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Polydora ciliata as Pest in Mussel-Farming

By

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The Netherlands mussel industry has to cope with a number of predators, parasites and competitors. Of the predators the crab, Carcinides maenas and the starfish, Asterias rubens are the most notorious. The mussel-farmers are well aware of the activities of these predators and know how to avoid or how to control serious damage. Of the parasites the parasitic copepod Mytilicola intestinalis is the most notorious, a chapter by itself. Of the competitors barnacles are the worst as this member of the mussel shell's epifauna often brings a lot of trouble in cleaning and marketing consumption mussels.

Late in June and early in July 1963, some mussel-farmers observed an alarming mortality among mussels on their plots in the Waddensea. Crabs or starfish could not be the culprits for open shells were often found with the "fish" still in it. Red worms, up to 10 cm long, were said to occur in great numbers on these plots and the mussel-farmers wondered whether a new enemy of the mussel had invaded this area.

Biological observations demonstrated that there was no question of poor condition of the mussels on the plots under consideration. The mussels were even unusually "fat" and showed no symptoms of weakening through the activities of parasites or noxious microorganisms. Noteworthy was that on all plots where mortality was observed the mussels appeared to be covered with a layer of a sticky clay up to two or three centimetres thick. This clay could not easily be washed away and apparently could not have been deposited there by a normal sedimentation process. Closer observation demonstrated that this clay consisted of countless tubes of the worm Polydora ciliata. Evidently this sedentary polychaete which is always very numerous in the Dutch coastal waters, had reproduced in a really astronomical way. Presumably the severe winter of 1962-1963 has something to do with this. Cockles and many other bottom organisms in the Waddensea were killed off nearly quantitatively by the prolonged cold weather and all their proteins were mineralized and mobilized through interference by microorganisms. The water was therefore extremely rich in nutrients and in due course in food of various description in spring and early summer, and this may have furthered the reproduction of Polydora ciliata to a large extent. Searching for a suitable habitat many Polydora larvae decided to build mud tubes on any solid substratum they could find. Mussel shells are rather smooth for settlement, but the barnacles on the mussels provided an excellent substratum. Soon the mud tubes developed into a complete covering, killing the barnacles by sheer suffocation and, eventually, killing the mussels by making it impossible for them to pump water into their siphons. Grab samples demonstrated that here and there up to 80% of the mussels have been destroyed in this way by intertwined Polydora mud tubes.

The red worms reported by the mussel-farmers, were found in great numbers in between the dying mussels, and also within the valves of a mussel which apparently had died a few hours ago. This worm was the sedentary polychaete Capitella capitata, a regular denizen of the sandy mud in the Waddensea. It was evidently allured by the dying mussels and worked as a scavenger. The death of the mussels could not be attributed to Capitella capitata.

Breaking up the cover of clay by dredging with a mussel dredge without a net was advised as control measure.