 scales in a longitudinal series.

1. Head large, more than (41.5 – .017 L) per cent of L. 21–24 long, simple pyloric caeca. Width of skull more than (14 – .0028 L) per cent of L. Upper jaws more than (16 – .008 L) per cent of L[2]. . . . . *A. agassizi* Goode and Bean 1882

2. Head moderate, less than (40 – .017 L) per cent of L. Only 12–16 long, simple pyloric caeca. Width of skull not more than (14 – .0080 L) per cent of L. Upper jaws less than (14 – .002 L) per cent of L.[2]

x. 15–16 scales between lateral line and origin of dorsal fin. Upper jaws not more than (12 – .002 L), not less than (11 – .002 L) per cent of L. Head less than (37.5 – .018 L), width of skull not more than (12.5 – .008 L)

[1] It is very uncertain whether *A. blanfordi* is actually distinct from *A. productus*. The type of the former is no longer available, and only the statement that its head is one-third of the length of the body permits a tentative distinction to be made, until new material may be obtained.

[2] Note the changes in coefficients of slope between *A. agassizi* and the other species under c, in regard to widths of skull (.0028 compared with .008) and lengths of upper jaw (.008 compared with .002). These formulas can, however, only be taken as purely descriptive of the data now available which are quite insufficient for the establishment of definitive norms.

per cent of L. Suboperculum irregularly quadrangular, with a broad, sloping posterior margin, and without distinct main ridge . . . . *A. tenebrosus* Gilbert 1891

xx. Only 10–12 scales between lateral line and origin of dorsal fin. Upper jaws not less than (12 – .002 L) per cent of L. Suboperculum with distinct main ridge ending in a point at the posterior margin.

y. Head more than (38.5 – .017 L), width of skull about (13.7 – .008 L) per cent of L. Suboperculum narrow, sickle-shaped, ending posteriorly in a single point. Center of anus about one-third as far from the origin of anal fin as from the bases of anterior ventral finrays . . . . *A. fundulus* Garman 1899

yy. Head less than (36 – .018 L), or possibly less than (37.5 – .025 L), width of skull about (12 – .008 L) per cent of L. Suboperculum wide, but with a short, blunt, point in the posterior outline at the end of the main ridge. Center of anus not more than one-fourth as far from the origin of anal fin as from the bases of anterior ventral finrays . . . . *A. convexifrons* Garman 1899

LLOYDIELLA new subgenus

The long anal fin separates *A. bicolor*, in an easily defined manner, from all other species of *Alepocephalus*. Actually *A. bicolor* would seem to be at least equally, if not more, unique with reference to several other features which cannot be quite so simply and easily expressed. In scatter diagrams showing proportions in reference to absolute length the measurements of *A. bicolor* form a group entirely apart from the rest in regard to the length of the head and of the lower jaw; almost entirely apart with regard to the orbits, interorbital width, and the lengths of the upper jaws; and largely apart in regard to the width of the skull and the distances from the snout to dorsal and anal fin. Characteristic of the groups of measurements for which a trend of change with size can be fairly clearly established, is the fact that the coefficients of slope for the *A. bicolor* are much greater than those that seem indicated for any other species of *Alepocephalus*. Thus the average size of the head in *A. bicolor* may be fairly expressed as (34.5 – .03 L) per cent of L, while no other species of which there is enough material available gives indications of a coefficient of change greater than –.018L. Similarly the orbits and lower jaws of *A. bicolor* indicate a coefficient of –.027L, while the measured orbits and lower jaws of all other species are in fair agreement with coefficients of –.008L, or less.

While the proportions dealt with in the preceding paragraph might be viewed as only partly independent and partly dependent upon the size of the head, this cannot be said of the relationships of the interorbital width to the diameter of the orbit and to the width of the skull. In both subspecies of *A. bicolor* the interorbital widths expressed in per cent of the diameter of the orbit, and also in per cent of the width of the skull, clearly indicate a coefficient of change of both percentages of about +.2L. In all other species of *Alepocephalus* of which there are a reasonable number of measurements, the changes with size of the same percentages are well fitted by a coefficient of only +.06L. This is specifically true of *A. tenebrosus* and *A. convexifrons*, two of the species that approach most closely to *A. bicolor* in regard to the size of both the orbits, and the length as well as the width of the head.

With so much concurrent evidence to indicate that *A. bicolor* occupies a quite separate position within the genus, at least a separate subgenus seems in order.

Subgenus HALSAURICEPS (Fowler 1934)

Genus *Halisauriceps* Fowler 1934, p. 247.

The new genus introduced by Fowler, 1934, was based solely upon the figure and brief description of *Alepocephalus longiceps* published by Lloyd, 1909. Unfortunately the type has been destroyed by accident, and no further information can be obtained about this species until fresh material is obtained.

The figure shows no indication of a shoulder organ, so one may reasonably assume that the species is a true alepocephalid. But nothing is known of the supramaxillaries, or of the manner in which the prominent snout is formed by the upper jaws, the extent of the possible modification of the premaxillaries and of their connection with each other, and other features that might be involved. Lloyd mentions "seven rudimentary caeca," which would be exceptional as a normal condition in a species of *Alepocephalus*. The present writer has several times found "rudimentary" caeca as an obviously abnormal condition of individual specimens, e.g. associated with parasites in the abdominal cavity or with unmistakable malformations. In some species of other genera, with only one or two caeca, these, although normal, may be so small that they might be described as rudimentary. But, with as many as seven caeca present, their rudimentary size or condition seems most likely to represent an individual abnormality. In certain instances of an obviously abnormal rudimentary condition of the caeca, there is also a strong indication that the number of discernible caeca may likewise have been reduced. It is therefore quite possible that the normal number of caeca in *A. longiceps* may be higher than seven.

It is thus evident that the actual status of *Halisauriceps* is quite obscure and must remain obscure until new material becomes available. The writer would hazard a guess that such material would serve to sharpen the distinction between *A. longiceps* and other alepocephalids, but, in the absence of factual knowledge, it seems best to retain the species within the genus in which it was just introduced, and in which its presently known features will still fit without broadening of the generic definition.

Bathytroctes and Related Genera

In the key to the genera of the Alepocephalidae previously published by the writer (Parr 1951, pp. 4–10) all the genera and subgenera dealt with in the following were still retained within a single genus, *Bathytroctes,* with a definition broad enough to cover the peculiarities of all of these forms. The following key may therefore be used as an extension of the previous key, starting after the point (*I, B, 2, b, xx, zz, yy, v*) on page 5, at which *Bathytroctes, sensu lato,* is defined.

In a scatter diagram showing the relative lengths of the heads plotted against absolute lengths of the bodies (L) for all specimens of all species here considered, those that have been previously referred to the genus or subgenus *Bajacalifornia,* plus *Bathytroctes calcaratus,* which also belongs here, form an exceptionally well defined and well separated group, with all species apparently fitted by a single formula: Length of head $(35.4 - .04L)^{+.5}_{-.4}$ per cent of L. The same coefficient of change also applies with unusual accuracy to the two known specimens of "*B.*" *nasutus,* as follows: head $(37.25 - .04L)^{\pm .05}$ per cent of L.

Among the rest of the species we also find two well separated groups, one with small, and one with large heads. Among the former we have only the measurements of single specimens of each species, so it is not possible to speak with confidence of the coefficient of slope that may actually apply to this group. But, using the coefficient of slope indicated for the species with large heads, we find that the measured lengths of the heads in the small-headed group do not exceed (35 − .03L) per cent of L, while the measured heads in the large-headed group all exceed (37.5 − .03L) and may even exceed (45 − .03L) per cent of L. It may be probable that the forms with smaller heads have a larger coefficient of slope, but even so, the measured heads would be less than (36.5 − .035L) and also less than (37.5 − .04L) per cent of L. On any assumption the small-headed species thus would seem to form a well separated group.

This separation of the small-headed group from those with large heads is confirmed by the position of the anus (at A, versus removed from A), agrees with very evident differences in general habitus which are not so easily defined in words, and greatly facilitates the general taxonomy of the group as a whole. A separate genus *Grimatroctes* is therefore introduced for these forms.

The separation of *Grimatroctes* from the large-headed species retained in *Bathytroctes* also makes it possible to re-establish the genus *Bajacalifornia*. In *Bathytroctes, sensu stricto* one may find various degrees of moderate development of a symphyseal knob, which, although it never compares with the symphyseal knobs in large specimens of *Bajacalifornia,* may even exceed the relative magnitude of the knob in smaller specimens such as those from which *Bajacalifornia drakei* is known. *Grimatroctes* on the other hand remains sharply distinct from *Bajacalifornia* in regard to symphyseal knob and the profile of snout and lower jaw. *Bajacalifornia* can thus be sharply distinguished from *Bathytroctes, sensu stricto,* by its very small head, and from *Grimatroctes* by the features first used to define *Bajacalifornia* as a separate genus.

The genus *Rinoctes* is so sharply distinct from the others by the shape and structure of its snout, that no confusion is possible. The fact that it agrees with *Bajacalifornia* in the formula for the length of the head, sharpens the distinction beyond any practical need by opposing the projecting snout of *Rinoctes* against the prominent lower jaw of *Bajacalifornia.*

Within the genus *Bathytroctes, sensu stricto, B. michaelsarsi* represents a species of strikingly different appearance from that of the others. This difference in general appearance is confirmed by entirely different gillraker, and pectoral fin ray counts, and a new subgenus, at least, would seem in order.

Key to genera of the Bathytroctes group

A. Head small, less than (37 – .035 L) per cent of L.

1. Premaxillaries meet dorsally in a long and very firm, almost rigid symphysis closely and strongly joined by integuments, so as to form a hard, beak-like, pointed snout, projecting beyond the tip of lower jaw by more than 1 (about 1.3) per cent of L. Anus only one-half to two-thirds as distant from the insertion of the anterior ventral fin rays as from the origin of anal fin. Upper and lower jaws of approximately equal length, or upper jaws slightly longer. 6–8

pyloric caeca. 20–25 gillrakers in first arch. P. 8. . . . . *Rinoctes*, new genus

Genotype: *Bathytroctes nasutus* Koefoed 1927

2. Premaxillaries do not form a prominent, pointed and beak-like snout, and are not joined in a long, almost rigid symphysis. Anus at anal fin, its centre about 3–15 times as distant from the insertion of anterior ventral fin rays as from the origin of anal fin.

a. Symphysis of lower jaw with a prominent ventral knob, projecting forward beyond the vertical from the point of the snout, and continuing the dorsal profile of the head downward and forward. Head very small, not over (36 – .040 L) per cent of L. Eyes small, less than (14 – .034 L) per cent of L. Snout long, not less than (50 + .4 L) per cent of orbit. Length of lower jaw exceeds length of upper jaw by more than (4 – .01 L) per cent of L. 11–21 pyloric caeca. P. 13–17. About 50–65 scales in a longitudinal series. . . . . Genus *Bajacalifornia* Townsend and Nichols 1925

b. Symphysis of lower jaw not prominent beyond the snout, with only a slight point ventrally. Eyes larger, more than (14 – .034 L) per cent of L. Snout shorter, not over (75 + .1 L) per cent of orbit. Jaws subequal or with lower jaw less than (4 – .01 L) per cent of L longer than upper jaw. 9–13 pyloric caeca. 32–38 gillrakers in first arch. 55–80 scales in a longitudinal series. P. 11–12. Measured heads not over (35 – .030 L) per cent of L. *Grimatroctes*, new genus

Genotype: *Bathytroctes grimaldi* Zugmayer 1911

B. Head large, more than (37 – .030 L) per cent of L. Anus removed from anal fin, its center from about one-third to twice as distant from the insertion of anterior ventral fin rays as from the origin of anal fin. Less than 60 (about 42–55) scales in a longitudinal series. No beak-like snout. Symphysis of lower jaw not greatly enlarged and prominent. 6–9 pyloric caeca. . . . . Genus *Bathytroctes* Günther 1878

RINOCTES new genus

Genotype *Bathytroctes nasutus* Koefoed 1927, p. 50, pl. III, fig. 10.

Diagnosis. No shoulder organ. Two supramaxillaries. Premaxillaries with continuous free edge. Interoperculum normal, elongate, oriented obliquely upwards and backwards, covered anteriorly by the preoperculum. Body completely scaly in the adults. No scales on head. Pectoral and caudal fins normal, without produced rays. Origin of dorsal fin well in advance of the origin of anal fin, which has less than 20 rays. Teeth in jaws in single series; dentition of maxillaries approximately equal to, or more extensive than that of the premaxillaries, which meet dorsally in a long, firm symphysis so as to form a hard, beak-like, pointed snout, projecting beyond the point of lower jaw by more than 1 per cent of L. Anus well in advance of the middle of the distance between the insertion of the anterior ventral fin rays and the origin of anal fin. 6–8 pyloric caeca. 20–25 gillrakers in first arch. Pectorals small, with only 8 rays. Head small, less than (37 − .035 L) per cent of L. The genus contains only one species.

Rinoctes nasutus Koefoed 1927

This species was originally described from a single specimen taken in the eastern portion of the Sargasso Sea, southwest of the Azores (N. 35°59′, W. 33°1′). It has not been reported again in the literature. It was therefore of considerable interest to find a second specimen in the collections of the Museum of Comparative Zoology (No. 35587) taken by the "Atlantis" inside of the Antillean chain of islands, off the south coast of Cuba, N. 20°47′, W. 80°24′, at Station 2966, February 26, 1938. The fact that both specimens were taken at extremely great depths, the type in 2865 meters, the "Atlantis" specimen in 3886 meters depth, suggests that we are here dealing with one of the most abyssal forms of living teleosts, since the records of alepocephalids of this general character plainly indicate that they belong to the bottom fauna, as explicitly recognized by Koefoed (1927) with whom the writer entirely agrees. On the assumption that the species may belong to the very great depths only, it is also of interest to note that the two specimens were taken in entirely separate ocean basins. Although the effectiveness of this separation must remain uncertain until the life history of the species is known, it does make it desirable to give the counts and measurements of the "Atlantis" specimen in some detail, as follows.

D. 14½. A. 12½. P. 8. V. 7. Br. 7. Gillrakers in first arch 4/1/15. Pyloric caeca 6 (2 + 4).

Length without caudal fin 122 mm. Proportions in per cent of length without caudal fin: Head 32.4. Orbit, longitudinally 9.1. Orbit, vertically 5.8. Snout 10.6. Snout to top of gill slit 29.1. Snout to top of preopercle 23.6. Interorbital width 2.95. Sphenotic width of skull 11.5. Pterotic width of skull 12.3. Combined length of upper jaws 17.1. Width of upper jaws (Max. + Supramax.) 3.3. Length of lower jaw 17.2. Length of premaxillary 5.9. Snout to dorsal fin 62.5. Snout to anal fin 74.5. Snout to ventrals 58.4. Base of dorsal 13.6. Base of anal fin 8.2. Insertion of ventral fins to center of anus 5.6. Greatest depth of body 13.9. Least depth of caudal peduncle 6.8. Longest gillraker 3.3. Longest pyloric caecum 5.3.

Stomach sipho-caecal, i.e. with a bluntly pointed end, extending beyond the pyloric arm by less than the diameter of the pyloric arm at the base.

It has, unfortunately, not been possible to obtain usable counts of the scales.

Genus BAJACALIFORNIA Townsend and Nichols 1925

Key to the species

A. Very slender, not over 10 scales in transverse count, about 50–55 in longitudinal series. Diameter of orbit more than (60 − .075 L) per cent of lower jaw. 21 pyloric caeca. Stomach siphonal. About 26 gillrakers in first arch, about 19 in lower limb. Western Atlantic. . . . . *B. drakei* Beebe 1929

B. Body deeper, 15–20 scales in transverse count.
   1. Only about 11 short pyloric caeca. Stomach siphonal. About 32 gillrakers in first arch, about 24 on lower limb. Diameter of orbit more than (60 − .075 L) per cent of lower jaw. 50–55 scales in longitudinal series. Pacific (Gulf of California) . . . . *B. burragei* Townsend and Nichols 1925
   2. 16–18 long pyloric caeca. Stomach caecal, with pyloric arm inserted in middle third of the combined length of caecum and ventricle. Diameter of orbit less than (55 − .075 L) per cent of lower jaw. About 60–62 scales in longitudinal series. 24–25 gillrakers in first arch, 18–19 on lower limb. Indo-Pacific. . *B. calcaratus* Weber 1913
   Syn.: *B. burragei* Norman 1939

GRIMATROCTES new genus

Genotype *Bathytroctes grimaldi* Zugmayer 1911a, p. 1; 1911b, p. 6, pl. I, fig. 2.

Diagnosis. No shoulder organ. Two supramaxillaries. Premaxillaries normal, with continuous free edge. Interoperculum normal, elongate, oriented obliquely upwards and backwards, covered anteriorly by the preoperculum. Body completely scaly in the adults. No scales on head. Pectoral and caudal fins normal, without produced rays. Origin of dorsal fin well in advance of the origin of anal fin, which has less than 20 rays. Teeth in jaws in single series; dentition of maxillaries approximately equal to, or more extensive than that of the premaxillaries, which are not joined dorsally in a firm symphysis and do not form a prominent, pointed snout. Anus at anal fin. Symphysis of lower jaw not prominent beyond the short snout, and with only a slight point ventrally. Head small, less than (37 − .035 L) per cent of L. Eyes large. 32–38 gillrakers in first arch. 9–13 pyloric caeca. 11–12 rays in pectoral fins. Scales small, 55–80 in a longitudinal series.

Key to the species of Grimatroctes

A. About 70–78 scales in a longitudinal series, 18–22 in transverse count. Pectoral fin bases completely surrounded by normal squamation in front and above, without naked band from gill opening to axil.

1. Only 9 pyloric caeca. Orbit about (13.5 – .02 L) per cent of L. Br. 6 . . . . *G. grimaldi* (Zugmayer 1911)
2. About 13 pyloric caeca. Orbit about (14.5 – .02 L) per cent of L. Br. 7 . . . . *G. microlepis* (Günther 1878)

B. About 55–61 scales in a longitudinal series, less than 18 in transverse count.

1. Caudal peduncle deep, its depth (at 160 mm. L) about 10–11 per cent of L, and about one-half of the depth of the body at the shoulder. Sphenotic width of skull about (14.5 – .015 L); diameter of orbit (13.5 – .03 L) per cent of L. Width of skull at anterior end of orbit about 4.7 per cent of L . . . . *G. danae,* Parr 1951
2. Caudal peduncle slender, its depth (at 220 mm. L) only about 6–6.5 per cent of L, and about one-third of the depth at the shoulder. Sphenotic width of the skull only about (13.3 – .015 L); diameter of orbit about (15.8 – .03 L) per cent of L. Width of skull at anterior end of orbit only about 3.4 per cent of L . . . . *G. zugmayeri* (Fowler 1934

Genus BATHYTROCTES Günther 1878

Key to the subgenera and species

A. Pectorals with 16–18 rays. 28–32 gillrakers in first arch, 20–23 in lower limb. 45–55 scales in longitudinal series . . . . *Nomoctes,* new subgenus
Genotype: *Bathytroctes michaelsarsi* Koefoed 1927

B. Pectorals with only 10–12 rays. Only 18–22 gillrakers in first arch, 13–15 in lower limb. 42–48 scales in longitudinal series . . . . Subgenus *Bathytroctes* (Günther 1878)

1. Head moderate, less than (39.5 – .03 L), sphenotic width of skull less than (17 – .015 L) per cent of L.
   a. Anus somewhat nearer to the origin of anal fin than to the insertion of anterior ventral fin rays. Lower edge of premaxillaries highly arched in lateral view, upper part without lateral toothplates. Eyes large, diameter of orbit corresponds to (19 – .03 L) per cent of L. Articulation of lower jaw approximately below middle of orbit. Anterior supramaxillary extends forward well beyond posterior supramaxillary . . . . *B. inspector* Garman 1899
   b. Distance from the insertion of anterior ventral fin rays to center of anus only about $\frac{1}{3}$–$\frac{2}{3}$ of distance from anus to anal fin. Premaxillary with a series of horizontal, semi-elliptic platelike

teeth along its upper portion, lower edge not highly arched. Eyes moderate, diameter of orbit less than (16 – .03 L) per cent of L. Articulation of lower jaw below posterior one-fourth of orbit. Anterior supramaxillary small, does not extend forward beyond posterior supramaxillary. . . . *B. alvifrons* Garman 1899

2. Head large, more than (40.5 – .03 L), sphenotic width of skull more than (17 – .015 L) per cent of L. Diameter of orbit more than (16.5 – .03 L) per cent of L. Articulation of lower jaw below the posterior one-third of orbit. Anterior supramaxillary extends forward beyond posterior supramaxillary by one-fourth of its length, or more.
   a. Head about (41 – .03 L), sphenotic width of skull less than (17.5 – .015 L) per cent of L. Interorbital width of skull less than (7.5 + .15 L) per cent of orbit. Posterior supramaxillary extends forward somewhat beyond the end of the anterior one-third of the anterior supramaxillary. Indo-Pacific. . . . . *B. macrolepis* Günther 1887
   b. Head more than (41.5 – .03 L) to (44 – .03 L) per cent of L. Sphenotic width of skull more than (17.5 – .015 L) per cent of L. Interorbital width of skull more than (7.5 + .15 L) to (25 + .15 L) per cent of orbit. Posterior supramaxillary barely reaches to, or slightly beyond the middle of anterior supramaxillary. Premaxillaries with upper, exterior row of horizontal, semi-elliptic platelike teeth. Atlantic. . . *B. koefoedi*, Parr 1951.

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