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|---------------------|-----------------------------------|
| (k) pH. | (o) Bottom strengthening methods. |
| (l) Currents. | (p) Plankton analyses. |
| (m) Nutrient salts. | (q) Population analyses. |
| (n) Bottom quality. | |

2. It will be necessary to properly evaluate existing and potential oyster resources. Surveys should be made of the size and location of existing reefs with analyses of their oyster population.

3. Factors affecting oyster culture should be studied where localized problems in pollution may occur. It is also necessary to gain understanding of the problems imposed by domestic and industrial pollution; and a survey is needed to determine the extent and effect of these factors on the oyster population.

4. Investigation of the fundamental aspects of oyster biology and the devising of experimental techniques to verify or evaluate field observations are necessary parts of this investigation.

5. Dissemination of scientific data so collected should be made available to the public and to legislative bodies for their information in enacting conservation laws relating to the oysters.

The author is deeply indebted to Dr. Philip Butler of the U.S. Fish and Wildlife Service for much of the biological data used in the preparation of this paper.

Studies On The Edible Oyster Of Puerto Rico

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FROM NOVEMBER, 1946, hydrographic records of the environment and biological studies of *Ostrea rhizophorae* Guilding, the common edible oyster of Puerto Rico, have been carried out. This oyster is found attached to the aerial roots of the common mangrove, *Rhizophora mangle* L., in various lagoons around Puerto Rico. This habit of growth has given the name "mangrove oyster" to this species. These studies have been conducted in the Boqueron Lagoon, on the south west coast of Puerto Rico, where one of the largest colonies exist. This lagoon is approximately 1½ miles long by ½ mile wide and is entirely surrounded by mangroves bearing oysters.

This colony of oysters is of considerable economic importance to the fishermen of Boqueron. It is estimated that from 2,000 to 10,000 oysters are taken from this lagoon each week throughout the entire year. Based on average samples of marketed oysters, at least 25,000 pounds of oysters are taken from this one lagoon during the period of a year. These oysters are sold only in local markets and are considered by many to have a flavor superior to that of *O. virginica*. Problems of controlled harvesting of these oysters have been considered. Because of the continuous harvesting practices the marketed oysters are not of a large size. The average marketed oyster is little over 55 mm. in shell length. The largest specimen observed in this lagoon had a shell length of 96 mm. It is probable that larger oysters could be obtained by regulating the "picking" of the oysters in different parts of the lagoon.

Hydrographic observations indicate that this species lives under environmental conditions different from those of *O. virginica*. The salinity of the waters is much higher, averaging about 35 parts per thousand. Extremes of high salinity,

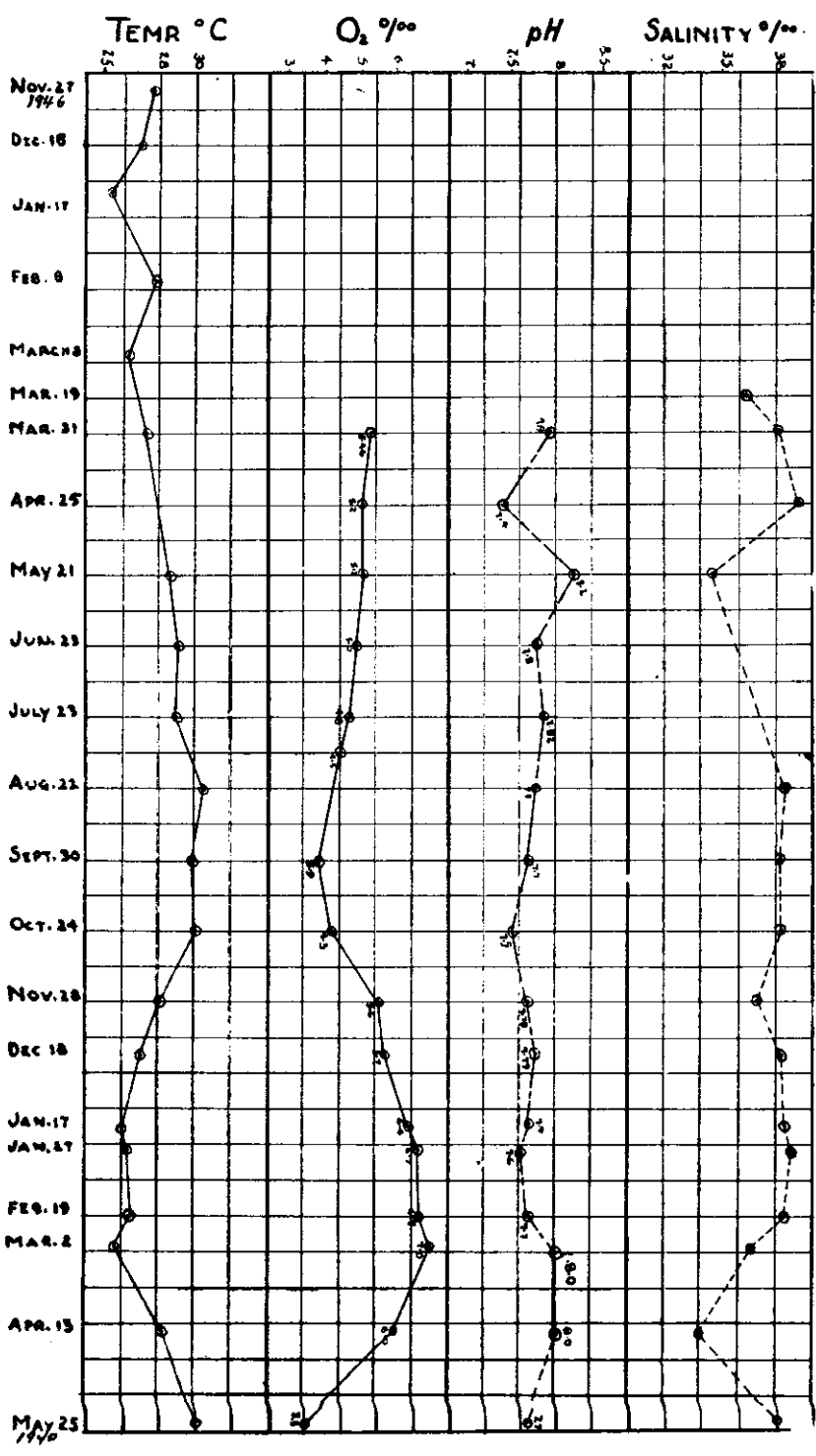


FIGURE 1

after extended dry periods, up to 44 parts per thousand have been recorded. Also, after very unusual heavy rains during the fall of 1949 when the flow of fresh water from a nearby fresh water lagoon was abundant, a salinity average of 16.8 parts per thousand was observed. However, nine days later the salinity was up to 28.9 parts per thousand, and up to 34.4 parts per thousand the following week.

The water temperature here is uniformly high. The extremes observed were from 25.0° to 31.0°C. Oxygen content of the water varied, inversely with the temperature, from 7.0 per cent to 3.7 per cent. The pH of the water varied from 7.4 to 8.2 (Figure 1.).

Studies on the rate of growth of adults and spat were made. Individuals attached to mangrove roots and to artificially furnished cultch were studied. The mature individuals grow at a rate of 0.12 mm. per day, and spat grow 0.25 mm. per day.

This species is dioecious with an observed sex ratio of approximately 5 females to 4 males. They are sexually active throughout the entire year; setting of spats has been observed during all seasons.

Reference is made to a detailed study by the present writer, "Studies on the biology of the edible oyster, *Ostrea rhizophorae* Guilding, in Puerto Rico." Ecol. Monog. 19:339-356, 1949.

Potentialities Of The Gulf Oyster Industry

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THOSE FAMILIAR with conditions in the Gulf states oyster industry will admit that there is room for a vast increase in production. It is not necessary to look further for one of the prime causes of this condition than to note the small percentage of grounds under lease. A recent survey made by the author revealed that there were only 25,000 acres under lease, as compared with an estimated 916,000 acres of natural oyster grounds not under lease. In other words, less than three per cent of the total acreage is being cultivated. It is only necessary to recall that of the oyster production in Massachusetts, Rhode Island, Connecticut, New York and New Jersey, about 98 per cent of the annual harvest comes from cultivated grounds, to appreciate the value of oyster cultivation in maintaining the industry at high productive levels. From the experiences in Maryland and other states it must be concluded also that the amount of money required to maintain production on public grounds is far too great to be achieved by subsidies or direct taxes. If these statements be admitted as facts, then the solution to the problem of creating a flourishing oyster industry is through the enlistment of private capital in the leasing and cultivation of oyster bottoms. If this be true, then state governmental agencies should take necessary steps to encourage the leasing of grounds for private cultivation on a sufficiently large scale, and without encumbering provisions, to make it really worth while for private capital to enter this field. Furthermore, as a result of the extensive researches sponsored by the oil interests, state and federal laboratories engaged in studies of the problems of the oyster industry, there is being accumulated a tremendous backlog of valuable information, far greater than any other area within the realm of oyster production. When this can be released to the public it should prove to be of inestimable value in the development of increased production of oysters.