
Exploring what movements matter in a critical eco-epidemiological situation, the case of avian cholera in seabirds of Amsterdam island

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Abstract

Infectious diseases can be a threat for wild populations and the spatial ecology of these diseases need to be explored to understand how infectious agents circulate in spatially structured ecosystems such as islands. On Amsterdam Island (southern Indian Ocean), *Pasteurella multocida*, the bacteria responsible for avian cholera, causes recurrent mortality of albatross and penguin chicks. Different types of movements of individuals, from foraging to migration and prospecting, could play a major role in the circulation of the infectious agent at different scales. The main purpose of this study is to evaluate the potential role of different species in the dissemination of *P. multocida* with a combined study of movement ecology and eco-epidemiology. We considered potentially involved behavioral processes such as foraging movements of brown skuas (*Stercorarius antarcticus*) and within-season prospecting movements of Indian yellow-nosed albatrosses (*Thalassarche carteri*). We deployed UHF-GPS loggers on breeding skuas and non-breeding albatrosses during avian cholera outbreaks. We show that the skuas spent an important time in the colonies of albatrosses and in different places around the island, but did not hold feeding territories. In addition, we found very high seroprevalence and titers of antibodies against *P. multocida* among the sampled individuals, suggesting that they could play an important role in the circulation of the infectious agent. We also show that Indian yellow-nosed albatrosses in breeding failure or pre-breeding individuals can visit different conspecific colonies on the island, suggesting they could also play a role in the spread of *P. multocida* among breeding patches of this locally abundant but threatened species. Our study identifies various movements that may be involved in eco-epidemiological dynamics in multi-host/parasite systems and that their careful characterization is important for basic and applied reasons.

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Keywords: habitat use, disease ecology, *Pasteurella multocida*, movement ecology, seabird