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Age and fecundity of *Decapterus rhonchus*  
 off NW-Africa

by

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The determination of the age of carangides involves considerable difficulties because, as already observed by various authors, neither otoliths nor scales appear to be particularly suitable.

Material and methods

The samples were taken from catches obtained off NW Africa ( $8^{\circ}$  -  $20^{\circ}$  N) during the months May - July, 1971, and July - August and October, 1972, and the investigations involved over 3,000 measurements.

Since the growth of the scales on different parts of the body is not even, one side of the bodies of five fish was divided into 14 regions and scales were taken from each of these regions for the purpose of comparison and investigation.

The area below the side behind the pectoral fin was found to be most suitable for this species too. The scales in this region had the clearest rings. In the majority of scales, the focus is not symmetrically arranged and the scales appear asymmetric.

Results

One ring after the focus could be clearly observed on almost all scales. We assume that these rings are associated with a change in the mode of life of the immature fish, for example the change to a pelagic life mode or the change from shallow coastal water to deeper water at a greater distance from the coast. This is corroborated by the absence of small fish in our samples which were taken exclusively at a considerable distance from the coast.

Intermediate rings make it much more difficult to determine the age although they are not to be found on all scales of an individual.

Double rings were found on a few scales; the double rings had almost merged on others. We interpreted the outer rings as annual rings and the inner rings as intermediate rings.

Intermediate rings and double rings were also found on juvenile fish and therefore cannot be correlated to spawning activities.

According to our investigations, the annual rings are formed towards the end of June in fish up to five years old. The animals had reached the maturity degree VIII (resorption and preparation for the new spawning cycle). This degree of maturity was not found until July/August in older fish, which then formed their annual rings, i.e. the annual rings are formed after spawning.

Scale growth of 2-3 units was observed during the period from June to August in fish up to five years old, whereas scale growth of only about 1 unit was observed in older fish exceeding five years of age.

The following table shows age-groups and the connected length-distribution.

Table 1

Age-group	Length-group (measured "nearest cm")
2	21 - 25 cm (20,5-25,4 cm)
3	22 - 30 cm
4	25 - 36 cm
5	26 - 37 cm
6	30 - 40 cm
7	31 - 41 cm
8	33 - 42 cm
9	34 - 44 cm
10	39 - 44 cm

The growth curve portrays the measured values after back calculation. It provides an initial impression of the possible age-length relationship both sexes (figure 1).

The majority of the catches investigated consisted of fish from the year classes V, VI and VII. Fish from the year classes I - III were seldom caught. We assume, like OVERKO (1971), that these younger fish remain in the shallower coastal waters. Up to 50 % of the animals consisted of five or six-year-old animals. The youngest and oldest fish in the samples belonged to the year classes 1 and 15 respectively, only one specimen of each year class being caught.

The determination of fecundity on portion-spawners is very difficult because the decision regarding which oocytes are being prepared for each portion is complicated and can be subjective. A few authors regarded the presence of fat vacuoles or of fat vacuoles and yolk vesicles as a criterion for the oocytes which are developing to maturity during the current spawning period.

Other authors have determined the number of eggs during each spawning process and the number of spawn portions.

OVERKO (1969) was the first to publish data regarding the fecundity of *Decapterus rhonchus*, unfortunately without mentioning the methods used.

#### Material and methods

The ovaries of 63 fish caught in Juli, 1972, and 9 fish caught in May, 1971, were investigated. Several samples (0.03 - 0.1 g) were taken from three points of the fixed ovaries, counted and later related to the total weight of the ovaries. Fertile eggs could be counted at a magnification of about 15 and could be easily distinguished from infertile eggs.

#### Results

Some of the fish taken in July, 1972, had already spawned once, whereas the ovaries taken in May, 1971, were shortly before the first spawning of the year. Since the material used by OVERKO (June, 1963) seems also taken from animals spawning for the first time in the year, we were able to compare his results with ours obtained for May, 1971. We counted all oocytes exceeding 0.2 mm in size (oocyte stadium III - IV).

Time	Number of eggs x10 <sup>3</sup>		Mean x 10 <sup>3</sup>	Length of fish
	max.	min.		
May 1971	436	921	658	30 - 39 cm
July 1971	182	393	288	29 - 44 cm
June 1963	479	987	687	29 - 35 cm

According to our investigations, two or three egg portions per spawning period must be deposited, the first portion containing the largest number of eggs. The numbers of eggs decrease considerably in the subsequent portions, because our values for July lie considerably below those stated for the first spawning.

#### Literature

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Fig.1: Growth curve of *D. rhonchus* separated by sexes

