Abstract

The impact of introduced marine pests has become more apparent recently, and the interest in the possibility of their biological control has increased. The common European shore crab, *Carcinus maenas*, has been introduced in e.g. South Australia and North America and is considered a pest in some areas due to its ability to reproduce in an efficient way in the new areas and competitive success with existing, often commercially important, species. *Sacculina carcini* is a parasitic castrator of the shore crab in Europe that has not been introduced together with the host. The parasite was considered a good candidate for biological control of the shore crab, but more detailed knowledge of the ecology of the parasite is needed. The aim of this thesis was to study settlement and post-settlement processes of *Sacculina carcini*, especially larval behaviour at settlement and host specificity.

Laboratory and field experiments were made to investigate the settlement choice of the female larvae on different crab species (including 5 Australian species) and different moult stages of *C. maenas*. Subsequent internal development of the parasites was followed for 1.5 years after infection. It was found that the female larvae were not at all species specific at settlement, but internal development all through to the reproductive stage only took place in *C. maenas*. Internal compatibility with the host is probably necessary. A preference at settlement of *S. carcini* larvae for newly moulted over inter-moult *C. maenas* was found.

The influence of size and gender of the host on the larval production of the parasite was investigated and was found to be insignificant. The gender of the larvae, however, had a pronounced effect on the number of larvae per batch. Female batches could exceed male batches with a third of the total number of larvae.

Prevalence of the parasite on shore crabs, in three areas on the west coast of Sweden, varied largely in time and space and ranged from 0 to 17% with a mean of 2.9% at these localities over three years. The abundance of the host was also very variable, particularly on the spatial scale, and the locality with the most hosts had the highest prevalence of the parasite.

Male and female *Sacculina carcini* have different lives. Females settle on a host and live internally for about three years before reproduction. Males only have a larval stage of a few weeks and are ready for reproduction soon after settlement on a virgin female. The great loss of male larvae, while searching for a virgin female, prompted an investigation of possible settlement cues. Larval behaviour in response to chemical substances from the settlement substrate (a host for females and a virgin female for males) was video recorded. A higher proportion of male larvae dived to the bottom in chemically conditioned water from a virgin female on a host, compared to larvae in saltwater controls. Females did not change their swimming behaviour in the presence of chemical substances from a host, neither in inter-moult or newly moulted stage. Males are apparently able to use waterborne chemical cues in the water column, while females do not seem to do that.

Finally, with the knowledge we have today on particularly the unspecific settlement behaviour of *Sacculina carcini* larvae, an introduction of the parasite into new areas as a pest control of *Carcinus maenas* does not appear to be a solution.