

Chapter 7

Ecology

This Chapter includes discussions of ecological aspects of marine parasites that have been studied in some detail, and which are attracting much attention and can therefore be called 'hot topics'. These aspects include transmission of parasites to hosts; specificity of parasites to hosts and microhabitats; parasites as hosts for other parasites; adaptation of parasites to an extreme habitat, brackish water; metapopulation biology; the structure of marine parasite communities; and parasite communities as non-equilibrium systems.

All parasites depend for survival on hosts, at least during part of their life cycles. It is therefore essential that transmission to hosts is assured, as discussed on pp. 280–286. There is no 'universal' parasite that infects all available microhabitats on all available host species. In other words, each parasite species occupies a particular niche – it is microhabitat and host specific. But how is specificity measured? The second section gives an account of such measures. It also discusses proximate and ultimate causes of niche restriction (i.e. the immediate chemical and physical causes that direct a parasite to its niche and are necessary for its survival there), and the biological function of niche restriction.

Parasites not only parasitise their hosts, but also may be hosts to parasites (hyperparasites) themselves. On land, such parasite 'chains' may be of remarkable length. For example, an insect may harbour an insect parasitoid, which in turn is parasitised by a hyperparasitoid of the first degree, to the third degree; a hyperparasitoid of the third degree may (at least theoretically) harbour a nematode parasite infected by a protistan, and the protistan may harbour a bacterium infected by a bacteriophage. Such long chains are not known from the marine environment; however, new hyperparasites are discovered frequently. Marine hyperparasites include crustaceans, monogeneans, nematodes, myxozoans and many protistans.

Brackish water systems are intermediate between freshwater and genuine marine ones. The largest brackish water system is the Baltic Sea, which has been studied over many decades. Its salinity ranges from approximately marine in the western parts to more or less freshwater in the eastern parts. Parasites have various degrees of adaptations to these brackish water habitats, which are discussed later in the relevant section (see pp. 298–301).

The next three sections deal with aspects of population and community ecology including metapopulation biology. The concept of metapopulation is not old. It was introduced to emphasise that populations are not homogeneous collections of individuals but are often composed of subpopulations that are, to a large degree, spatially separated, with limited exchange of individuals between them. This has important consequences for population biology, affecting the survival of species, as discussed in the metapopulation biology section (see pp. 302–309).

Much effort has gone into the study of marine parasite communities. A concise and up-to-date discussion of such communities is given in the relevant section, which includes not only a discussion of community patterns but also of processes leading to the patterns.