ON CERTAIN GONADIAL ABNORMALITIES MET WITH IN THE INDIAN OIL SARDINE SARDINELLA LONGICEPS VAL.*

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HERMAPHRODITISM as an abnormal phenomenon has been recorded among many Indian fishes (Chacko and Krishnamoorthy, 1949; Nayak, 1959; Prabhu and Antony Raja, 1959; Raju, 1960; Rao, 1962; Thomas and Raju, 1962 and Antony Raja, 1963). Certain other abnormalities such as parasitized ovary have also been described (Raju, op. cit., and Annigeri, 1961). In the course of studying the maturity and spawning of the oil sardine from the landings at Cannanore, five instances of deviation from the normal gonadal set-up have been met with, and since these appear to be the first record of the kind in the oil sardine they have been described in the present note.

![Diagram of typical gonadal set-up in male and female Sardinella longiceps.](attachment:diagram.png)
The normal gonads in *S. longiceps* (Fig. 1) are paired organs lying in the body cavity suspended by the peritoneal membrane. They are supplied by the gonadal artery which bifurcates to form the right and left testicular or ovarian arteries as the case may be, each running a length of about 2 mm. laterally and then entering the right and left testis or ovary respectively. The vas deferens is a slender duct lying on the posterior midventral side of each testis. In the female the posterior part of the ovary itself functions as the oviduct. The two gonoducts unite proximally to form a common seminal duct in the male and a common oviduct in the female, which opens outside by the genital opening. The genital opening in the male is situated on a muscular papilla and in the female on a membranous papilla. George (1959) found these externally visible genital papillae in the cloacal region as useful in differentiating the sexes. The right and left gonads are similar to each other but for the fact that in the female the left gonad may be slightly larger than the right one. For a comparative appraisal of the measurements of the abnormal gonads with those of the normal ones from fish of the same size range, reference may be made to Table 1.

**MALE WITH VESTIGEAL RIGHT GONAD**

Although slightly dissimilar gonads have been encountered in the male occasionally, a great disparity in size as recorded in this case (Fig. 2) has not hitherto been
observed. In this specimen the left gonad has developed normally, measuring 60 mm long and 19 mm broad (at the broadest region) and is in maturity stage between V and VI. It is supplied by the left testicular artery and its seminal duct opens out independently. On the other hand the right gonad is vestigeal being represented by a thin whitish tissue attached to the body wall and measuring 11 mm in length and 1.5 mm in breadth. The right gonadal artery supplying this vestige is also highly atrophied, being represented by a thin membraneous strand attached to the body wall.

**Male with Gonads Fused Anteriorly**

In the present case (Fig. 3) fusion of the two gonads has taken place at the region of bifurcation of the common testicular artery, and extending for about 4 mm. The two gonads are thus attached directly to the common testicular artery due to the absence of the right and left testicular arteries. Apart from this the gonads are normal in all other aspects.

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**Fig. 3.** Gonads in male fused anteriorly (ventral view). R.O.F. Region of testicular fusion.

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4Measurements of the gonads mentioned in the paper were made on specimens preserved in 5% formalin.
5Maturity stages have been determined based on the key adopted by the International Council for the Exploration of the Sea, as reproduced by Lovern, and Wood (1937).
FEMALE WITH GONADS FUSED POSTERIORLY

In this case a distinct fusion of the two gonads has occurred behind the middle region (Fig. 4). The fusion extends for a length of about 4 mm., and posterior to the region of fusion the gonads lie 1.5 mm. apart and are normal but for the fact that they are very thin. However, the more remarkable aspect of the specimen is that a portion of the hind intestine lying close to the region of the ovarian fusion has amalgamated with this so as to form an ovario-intestinal complex.

FEMALE WITH ATROPHIED LEFT GONAD

Although the left gonad may sometimes be slightly larger than the right one in the female, the absence of any one of the gonads has not so far been recorded. In this specimen (Fig. 5) the right gonad is well developed, measuring 32.5 mm. in length.
FIG. 5. Atrophied left gonad in female (ventral view). A.R.O.A. Atrophied right ovarian artery.

and 14 mm. in breadth (at the broadest region) and is in maturity stage between V and VI. The right ovarian artery is also normal and the right oviduct opens out independently. On the other hand the left gonad has completely atrophied, not even represented by a vestige. All that is present on the left side is the atrophied left gonadial artery appearing as a thin membraneous strand attached to the body wall.

**FEMALE WITH ATROPHIED RIGHT GONAD**

Exactly opposite to the condition observed in the previous case, in the present specimen the left gonad has developed normally and is in partly spent condition (VI b). The right gonad has completely atrophied (Fig. 6), not even represented by a vestige, its artery being reduced to a thin strand-like membrane.

**SUMMARY**

Five instances of gonadial abnormalities are recorded in the Indian oil sardine *Sardinella longiceps* Val. and are described in the paper.

**ACKNOWLEDGEMENTS**

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**REFERENCES**


Antony Raja, B. T. 1963. An instance of hermaphroditism in the Indian oil sardine *Sardinella longiceps* (Cuv. and Val.). *(In press).*


<table>
<thead>
<tr>
<th>Date of record</th>
<th>Description of specimen</th>
<th>Total length (mm.)</th>
<th>Weight (gm.)</th>
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<td>Right</td>
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