

DRIVERS OF PATHOGEN DIVERGENCE: INVESTIGATING THE WEST GREENLAND CARIBOU HERDS

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Infectious diseases can have negative effects on the sustainability of wildlife populations. Understanding the factors that influence the diversity of pathogens is therefore important to plan effective management strategies. West Greenland presents a unique opportunity to study pathogen divergence *in situ*. The caribou (*Rangifer tarandus groenlandicus*) of Akia-Maniisq and Kangerlussaq-Sisimiut are physically separated which has resulted in limited pathogen migration between the two herds. Additionally,

Akia-Maniisq has had contact with imported semi-domestic Norwegian reindeer (*R. t. tarandus*) and Faroe/Icelandic sheep (*Ovis ovis*). Due to this physical separation and varied exposure to domestic animals we expect to find differences in pathogen diversity. In this study we investigate gastrointestinal parasites and *Mycobacterium avium* spp. *paratuberculosis*, the causative agent of Johne's disease, as these pathogens are generally obtained from pasture and known to impact individual and herd health.

OBJECTIVES

1. Describe pathogen fauna of interest in these herds
 - ❖ Gastrointestinal (GI) parasite diversity and abundance
 - ❖ Prevalence of *Mycobacterium avium* spp. *paratuberculosis* (*Map*)
2. Evaluate how pathogens and their abundance affect individual health parameters
 - ❖ Body condition
 - ❖ Pregnancy rates
3. Explore how historical and contemporary factors (such as contact with imported species) may be associated pathogen differences between herds



METHODS

In the summers of 2008 and 2009, 81 adult females ($n_{\text{Akia}} = 41$ and $n_{\text{Kanger.}} = 40$) were collected by members of the Greenland Institute of Natural Resources. Thorough post-mortem examinations were done to record basal physical characteristics, collect tissue and fecal samples, and extract endo-parasites.

- ❖ Sample Analyses:
 - Fecal and Baermann examinations to asses for GI parasite diversity
 - GI parasite counts from abomasal and intestinal washes and digests
 - Serology (ELISA) and PCR on fecal and tissue cultures for *Map* prevalence
- ❖ Data Analyses:
 - Comparison of *Map* status and parasite diversity and intensity with body condition and pregnancy parameters
 - Examination of pathogen diversity and intensity between herds

PRELIMINARY RESULTS

Initial results from fecal analyses suggest significant differences between herds.

	Akia-Maniisq	Kangerlussaq-Sisimiut	Sheep*
Trichostrongylid [†]	55%	10%	+
Nematodirus spp.	0%	48%	+
Marshallagia spp.	0%	62%	-
Moniezia spp.	10%	5%	+

* From Rose, C. Thesis. May 1990. The Royal Veterinary and Agriculture University, Copenhagen.

Table 1. Prevalence of GI Parasites



	Akia-Maniisq	Kangerlussaq-Sisimiut
Trichostrongylid [†]	4	1
Nematodirus spp.	0	2
Marshallagia spp.	0	2
Moniezia spp.	24	11

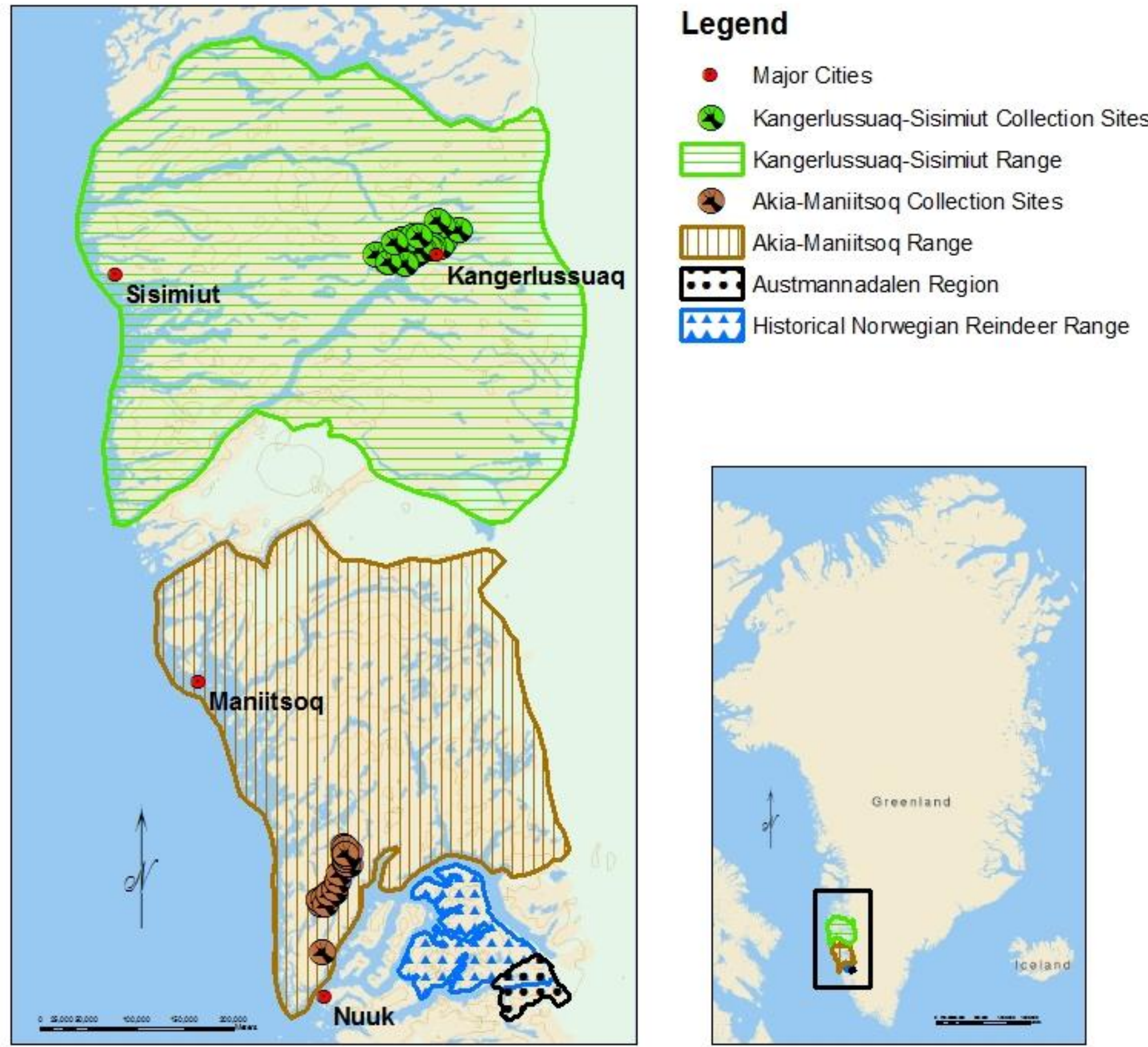
[†] Could represent *Ostertagia* spp., *Teladorsagia* spp., or *Trichostrongylus* spp.

Table 2. Intensity of GI parasites (eggs per gram)

FUTURE DIRECTIONS

We plan to sample domestic and feral sheep, as well as introduced reindeer for GI parasites and *Map*

- ❖ Fecal and tissue samples will be collected by our collaborators in the sheep and reindeer farming regions during the yearly harvests
- ❖ Fecal samples will be collected from pasture for the feral sheep flock that inhabits the Austmannadalen region (Figs. 1 & 2)
- ❖ Pathogens will be identified using morphological and molecular methods for adult parasites, whereas eggs will be identified primarily through molecular methods
- ❖ We will investigate the pathogen fauna in these introduced groups to evaluate possible transmission to and from caribou



Figures 1 & 2. Ranges of the native and imported species of interest in West Greenland

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