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Where Are the Parasites? [Letters]

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COMMENTARY

LETTERS

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On the decline. Pathogens may play a role in the decline of caribou populations across the North.

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Where Are the Parasites?

THE REVIEW BY E. POST *ET AL.* ("ECOLOGICAL dynamics across the Arctic associated with recent climate change," 11 September, p. 1355) paid little heed to parasites and other pathogens. The rapidly growing literature on parasites in arctic and subarctic ecosystems provides empirical and observational evidence that climate-linked changes have already occurred. The life cycle of the protostrongylid lungworm of muskoxen, *Umingmakstrongylus pallikuukensis,* has changed (*1*), and the range of that organism and the winter tick, *Dermacentor albipictus,* has expanded (*2*).

Extremes in temperature and the hydrological cycle, predicted in most climate scenarios, can result in epidemic disease outbreaks in arctic-adapted species such as reindeer and muskoxen, with substantial economic costs for northern aboriginal peoples (*3*–*7*). Similarly, increased frequency and magnitude of flooding might enhance transmission of waterborne pathogens such as zoonotic strains of *Giardia,* in and between terrestrial and marine systems (*8*, *9*).

Parasites whose stages in the environment are buffered by gastropod or insect intermediate hosts/vectors have the potential to increase in abundance and distribution, whereas for those with life stages that develop freely in the environment, extreme variability in microhabitat temperatures and humidity might either increase or reduce their abundance (*2*, *10*).

Given the low species diversity of arctic ecosystems, and the potentially reduced immunocompetence of arctic species (*11*), these host systems may be particularly sensitive to parasitic invasions (*2*). Invasions will occur primarily through range expansion of

more southerly host species, through ongoing wildlife translocations, and increasing pressures for domestic animal agriculture. All will radically alter the existing parasite fauna and lead to parasite-mediated competition between current residents and newly arrived host species. This might in turn lead to the loss of parasite diversity as arctic-adapted hosts and their endemic parasite species become increasingly displaced by competitive interactions. Such changes will have profound consequences for ecosystem structure and function and directly impact the health, economy, food safety, food security, and cultural activities of northern peoples.

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