

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 gonadial 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.

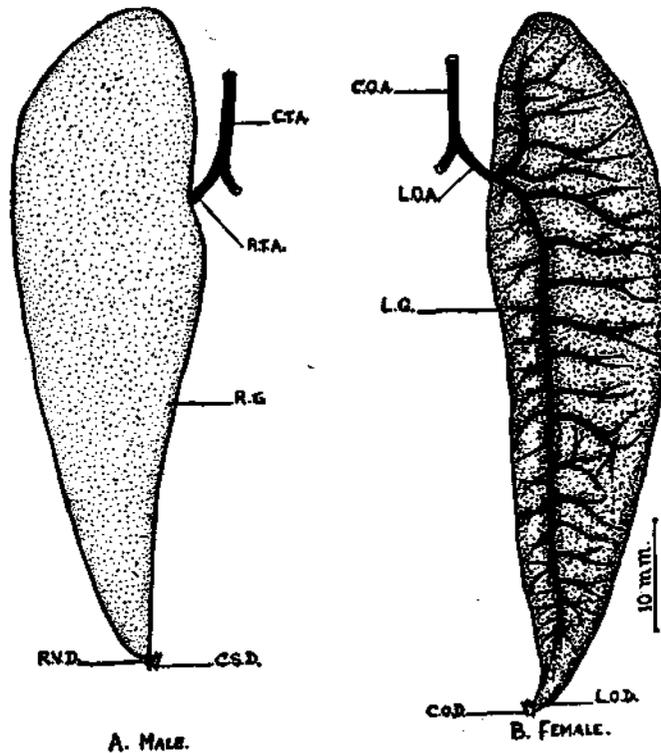


FIG. 1. Ventral views of the typical gonadial set-up in male and female *Sardinella longiceps*. C.T.A. Common testicular artery, C.O.A. Common ovarian artery, C.S.D. Common seminal duct, C.O.D. Common oviduct, L.O.A. Left ovarian artery, L. G. Left gonad, L.O.D. Left oviduct, R. G. Right gonad, R.T.A. Right testicular artery, R.V.D. Right vas deferens. (same lettering for other figures).

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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 the 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

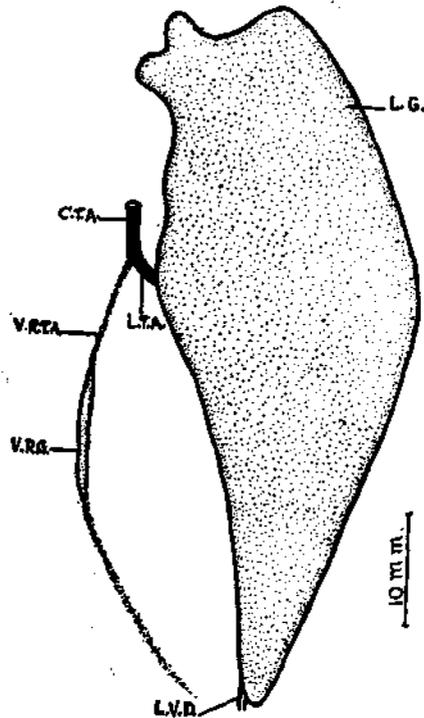


FIG. 2. Vestigial right gonad in male (Ventral view). L.T.A. Left testicular artery, L.V.D. Left vas deferens, V.R.G. Vestigial right gonad, V.R.T.A. Vestigial right testicular artery.

observed. In this specimen the left gonad has developed normally, measuring 60 mm.¹ long and 19 mm. broad (at the broadest region) and is in maturity stage² 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 vestigial 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 gonadial artery supplying this vestige is also highly atrophied, being represented by a thin membranous 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

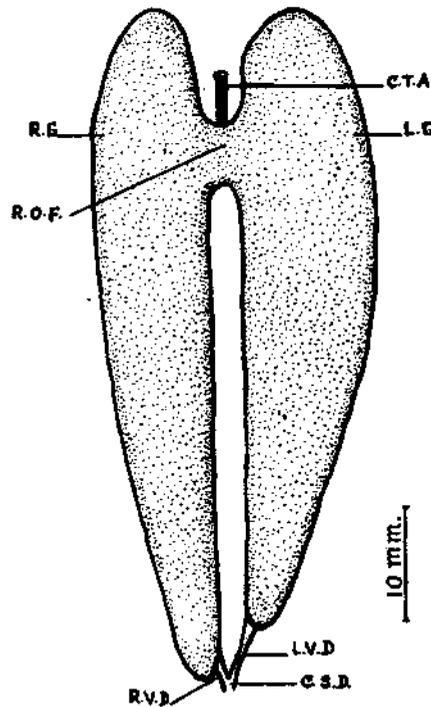


FIG. 3. Gonads in male fused anteriorly (ventral view). R.O.F. Region of testicular fusion.

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.

¹Measurements of the gonads mentioned in the paper were made on specimens preserved in 5% formalin.

²Maturity 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

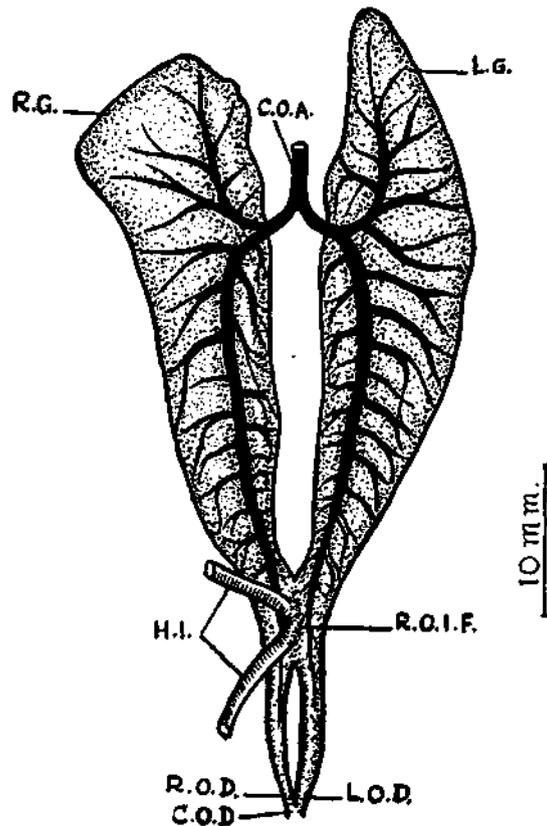


FIG. 4. Gonads in female fused posteriorly (ventral view). H.I. Hind intestine, R.O.D. Right oviduct. R.O.I.F. Region of ovario-intestinal fusion.

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 52.5 mm. in length

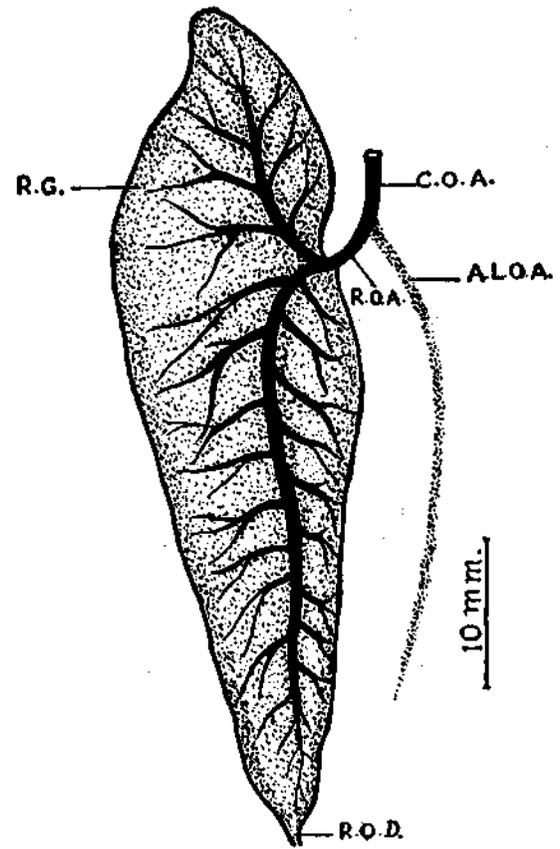


FIG. 5. Atrophied left gonad in female (ventral view). A.R.O.A. Atrophied right ovarian artery.

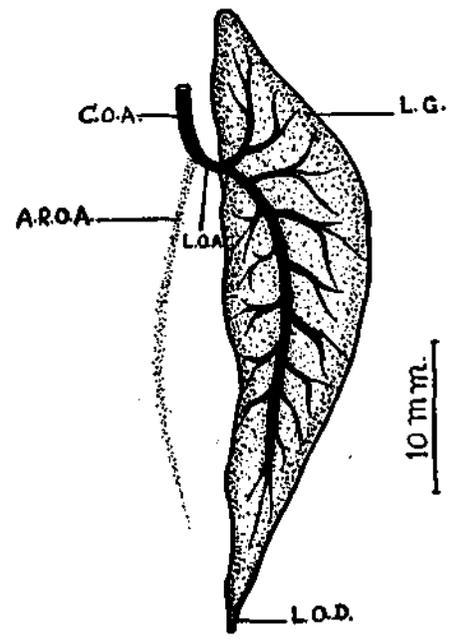


FIG. 6. Atrophied right gonad in female (ventral view). A.L.O.A. Atrophied left ovarian artery. R.O.A. Right ovarian artery.

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 membranous 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.

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TABLE 1
Comparison of the measurements of abnormal gonads with those of normal gonads

Date of record	Description of specimen	Total length mm.	Weight gm.	Measurements of the gonad				Maturity	
				Length mm.		Breadth at broadest region mm.			
				Right	left	Right	left	Right	left
—	Normal male	168	46	60	61	17	16	VIb	VIb
—	Normal female	159	38	51	49	9	11	IV	IV
4-9-1961	Male with vestigeal right gonad	161	38	11	60	1.5	19	—	V-VI
22-9-1961	Male with gonads fused anteriorly	182	55	58	54.5	10	10	VIb	VIb
Do.	Female with gonads fused posteriorly	170	45	48	52	8.5	9.5	IV	IV
4-9-1961	Female with atrophied left gonad	159	39	52.5	—	14	—	V-VI	—
23-7-1962	Female with atrophied right gonad	147	26.5	—	40.5	—	9	—	VIb