Blue Whiting Assessment Workin Group
12 - 18 September 1990
Working Document

HISTOLOGICAL STUDY THE GONADS OF THE BLUE WHITING SOUTHERN STOCK

Nélida Pérez and Manuel Meixide

Centro Oceanografico de Vigo Aptdo. 1552. 36280 Vigo. Spain

The collections were made in the waters of Galicia and the northwest Cantabrian sea (area VIIIc of ICES, Fig. 1) on board commercial trawlers, between February and March 1989 which we supous was the spawning season.

A total of 9 hauls was made with a trawl net, between 02 00 and 18 00 (GMT), at depth less than 200 m.

A number of 229 individuals were sampled ranging in size between 16 and 28 cm. For the histological study, 97 individuals randomly selected from the samples were used. The ovaries which were extracted immediately after each haul were preserved following the method of Hunter, 1984 (Table 1).

RESULTS AN DISCUSSION

Of the 97 individuals which were studied histologically, it was found that 11 were immature, i.e. the oocytes were without yolk, about 11% of the sample. In addition, 4 ovaries were already in postspawning condition, according to the terminology of Hunter and Macewicz (1984), which is only 4% of the samples. Of the individuals sampled, 85% had oocytes with yolk (Table 1). These results show that the sampling coincided with the spawning period.

The histological study of mature individuals, showed one feature which is very clear in Table 1, is the higher frequency of ovaries in spawning condition, in February, and first period of March, than the last sampling of March. It was found also that all ovaries with postovulatory follicles, in whatever stage of regression, contained oocytes with yolk, and in some cases was found ovaries whit oocytes hydrated and yolk oocytes and old postovulatory. Although these results are very preliminary, they reveal a period very short between two partial spawnings for the blue whiting.

The percentage of ovaries with follicles in different stages of regression was observed in subsequent months, and reached a maximum in a first period of March when 33% of the ovaries contained follicles.

In this study a large proportion of ovaries were found with oocites in alpha atresia, the earliest stage of atresia (Hunter and Macewicz, 1984). Of the total number of ovaries with yolk oocytes in this period, 27% had alpha atresia, but if we take into account the percentage of ovaries with alpha atresia during different months, the percentage varies; 17% in February incrising to 40% in a second period of March (Table 2). This variation in the percentage in which atresia appears seems to show that the incidence of atresia varies as the spawning season advances. The higher incidence of atresia is found at lower value of hydrated oocytes incidence, only 9% in relation with values about 40% in other periods.

Of all the ovaries seen, 7 were found with hydrated atresic oocytes, which represents 7% of the total. This finding is of great importance for the calculation of the batch fecundity of this species.

REFERENCES

Hunter, J.R. 1985.
Preservation of Northern Anchovy in Formaldehyde Solution.
NOAA Technical Report NMFS 36.

Hunter, J.R. and B. Macewicz 1985.
Measurement of Spawning Frequency in Multiple Spawning Fishes.
NOAA Technical Report NMFS 36.

Collection number	Date	Time of day (GMT)	Total length Mean	Total length Range	Number of fish samples	Number of hist. samples
1	14-2-89	10 00	20	17-26	49	15
2	14-2-89	14 00	20	17-23	38	21
3	20-3-89	11 00	21	17-23	30	12
4	20-3-89	15 00	21	-	11	1
5	20-3-89	20 00	20	18-23	14	5
6	31-3-89	06 00	19	17-22	20	9
7	31-3-89	10 00	20	17-28	24	16
8	31-3-89	02 00	21	17-25	25	11
9	31-3-89	18 00	18	16-22	18	7
Total					229	97

Table 1. Characteristics of 9 collections of female blue whiting from the Iberian waters in 1989.

State	14-2-89	20-3-89	31-3-89
0	10	3	26
1	17	9	4
2	6	6	5
I	3	-	8
A	3	3	17

Table 2. Number of different gonad states by month.
0= no postovulatory follicles
1= hydrated+postovulatory follicles
2= postovulatory follicles
I= inmature oocytes, A= alpha atresia

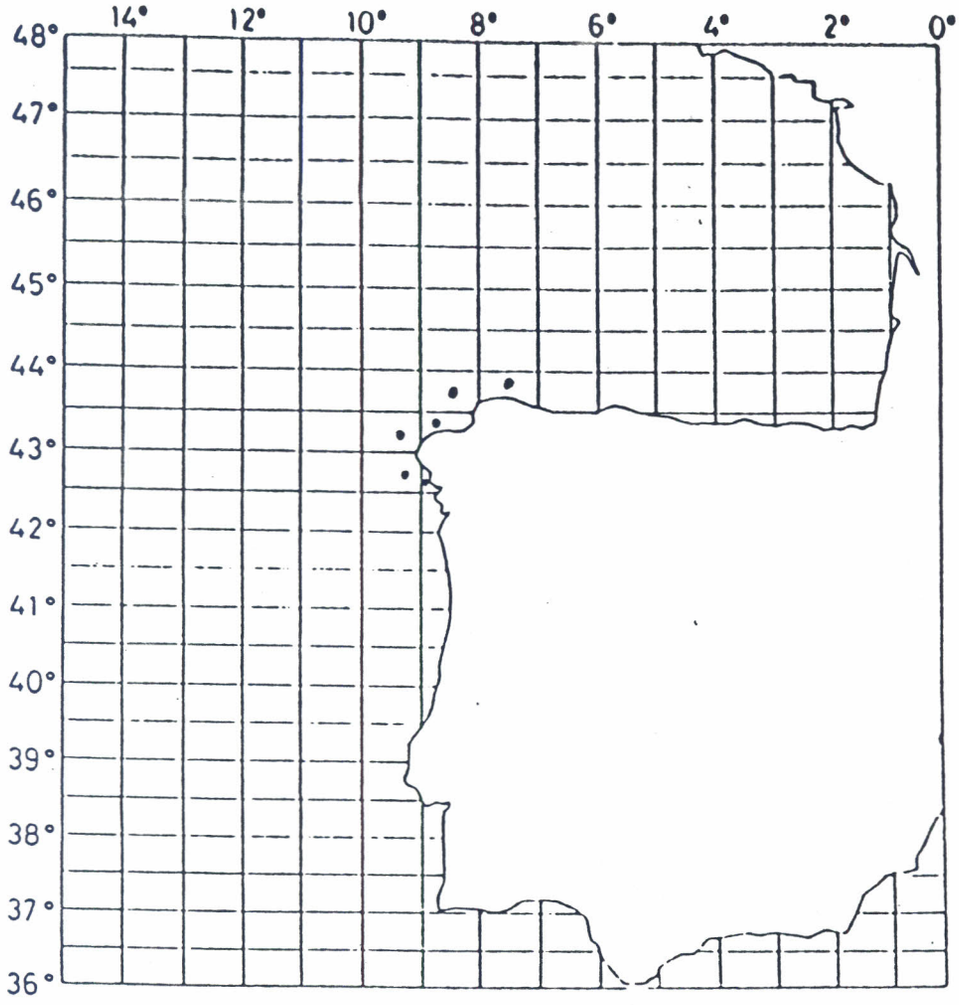
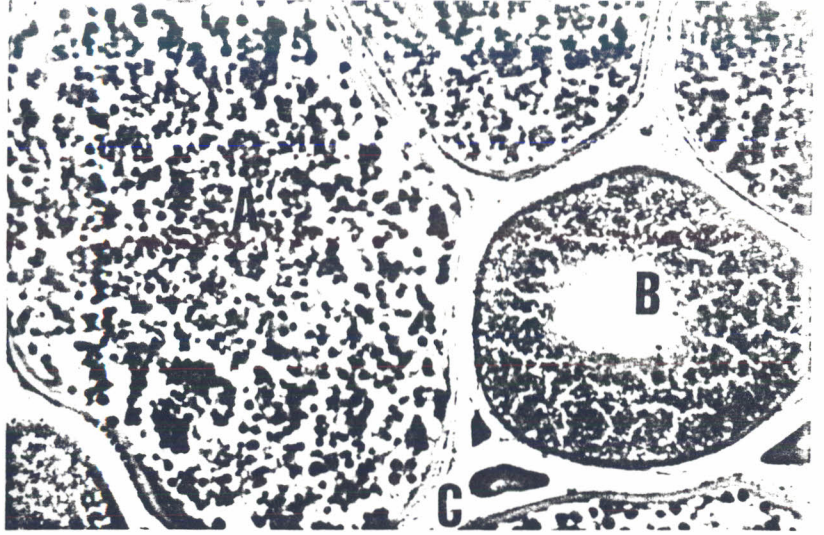
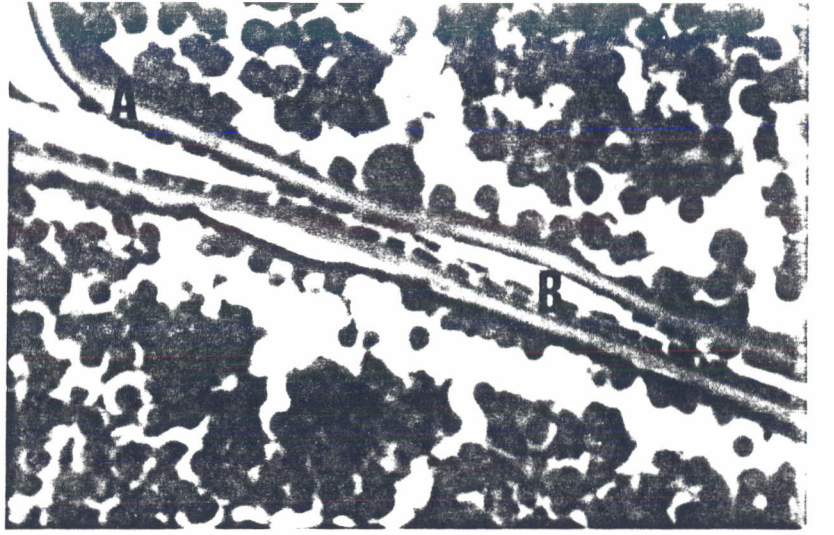


Fig. 1- The stations sampled in 1989.

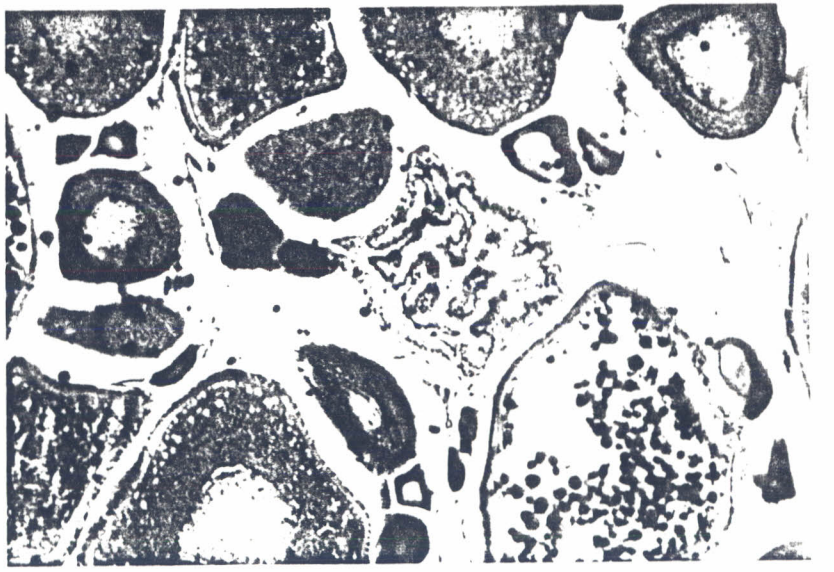


1.- A: Yolk oocyte.
B: Unyolk oocyte.
C: Inmature.



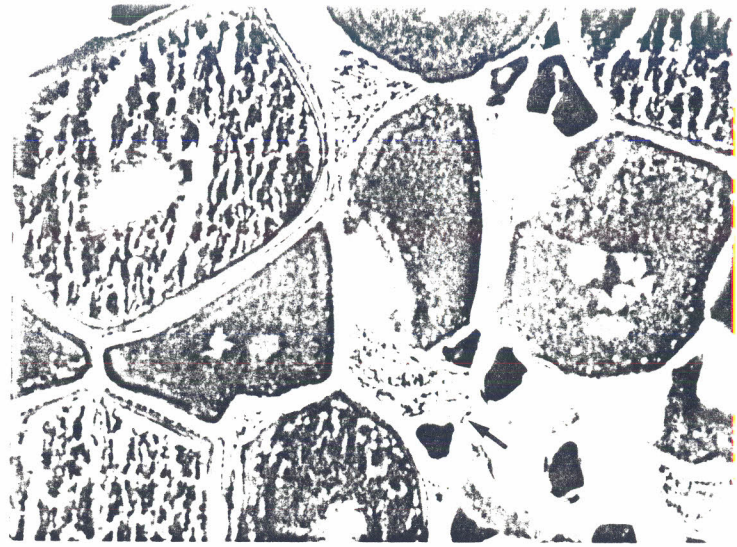
2.- A: Granulosa membrane.
B: Radiata membrane.

3.- Hydrated oocyte.

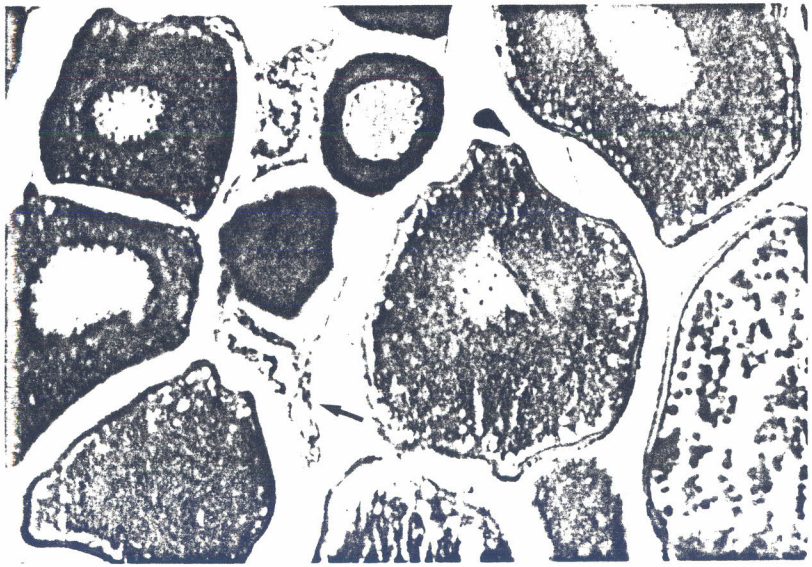


4.- New postovulatory follicles.
(<6 hours)

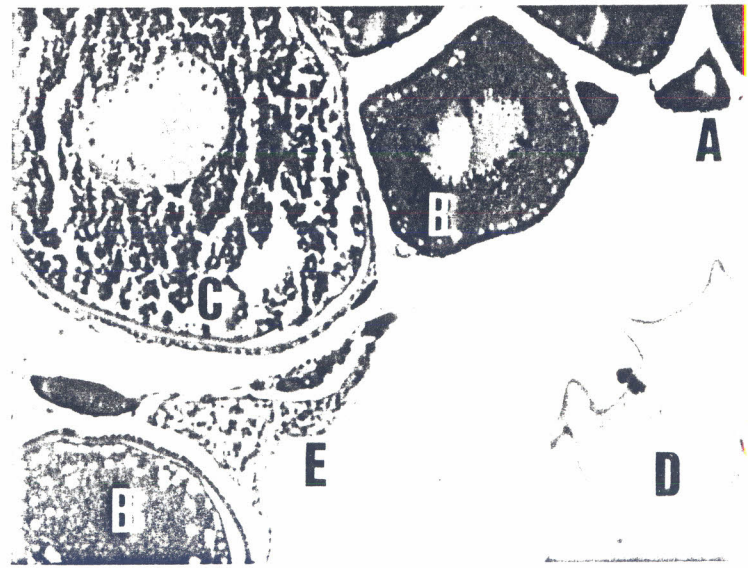
5.- Less new potovulatory follicle.
(between 6 and 12 hours)



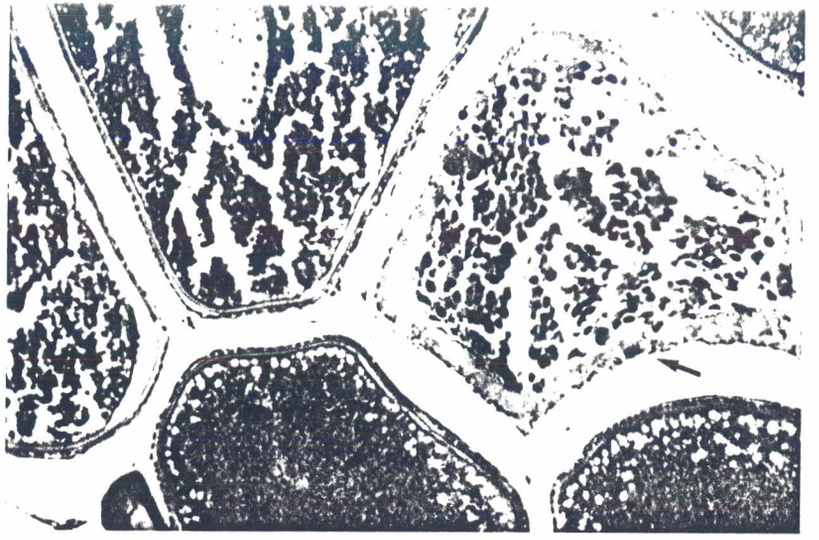
6.- Old postovulatory follicl



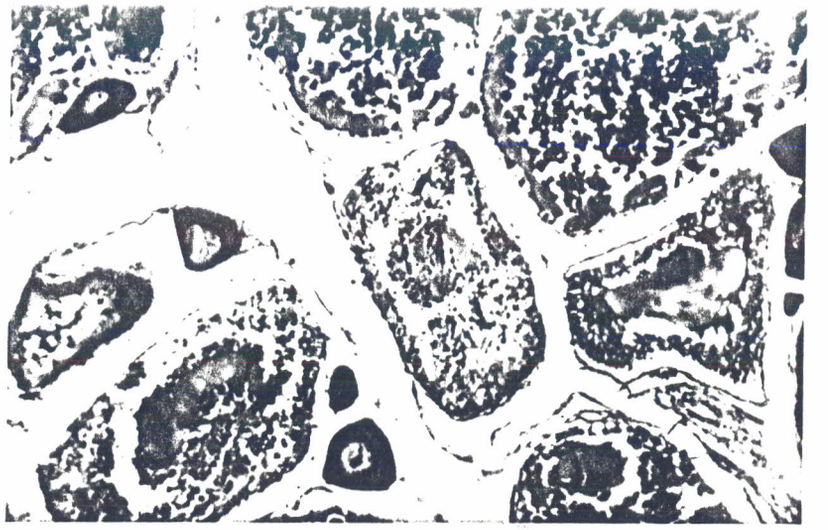
7.- Older postovulatory follicle.



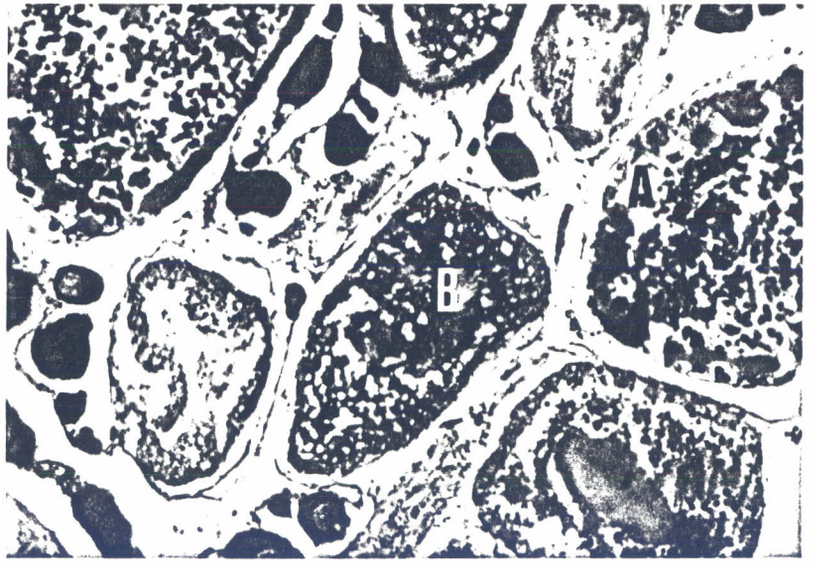
8.- A: Inmature.
B: Unyolk oocyte.
C: Yolk oocyte.
D: Hydrated oocyte.
E: Postovulatory follicle.



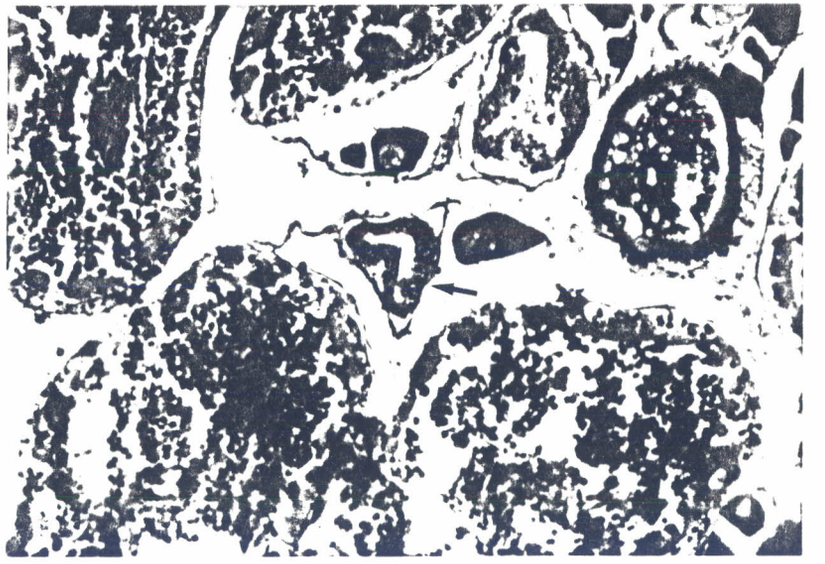
9.- Initial α-atresia in yolk oocyte.



10.- Advanced α-atresia.



11.- A: Very old α-atresia in yolk oocyte.
B: Initial α-atresia in partial yolk oocyte.



12.- β-atresia.