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Transportation of Larvae of Iwagaki Oyster, Crassostrea nippona, in Maizuru Bay, Japan.

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Abstract

Maizuru Bay is an enclosed bay facing the Sea of Japan in Kyoto Prefecture. Iwagaki oysters, Crassostrea nippona, are farmed in this bay. Oyster larvae are harvested in one empirically known area located outside the bay. On the other hand, the amount of harvest is affected by fluctuations in natural conditions. Therefore, in order to find a new harvest area, we tried to clarify the transportation process of the Iwagaki oyster larvae in Maizuru Bay by numerical model experiments.

4 tidal components, wind effect, river discharge, water temperature and salinity are considered in numerical model. Here, the oyster larvae mainly occur in September in Maizuru bay. Then, numerical model experiments are carried out under the situation in September and the larvae are released from oyster farm.

As a result of the numerical model experiment, the following is found. The flow field in the head of Maizuru Bay has a vertically three-layer structure with inflow at the surface and bottom layers and outflow at the middle layer. In the outer region of Maizuru Bay, the density current that propagates eastward along the shore from the Yura River mouth is dominant due to freshwater discharge of Yura River located on the west side of the bay mouth. Further, as a result of larvae tracking experiment, it is found that, while most of larvae that occurred in Maizuru Bay remain in the bay, some larvae flow out of the bay and are transported to the east, where they reach the conventional harvest area at the optimal time for landing (about two weeks).

Using these results, a new harvest candidate area was selected. In this area, Kyoto Prefectural Fisheries Research Institute carried out a larva harvest experiment and same level of harvest results as in the conventional harvest area was obtained.

Keywords

Numerical model experiment, Larva tracking, Oyster farming