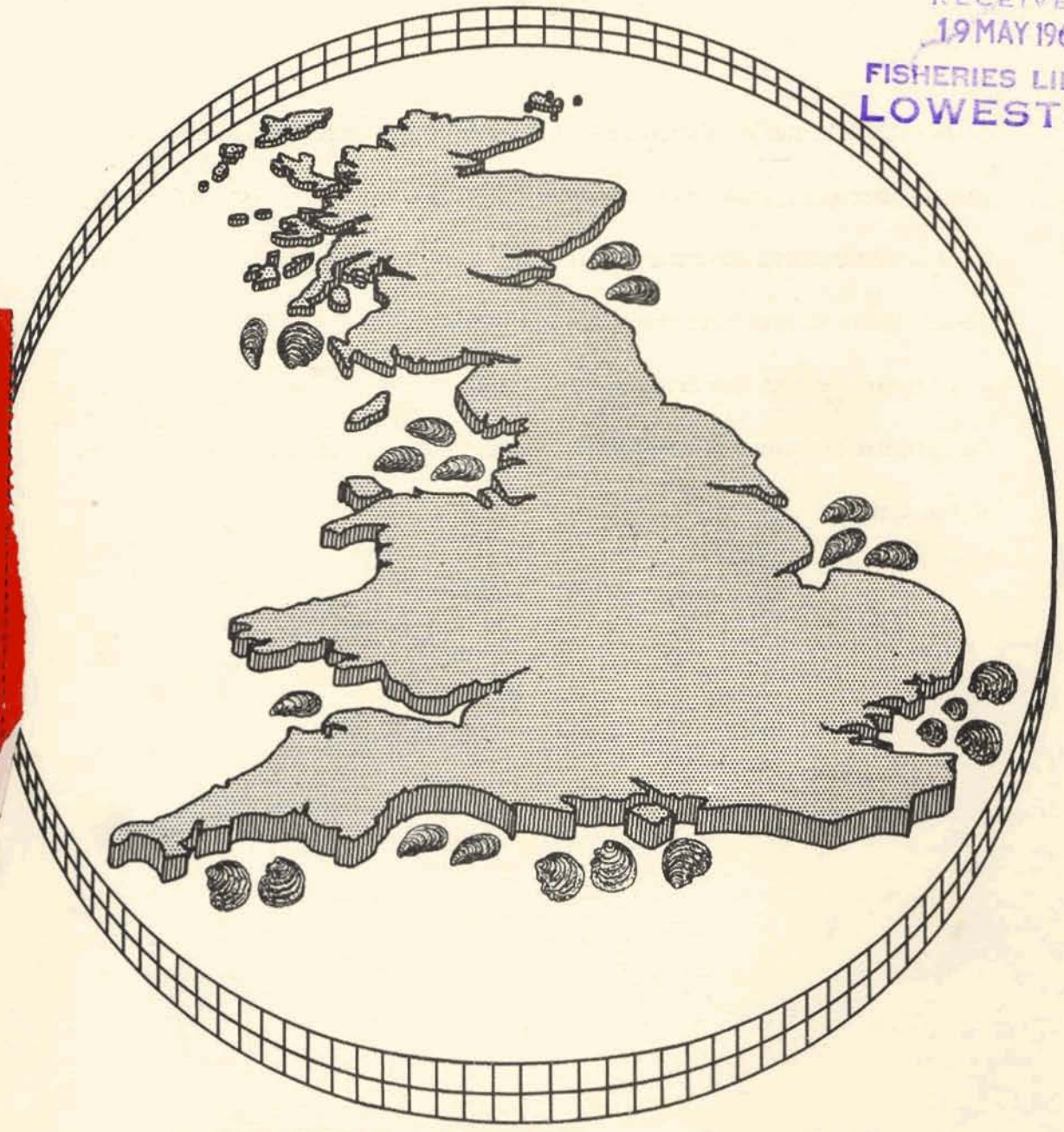
MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

PROTECTING BRITISH SHELLFISHERIES



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Laboratory Leaflet (New Series) No. 10

PROTECTING BRITAIN'S SHELLFISHERIES

The Molluscan Shellfish (Control of Deposit) Order 1965 (Statutory Instrument No. 1971)* which came into operation on 1 January 1966 is designed to protect Britain's shellfisheries, in particular the mussel and oyster fisheries, from the introduction of foreign pests and diseases. It is designed also to limit the further spread of those which have already been introduced and which have become established on our coasts. Of these, three are of prime importance: the American whelk tingle, Urosalpinx cinerea, the American slipper limpet, Crepidula fornicata, and the "red worm" parasite, Mytilicola intestinalis.

This leaflet indicates briefly the damage done to our shellfisheries by these three pests, and so underlines the purpose of the Order. The leaflet in fact supplements the Order and should therefore be read in close conjunction with it.

The tingle was introduced from America, in the early part of this century, on American Blue Point oysters imported for growing and fattening in the east coast estuaries. Its presence was first recorded in 1920, in the River Blackwater, Essex, but by this time it was already well established. In the course of the relaying of young oysters from Essex to the north Kent shores the tingle was transported there too and as a result it is now found from Walton-on-the-Naze, Essex, to Herne Bay, Kent (Map 1), but nowhere else in Europe.

The tingle (Figure 1) is a marine snail which grows to a length of about 1½ inches and feeds almost exclusively on oysters. It first rasps a hole through the oyster's shell with its ribbon of teeth and then, by inserting its proboscis, sucks out the oyster meat. During each feeding season one tingle will eat at least 40 oyster spat, and as it will live for at least six years it is capable of eating at least 240 young oysters in its lifetime. The female tingle lays about 25 egg capsules each year and from each of these 10 young tingles, miniature adults, will hatch. Thus, once this pest is introduced into a new area it can quickly populate the grounds. On one Essex oyster ground where tingles were hardly known in 1947 they multiplied so rapidly that by 1962 there were 10,000 per acre. In its home country, America, the tingle is so abundant that in some places oyster culture has virtually ceased and thousands of dollars are spent on experimenting with methods for its control.

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*Obtainable from H.M. Stationery Office, price 6d.

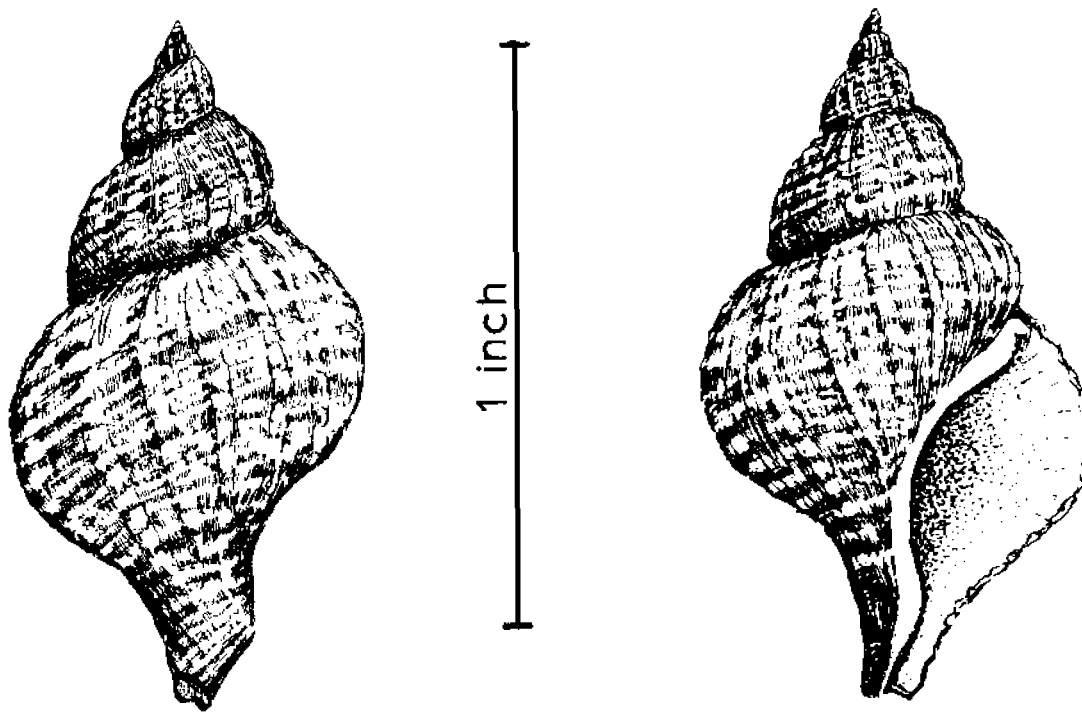

Figure 1. The American tingle

There is one fortunate feature. The tingle's egg-capsules are laid attached to shells and stones, and the young hatch out in the crawling stage. Therefore they are not likely to be spread very far by water movement, and in fact their range has only extended about two miles north and south in twenty-five years. Unless they are deliberately or inadvertently transplanted on oysters or other shellfish - newly hatched tingles are only about 1/16th inch in length and almost impossible to see - they should remain confined to the Essex and Kent shores. This is why, in part IV of the Schedule to the Order, these two counties have been singled out for the prohibition of movement of shellfish from them to any other part of the United Kingdom. Further details of the American tingle, its rate of predation, and methods of controlling it can be found in "Spotlight on the American Tingle", Laboratory Leaflet (New Series) No. 2, issued by the Ministry of Agriculture, Fisheries and Food from the Fisheries Laboratory, Burnham-on-Crouch.

The American slipper limpet, like the tingle, was introduced to our waters on Blue Point oysters imported to the east coast. It seems to have arrived much earlier than the tingle, and by the early part of this century was abundant on the Essex oyster grounds. The limpets, which are also a form of marine snail, live in groups with one individual

sitting atop the next, forming chains of up to 10 or more (Figure 2). They lie on the bottom and feed, like oysters and mussels, by filtering food particles from the water. They therefore compete with oysters for food. They breed much more readily than our own shellfish and have become superabundant, smothering areas of sea bed which would otherwise be commercially productive. In places there are as many as 40 tons per acre, so that the cost of reclaiming derelict grounds is considerable, particularly as, in the course of their feeding, the limpets tend to trap mud which also smothers the grounds.*

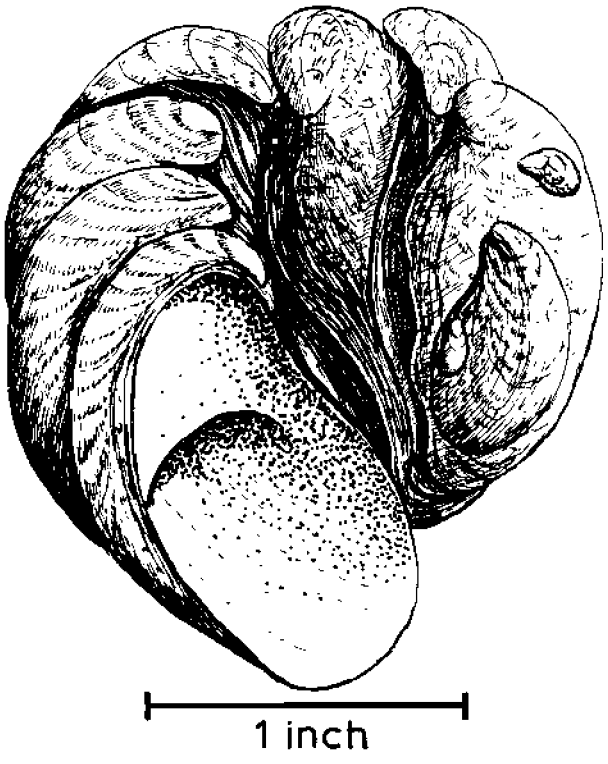

Figure 2. A chain of slipper limpets. Note the shape of the bottom (empty) shell, from which the animal is named

The eggs which the limpet lays are retained in capsules under the shell until they hatch. The newly hatched larvae look quite unlike the adult, and swim or drift in the upper layers of the water as part of the plankton for one or two weeks before settling to the bottom and turning into miniature limpets. In this respect they are similar to oysters, mussels and other marine animals with free-swimming larvae.

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*Under the Sea Fish Industry Act of 1962 the Ministry of Agriculture, Fisheries and Food will make grants towards the costs incurred in cleansing and restocking oyster beds affected by pests and diseases.

During the planktonic stage they all feed on tiny green plants floating in the water, so that at this stage in their life history, too, the limpets compete with oyster larvae for food; finally, when they settle to the bottom they attach to hard surfaces which would otherwise often be suitable for the attachment of young oysters. Thus at all stages of their life they are active and serious competitors.

Because they have a free-floating larval stage which persists for some time the slipper limpets have become more and more widely spread round our coasts. They have drifted from Essex and Kent and colonized fresh areas of sea bed both to the north and the south, and have been introduced on oysters from Essex into places like Emsworth harbour (Hampshire). The general spread has all taken time; for example it was not until the late 1940s that slipper limpets were found on the Cornish oyster grounds and even now they occur there only occasionally. However they are abundant as far west along the Channel coast as Poole in Dorset and as far north along the east coast as Lowestoft in Suffolk. Apart from this spread by natural drift of young stages and by relaying of oysters, they have been introduced (probably on ships) into localized areas such as Milford Haven in South Wales and Blyth in Northumberland. The limpets have also spread to the north European coast; they are abundant on the coasts of Denmark, Germany, Holland and Belgium, and are becoming more and more common in northern France (Map 2). Whilst it is impossible to prevent the occasional transference of limpets on ships which are being laid up, it would be foolish to introduce them in quantity to productive or potentially productive shellfish areas from which they could spread still further. For this reason shellfish from areas densely populated with limpets (the right-hand column of part III of the Schedule to the Order) may not be moved to lightly populated areas such as Devon and Cornwall (the left-hand column of part III). Similarly, to prevent any introduction of limpets into areas at present free of them (left-hand column of part II) the relaying into these areas of shellfish from infected areas (right-hand column of part II) is prohibited.

Of these three pests Mytilicola intestinalis is the most widely spread. It has been known for many years as a gut parasite of molluscan shellfish, principally mussels, in the Mediterranean, but in the past twenty-five years it has spread along the north European coast as far as Denmark and also across the Channel to parts of the British coast (Map 3).

Mytilicola is a crustacean, allied to shrimps and prawns, which as a parasite has lost most of its limbs and become worm-like. This, plus its red colour, has led to its being known as the "red worm" of mussels - though it will infect other shellfish. The females grow to approximately $\frac{3}{8}$ inch in length and the males are smaller (Figure 3); as many as 30 parasites of varying size may be found in a single host mussel. The mature females carry sacs of eggs which hatch into

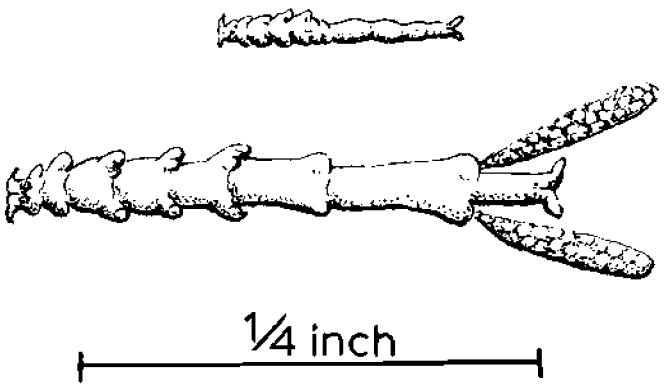
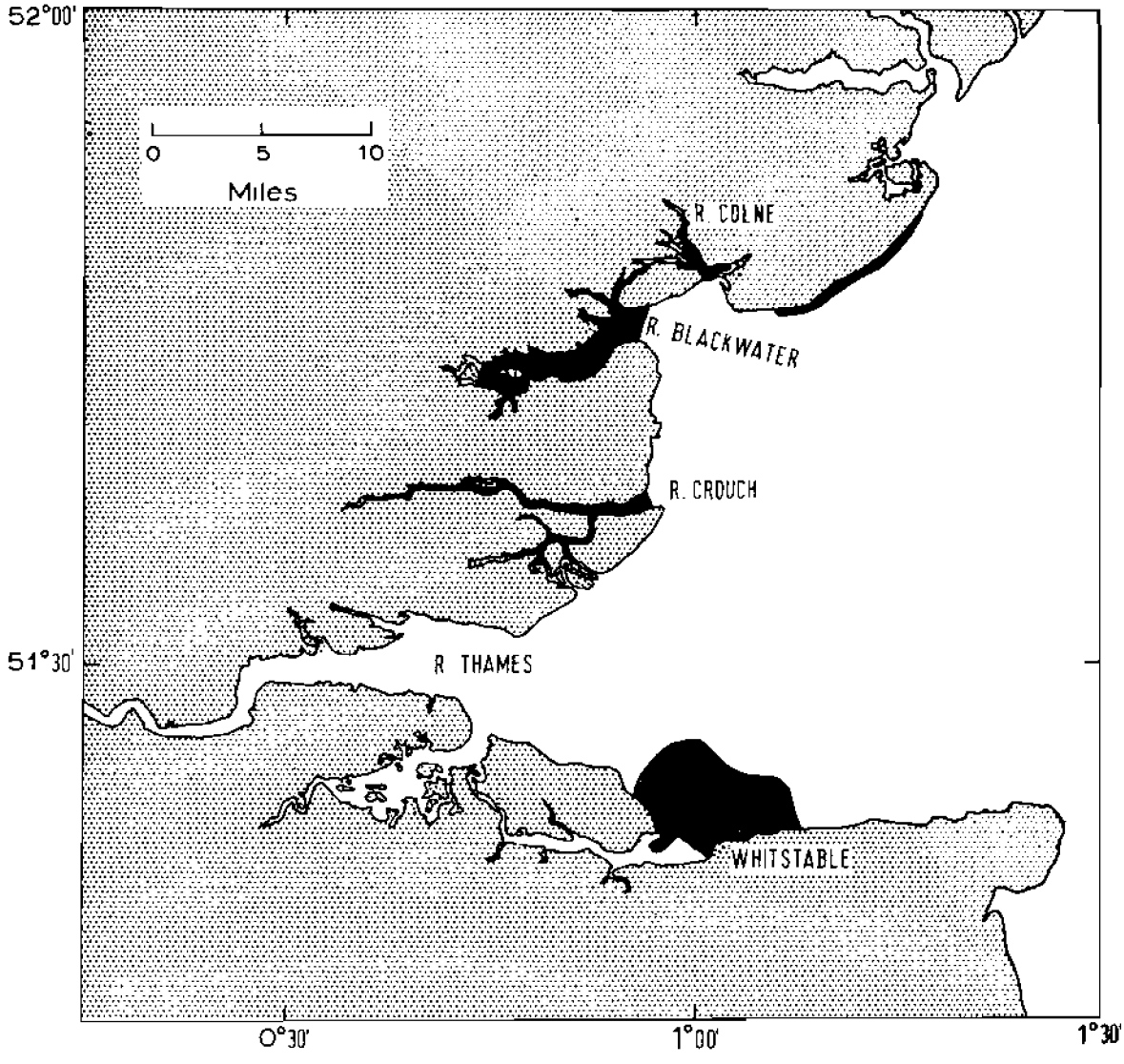


Figure 3. "Red worm" parasites (Mytilicola intestinalis) removed from the gut of a mussel
Above: male; Below: egg-carrying female

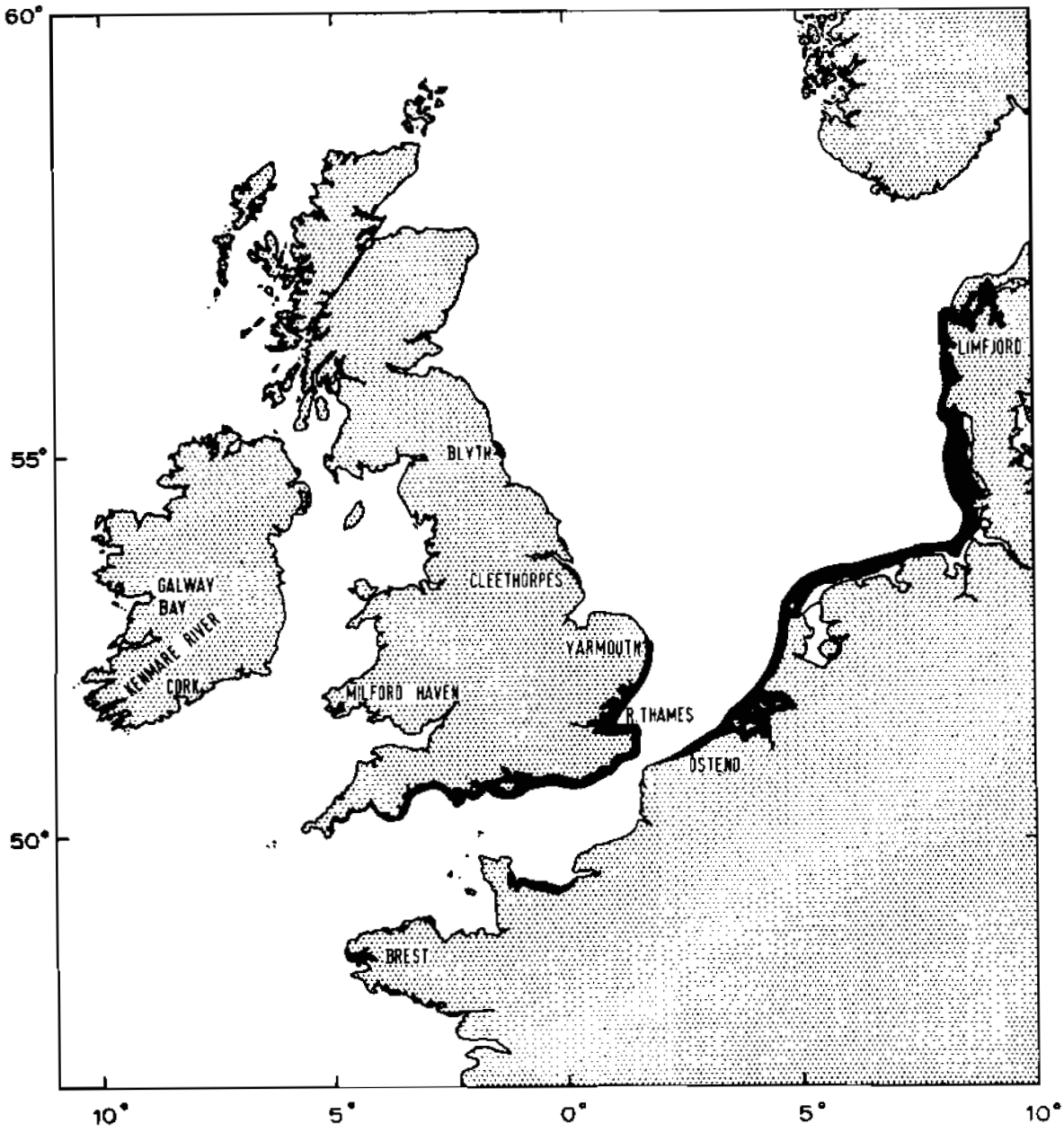
free-swimming larvae and leave the host; they then drift in the plankton and develop to the infective stage. At this time they go to the bottom, so that mussels on beds are much more likely to be infected than those suspended in mid water.

The presence of parasites in the gut causes the mussels to lose condition and in the weakened state death is much more likely to occur. There is good evidence to show that as a result of the rapid spread of Mytilicola the output of the Dutch fishery was cut by 95% in 1950, as a result of poor quality and the death of their mussels. Like the slipper limpet, Mytilicola has been carried to isolated ports in the British Isles (Map 3) in mussels on ships moved from the south-east for breaking up. Fortunately the major mussel-producing grounds of the Wash and North Wales are still free of this and the other two pests. This is why these grounds (the left-hand column of part I of the Schedule to the Order) are scheduled as areas into which no shellfish may be introduced.

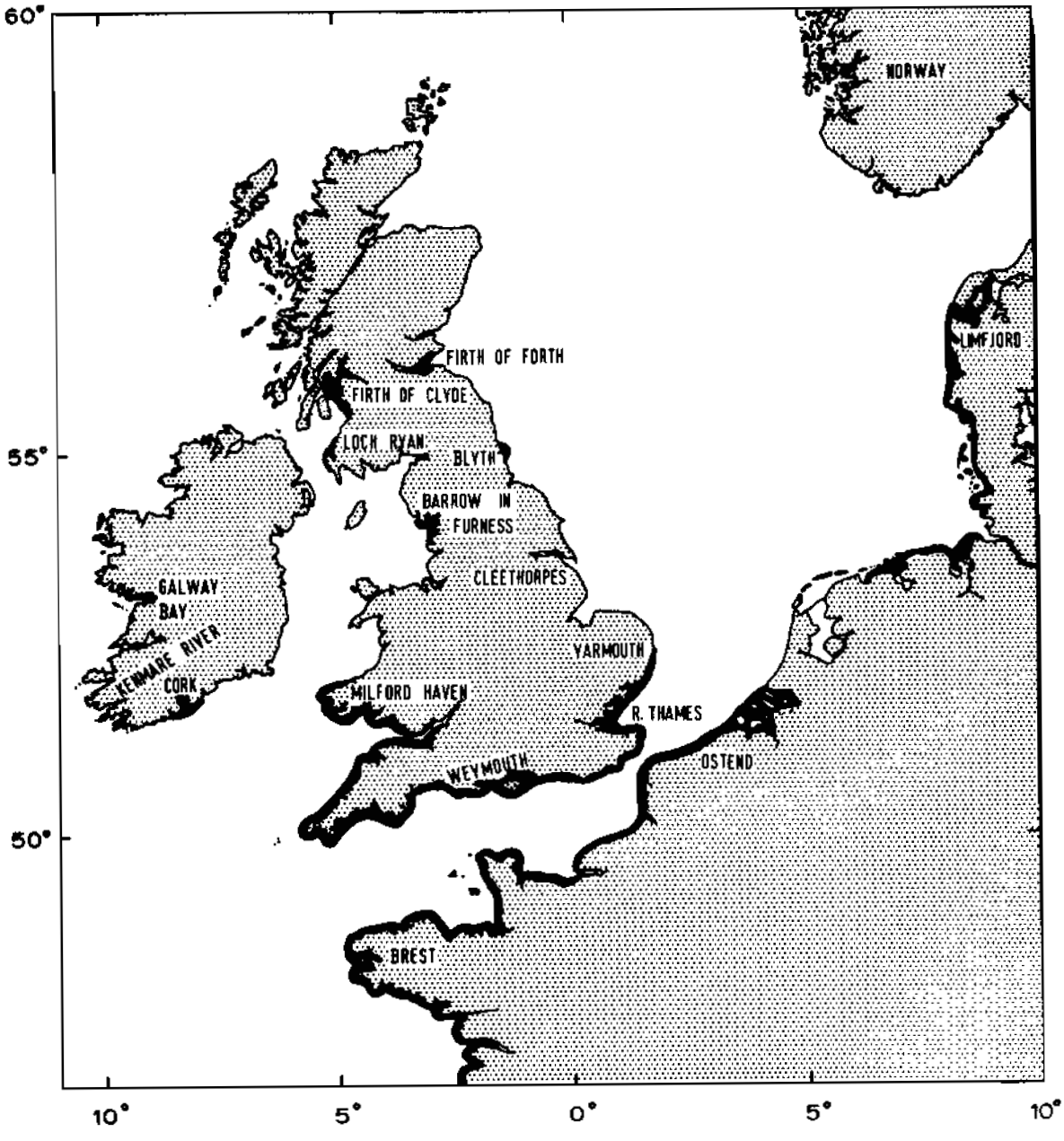
It must be stressed that there are other shellfish pests, parasites and diseases in other parts of the world that could be introduced to our waters on imported shellfish, and one of the objects of the Order is to prevent this. Furthermore, animals naturally associated with these shellfish and relatively unimportant in their home waters could become major pests if introduced here. The slipper limpet is a classic example. Although widely spread on the eastern seaboard of North America it is never abundant there, and its presence on oysters brought over here was probably not considered important. Yet it has multiplied to a tremendous degree in our waters and become a major pest of shellfish grounds.



Map 1 The distribution of the American tingle, which is confined to the Essex and north Kent shores.



Map 2 Northern Europe, showing the distribution of the slipper limpet.



Map 3 The distribution of Mytilicola intestinalis in northern Europe.

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