
Host-parasite systems in polar areas as models to explore inter-specific dynamics in spatial contexts

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Abstract

Exploring how species interact in a spatial context is critical for understanding how they may respond to environmental changes. Because host-parasite systems in polar areas are relatively simple in terms of numbers of species involved (communities of a few hosts and parasites), because the distribution biodiversity is highly structured in space in polar areas (e.g., colonies of seabirds are hotspot of biodiversity), and because some of the effects of global change are especially rapid in polar areas, host-parasite systems in such areas can constitute unique models to investigate how particular ecological and evolutionary processes may affect the responses of communities to environmental changes at different scales. Using polar seabirds and their parasites as study systems, we illustrate how results of basic and applied relevance could be obtained on processes such as host race formation in arthropod vectors, host mediated dispersal and transgenerational immunity. Current work on seabird ticks in polar areas for instance shows that host specialization likely occurred repeatedly, with direct implications for the broad circulation of tick-borne agents such as Lyme disease bacteria *Borrelia burgdorferi* and flaviviruses. Detailed investigations about host and parasite dispersal in the same systems also stress that knowledge of key life history traits of the involved species is required to infer colonization rates and the history of spread of infectious agents. Polar areas thus not only constitute areas where dramatic changes may be occurring, but also where important insight can be gained about general processes involved in the responses of communities to environmental changes.

Keywords: Parasites, Pathogens, Disease ecology, Polar biodiversity

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