

Biology and Distribution of the South African Pilchard  
(*Sardinops ocellata*) in Summer Period

by

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South African pilchard (*Sardinops ocellata*) inhabits the inshore zone which stretches for a hundred miles from the Tigres Pen to Cape Agulhas. Its concentrations are sometimes also met in more eastern regions up to Durban Harbour.

The largest concentrations of *Sardinops ocellata* gather in the St. Helena and Walvis Bays. It comes into the Tigres Bay in considerable amounts. Davies (3) considers it to be of the same *Sardinops ocellata* species. Vilela calls it *Clupea sagax*. In accordance with his data large concentrations of pilchard come into the Tigres Bay in July/October and in January.

In the St. Helena and Walvis Bay regions the largest concentrations of pilchard are observed in March/August. As from August it begins leaving this region by separate shoals. The period of these migrations coincides with the beginning of the most mass pilchard spawning. Its main spawning migrations are to regions with relatively warm water; from St. Helena Bay, pilchard is moving south-westwards, from Walvis Bay region - north-westwards.

In the Southern hemisphere the main spawning takes place during the spring and summertime (October/February). However, it is possible to observe spawning specimens during the whole year. While spawning, pilchard is distributed over a very large area. In the southern region spawning specimens occur from the Orange River offing to Cape Barracouta, i.e. for the distance of about 500 miles.

Our observations were mainly conducted during the spring/summer period, i.e. the time when pilchard passes the spawning phase of its life-cycle. During this period pilchard was met in the northern region (17°23' S - Walvis Bay Harbour, at depths from 60 m down to the slope of the continental shelf) by the expedition onboard the trawler "Muksun" (1960-61) and also by the following expedition (1961-62) on the trawler "Orekhovo". Off Lüderitz Harbour there were smaller concentrations of pilchard. Pilchard was concentrated irregularly over a rather considerable area. The largest concentrations of pilchard were found in the zones where maximum development of phytoplankton are situated, in the bottom layers rising to the surface of the ocean. Spawning pilchard occurred mostly in the zone of the cold Bengal Current mixing with a contrary warm current. Pilchard in small 50 m long shoals were observed in this area consisting of specimens of one and the same size. The shoals were situated at different distances from the shore; small-sized pilchard shoals were found nearer the shore, being of a larger size than those consisting of adult fish. Usually, in shoals of mature pilchards (three-four year olds with a length of about 20 cm) it was possible to find specimens with different gonad maturity stages:- from immature to pre-spawning fish and some with running gonads. The percentage of pilchard with more mature and running gonads was higher in northern regions, i.e., in relatively warm water.

Spawning of pilchard and probably the development of eggs and larvae in the northern region as well as in the southern region takes place in the upper 20 metre layer of water. South African pilchard sheds eggs by portions. This can be proved by measuring the different diameters of eggs taken from gonads of one and the same female. Figure 1 shows egg sizes of several female pilchard captured on 29th November 1960 in the point 20° 09' S and 12° 57' E.

Our observations show that in some pilchard shoals male gonads ripen before female gonads, e.g., in November/December, 1960 the maturity rate of females varied between 3-8 mainly, and males between 4-11%. However, some females, the gonads of which were at the stage just before the shedding of the bulk of eggs, had the maturity rate of 20-38% and thus only at the last moment were overtaking males by maturity rate. The maturity rate of the males did not exceed 18%. A store of ripe spermatozoes in the dorsal part is characteristic of the development of male gonads. A period of this "storage" is very prolonged and running gonads are spent gradually.

Concentrations of pilchard in the area investigated consisted mainly of specimens of 17-26 cm with a mode equal to 21 cm. (Length was measured in accordance with Smith classification:- snout to tip of middle caudal fin rays). In the northern regions of

the area the average size of pilchard was larger than, for example, those in the Walvis Bay region.

Pilchard were feeding mainly on phytoplankton. Diatoms were the main items of a food lump. As it was observed, pilchard with running gonads had a low index of stomach content. It therefore follows, that pilchard do not stop feeding during the spawning period, but that the intensity of feeding decreases. During the summer period vertical migrations of pilchard are inconsiderable. During daylight small shoals of pilchard can be observed in the upper and intermediate water layers. When twilight is coming shoals move to the surface and at night they are distributed in even smaller shoals in the upper 15 metre layer of water. At the places where there is no bloom, i.e., pilchard cannot find its favourite food - phytoplankton, vertical migrations of pilchard shoals become longer. At such places pilchard change from feeding on small forms of zooplankton and can go down to the bottom layers of water, if there are favourable hydrological conditions in these layers. Pilchard avoid inhabiting water with lower oxygen content, but there is a large amount of pilchard in the over-oxygenated water.

Off Frio Cape a glow of pilchard shoals is observed periodically at night.

In the summer period fatness of pilchard is not high:- fat content in the meat is not more than 6%, accumulation of fat on internal organs is at an average equal to 1 ball.

In summertime pilchard fishery is on a small scale. The main pilchard fisheries in south-west Africa and South African Republic take place from March to September, i.e., autumn and winter.

#### References

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