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HITHERTO UNKNOWN EARLY DEVELOPMENTAL LARVAL  
STADIA OF THE WEST AFRICAN ALBULID FISH,  
**PTEROTHRISSUS BELLOCI** CADENAT, 1937

by

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Illustrations by Margaret M. Smith.

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Family Albulidae

The few fishes of this and of related *Isospondylous* families resemble the eels in going through comparable early larval stages, of forms entirely different from the adults. ***Pterothrissus belloci*** Cadenat, 1937 one of the latest of the few species of that type to be discovered and initially considered rare, has been shown (Poll, 1953) to occur in considerable numbers at about 100 fathoms over the range 15°N to almost 20°S along West Africa. Rather small, rarely exceeding a length of 350mm, it has become of some importance as a food fish in equatorial West Africa.

Little is known about its reproduction, save that in normal catches males are generally smaller and less abundant than females. There is some evidence that the fish normally lives in even deeper water and that it migrates in towards the hundred fathom line to breed. So far only mature fishes have been found, no early juveniles have yet been reported or described. The larval stages of the related ***Pterothrissus gissu*** Hilgendorf, 1877 have been described by Matsu-  
bara (1942, 1-16, figs 1-10, Pl 1). He had 110 specimens of the larval fishes at varying stadia, most were taken at a depth of 125 fathoms southeast of Tyosi, Japan.

No larval stadia of ***P. belloci*** have yet been reported or described. The present account is based on three specimens found by Mr. F. H. Schulein at Walvis Bay (about 23°S). These transparent "Leptocephalus" fishes, at casual glance Apodal, on investigation however have proved to be hitherto unknown larval stages of ***Pterothrissus belloci***. One, 123mm total length, is the earlier, the other two, 82 and 85mm total length respectively, are at a more advanced stage, and show the trend of metamorphosis with shrinkage. From these specimens it is apparent that in the early stages the dorsal and anal fins are very short and far back. With development the body shortens. At the same time the dorsal fin develops rapidly and its origin moves forward with great increase in the length of its base. Later stadia will be needed for full information about the further development and exact changes which take place in the dorsal fin after the stadia described here, but it appears that while the hind end of the fin remains at about the same position in relation to the myomeres, i.e. above

myomeres 65-68, the post-dorsal length steadily diminishes. The base of the dorsal fin must continue to expand steadily forwards until the stage of that of the adult is attained. The whole anal fin moves forward with accompanying increase in the length of its base, and of its rays.

In the early stadia the pelvic fins are minute, and initially markedly closer to the snout tip than to the caudal base. While they remain inserted constantly at about the thirty-third myomere and about the same actual distance from the snout tip, in later larval stadia the relative position of the fin must change with growth, the fin becoming relatively more posterior, for in the adult it is about midway between the caudal base and the tip of the snout. In metamorphosis the head increases slightly in actual length and rapidly in relative length. The relative size of the eye increases, and it increases in actual size with the head. The relative depth of the body in the length increases steadily. The snout and mouth alter as described below.

The myomeres in the larval stadia remain constant in number and accord significantly in number and disposition with the scale rows of the developed fish. In the more advanced larval fishes the skin on the hinder myomeres show signs of folds clearly developing into rudiments of scales, that later become transverse rows. The anal canal runs along the ventral surface of the body and protrudes a short distance immediately in front of the origin of the anal fin. There is a thin median fold of skin from the end of the dorsal to the caudal base, in the earlier stages it is higher than the dorsal rays. There is also a narrow median ventral skinny keel from close behind the pelvics to the anus just before the anal origin.

The body of the 123mm fish is narrow behind the head and increases to maximum depth at the origin of the dorsal fin, where the depth is 11 in the standard length. The eye is about 5 in head, and 1.5 in the snout. The nostrils are relatively large, close before the eye, adjacent, separated by the narrowest septum (as in the adult), the posterior circular, the anterior oval.

The snout is acutely conical, the mouth is sub-inferior, the pointed tip of the snout protrudes slightly beyond the apex of the lower jaw. There are fine sharp needle-like teeth in each jaw. The dorsal origin is 1.85 times further from the snout tip than from the caudal base, its base is 2.5 times in its distance from the caudal base, and about equal to the maximum depth of the body. The rays are short, barely one-tenth of the height of the body below, of about uniform length so that the edge of the fin is apparently straight. The anal fin is close before the caudal base, almost confluent, its base is about 3 in head, the edge of the fin is convex, the longest ray is about as long as the dorsal rays. The caudal is broken. The pectorals are broadly hastate, about 3 in head, the rays barely differentiated. The pelvics are minute, inserted well in advance of the dorsal origin, and about 1.35 times further from the caudal base than from the snout tip, the rays are not countable. Other counts are as follows: D 55. A 12. P



about 15. C 4+10+10+4. Myomeres 84. There is a series of small black spots along the ventral surface of the body, the fish is otherwise colourless save for the silvery iris and black pupil of the eye.

The two specimens, 82 and 85mm total length (caudal broken), 76 and 79mm standard length respectively, are virtually identical, and represent a later stage, showing a number of changes from the 123mm fish. The body is more uniform in depth, the maximum depth is midway, about 7 in standard length, tapering towards each end. The head is now subequal to the maximum depth, the eye is about 5 in head and 2 in snout. The snout is much more obtusely conical, the skin somewhat wrinkled much like that of the adult, the mouth is more distinctly inferior. The structure of the upper jaw is now clearly as in the adult, that is, the premaxilla forms only the front half of the side, the hinder half consists of the maxilla. There is a band of 2-3 series of minute teeth along the premaxilla and in the lower jaw.

Both dorsal and anal fins have moved forwards, the dorsal origin in one specimen is exactly midway in the length, in the other it is slightly nearer the caudal base. The dorsal base is relatively about 2.5 times that in the 123mm stage, it is 1.3-1.4 times the post-dorsal distance and about 2.4 times the height of the body. The fin is higher, the margin gently convex, the longest rays are now about 3.5 in the height of the body below. The anal fin is no longer adjacent to the caudal but slightly advanced, the hind margin is distant about the length of its base from the caudal base, the anal base is about 2.7 in head. The pectorals are longer, narrower, and about 2.5 in head, the rays distinct. The pelvics have developed to a length of about 5 in head, their relative position is almost unchanged, about 1.25 times further from caudal base than snout tip, they are however actually closer to the head (33mm to snout tip, 50mm in the 123mm fish).

Counts in the 82 and 85mm fish are as follows: D 52 and 56. A 12 and 13. P 16. V about 9. C 4+10+10+4. Myomeres 85 and 86. Gillrakers are small but distinct points, 4+1+11 on the outer arch. Apart from the silvery iris, darker above, and black pupil of the eye, there is no colour save a series of fine black specks along the ventral margin of the body.

A comparative resume of the data of these larval forms and of adult fishes is given below.

**Pterothrissus belloci.**

| Standard length<br>(S.L.)mm          | LARVAL      |     |        | ADULT                    |
|--------------------------------------|-------------|-----|--------|--------------------------|
|                                      | 119         | 79  | 76     | 150-350<br>Average data  |
| Body depth % S.L.                    | 9           | 14  | 14     | 20                       |
| Head length % S.L.                   | 8           | 14  | 14     | 28                       |
| Snout tip to dorsal<br>origin % S.L. | 65          | 50  | 53     | 27                       |
| Dorsal base % S.L.                   | 10          | 26  | 27     | 58-60                    |
| Post-dorsal length<br>% S.L.         | 25          | 21  | 21     | 14-15                    |
| Snout tip to pelvic<br>origin % S.L. | 45          | 44  | 44     | 60                       |
| Anal origin to caudal<br>base % S.L. | 3           | 12  | 13     | 23                       |
| Anal base % S.L.                     | 3           | 6   | 6      | 10                       |
| Dorsal origin at<br>myomere          | 53          | 41  | 40     | Scale row 3-5            |
| Dorsal base covers<br>myomeres       | 12          | 27  | 28     | about 50<br>scale rows   |
| Anal origin at<br>myomere            | 82          | 77  | 77     | scale row<br>about 55    |
| Anal base covers<br>myomeres         | 3?          | 6   | 6      | about 10<br>scale rows   |
| Pelvics at myomere                   | 33          | 33  | 33     | scale row<br>33-35       |
| Hind dorsal base at<br>myomere       | 65          | 68  | 68     | scale row<br>about 64-68 |
| Length of dorsal ray in<br>head      | About<br>10 | 6   | 6      | 2.5-4                    |
| Length of pectoral<br>in head        | 3           | 2.5 | 2.5    | 1.4                      |
| Dorsal ray count                     | 55          | 52  | 56     | 51-59                    |
| Anal rays                            | 12          | 12  | 13     | 12-14                    |
| Pectoral rays                        | 15          | 16  | 16     | 16-17                    |
| Myomeres                             | 85          | 85  | 87     | —                        |
| L.1. count                           | —           | —   | —      | 85-90                    |
| Gillrakers                           | —           | —   | 4+1+11 | 4-5+1+11-12              |

These early stadia of **P. bellocci** show broad agreement with what has been described by Matsubara, 1942 for comparable stadia of the Japanese **P. gissu**. It is noteworthy that in **P. gissu** also the number of myomeres in the larval forms is of the same order as the number of scale rows in the metamorphosed and adult fishes.

The presence of such plainly early juveniles at Walvis Bay indicates that **P. bellocci** probably lives and breeds in (deeper water of) that area. (see Smith 1965, 14). From what is known of the habits of this species and of the related **P. gissu** however the presence of such early larval stadia in the littoral zone has not been observed elsewhere.

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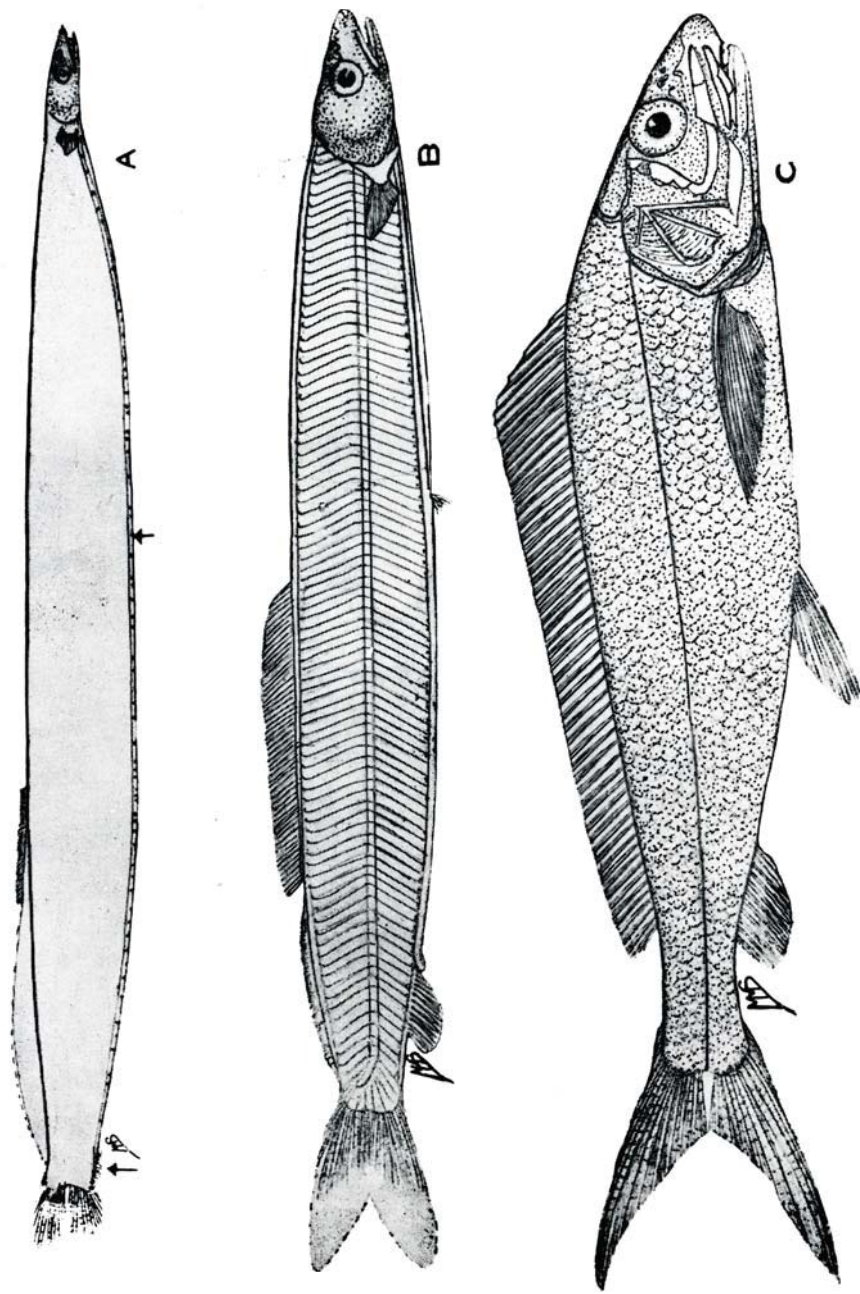


Fig. 1. Larval stadia of *Pterothrissus belloci* Cadenat, with adult. A. Earlier stadium at 118mm standard length, outline only, myomeres not shown. The anterior arrow shows the position of the minute pelvic fin, the arrow near the tail indicates the anal fin. B. At 76mm standard length. C. Outline of average adult.



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