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The mean length at age of dab in Århus Bay in relation to oxygen conditions 1953-1994.

by

Ole Bagge, Erik Steffensen, Else Nielsen and Christian Jensen.

Danish Institute for Fisheries and Marine Research.
Charlottenlund Castle.
DK-2920 Charlottenlund, Denmark

and

Miljøkontoret, Århus Amtskommune,
Lyseng Allé 1, 8270 Højbjerg, Denmark.

Abstract.

Trawl surveys with standard trawl have been carried out in Århus Bay in the northern part of Subdivision in periods 1953-1963, 1982-1985 and 1991-1994. The length at age of dab, males and females together, in the first and the last period have been compared and found significantly different. (Bagge et al. 1994)

The survey has been carried out also in 1994 and in the mean time additional otoliths from the early period have been found so that this period now include 1954, 1957, 1960 and 1962. This improvement of the data base has made it possible to compare the mean length at age of males and females separately within periods and between periods, which however, has not changed the conclusions.

1. Introduction.

In the northern part of Subdivision 22, Århus Bay, trawl surveys with standard trawl have been carried out periodically from 1953-1993. The abundance and age distributions of dab, plaice during the period and the mean length at age for males and females pooled in the beginning and the end of this period have been compared. A significant decrease has been found and discussed in relation to changed oxygen conditions. As the oxygen conditions in 1994 have not improved only the mean length at age for males and females separated will be dealt with. (Bagge et al., 1994).

2. Material and Method.

Trawl surveys with standard trawl have been carried out in autumn (October-November) in Århus Bay 1953-1963, 1982-1985 and 1991-1994.

The standard trawl is a Sønderborg bottom trawl with ground rope 50 feet and head rop 70 feet. The opening of the trawl is 250 meshes of mesh size (50 mm knot). Sweeps 30 fathoms and otter boards 26.5 x 46 inches. The trawling velocity is 3 knots and the duration of hauls 30 minutes.

The catch has been dealt with according to standard methods: sorted to species and sex, measured, weighted and samples of otoliths taken from flatfish and cod.

3. Results.

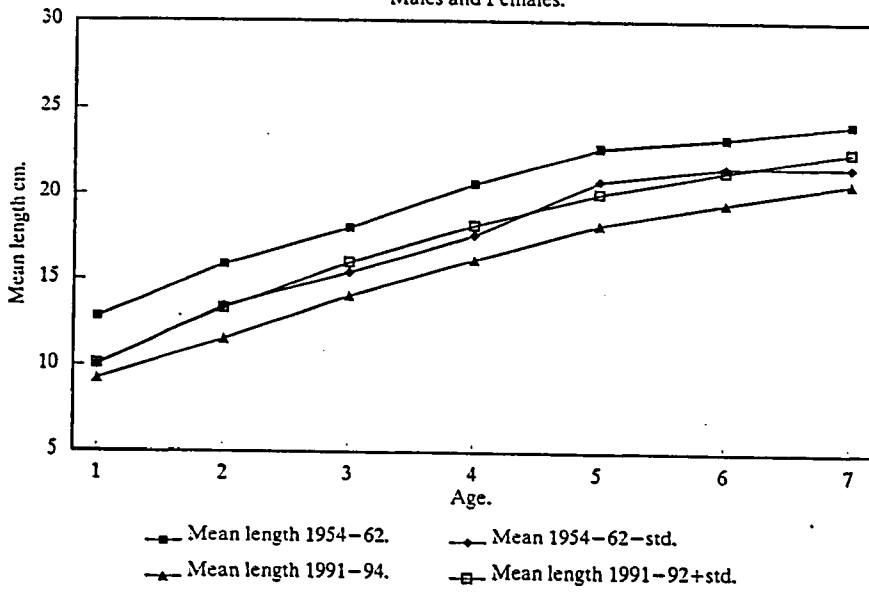
3.1. Mean length at age.

Data on mean length of dab in Århus Bay, males and females separately 1953, 1960, 1962, 1963, 1982, 1983 and 1985 have been reported by Bagge and Nielsen, 1986. The age readings of those have been done onboard the research ship just after the catch by different age-readers and the otoliths have only occasionally been stored, except in 1954, 1960, 1991, 1992 and 1993. These otoliths have been re-read by the same person (E. Steffensen) in order to make the readings comparable. That material 1954 and 1960 and 1991-93 has been compared and discussed in Bagge et al (1984) with the mean length of age for males and females pooled in order to enlarge the number of observations per age group. Since then otoliths from 1957 and 1962 from Århus Bay have been found and in addition a trawl survey has been carried out in the beginning of november 1994. That has increased the number of otoliths and made it possible to compare mean length at age for males and females separately between 1954, 1957, 1960, 1962 and 1991-1994. That is important, because different mean length at age for males and females and different number per age group may introduce bias in the pooled version. The results are given in fig. 1 and 2. In figure 2 is shown the mean length at age for males and females within the 2 periods. From age 2 the mean length at age for females is higher than for male. The separation of males and females and the inclusion of 1957, 1962 and 1994 has not changed the different mean length at age in the two periods (Fig. 2). The results of the mean length at age (males and females pooled) from Bagge et al. 1994 are given in Figure 3.

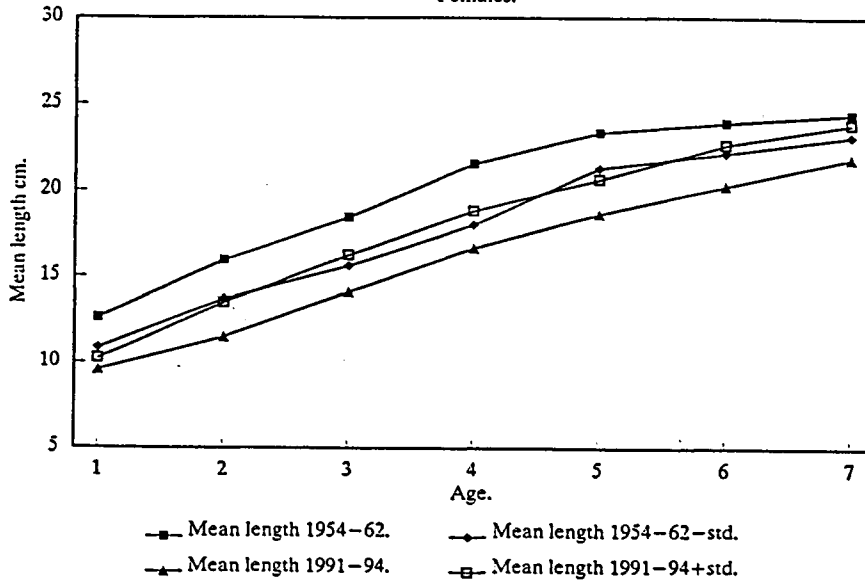
4. References:

- Bagge, O., E. Steffensen, E. Nielsen and C. Jensen, 1994.
Growth and abundance of plaice in Århus Bay in relation to oxygen conditions 1959-1993. ICES, C.M. 1994/J:16.

Mean length at age and std. Males and Females.



Mean length at age and std. Females.



Mean length at age and std. Males.

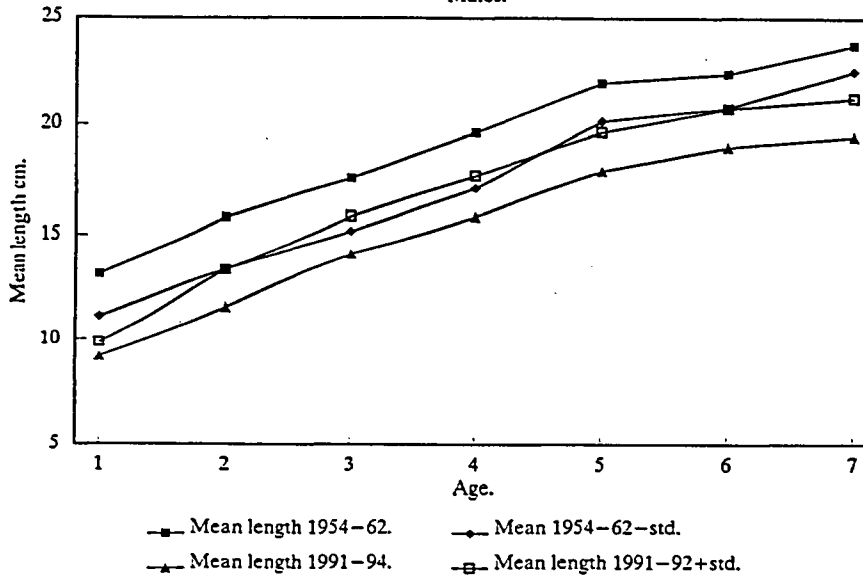
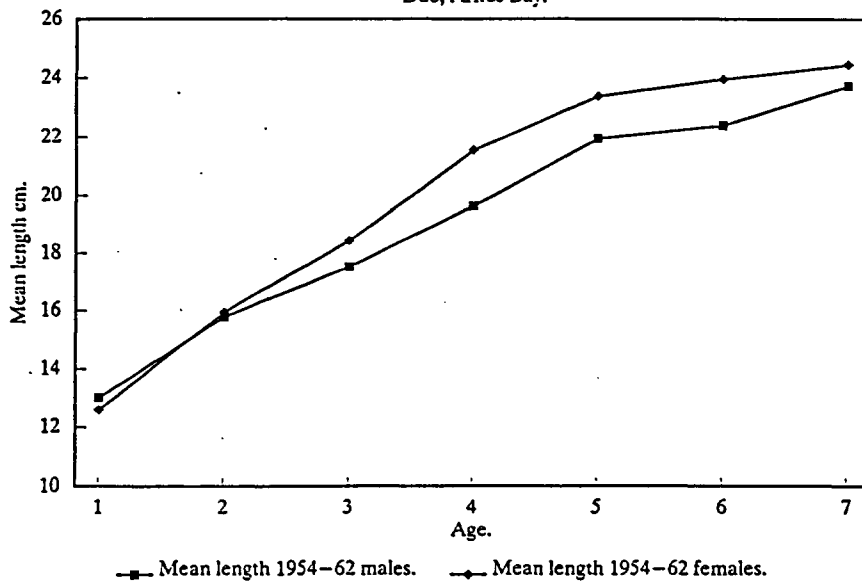


Fig. 1.

Mean length at age.

Dab, Århus Bay.



Mean length at age.

Dab, Århus Bay.

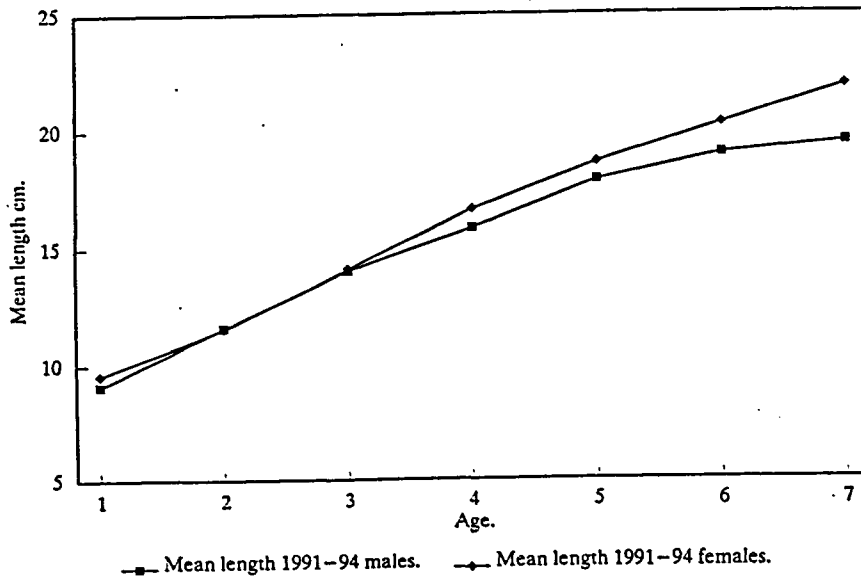


Fig. 2.

Mean length at age and std.

Females.

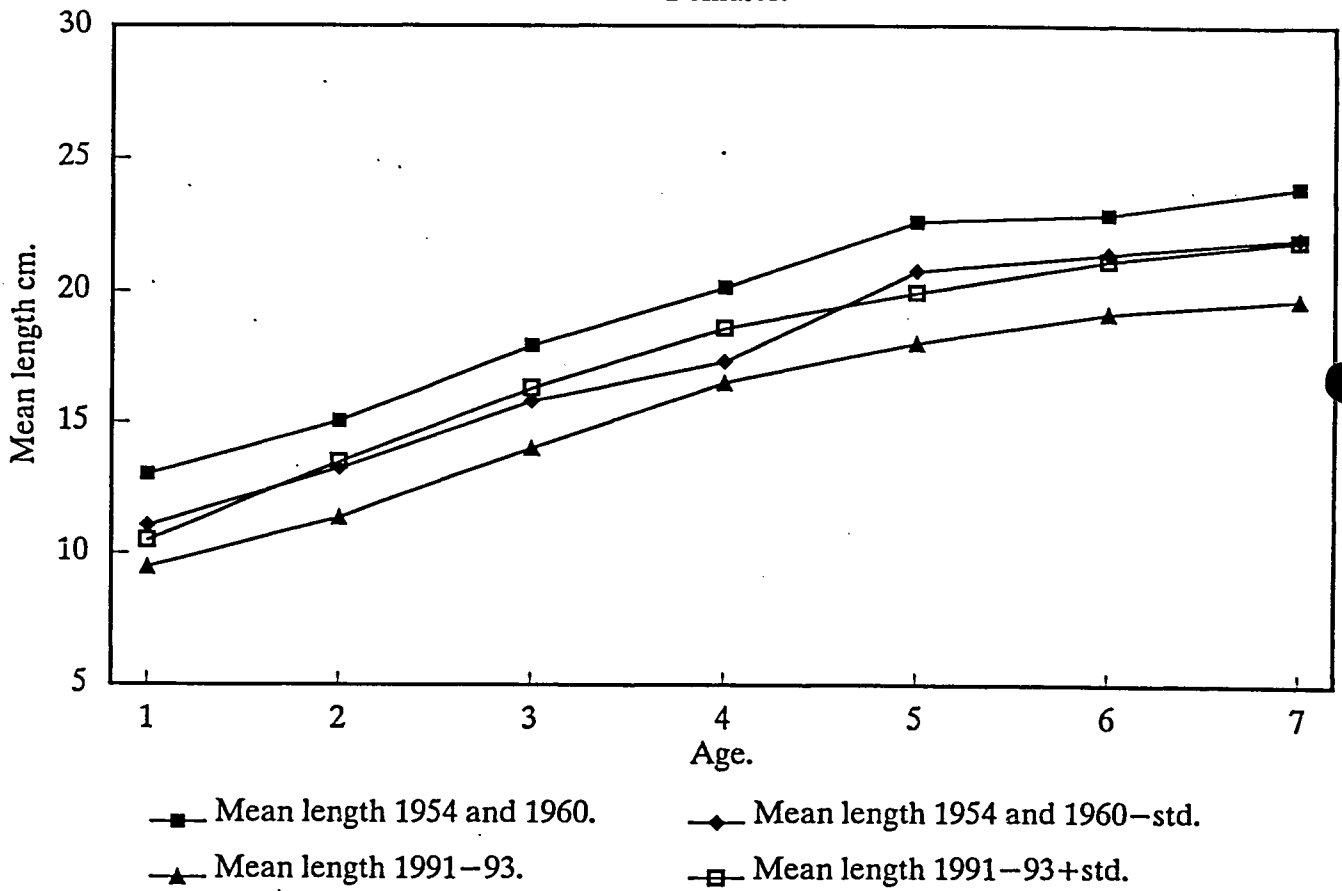


Figure 3. The results of mean length at age from Bagge et al., 1994.

Mean length at Age
Århus Bugt

Table 1 1954, 1957, 1960 and 1962 November)

Males

Age	1	2	3	4	5	6	7	8
Number	96	182	176	93	62	25	15	
Mean length cm	13.02	15.48	17.52	19.65	21.95	22.40	23.73	
Sd.	1.86	2.52	2.33	2.57	1.78	1.59	1.22	

Males

1991-1994

Number	39	130	196	214	232	163	62	26
Mean length (cm)	9.10	11.56	14.02	15.85	14.89	18.99	19.48	19.12
Sd	0.77	1.66	1.82	1.79	1.77	1.76	1.95	1.88

Females

1954, 1957, 1960 and 1962

Number	74	174	169	89	65	28	13	
Mean length (cm)	12.61	15.95	18.43	21.56	23.38	23.96	24.46	
Sd.	1.72.	2.28	2.81	3.55	2.07	1.76	1.79	

Females

1991-94

Number	25	108	107	140	110	75	56	18
Mean length (cm)	9.56	11.51	14.10	16.66	18.64	20.28	21.90	23.17
Sd.	0.69	1.94	2.16	2.15	2.03	2.30	2.01	2.35

Males and females 1954, 1957, 1960 and 1962

Number	170	356	345	182	127	53	28	
Mean length (cm)	12.84	15.87	17.96	20.58	22.69	23.23	24.07	
Sd.	2.83	2.40	2.56	3.05	1.95	1.68	1.25	

Males and females 1991-1994

Number	64	238	303	354	242	238	118	44
Mean length (cm)	9.26	11.54	14.05	16.17	18.13	19.40	20.64	20.44
Sd	0.83	1.79	1.94	1.93	1.85	1.93	1.87	2.08