provisions against deliberate introductions.

THÜNEN
Digitalization sponsored by Thünen-Institut

This paper not to be cited without prior reference to the author

International Council for the Exploration of the Sea

C.M. 1974/K:15
Shellfish and Benthos Committee

REF:E

Recent Research on Introduced Oyster Pests in England and Wales

by

A Franklin and G D Pickett
Fisheries Laboratory, Burnham-on-Crouch, Essex

Bundesforschungsanstalt Bibliothek für Fischerei, Hamburg

The Molluscan Shellfish (Control of Deposit) Order, which originally came into operation in England and Wales in 1966 to limit the import and spread of shellfish pests, may be amended during 1974 so as to improve the controls that already exist. It is therefore important that up-to-date information is available on pests within England and Wales, and so research has been undertaken recently in order to determine the distribution of the major pests. These include the American whelk tingle (Urosalpinx cinerea), the American slipper limpet (Crepidula fornicata) and the red-worm parasite Mytilicola intestinalis. The work on Mytilicola, which includes surveys undertaken between 1972 and 1974, is described in a separate report to this meeting (Dare 1974).

UROSALPINX

The American whelk tingle, drill, or borer arrived in Britain towards the end of the nineteenth century, probably with consignments of oysters from the United States imported into one or two estuaries in Essex. Natural spread has been slow, due to the lack of a free-swimming larval stage in the organism's life-history, but transplantation of oysters has aided colonization of most of the estuaries of Essex and also the Whitstable area in Kent (Figure 1).

The distribution in the late 1950s was described by Hancock (1959), and checks have recently been made of areas adjacent to the known limits of distribution, to determine if any extension in range has occurred since that time. The traps used consisted of curved roofing tiles, which when placed convex side uppermost in a row parallel to the shore near low water spring tide level, provided ideal spawning sites for Urosalpinx. Normally ten tiles were laid at each site and these were examined at monthly intervals between May and Septemberduring two consecutive years or until Urosalpinx had been recorded at the site. The presence of spawn capsules alone is sufficient evidence to indicate the presence of Urosalpinx in an area, since they are of a characteristic shape and can easily be separated from those of the native drill species, Nucella and Ocenebra. An additional site was chosen

within the known distribution range, capsule abundance estimates were made, and the results were compared with numbers recorded at the same site in the mid 1950s. The survey results indicated that some extension of the range had occurred in the last 10-15 years, but not into any new discrete areas (Figure 1). The abundance studies showed that spawning reached a peak in mid-summer, and that, at the selected site, the total number of spawn capsules caught in the two summers between May 1972 and October 1973 was just over 260 per individual tile. In a comparable period between 1955 and 1956 the total was 290 per tile. It would therefore seem that Urosalpinx numbers have remained fairly constant, at least at the selected site, in the last twenty years, after the initial build-up following introduction.

A separate dredge survey was carried out in 1974 in the Medway estuary, an area where hatchery oysters are relaid on rafts; no drills or spawn capsules were found.

CREPIDULA FORNICATA

The slipper limpet was introduced to the United Kingdom at about the same time as Urosalpinx. Like the drill, its spread has been encouraged by the relaying of oysters, but, in addition, it has probably been transported to other sites on the hulls of ships, especially those held at anchor for long periods of time before being broken up. Because of its pelagic larval phase, natural spread has been more rapid than with Urosalpinx, and the whole of the south coast of England is now infested to varying degrees (Figure 1).

Recent examination has provided few new records to supplement the data summarized by Hancock (1969). Specimens were found in Swansea Bay in South Wales, and it is likely that limpets occur in other areas south and east of Milford Haven where it was last recorded by Hancock. As a precautionary measure, this stretch of coast has already been designated as lightly infested.

A light infestation also occurs along the western half of the English Channel and attempts have been made to limit increases in the standing Crepidula populations within this area. A fishery for queen scallops (Chlamys operculàris) has recently developed along this coast and a few Crepidula have been found on the shells. The deposition in harbour areas of broken shell, undersized queens, etc could lead to a build-up of the existing limpet populations near important oyster fisheries; leaflets have therefore been issued to fishermen, warning them of the danger. A second, more serious, route by which the existing population of Crepidula might be increased in this area is by the introduction of oysters taken from the Solent fishery (near the Isle of Wight). These oysters are very heavily infested with Crepidula, but fortunately the latter can be killed by immersion in

brine, and satisfactory dipping techniques have been developed (Franklin 1974). Licences are now issued to allow oysters from the Solent to be relaid, after treatment, in the western English Channel.

SARGASSUM MUTICUM

Although the role of this introduced seaweed as a pest in the United Kingdom has not yet been satisfactorily resolved, a group of British algologists attempted to eradicate the species soon after it was first found in February 1973 at Bembridge on the Isle of Wight. Control by handgathering commenced in May at Bembridge and at other sites subsequently found on the Isle of Wight (Shanklin, Seaview and St Helens) and in Portsmouth Harbour on the mainland. Control measures appeared satisfactory during 1973, though the plants had produced spores before and during the eradication programme. It was estimated that at Bembridge (where over four tonnes of weed were removed in 1973) over 80% of the standing crop was removed each spring tide period during the summer; this crop consisted mainly of small plants which had grown up in the intervening two weeks. At this time virtually all the plants were found intertidally, although some grew on floating pontoons in Portsmouth Harbour down to about one-half metre below the surface.

Control became less intensive during the poorer weather and restricted daylight conditions of winter, and by the spring of 1974 the populations of Sargassum had attained a size and density similar to that of the previous year before eradication was attempted. In addition, new populations were found at St Helens and Ryde on the Isle of Wight and in Langstone Harbour on the mainland, although it is possible that some of these discoveries were the result of more intensive searching rather than a true spread since 1973. At some of the new sites the weed has been growing sublittorally; in Portsmouth Harbour specimens have recently been found down to three metres below the surface.

Results from tagged plants have indicated that at some sites growth has taken place throughout the year, although during the winter the growth rate of 1 cm/day is about half that observed in the spring and summer. Some plants remain fertile throughout the winter, which greatly increases the risk of spreading spores by means of drift plants detached during winter gales. However, despite widespread national publicity, including the distribution of descriptive leaflets to marine biologists, fishermen, yachtsmen, etc, the presence of established plants outside the Solent area has not been confirmed. The weed has not been found during extensive dredge surveys carried out on the stocks of oysters in the Solent. Many of these oysters are already subject to brine-dipping and experiments have indicated that this treatment is effective in killing any attached Sargassum, although more

detailed work on respiration and photosynthesis is now being carried out. The research on Sargassum muticum is being carried out at Portsmouth Polytechnic, Park Road, Portsmouth to find out whether recovery takes place from the basal system.

With regard to future control policy, it now seems certain that hand-gathering will not prove a satisfactory method of eradication, but until the research being undertaken on the species (including its reaction to herbicides) indicates a better, more effective line of attack, hand-gathering will be continued under the supervision of a paid co-ordinator.

OYSTER DISEASES

Mortality amongst Crassostrea angulata imported from Portugal to Essex has been very high in recent years. The oysters have been characterized by extensive chambering of the shell, but examination has so far failed to identify the causative organism.

There have been no exceptional losses reported amongst Ostrea edulis in England and Wales, mainly because of rigid control on imported stock. The spread of the digestive gland disease of O. edulis in France has led to a gradual restriction of licensed imports to the UK, following a partial relaxation of the ban in 1969. Limited importation took place in 1969 from Morbihan, Quiberon and from the north coast of Brittany from Brest to Morlaix. In 1970 and 1971 importation was permitted from Morlaix only, but since 1972 no oysters for relaying have been imported from France into the United Kingdom.

Summary

1. Recent investigations have shown some extension in the range of Urosalpinx cinerea in Essex and Kent, but the animal has not been found in any new areas.
2. Little expansion in the distribution of Crepidula fornicata has been found, but steps have been taken to prevent the introduction of limpets into areas which are at present only lightly infested.
3. The immigrant seaweed Sargassum muticum, first recorded in the UK in February 1973, has now been found at several sites on the Isle of Wight and in adjacent mainland coastal waters. Attempts to eradicate the weed by handgathering have so far proved unsuccessful.
4. Mortalities due to oyster disease have been of limited importance in England and Wales in recent years.

REFERENCES

DARE, P. J., 1974. A survey of the distribution limits of Mytilicola intestinalis Steuer in England and Wales, 1972/74. ICES, C.M. 1974/K:12 (mimeo).

FRANKLIN, A., 1974. The destruction of the oyster pest Crepidula fornicata by brine-dipping. Tech. Rep. Fish. Lab. Lowestoft, No. 8.

HANCOCK, D. A., 1959. The biology and control of the American whelk tingle Urosalpinx cinerea (Say) on English oyster beds. Fishery Invest., Lond., Ser. 2, No. 22(10).

HANCOCK, D. A., 1969. Oyster pests and their control. Lab. Leaflet (N.S.) No. 19 Fish. Lab. Burnham-on-Crouch, Essex.

FIG.1 Pest Distribution