International Council for the
Exploration of the Sea

CM 1975/K:28
Shellfish & Benthos
Committee

INVESTIGATIONS INTO THE GROWTH CHARACTERISTICS OF THE SHELL OF *Crassostrea gigas*

by D Key, MAFF, Fisheries Laboratory, Burnham-on-Crouch, Essex U K

Crassostrea gigas, the Pacific oyster, is being reared in hatcheries in Britain in increasing quantities and several new coastal areas are being utilised for its cultivation. Due to the relatively fast growth rate of its shell, when compared with the European flat oyster (*Ostrea edulis*), it has been found economically feasible in some areas to retain *C. gigas* in containers until they reach marketable sizes. Plastic mesh bags held on rigid frames on the foreshore, where they uncover at low water of spring tides, are the most commonly used technique for achieving the final stages of growth. However, in some areas, and particularly in those where the Portuguese oyster (*C. angulata*) has traditionally been grown on intertidal areas of the bed, an attempt has been made to hold *C. gigas* on the ground for the final growth period.

During 1974, several reports were received of abnormal growth of the shells of *C. gigas*. On investigation, the form of the abnormality was found to be a partial or total reduction in growth in the "length" of the shell, but multiple layers of shell were laid down one inside the other so that an abnormal increase in thickness of the shell resulted.

In Figure 1 some examples of oysters with thickened shells are shown and a comparison can be made with the single specimen showing normal growth on the right of the picture.

As a result of investigations and the circulation of a questionnaire to the industry the following information about the occurrence of the abnormality was gathered:

1 Affected stock had been purchased at a small size from a variety of hatcheries.

2 No abnormality was noted at the time of delivery of the stock or while stocks were being grown in mesh containers held off the sea bed.

3 In some areas all stocks laid on the ground were affected regardless of the source or previous cultivation procedures. In other areas all seed oysters laid on the sea bed showed normal growth.

4 Small seed Ostrea edulis grown by similar techniques alongside the affected stocks of C. gigas showed normal growth.

5 Affected oysters were examined for signs of disease organisms in the tissues but none was detected.

It was therefore concluded that in some areas a component of the environment severely affected the growth of C. gigas but not that of O. edulis.

To investigate this problem further, experiments have been set up to compare the growth of C. gigas and O. edulis at six sites around the coasts of England and Wales; the sites were selected from those which had demonstrated a wide range of growth characteristics for C. gigas. It is hoped that the investigation will also give some indication of the cause of the widely differing growth characteristics experienced when cultivating C. gigas in different areas and help to determine the conditions for maximal growth.

At each site the growth of the two species of oyster is being monitored. Additional observations include analyses of the bottom sediments for particle size, the rate of deposition, the quantities of suspended particles, and organic content. Analyses of the oysters for heavy metals, pesticides and hydrocarbons will be made at the end of the growth period. Each site will also be visited to determine temperature and salinity, current speed, dissolved oxygen, pH, suspended solids and suspended organics during the full tidal cycle on a spring and a neap tide.

Figure 1. Four oysters with abnormal deposition of shell at the growing edge (A), and a single oyster illustrating normal growth (B).