

**A CASE OF HERMAPHRODITISM AND SOME OTHER GONADAL
ABNORMALITIES IN THE SKIPJACK *KATSUWONUS PELAMIS**
(LINNAEUS)**

By G. RAJU

Central Marine Fisheries Research Unit, Tuticorin

In the course of the examination of more than 2300 gonads of *Katsuwonus pelamis* (Linnaeus) for the study of the spawning habits of this fish, from the Laccadive Sea at Minicoy, I came across three abnormal gonads including a hermaphrodite one. As this is the first record of abnormal gonads of tuna from Indian waters, it has been described in this present note.

The normal gonads of the skipjack (Fig. 1) are paired and elongate organs with the left lobe usually being slightly larger than the right and both are suspended from

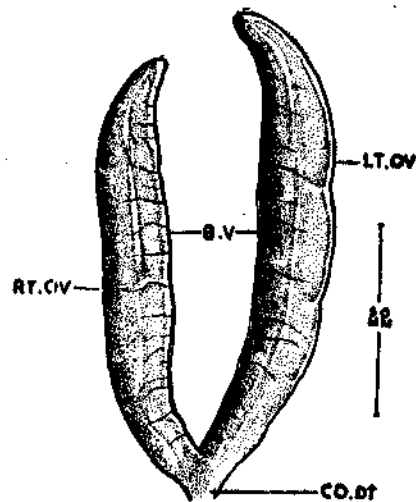


FIG. 1. Normal ovary of 415 mm. Standard length specimen.
B.V. Blood vessels, CO.DT. common duct, LT.OV. Left ovary, RT.OV. Right ovary.

the dorsal wall of the body cavity by a fold of the peritoneum. They are free distally but proximally they unite to form a common duct opening into the cloaca. In the female the posterior part of the ovary itself functions as the duct whereas in the male there is a slender duct running along the entire length of the mid-ventral side of each testis.

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HERMAPHRODITE GONAD
(Fig. 2)

The only instance of hermaphroditism recorded from among the various tunas appear to be that of Nakamura (1935) who has also noticed this in *Katsuwonus pelamis* from the Pacific Ocean. In the hermaphrodite specimen from Minicoy which does not show any apparent changes in other body characters, the details are as follows :

The left gonad consists of a lower long, narrow, dorsoventrally compressed white testicular region and an upper somewhat broad, oval, yellow ovarian region, elliptical in cross-section. The right gonad consisting of the lower white testicular region is convex dorsally and grooved ventrally whereas the ovarian region which is somewhat similar to the left one is more rounded in cross-section. For a comparison the measurements of the body, the testicular and ovarian regions of the hermaphrodite animal, are given along with that of two normal individuals (male and female) of about the same size group (Table IA).

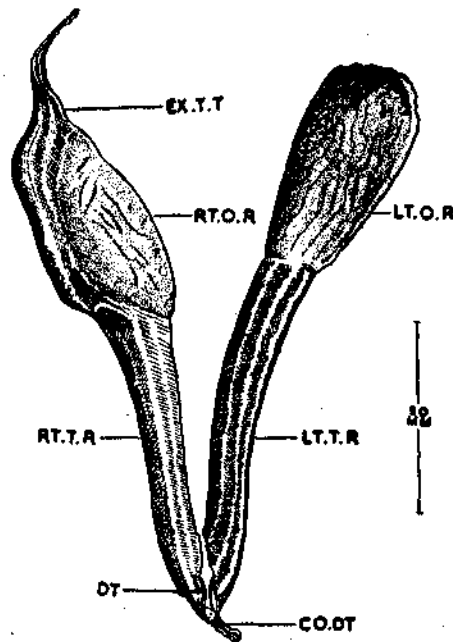


FIG. 2. HERMAPHRODITE GONAD.

Shows the relative position, shape and size of the different regions.

CO.DT. Common duct, DT. Ducts of the two sides emerging from the testes, Ex. T.T. Extensions of the testicular tissue, LT.O.R. Left ovarian region, LT.T.R. Left testicular region, RT.O.R. Right ovarian region, RT.T.R. Right testicular region.

It is interesting to note that in the left gonad while the upper and lower parts are exclusively of ovarian and testicular tissues respectively, in the right, there is an extension of thin layer of testicular tissue over the ovarian region which after spreading dorso-ventrally is prolonged above as a tapering horn-like structure (Fig. 2).

The microscopical examination of the ovary reveals the presence of translucent yellow ripe ova with a conspicuous golden yellow oil globule. They vary from 0.627 to 0.809 mm. in diameter with a mode at 0.726 mm. and lie freely in the lumen of the ovary while the opaque yolky maturing ova (0.182 to 0.612 mm.) mixed with transparent immature ova are found attached to the follicles lining the ovary.

The specimen was collected during the normal spawning period of this species and its size of 417 mm. (Standard length) perhaps indicates its attaining maturity for the first time. Though the ovarian regions are fully ripe the testicular regions appear to be just maturing with the right lobe somewhat more advanced in maturity than its left counterpart.

This rare phenomenon in fishes is of interest as hermaphroditism as a 'teratological' condition is recorded only for a few groups of fishes and notable recent contributions on the subject are by Prabhu and Antony Raja (1959), Reed (1954), Lagler and Mary (1951), Chacko & Krishnamorthy (1949), Dence (1938), Schultz (1931), and Bishop (1920). The literature regarding functional or true hermaphroditism is reviewed by Lavenda Nathan (1949).

OVARY WITH THE DIVIDED RIGHT LOBE

(Fig. 3)

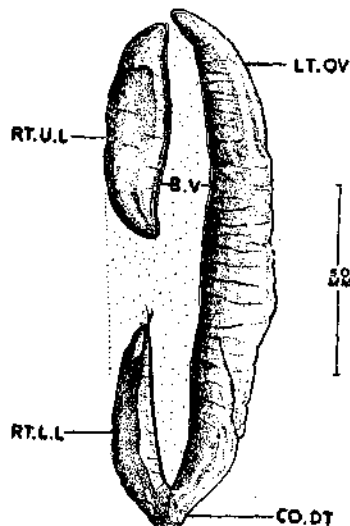


FIG. 3. OVARY WITH DIVIDED RIGHT LOBE.

B.V. Blood vessels, CO.DT. common duct, LT.OV. Left ovary, RT.L.L. Right lower lobe, RT.U.L. Right upper lobe.

The left ovary is normal in appearance. But in the right side there are two short lobes; an upper and a lower one 24 mm. apart from each other. The upper one is completely cut off without any connection with its fellow of either the opposite side or its own side, excepting that they are all suspended by the same peritoneal

TABLE I A

Comparison of the Different parts of the abnormal Gonads with those of the normal specimens of the same size range

Description of the specimen	Measurements of the body		Measurements of testis (mm.)							Measurements of ovaries (mm.)							Date of collection	
	Standard length (mm)	Weight (kg)	Length of		Breadth of		Maturity of		Diameter of the duct	Length of		Breadth of		Maturity of		Diameter of the duct		Diameter of the most mature group of ova
			Right lobe	Left lobe	Right lobe	Left lobe	Right lobe	Left lobe		Right lobe	Left lobe	Right lobe	Left lobe	Right lobe	Left lobe			
Herma-phrodite	417	2.04	86	94	16	14	Ripening Stage V	Matur-ing Stage III	1.7	59	57	30	28	Ripe ready for spawning Stage VI	Similar to right		0.627 to 0.809	22nd Feb. 1959
Normal male	418	1.70	129	132	19	21	Mature Stage IV	Similar to right	1.6	—	—	—	—	—	—	—	—	—
Normal female	415	1.80	—	—	—	—	—	—	—	116	128	18	21	Mature Stage IV	Similar to right	10	0.516	—

TABLE I B

Parasitized female	432	1.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	103	142	17	30	Mature Stage IV	Externally Stage V Internally immature ova	8	Rt. lobe 0.182 to 0.492. Lt. lobe 0.165	8th Nov. 1958
	432	1.80	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	127	139	18	20	Ripening Stage V	Similar to left.	13	0.516 to 0.528	

TABLE I C

Female with the divided Right Ovary	405	1.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Upper lobe 56 Lower lobe 54	137	Upper 16 Lower 12	18	Maturing Stage II	Similar to left	8	0.231	13th April 1959
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fold. The lower lobe is connected to the left ovary through a common oviduct as in normal specimens. The measurements are given in Table IC.

PARASITIZED OVARY

(Fig. 4)

Normally, although, the left ovary is slightly larger than the right one, such a disparity in size as seen in this case is uncommon. The measurements are given in Table IB.

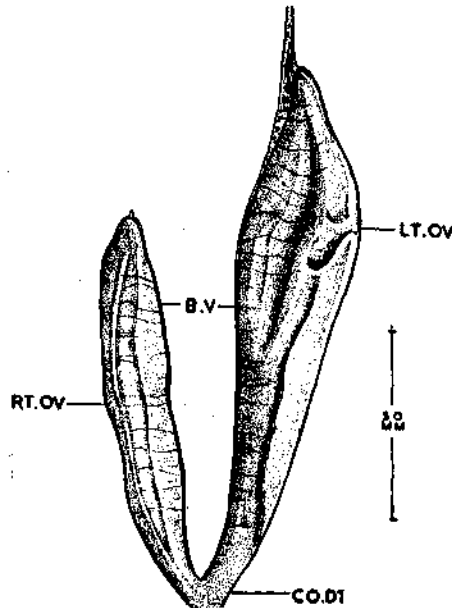


FIG. 4. PARASITIZED ovary. Abbreviations as in Fig. 1.

The parasitized left ovary, except for its very thin layer of soft, outer covering with immature ova below in certain places, is very much hardened and 'woody'. Excepting the transparent immature ova along the periphery all the other ova are completely destroyed. On the other hand in the normal right ovary where no parasites are found, in addition to the immature ova, yolky, maturing and mature ova ranging in diameter from 0.182 to 0.495 mm. are found. It is interesting that only one side should be affected.

The distribution of the larval nematode worms inside the left ovary is not uniform. Instead they are enormously congregated at the distal end where the regions occupied by them are black in colour. Figure 5 and Table II show the distribution of the worms in different regions.

The irritation due to the presence of worms inside and consequently the tissue-reaction and the remnants of destroyed ova are probably the cause for the enormous development and hardening of the left ovary.

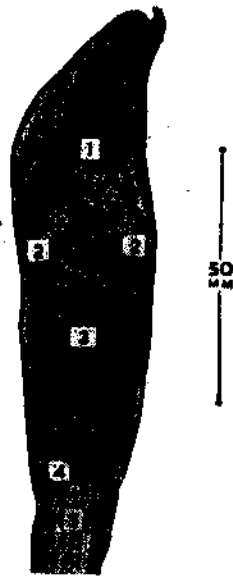


FIG. 5. GROSS Longitudinal section of the left parasitized ovary. Numbers indicate the different regions of sampling to show the distribution of the nematode worms (Refer Table II).

TABLE II

Regions examined (Fig. 5)	No. of worms per gram of tissue (estimated and corrected to the nearest hundred).
1	56,000
2	7,500
3	2,500
4	1,800
5	400

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* Not consulted in original.