

BIOLOGICAL BOARD OF CANADA

MANUSCRIPT REPORTS OF THE BIOLOGICAL STATIONS

No. 82F

Title

Sex Reversal in *Ostrea virginica*

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1935

SEX REVERSAL IN OSTREA VIRGINICA

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Report for 1935.

Of those determined in 1932 there were sixty-six alive in 1935 but in nine of these it was impossible to determine the sex for at least one year. The changes in sex of the remainder is recorded in the following table.

Table II. Change of sex in oyster marked in 1932.

<u>Number</u>	<u>Sex from year to year</u>
23	Male every year.
3	Female every year.
2	Male to male to male to female.
2	Male to female to male to male.
3	Male to female to female to male.
3	Male to female to female to female.
7	Female to male to male to female.
5	Female to male to male to male.
1	Female to male to female to female.
1	Female to female to male to female.
3	Female to female to male to male.
4	Female to female to female to male.

It should be noted that most of the oysters in which the sex was determined in 1931 and 1932 were two or three year old oysters when first recorded.

Consideration of the last two tables shows that there is a considerable variation from oysters which remain of one sex throughout the period to oysters which change sex almost every year. Even if the behaviour of these captive oysters is not quite the same as it would be on the natural beds this certainly suggests that the sex is determined afresh in each oyster each year. Previous work has shown a general tendency in nature from male to female as the oysters get older but this may be influenced individually by food, temperature or some other factor.

Effect of crowding on sex of oysters.

In 1933 there indications that crowding might affect the sex of the oysters. To test this a number of oysters of known

known sex were suspended individually on wires while control oysters were crowded together in baskets. These oysters were kept over winter and until the next breeding season. Unfortunately a number of the floats supporting the wires became water logged and sank so that the experiments were almost worthless. They were repeated over the winter of 1934-35, and, of those kept in baskets, some were crowded with other oysters and some with mussels as well. A few were lost and a few died but the mortality was very small. The results of these experiments are summarized in the following tables.

Table III. Effect of crowding on oysters in 1934.

	<u>Number of oysters</u>	<u>% female in 1935</u>	<u>% male in 1935</u>
Oysters suspended individually	37	35	65
Oysters in baskets, no mussels	61	36	64
Oysters in baskets with mussels	16	69	31

Table IV. Effect of crowding on oyster in 1934.

	<u>Number of oysters</u>	<u>% female in 1935</u>	<u>% male in 1935.</u>
Oysters suspended individually	98	20	80
Oysters in baskets, no mussels	80	19	79
Oysters in baskets with mussels	35	26	74

Consideration of these tables shows that there was very little difference between the oysters that were kept individually and those that were crowded together in baskets without mussels. But the baskets that contained mussels had a higher proportion of females in each case. It is hard to account for this result. Possibly a cluster of molluscs in a basket better strains out the food materials from the water than can a single oyster so that those in baskets have more food available but oysters are more effective competitors to each other for this food than are mussels to oysters. In this case the oysters in baskets with mussels might be the best fed.

The experiments are being repeated over the season 1935-36 except that quahaugs are being used in place of mussels. Since a quahaug has no byssus they cannot form the tight clusters formed by mussels and the experiments should be a better check on those just described. In addition a number of unbored oysters are being similarly placed individually and in baskets both with and without quahaugs and the sex ratios of these will be compared in 1936. It is hoped that this will show whether boring the oysters really harms them so that results cannot be regarded as normal.

Discussion

The records of the sex of marked oysters have now been kept for four and five years and a considerable variation is shown in the number of times that the sex has been changed during this time. Some of these oysters never changed sex during the period and it is possible that they are not capable of doing so and have a

different genetic constitution from those that change at intervals. The oysters have all been kept until 1936 and the matter will be further discussed then.

So far there is little evidence in support of the idea that crowding of oysters tends to make them function as males for that breeding season. The experiments testing this are being continued.