

Application of a molecular tool to describe the diversity and distribution of gastro-intestinal parasites in northern caribou

Nathan P. deBruyn^{1,2}, Eric P. Hoberg³, Neil Chilton⁴, Kathreen Ruckstuhl², Ryan Brook¹, & Susan Kutz¹

¹ Faculty of Veterinary Medicine, University of Calgary, Calgary, AB, Canada (npdebruy@ucalgary.ca).

² Department of Biological Sciences, University of Calgary, Calgary, AB.

³ Agricultural Research Service, USDA, Beltsville, MD.

⁴ Department of Biology, University of Saskatchewan, Saskatoon, SK.

Climate change is driving a northward shift in the distribution of North American wildlife, including ungulates. Temperate ungulates are host to a diversity of gastrointestinal nematode species, many of which are not found in woodland and barren-ground caribou (*Rangifer tarandus*). Some of the most pathogenic of these parasites are those of the family Trichostrongylidae which are known to induce considerable morbidity and mortality in livestock globally. Although invasion of new trichostrongylid species to high latitudes may have significant impact on the health of naïve (unexposed) caribou populations, the northern diversity and distribution of most species is unknown. In fact, our recent trichostrongylid survey of 20 wild ungulates in central Alberta and Saskatchewan revealed four new host and seven new geographic records. A challenge to determining parasite diversity is that many trichostrongylid eggs are morphologically indistinguishable and post-mortem recovery and examination of adult nematodes is necessary to establish species identification. To better describe the diversity of parasite fauna that may infect northern caribou, we have developed a rapid, non-invasive tool, Single Stranded Conformation Polymorphism (SSCP), for broad-scale screening of cervid fecal pellets for trichostrongylid parasites. SSCP is a simple PCR-based technique that allows for species-specific electrophoretic discrimination using ITS-2 rDNA from parasite eggs. Trichostrongylid eggs in fecal pellets from three ecotypes of caribou, white-tailed deer (*Odocoileus virginianus*), mule deer (*O. hemionus*) and elk (*Cervus elaphus*) are being screened using SSCP to determine parasite diversity and range along two north-south transects in western Canada. Results outlining trichostrongylid diversity and distribution and implications for threatened woodland and barren-ground caribou populations will be reported. Baseline data on parasite biodiversity and distribution will provide a platform from which managers and veterinarians can monitor parasite range expansion in a warming climate and identify key parasite related risks.