4. Ecology

In studying the ecology of an animal, we seek to answer the questions: Why does this animal inhabit so much and no more of the earth? Why is it abundant in some parts of its distribution and rare in others? Why is it sometimes abundant and sometimes rare? These are all problems of distribution and abundance.

H.G. Andrewartha and L.C. Birch, 1954

4.1 House dust and the genesis of a detrital ecosystem

The idea of house dust as an ecosystem was first presented by van Bronswijk (1972a) to describe the basic house dust food web consisting of skin scales, microorganisms and mites. The diversity of bacteria, fungi, mites and insects that have been recorded from house dust, together with their temperature and humidity preferences were elaborated in a later paper (van Bronswijk, 1979), but consideration of the characteristics of house dust as a discrete ecosystem were constrained to some generalisations about the trophic interactions between various organisms. However, there is a great deal more to ecosystems than simply figuring out who eats whom.

4.1.1 Characteristics of ecosystems

The vast majority of plants and animals live within ecosystems that are ancient, complex, slow to evolve and mature, and that are spatially vast. When we think of examples of ecosystems we tend to conjure up images of wetlands, the soil, freshwater lakes, mangrove swamps, rainforests, prairie grasslands, temperate woodlands and Arctic tundra, though some of these may be better described as biomes (see section 4.3.2). The notion that our beds and carpets – the textile-covered insides of our houses – merit the same status of ecological organisation as a coral reef seems, at first, alien, almost absurd. Just for starters, the diversity of plants and animals that inhabit a coral reef is countless times greater than the denizens of our mattresses. But diversity is not everything when it comes to ecosystems. One only has to think of the variety of life along a few hundred metres of rocky seashore compared with what one could expect to observe over the same distance of sandy desert, even accounting for the burrowing habit of many desert animals. Comparable with the notion of house dust as an ecosystem, our skin has been regarded as worthy of ecosystem status (Marples, 1965; Andrews, 1976). And the diversity of life on (and in) our own integument, as captivatingly described by Mary Marples in her classic work, *The Ecology of the Human Skin*, is considerably greater than one might expect. Bacterial community composition of the human forearm was recently characterised by Z. Gao *et al.* (2007) using molecular methods. Some 42 years after Marples' book, these authors comment on how little is known about microbial diversity of the skin.

If ecosystems are not defined by biological diversity alone, then what are their characteristics? In fact,