

# A Nearctic parasite in a Palearctic Host: *Parelaphostrongylus andersoni* infecting semi-domesticated reindeer in Alaska



Guilherme G. Verocai<sup>1\*</sup>, Manigandan Lejeune<sup>2</sup>, Greg L. Finstad<sup>3</sup>, Susan J. Kutz<sup>1</sup>

<sup>1</sup> Department of Ecosystem & Public Health, Faculty of Veterinary Medicine, University of Calgary, AB, Canada

<sup>2</sup> Canadian Cooperative Wildlife Health Centre, Calgary, AB, Canada

<sup>3</sup> Reindeer Research Program, School of Natural Resources and Agricultural Sciences, University of Alaska, Fairbanks, AK, USA

\*gui.verocai@ucalgary.ca

## Background

*Parelaphostrongylus andersoni*: Nematoda; Protostrongylidae

- Infects skeletal muscles of caribou and white-tailed deer across North America. Causes significant muscular and pulmonary pathology<sup>1</sup>.

Eurasian reindeer: *Rangifer tarandus tarandus*

- Introduction to Alaska began in 1892
- Animals brought from Russia, and later Norway to provide Inupiat people with a source of meat in times of caribou scarcity<sup>2</sup>.
- Semi-domesticated reindeer currently farmed in Alaska using modern management practices<sup>2</sup>.

Protostrongylidae in North America

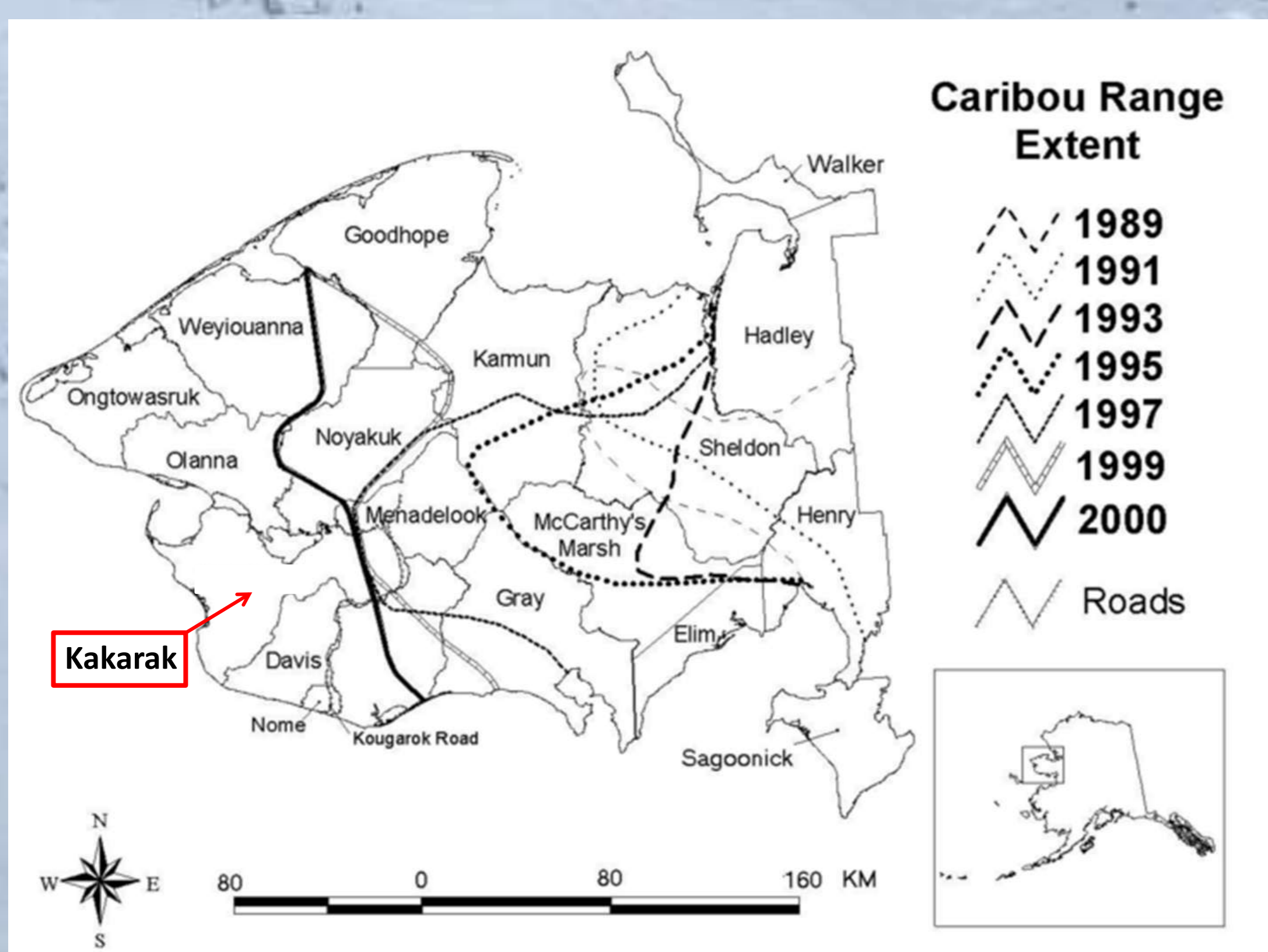
- Knowledge of parasite diversity in native North American ungulates has increased substantially in the last decades<sup>1</sup>
- Knowledge in free-ranging introduced ungulates is sparse.
- Protostrongylids have not been previously reported in reindeer in North America<sup>3,4,5</sup>.

## Objective

Determine what protostrongylid species are present in semi-domesticated reindeer from the from Seward Peninsula, Alaska.

## Methods

Fecal samples (n=44) collected from reindeer of the Kakarak herd. This herd ranges on western Seward Peninsula and historically has had no direct contact with native Grant's caribou (*Rangifer tarandus granti*) of the Western Arctic herd (WAH).



Map of Seward Peninsula, Alaska, showing reindeer herd ranges and recent westward advance of Western Arctic caribou herd on the Peninsula (adapted from Finstad et al. 2006)

- Feces analyzed for dorsal spined protostrongylid larvae (DSL) using the modified beaker Baermann technique<sup>6</sup>.

- Genomic DNA extracted. PCR performed using the primers NC1 and NC2<sup>7</sup>. Sequences at the ITS-2 locus were compared with those available on GenBank.

## Results

- DSL found in ten reindeer (22.7%), intensities of 0.2-50 larvae per gram of feces.
- 40 DSL sequenced: all *P. andersoni* based on BLAST analysis.
- 10 sequenced deposited in GenBank (JQ 946524 to JQ 946533).



DSL of *Parelaphostrongylus andersoni* extracted from reindeer feces

## Discussion

The presence of *P. andersoni* in this reindeer herd might be due to:

- 1) **Recent sympatry with caribou**: introduction associated with the enhanced proximity or range overlap with the WAH during the last 12 years;
- 2) **Natural dispersal**: Sporadic sequential translocation of the parasite to westernmost areas of the Peninsula from the WAH through solitary individuals or other reindeer herds that may have been sympatric with WAH;
- 3) **Anthropogenic**: reindeer movement among herds has been documented either by commercialization or herd admixture, and infected reindeer originally from herds with direct contact with WAH may have entered the herd.

## Conclusion

- The Nearctic nematode *P. andersoni* occurs in semi-domesticated reindeer, a Palearctic host introduced to western Alaska.
- *Parelaphostrongylus andersoni* might also infect other reindeer herds in Alaska and Canada, potentially causing deleterious effects and negatively impacting commercial production

## References

1. Kutz, Ducrocq, Verocai et al. 2012 Advances in Parasitology, 2. Finstad et al. 2006 Nomadic Peoples, 3. Choquette et al. 1957 Can. J. Comp. Med., 4. Dikmans, 1939 Proc. Helminth. Soc. Wash., 5. Hadwen, 1922 J. Parasitol., 6. Forrester & Lankaster 1997, 7. Kutz et al. 2007 Can. J. Zool.