

AN INSTANCE OF ABNORMALLY RIPE OVARIES IN THE INDIAN
MACKEREL, *RASTRELLIGER KANAGURTA* (CUVIER)

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A case of abnormally ripe ovaries, the first of its kind, is reported where-
in an additional lobe in stage VI was found along with the normal pair of ovaries
in stage IV. The estimated number of ripe and maturing ova in this abnormal
sac was 18,600 each.

Among the scombroid fishes of Indian waters, gonadal abnormalities have
been recorded only in the case of oceanic skipjack, *Katsuwonus pelamis* (Raju,
1960; Thomas and Raju, 1964) and the Indian mackerel, *Rastrelliger kana-
gurta* (Prabhu and Antony Raja, 1959; Rao, 1962). Except for two instances
of abnormality due to parasitism and atrophy in *K. pelamis* (Raju, 1960) the
other reports relate to cases of hermaphroditism in the respective species.
Thus, no type of abnormality other than hermaphroditism has been observed
for the Indian mackerel and hence this report may be of interest to bring on
record one such, which may be of additional importance in exhibiting func-
tional aspect of the ovaries.

During routine biological studies on the Indian mackerel at Karwar, a
sample of fish caught in the shore seine, 'yendi,' on 24-7-1970 contained an
adult specimen measuring 228 mm total length with much distended abdomen.
On dissection it appeared that the entire body cavity was filled with ripe ovaries,
but actually it represented only the enormous growth of an additional lobe of
the ovary, the normal paired ones lying beneath. This abnormal outgrowth
was found to have overgrown on some of the pyloric caeca and a portion of
lower tips of the liver lobes. It was also parasitized by nematodes, six of
which could be traced at different parts. The most interesting feature of this
ovarian sac was that it was fully ripe in stage VI(b) (Pradhan and Palekar,
1956) with majority of the ova completely transparent and the others nearly
so. Although the ripe ova were not oozing out, they were found in the lumen
and slight pressure at the posterior end extruded ova through the common

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oviducal opening. The complete ripeness of this sac with neither the maturing opaque ova nor even the immature oocytes is an unique departure from the normal features. The normal pair of ovaries was in stage IV with a length of 43 mm and breadth of 11 mm and extending to slightly over two-thirds of the length of the body cavity (Fig. 1). In the fresh state while the

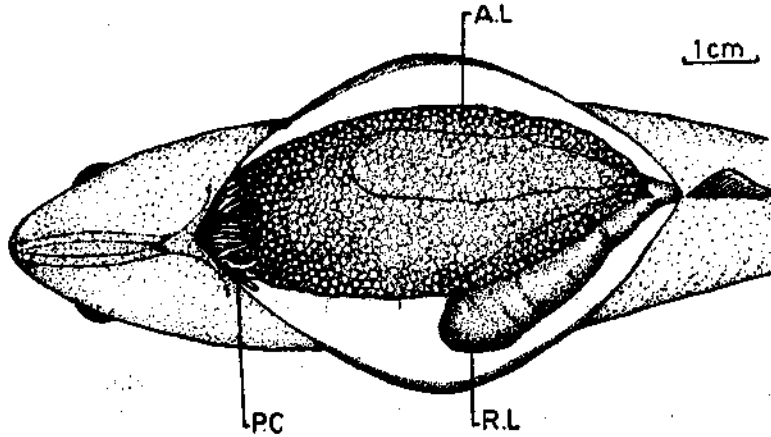


Fig. 1. Diagrammatic representation of the disposition of normal pair of ovaries with the abnormal outgrowth inside the body cavity. A.L: Abnormal lobe; P.C. Pyloric caeca; R.L: Right lobe of normal ovary.

ripe ova ranged in size from 0.680 to 1.071 mm with the mode around 0.901-0.952 mm, the maturing ova in the normal pair of ovaries measured from 0.357 to 0.680 mm, with a modal size of 0.425-0.442 mm. Most of the ripe ova had a single oil globule ranging from 0.187 to 0.255 mm (mean = 0.223 mm) while certain others had more than one, varying up to eight droplets of smaller sizes. The frequency of the maturing ova in the normal pair and that of the ripe ova in the additional lobe, as obtained from the fresh material, is shown in Fig. 2.

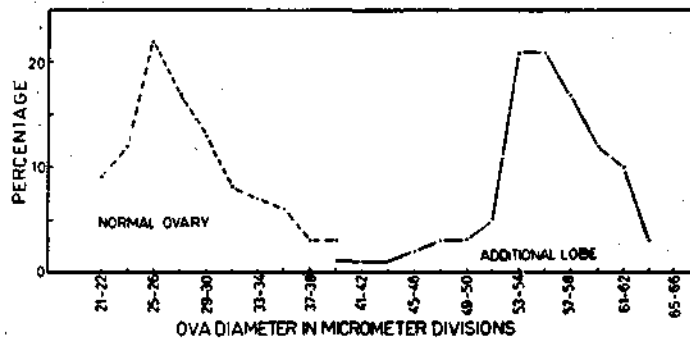


Fig. 2. Ova-diameter frequency (1 micrometer division = 0.017 mm).

Radhakrishnan (1965) has recorded a maximum size of 0.935 mm for the ripe ova with the modal size varying between 0.629 and 0.749 mm and Vijayaraghavan (1965) has reported 0.736 and 0.672 mm respectively. It is presumed that these are measurements obtained from formalin preserved material while the present material, after preservation in Gilson's fluid shows a maximum size of 0.901 mm and a modal size of 0.782-0.799 mm. Hence, the degree of ripeness in the present report appears to be the most advanced among the existing records.

Regarding the shrinkage under preservation, Joseph (1963) compared the mean diameter of modal groups of ova preserved in 4% formalin and Gilson's fluid and that between the latter and fresh material. He found that the estimate of differential shrinkage was 24% for all egg sizes in both the sets of data. In the present study, the mean shrinkage was 0.158 mm and 0.107 mm respectively among the ripe and maturing ova amounting to 17% and 22% respectively, thus indicating that the shrinkage in smaller ova may be slightly greater.

After preservation of all the three lobes together in modified Gilson's fluid (Simpson, 1951), the material was examined after a month for fecundity estimates. The ovaries were vigorously shaken in a stoppered specimen tube to get all the ova liberated from the ovigerous lamellae and to break down the ovarian tissues as well. The volume was raised to 200 ml and for proper random sampling the material was kept uniformly stirred while 1 ml of it was pipetted out on a plankton counting chamber. The transparent ova were counted separately from other opaque ova and five such aliquots were counted similarly. The counts were 84, 86, 95, 94 and 104 for maturing ova and 77, 99, 100, 90 and 100 for ripe ova which showed strikingly identical averages of 93 ova per ml for the above two categories. Thus, the calculated number of ripe ova and maturing ova was 18,600 each and even if both were to be added, the count is far below that given for Indian mackerel as 94,000 by Devanesan and John (1940).

The presence of a few young nematode parasites in the abnormal sac has not affected the ovary as reported for *Katsuwonus pelamis* (Raju, 1960) and *Otolithus argenteus* (Annigeri, 1961) in which cases, of course, the incidence was much extensive. On the other hand it is not known whether the parasites caused any irritation to the gonadial tissues and the resultant reaction accelerated the process of ripening and hence the abnormal enlargement of the additional sac.

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ADDENDUM.

Subsequent to the present communication, two further instances of abnormal ovaries in the mackerel were noticed at Karwar. In one of them (fish of 228 mm total length) obtained on 13-7-1971, the left ovary overlying the right one nearly filled the body cavity. The length, breadth and weight of the left ovary were 64 mm, 27 mm and 24.690 g, while the corresponding measurements of the right ovary were 34 mm, 7 mm and 0.670 g respectively. The left ovary was almost completely filled with ripe ova (modal size 0.969 mm in fresh condition) and the right one was in spent condition with a few unspent ova (up to 0.714 mm) and a majority of immature oocytes. The fecundity estimate was 107,400 ova.

The second specimen (225 mm total length) obtained on 18-8-71 had three external healed wound openings on the left side of the body. The right ovary completely filled the body cavity, while in the left one the anterior two-thirds portion was flattened and dark and the posterior one-third was bulb-like and fused with the lower part of the right ovary, the flat and bulb-like portions being connected by a narrow passage. The right ovary with the fused portion of the left one measured 74 mm in length, 31 mm in breadth, 88 mm in girth and 26.451 g in weight; the ova in the massive upper portion had a modal diameter of 0.969 mm, with an appreciable number of them shrunken and a few without oil globule. The number of healthy ova was 122,500 while that of the shrunken ones was 24,500.

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