

## BODY FLUID LOSSES OF NORTHERN AND SOUTHERN OYSTERS<sup>1/</sup>

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### PREFATORY ABSTRACT

THE PRESENT STUDY SHOWED THAT AS MUCH AS 69.5 PERCENT OF THE WEIGHT OF THE SOUTHERN OYSTER MAY BE LOST AS FLUID IN THE FIRST 60 MINUTES AFTER SHUCKING. TO ACQUIRE BASIC INFORMATION NEEDED IN THE CONTROL OF SUCH LOSSES, THE AUTHORS INVESTIGATED SEASONAL AND GEOGRAPHIC DIFFERENCES IN THE AMOUNT OF FLUID LOST FROM THE OYSTER AND ALSO STUDIED RELATIONSHIPS BETWEEN THE CONCENTRATIONS OF PROTEIN, SALT, AND CELLS IN THE BODY FLUIDS.

### BACKGROUND

The loss of body fluid is a problem of great economic concern to the oyster industry. Loss of fluid affects the appearance and the palatability of the oyster and causes serious difficulties related to the fill of container.

Investigation of the physiology of body fluid in the oyster *Crassostrea virginica*, which is the commercial species found along the East and Gulf coasts, has been in

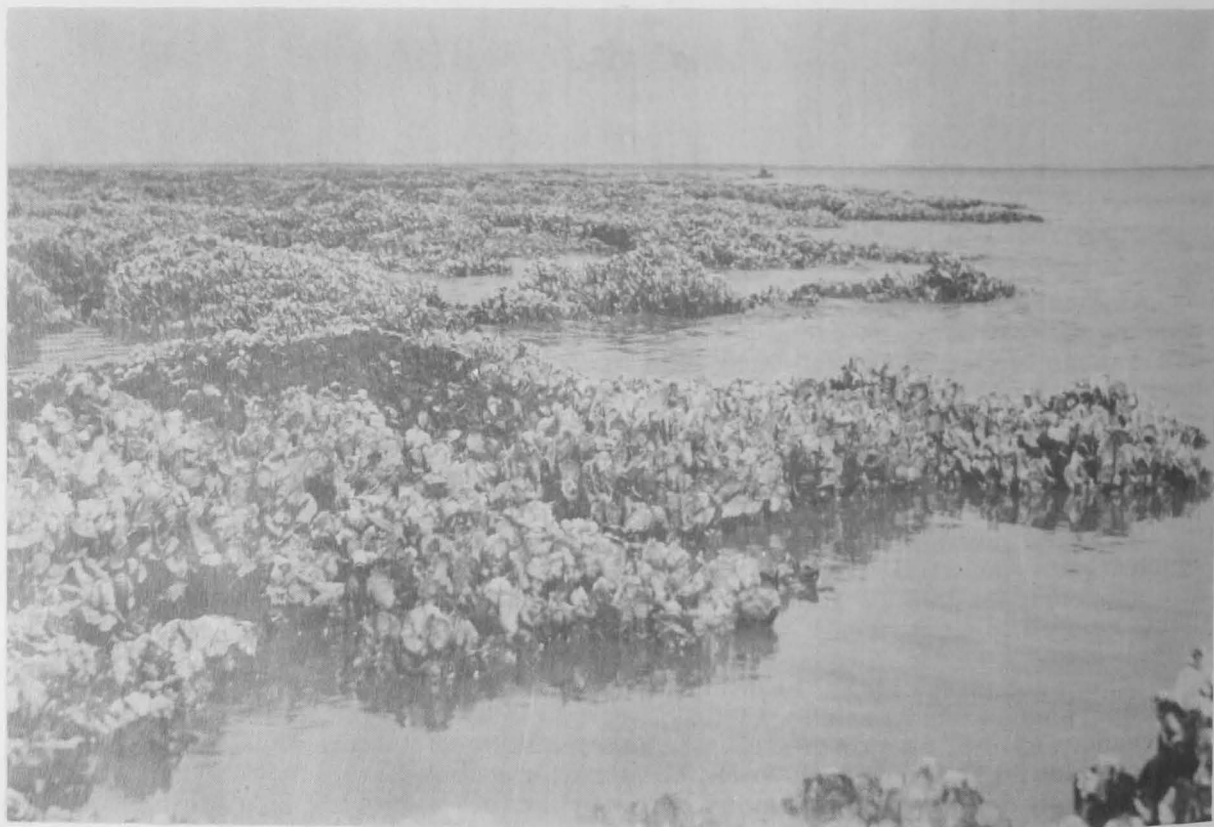


FIG. 1 - EASTERN OYSTERS EXPOSED AT LOW TIDE

progress for more than a year. Among the several phases that have been considered are losses due to injury and to heat shock. The present report summarizes re-

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cent experiments on the extent of loss of body fluid by Northern and by Southern oysters that were shucked in the spring and in the fall of 1956.

The idea that Southern oysters lose more body fluids at all times of the year than do Northern oysters has been accepted for a long time. No quantitative comparisons, however, have been made. The importance of the problem is that if Southern oysters "bleed" more and consequently shrink in size more than do their Northern counterparts, then for a given volume of shucked oysters, more Southern than Northern shell oysters of the same size would be required.

#### EXPERIMENTAL

Oysters were obtained from three sources: Louisiana (the vast majority were grown in Barataria Bay), Chesapeake Bay, and Delaware Bay, during the months of March and April, and of October and November in 1956. In 20 of the 22 experiments that were conducted, the oysters were placed in sea-water aquaria to allow them to acclimatize to the sea water for at least 24 hours prior to shucking. In the other two instances, oysters were shucked on the day of arrival at the laboratory.

Each experiment was performed as follows: Bodies of 19 oysters were removed from their shells and placed in individual containers. Initial body weight, including the fluid escaping through ruptures in the mantle, was determined. The bodies, without the fluid that escaped, then were weighed at intervals. Weights were expressed as percentages of the original body weight.

#### RESULTS AND DISCUSSION

Data for oysters from each locality, averaged according to season, are present in table 1. In the spring, practically no difference was found between Northern and

Table 1 - Relation Between Geographical Source, Season, and Body Weight of Oysters 60 Minutes after Shucking

Geographic Source	Body Weight 60 Minutes After Shucking	
	In the Spring	In the Fall
	... (Percentage of Original Weight) . .	
Delaware Bay . . . . .	54.4	57.1
Chesapeake Bay . . . . .	51.3	40.8
Louisiana . . . . .	53.5	30.5

Southern oysters. In the fall, however, striking differences appeared. Louisiana oysters lost considerably more weight than did Chesapeake oysters, and Chesapeake oysters, in turn, lost considerably more weight than did the Delaware oysters. Thus, in the fall, the farther north the habitat of the oyster in the areas studied, the smaller was the loss of body fluid when shucked and drained.

The composition of body fluid was found not to be uniform in all parts of the oyster. The fluid does not simply flow from one part of the body to another. Differences in concentration of protein, salt, and number of cells in fractions of the body fluid taken from different portions of the body support this contention. The amount of protein in the fluid was correlated positively with the salt content. Oysters having fluids with the greatest concentration of protein tended to have the highest concentration of salt. The most cells, for example, were found in the blood taken directly from the heart (1,715 per cubic milliliter), and the fewest were found in the pericardial fluid (348 per cubic milliliter). Cells comprised less than 0.1 percent of the volume of body fluid.

## SUMMARY AND CONCLUSIONS

Loss of body fluid from the oyster is of great economic concern to the oyster industry. The present study showed, for example, that as much as 69.5 percent of the weight of the oyster Crassostrea virginica may be lost as fluid in the first 60 minutes after shucking.

Study of physiology of body fluid in this oyster, which is the commercial species found along the East and Gulf coasts, showed that:

1. In the spring, practically no difference was found between Northern (Delaware Bay and Chesapeake Bay) and Southern oysters (primarily from Barataria Bay, La.) in the amount of body fluid lost.
2. In the fall, Louisiana oysters lost considerably more weight than did Chesapeake oysters, and the Chesapeake oysters lost considerably more weight than did the Delaware oysters.
3. Oysters with the greatest concentration of protein in the fluid usually had the highest concentration of salt.
4. In a comparison of the various portions of the body of the oyster, the most cells were found in blood taken from the heart (1,715 per cubic milliliter); and the least, in the pericardial fluid (348 per cubic milliliter).
5. Cells comprised less than 0.1 percent of the volume of body fluid.

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## IRISH MOSS

Experiments conducted in Canada on the continuous co-current extraction of Irish moss have shown that 80 percent of the total soluble solids in Irish moss can be extracted with a contact time of 8 minutes and a temperature of 194° F. (90° C.). The percentage extraction increased with increasing temperature, but temperature of extraction did not influence the quality of the product. The continuous co-current method of extraction is regarded as satisfactory.

--Eighth Annual Report of the Nova Scotia Research Foundation, 1955.