

NOTES ON HYPEROSTOSIS IN THE FISH *DREPANE PUNCTATA*
(LINNAEUS)

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INTRODUCTION

WHILE studying certain anatomical differences between the two species of the genus *Drepane* namely *Drepane punctata* (Linn.) and *Drepane longimana* (Bloch & Schneider) some thickened bones popularly called 'stones' were noticed by the author in *D. punctata*. Cantor (1849) stated that in the largest specimen (1'5" = 433 mm.) of *D. punctata* examined by him the rounded protuberance of the skull between the eyes is very large and prominent and the roots of the four central caudal rays are enlarged and joined together without any intermediate membrane, and Delsman (1925) made a mention of the inflation of frontals, supraoccipitals and lacrymals in *D. punctata*. Besides these, the present observations in *D. punctata* revealed certain other bones showing hyperostosis the occurrence of which has not hitherto been reported. Results of a detailed study of the nature and occurrence of such bones are given in this paper.

MATERIAL AND METHODS

Specimens of *D. punctata*, for this study, were obtained mainly from the trawl catches in the Palk Bay off Mandapam. A few specimens were also obtained from the drift net catches at Rameswaram and Pamban. Sixty specimens ranging in size from 88-502 mm. total length were examined during the period November 1965 to June 1967 for the excessively thickened bones. Skeletons of fresh specimens were prepared by cooking in water to soften the muscles and then the flesh was removed and the skeletons were washed and dried. A few specimens of *D. longimana* were also examined to ascertain the occurrence of such instances of hyperostosis as found in *D. punctata*.

OBSERVATIONS

Hyperostosis or excessive ossification is confined to the lacrymals, frontal, supraoccipital, last two pairs of ribs, the neural spines of 18th and 19th vertebrae, haemal spine of the 19th vertebra and central two to four caudal rays. In a single specimen (471 mm.) the bases of the 10th, 12th, 13th and 14th dorsal rays were also thickened. The enlarged bones are of various shapes: round, oval and quadrangular. In certain cases, the thickening takes place uniformly on the surface of the bone without bringing any change in the original shape of the bone. The bony enlargements in the case of frontal, supraoccipital and caudal rays are clearly perceptible externally, the frontal in bigger size specimens, giving a hump-like appearance.

The excessive thickening of lacrymals was first found in a specimen 390 mm. T.L. Being thin and transparent with negligible thickness in the normal condition, they get uniformly ossified and with a maximum thickness of 3-4 mm.

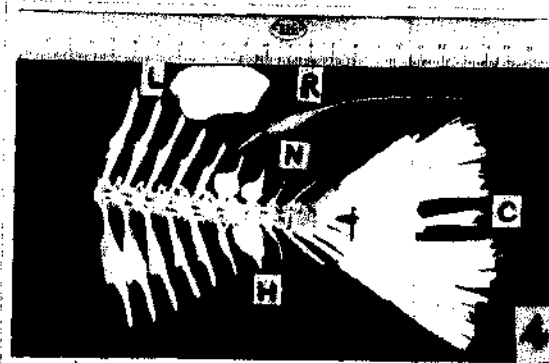
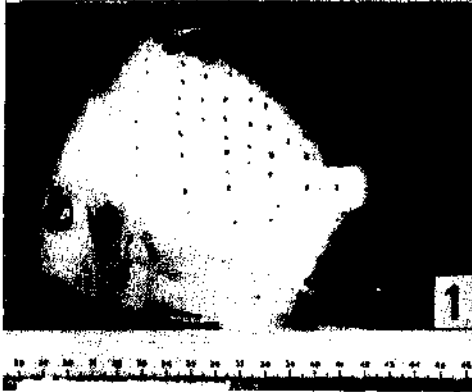
In the unossified condition the posterior confluence of the frontal ridges and in continuation of it, the supraoccipital crest are elevated, with no elevation of the profile between the orbits. When there is excessive thickening of the frontal and supraoccipital they form two heavy bony masses, the frontal ridges coalesce together forming a frontal crest posteriorly which remains unossified leaving a gap between the two ossified bones resulting in slight concavity in the nape which is perceptible externally. The enlargement of supraoccipital takes place anterodorsally, the posterior part remaining as a thin transparent blade.

The hyperostosis in the case of ribs is confined to upper 1/3 length of rib, excluding the articular portion and only the posterior two pairs are ossified. The ossification takes place on the inner surface and it is broad above and tapers down gradually.

The neural spines of 18th and 19th vertebrae and haemal spine of 19th vertebra consistently show hyperostosis except in cases where hyperostosis in these bones is entirely absent. Only two cases (460 and 465 mm. TL) of such absence were found so far. Only the lower halves of the above neural spines are ossified the upper halves being normal whereas in the haemal spine the entire spine except the tip is thickened. The tips of these thickened bones and both the spines of the 20th vertebra are bent forwards unlike their counterparts in the normal condition. In the case of caudal rays the basal portions of the central 2-4 rays, and mostly the central four rays exhibit hyperostosis and as a consequence of which they come close together without any intermediate membrane.

DISCUSSION

Hyperostosis in many species of fishes was reported earlier and various explanations were given for this phenomenon. Chaubanaud (1926) described the frequency, symmetry and specific constance of external hyperostosis of some fin rays in four species of the family Sciaenidae. Gregory (1933) stated that in *Chaetodipterus faber* 'the great supraoccipital crest and inter-orbital bridge are much swollen and very dense, so that they must measurably tend to depress the forepart of the fish and perhaps require correctional movements of pectoral fins or counterbalancing in some other parts as in the swollen epineural and interhaemal spines'. He also stated that in *Archosargus* 'it would seem that the heavy dentition and jaws and the excessive amount of dense bony tissue in the skull would overweight the head, if the body itself were not so huge'. Ebina (1936) as cited by James (1960) mentions extraordinary bone formation in the supraoccipital bone of *Eynnys cardinalis*. Barnard (1948) referred to this condition in *Chrysoblephus gibbiceps* and *Caranx equala* and termed it as hyperostosis. Gopinath (1951) attributed the extraordinary development and secondary ossification of supraoccipital crest in *Caranx sexfasciatus* (Quoy and Gaimard) and *Alectis indica* (Rüppell) to a demand for hydrostatic balance and stability. James (1960) stated that in *Trichiurus lepturus* Linnaeus, the enlargement of various bones may either be a peculiarity of the species or could be a disease. Bhatt and Murti (1960) refer to this condition in *Trichiurus haumela* (Forskål) as osteoma—a neoplastic disease.



Drepane punctata (Linnaeus)

(1) Specimen 172 mm. TL without any hyperostosis. (2) A specimen 465 mm. TL showing hyperostosis visible externally in frontal and caudal rays. (3) Skull of a specimen 255 mm. TL with normal lacrymals (L) and thickened frontal (F) and supraoccipital (S). (4) Bones of a specimen 390 mm. TL, showing ossified lacrymal (L) Rib (R) neural spines (N), haemal spines (H) and caudal rays (C).

All the above authors have referred to the occurrence of hyperostosis of supra-occipital, interneural, interhaemal and cleithrum of pectoral fin, in a number of fishes, while its occurrence with regard to other bones seems not known. The present author observed this phenomenon in lacrymals, ribs and neural and haemal spines also.

Hyperostosis in *D. punctata* appears to occur only in specimens above 230 mm. T.L. These thickenings do not seem to have any relation with sex but they seem to be related to size. Thus thickened frontals were found in fish measuring 230 mm. and above; supraoccipitals and ribs in fish of 268 mm. and above, lacrymals, neural and haemal spines in fish of 390 mm. and above and caudal in fish of 370 mm. and above. It is also found that in *D. punctata*, the thickenings increase in size with the increase in size of the fish.

It may be stated in this connection that in *D. punctata* this phenomenon in various bones is related to the size of the fish appearing only after a certain size and growing thereafter along with the size of the fish. Whatever be the reason for its occurrence in *D. punctata* it is significantly absent in *D. longimana*. The largest specimen of *D. longimana* examined in this study was 180 mm. while the smallest specimen of *D. punctata* found with hyperostosis was 230 mm. Hence it is not certain whether larger specimens of *D. longimana*, if any, would show this condition* especially when it is found to be related to size in a closely allied species.

SUMMARY

Hyperostosis of frontals, supraoccipital, lacrymals, ribs, neural and haemal spines and of caudal rays in *Drepane punctata* is described. Hyperostosis seems to occur only in *D. punctata* and it has so far not been found to occur in specimens of *D. longimana* (maximum size 180 mm.).

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* Since the paper was sent to press, it was possible to examine a single specimen of *Drepane longimana* (277 mm.) collected at Colachel (S.W. coast of India) on 14-11-1968 which showed hyperostosis in frontal, supra-occipital and haemal spines of the 18th and 21st vertebrae.

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* Not referred to in original.