

OYSTER TRANSPLANTING IN WINTER AND EARLY SPRING

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In cultivating oysters it is often necessary to transplant them from one bed to another. In New England and New York waters, where cultivation has attained a very high level, oysters may be transplanted several times before they are ready to be marketed.

A new generation of oysters, which is commonly called "set," appears in the summertime on shells planted in comparatively shallow water near the shore. To



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protect the set from winter storms, which often cover the setting beds with a heavy layer of sand or mud, the young oysters are transplanted to deeper water, or to areas protected from strong wave action.

If the transplanted oysters grow well and the mortality among them is comparatively low, it may be again necessary to "thin" the oyster bed by moving some of its population to other ground. Such a measure is usually employed when it is desirable to decrease the competition for space and food among crowded oysters.

During the later period of their life, oysters are usually transplanted again. In those cases the practice of transplanting is based on the experience of the oyster growers who have noticed that in some areas the oysters grew very rapidly and their meats remained lean, while in other sections the mollusks quickly became "fat." As a result, certain beds are designated as growing areas, while others are considered fattening grounds.

In transplanting, the oysters are taken from the bottom with large dredges and piled on the deck of the boat. After the boat is loaded, the oysters are shipped to a new location where they are again planted. Sometimes the oysters may be out of water for several days before they reach their new destination.

Many precautions are necessary to avoid high mortality or serious shell injury to the transplanted oysters. The oystermen know this and usually exercise considerable care during the operations. Until recently, however, the effects of certain conditions, under which transplanting is sometimes conducted, remained undetermined. To find the answer to some of the questions which interested the oyster growers of the North Atlantic district, we undertook several experiments at our laboratory at Milford, Connecticut.

The age of the oysters employed in our experiments ranged from approximately 6 months to 5 years. We found, however, that the conclusions reached at the end of our studies were equally applicable to all age-groups.

One series of observations, conducted during the past winter, has demonstrated that extreme caution should be exercised in handling and transplanting oysters

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when the air temperature is below freezing. Failure to employ certain precautions may result in a mass mortality of the mollusks.

The results of the experiments may be briefly summarized as follows: The majority of oysters, if frozen but left undisturbed until they thaw out, will survive. However, if frozen oysters are shaken, shovelled, or subjected to any other type of rough handling, heavy mortality will occur among them. In some of our experiments, 100 percent of the oysters which were first frozen and then shaken in bushel baskets, died, while almost all the oysters in the other baskets which were frozen but not shaken, lived after thawing and were still in an apparently healthy condition 10 weeks after the end of the experiment. The mortality among the shaken oysters was probably due to the damage caused by the rearrangement of ice crystals within the body cells of the mollusks.

The shells of the frozen oysters were extremely brittle. Therefore, even if a few frozen oysters may survive the effects of handling, their shells may be so seriously damaged that it would later result in the death of the mollusks.

Because of the comparatively high salt content of the blood of oysters, they do not freeze until the air temperature is several degrees below the freezing point of fresh water. For example, the meats of the Long Island Sound oysters remained unfrozen when exposed for several hours to a temperature of 28° F. However, below this temperature oysters may freeze quickly, especially if they come from relatively fresh water. Naturally, because of the difference in volume, a small oyster will freeze quicker than a large one.

On the basis of our observations, we offer the following suggestions to the oyster growers of New England and New York who transplant oysters in the winter-time:

1. Do not let oysters freeze while they are on deck. The vibrations caused by the boat engine or the shocks experienced at the docking of the boat may be sufficiently strong to cause injury to the frozen oysters.
2. If, because of an unforeseen change in the weather, the oysters freeze on deck while in transit, they should not be handled until they thaw out. Sometimes it may be practical to pump sea water over the pile of frozen oysters to accelerate thawing. The use of a strong stream of water should be avoided.
3. Planters should not buy seed oysters which may have been handled in a frozen condition. Oysters that were previously frozen and killed by handling will be found slightly gaping, provided that at the time of examination the air temperature is high enough to permit the oysters to thaw out.

Studies of various phases of the growth of oysters, which we conducted at Milford Laboratory, gave interesting results, some of which may guide us in confining the transplanting of oysters to the period when such an operation would be most advantageous. While working with a large number of individually-marked oysters, we found that in Long Island Sound they do not grow from the onset of cold weather until the end of March. In April, usually during its latter part, the growth is resumed. In some oysters it may be quite rapid, but, in general, the average increase in length during April is not large. In May, however, the growth of oyster shells is very rapid. This newly added shell-growth is comparatively soft but, nevertheless, extremely brittle. The dredging or handling of oysters during that period would, undoubtedly, result in the breaking off of all or large portions of the new shell. Obviously, this would be definitely undesirable.

The results of our observations suggest, therefore, that if the oysters must be moved in the spring, the oyster growers should attempt to transplant as many as possible during the last two weeks of March and the first two weeks of April. The advantages of transplanting during this period are as follows:

1. Damage to the oyster shells, which at that time of the year have hard edges, will be much smaller than if the transplanting is done later in the season when new brittle growth is already formed.
2. Damage caused to the shells during transplanting should be repaired, in most instances, during the following period of rapid shell-growth.
3. The comparatively high air temperature of late March and early April will usually prevent freezing of the oysters while in transit.

We believe that the members of the oyster industry will gain if they follow the simple suggestions which we offer in this article. The mortality among the transplanted oysters will be substantially reduced, and the annual increase in the size of the oysters transplanted before the period of their active growth will be greater than if they are transplanted when the new shell-growth is soft and easily broken off.



FISH HAVE A HIGH NUTRITIVE VALUE

Fish are an excellent source of most of the minerals which the body needs to develop properly and perform its functions. Calcium and phosphorus (without which proper development of bones and teeth is impossible) occur in fish fillets in about the same quantities as in beef round. Marine fishes are especially rich sources of iodine, containing 50 to 200 times as much of this essential element as any other food. Oysters, shrimp, and crabmeat, compared with milk, provide half as much calcium, five times as much magnesium, and slightly more phosphorus. Iron and copper, which built up the hemoglobin content of the blood and prevent or remedy nutritional anemia, are easily obtained by eating most fish. Oysters and shrimp are the best known sources of these two minerals.

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