THE DEVIL'S IN THE DIVERSITY: DIVERGENT PARASITE FAunas AND THEIR IMPACTS ON BODY CONDITION IN TWO GREENLAND CARIBOU POPULATIONS

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INTRODUCTION

Body condition and fecundity in Rangifer tarandus spp. can be negatively impacted by gastrointestinal nematode parasites [1-2], but these relationships may be specific to the parasite species present. Our previous work suggested a divergent parasite fauna in two west Greenland caribou (R. t. groenlandicus) populations [3]. Herein, we report on a more detailed study of parasite diversity in these animals and discuss the processes which may have structured parasite faunas. Further, we investigate if these parasite faunas impact west Greenland caribou.

OBJECTIVES

1) Characterise gastrointestinal parasite diversity in Akia-Manitsoq (AM) and Kangerlussuaq-Sisimiut (KS) (Fig. 1) caribou

2) Determine if abomasal nematodes are significant predictors of caribou body condition and fecundity in these populations

METHODS

Female caribou and their calves-at-heel were collected opportunistically as part of CARMA’s surveys [4]. 47 Caribou were collected from AM in March / April 2008 and 49 from KS in March 2009. Post-mortem examinations recorded animal age (Adult ≥ 3 years, subadult 1-2 years, calf < 1 year), reproductive status and indices of body condition (i.e. carcass weight, body protein mass, fat, kidney fat and marrow fat). Abomasas and small intestines of adults and subadults were examined for gastrointestinal parasites. Adult nematodes of both sexes were identified to species.

NEMATODE DIVERSITY

Larval and adult nematodes were found in all abomasas (Fig. 2); no parasites were recovered from small intestines. Significant differences between populations were found; in AM, only Ostertagia gruehneri was recovered, but in KS, both Marshallagia marshalli and Teladorsagia boreoarcticus were found (Table 2).

ASSOCIATIONS WITH BODY CONDITION & FECUNDITY

In both populations the dominant species of nematode was negatively associated with body condition, although estimates were consistently small (β = -0.24 to -0.61). Intensity of larvae was not a significant predictor. AM: O. gruehneri was associated with: back fat, protein mass & kidney fat (Fig. 3A)

KS: M. marshalli was associated with: carcass weight, protein mass & kidney fat (Fig. 3B)

Only O. gruehneri was associated with fecundity (Fig. 4). Intensity (and presumed impact) of O. gruehneri is highest pre-rut, whereas M. marshalli is most abundant overwinter and this may suggest that nematode species with seasonal peaks pre-rut have a greater impact on caribou fecundity than those with seasonal peaks overwinter.

DISCUSSION

AM and KS caribou originate from Canadian barren-ground (R. t. groenlandicus) [3], but their abomasal nematodes are very different. Current faunas may be a result of parasite loss during colonisation of Greenland by caribou and subsequent parasite spill-over from Norwegian reindeer (R. t. tarandus) and Greenland muskoxen (Ovibos moschatus) imported to AM and KS, respectively [5-6]. Abomasal nematodes were significant predictors of body condition in both populations suggesting that nematode parasites, regardless of species and at low intensities, may impact caribou health. These closely related caribou populations with their unique and divergent faunas provide a natural system for investigating parasite ecology and impacts.

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Reference