

# AN INTERESTING CASE OF AMBICOLOURATION IN THE “ PAN ” SOLE, *BRACHIRUS PAN* (HAMILTON)<sup>1</sup>.

By S. JONES, *Research Officer*, and P. M. G. MENON, *Ravi Varma Research Scholar, Central Inland Fisheries Research Station, Barrackpore (Calcutta)*.

## INTRODUCTION.

Abnormalities such as ambicolouration, albinism and reversal of sides occasionally seen in flat-fishes have hitherto been recorded only from the European, American, Australian and South African waters where flat-fishes form fisheries of considerable magnitude. In the course of routine examination of the fish catches of the Hooghly River, we came across an ambicolourate specimen of *Brachirus pan* (Ham.)<sup>2</sup>. As this is the first record of an ambicolourate specimen from the Indian waters it has been described in the present paper with remarks on the ontogenetic significance of ambicolouration.

Examples of flat-fishes with blind-side pigmentation—or “ doubles ” as they were formerly known—were erroneously thought to be distinct species by some early workers. Later they were correctly recognised to be only abnormalities and Cunningham and MacMunn (1893) termed them “ ambicolourate ” and the phenomenon has since then been called “ ambicolouration ”

Norman (1934) who noticed different colour gradients in the blind side pigmentation put them into three main categories, viz., “ staining ”, “ spotting ” and “ true ambicolouration ” Further, in the case of true ambicolouration four types of pigmentation have been distinguished: they are, ‘ partial pigmentation ’, ‘ trunk pigmentation ’, ‘ nearly complete ambicolouration ’ and ‘ complete ambicolouration ’.

Our specimen collected from the Hooghly River near Pulta on the 17th November, 1949 in a ‘ Bhinjal ’ (a conical bag-net) along with a variety of fishes including normal flat-fishes, is a typical example showing “ nearly complete ambicolouration ” This specimen, Regd. No.  $\frac{F\ 513}{2}$ , has been deposited in the Zoological Survey of India, Calcutta.

We take this opportunity to thank Dr. T. J. Job., Chief Research Officer, Central Inland Fisheries Research Station, for his valuable criticism.

## NOTES ON THE AMBICOLOURATE SPECIMEN.

The specimen under record is 71 mm. in total length. The colouration of the ocular side is normal. On the blind side, the specimen shows the colouration of the opposite side except at the head region

---

<sup>1</sup>Published with the permission of the Chief Research Officer, Central Inland Fisheries Research Station.

<sup>2</sup>*Synaptura pan* (Hamilton): Norman, J. R., *Rec. Ind. Mus.* XXX, p. 181 (1929).

(Text-fig. 1b), where it is white as in normal specimens. The ambicolouration extends up to the postero-dorsal angle of the operculum, spreading as far as the base of the ninth dorsal fin-ray and the whole of the gular region as shown in the figure. The immediate border area behind the white region is darker than the rest of the pigmented area.

The dorsal fin shows the hooking characteristic of complete and nearly complete ambicolourate specimens. There is a groove extending from the base of the hook to the posterior limit of the upper eye along its dorsal edge. The upper eye is partially sunken in the groove reaching almost the middle of the thickness of the head (Text-fig. 1d & e). The blind side is less rounded than the ocular side, but is more convex than in normal specimens, thereby approaching towards a more symmetrical condition associated with ambicolouration (Text-fig. 1d & e).

Both the pectoral fins are of the same length and colouration unlike in normal specimens. Besides, both the pectoral fins are 6-rayed, while in the normal specimens, the pectoral of the ocular side bears 6 rays and of the blind side 4 rays.

The scales are ctenoid on both sides, those of the head and nape being distinctly broader.

Other points of interest not recorded in ambicolourate flat-fishes have also been observed in this specimen.

The ventral portion of the head, especially the mouth and the region below it, is broader than in normal specimens, with the margin upturned a little and showing a distinct white colour when viewed from above (Text-fig. 1d & e).

Though blind finger-like tactile filaments<sup>1</sup> are present on both sides in normal as well as the ambicolourate specimens, in the latter they extend only to the base of the 9th dorsal fin-ray from which point the pigmentation starts. Further, they are longer and more numerous below the lips and are found on both sides of operculum all along its ventral edge, while in normal specimens they are not only less in number and sparsely distributed but on the operculum they are present only along the ventral edge of the blind side. A cluster of these filaments very distinctly seen at the antero-ventral angle of the operculum, is absent in normal specimens. The significance of this difference in the density and distribution of these filaments is not known.

The presence of a groove extending from the base of the hook to the upper eye and the peculiar position of this eye partially sunken in the groove as already described above, are also points about which no mention or reference could be found in previous records.

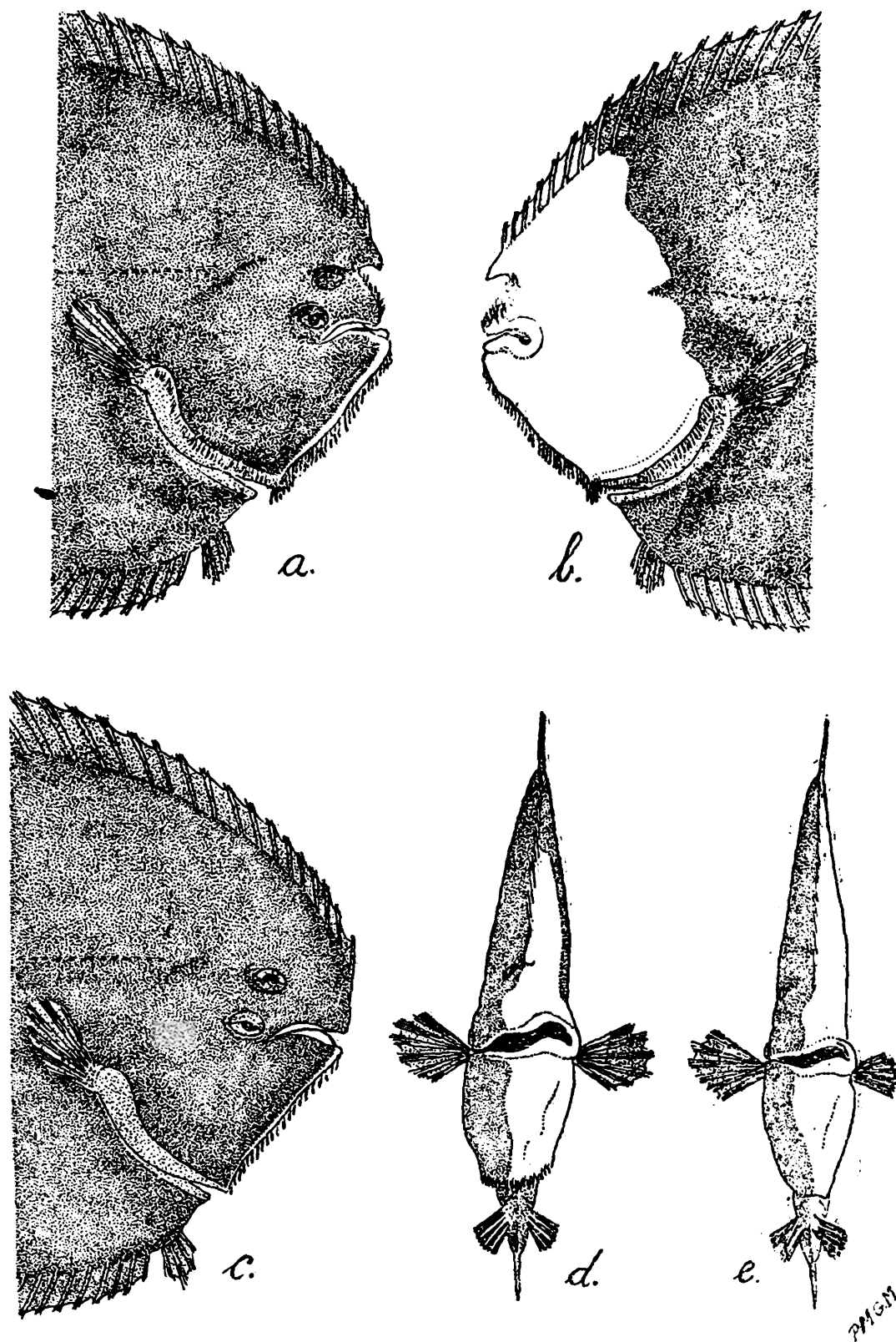
#### ONTOGENETIC SIGNIFICANCE OF AMBICOLOURATION.

Different theories put forward to explain the significance of ambicolouration have been reviewed by Bateson (1894), and Gemmill (1912).

---

<sup>1</sup>For the sake of clearness these filaments are not fully shown in the figure.

Hussakof (1914), basing his views on the experiments and observations of Cunningham (1881 ; 1895) and Cunningham and MacMunn (*op. cit.*) held the opinion that blind side pigmentation was caused by exposure to reflected light, especially in the case of flat-fishes, living on hard bottoms. This view, however, does not seem to hold good in all cases of ambicolouration as has been shown by Norman (*op. cit.*).



Text-fig. 1.—*Brachirus pan* (Ham.). (a.) View of the head of the ambicolourate specimen from the ocular side showing the hooking of the dorsal fin and the general pigmentation ; (b.) View of the head of the ambicolourate specimen from the blind side ; (c.) View of the head of a normal specimen from the ocular side ; (d.) Front view of the ambicolourate specimen ; (e.) Front view of a normal specimen.

Though in normal flat-fishes the migration of the eye takes place before the anterior movement of the dorsal fin, in specimens showing "true ambicolouration", the migration appears to be arrested or delayed preventing the forward movement of the dorsal fin, which, as observed by Ritchie (1908), consequently forms a characteristic fleshy hook. Another known feature, suggestive of a tendency to revert towards original bilateral symmetry and often associated with ambicolouration, is the symmetrical pectoral fins. Besides, as exemplified by our "nearly complete ambicolourate" specimen, the presence of a well-developed groove extending from the base of the fleshy hook of the dorsal fin to the upper eye and the peculiar position of the eye partially sunken in the groove (and indicative of reversion to the blind side) and the ventral portion of head below the mouth are characters which lend additional support to the view of Norman (*op. cit.*) that "ambicolouration merely represents variation in the direction of original bilateral symmetrical condition of the ancestors of flat-fishes". These abnormal specimens are thus products resulting from partial arrest of assymetry in the ontogeny of some of these flat-fishes.

#### SUMMARY.

An abnormal specimen of *Brachirus pan* (Ham.), showing "nearly complete ambicolouration", is recorded and described for the first time from Indian waters with remarks on the ontogenetic significance of "ambicolouration".

#### REFERENCES.

- BATESON, W. (1894).—*Materials for the Study of Variation*, London, pp. 466-473.
- CUNNINGHAM, J. T. (1881).—An experiment concerning the absence of colour from the lower side for Flat-fishes, *Zool. Anz.* XIV, pp. 27-32.
- CUNNINGHAM, J. T. (1895).—Additional evidence on the influence of light in producing pigments on the lower sides of Flat-Fishes, *Journ. Mar. Biol. Assoc.* IV, pp. 53-59.
- CUNNINGHAM, J. T. and MACMUNN, C. A. (1893).—On the colouration of the skin of Flat-fishes, especially of Pleuronectidae, *Phil. Trans. Roy. Soc.* CLXXXIV, pp. 801-812.
- GEMMILL, J. F. (1912).—*The Teratology of Fishes*, Glasgow, pp. 56-59.
- HUSSAKOF, L. (1914).—On two ambicolourate specimens of the Summer Flounder, *Paralichtys dentatus* with an explanation of ambicolouration, *Bull. Amer. Mus. Nat. Hist.* XXXIII, pp. 95-100.
- NORMAN, J. R. (1934).—*A Systematic Monograph of the Flat-fishes (Heterostomata)*, I, London, pp. 22-27.
- RITCHIE, J. (1908).—An ambicolourate Turbot with eyes approximately normal in position. *Ann. Scott. Nat. Hist.*, pp. 146-150.