



HAL
open science

Parasitic nematode abundance and diversity variation in bighorn sheep populations across southwestern Canada

Gilles Bourgoïn, Jocelyn Poissant, Janneke Wit, Kathreen Ruckstuhl, Camille Beaumelle, Gavin Hough, Collin Letain, John Gilleard, Susan Kutz

► To cite this version:

Gilles Bourgoïn, Jocelyn Poissant, Janneke Wit, Kathreen Ruckstuhl, Camille Beaumelle, et al.. Parasitic nematode abundance and diversity variation in bighorn sheep populations across southwestern Canada. 28th International Conference of the World Association for the Advancement of Veterinary Parasitology, Jul 2021, Dublin (Virtual), Ireland. hal-04629830

HAL Id: hal-04629830

<https://hal.science/hal-04629830>

Submitted on 30 Jun 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Parasitic nematode abundance and diversity variation in bighorn sheep populations across southwestern Canada

G. Bourgoin^{1,2}, J. Poissant³, J. Wit³, K. Ruckstuhl³, G. Hough³, C. Beaumelle^{1,2,4}, C. Letain⁵, J. Gilleard³, S. Kutz³

¹Univ Lyon, VetAgro Sup, Marcy l'Etoile, France. ²Univ Lyon, Université Lyon 1, CNRS, UMR 5558, LBBE, Villeurbanne, France. ³University of Calgary, Calgary, Canada. ⁴Université Grenoble Alpes, Université Savoie Mont Blanc, CNRS, LECA, Grenoble, France. ⁵Canadian Wildlife Health Cooperative, Alberta, Calgary, Canada

Copyright © 2021 Bourgoin Gilles; contact: gilles.bourgoin@vetagro-sup.fr

1- Introduction

- Bighorn sheep is an iconic wild ungulate species inhabiting the mountains of western North America.
- Wildlife populations are challenged by several stressors including climate change, introduction of non-native species, and encroachment of domestic livestock¹
- potential increase of the abundance of existing parasites, as well as new species may proliferate into previously unaffected regions.
- Characterising parasite diversity and infection intensity in wildlife is complex and labour intensive.
- Fecal egg count is often used, but this technique has poor resolution. Parasite species which cannot be differentiated using fecal examination may differ in pathogenicity.

2- Objective

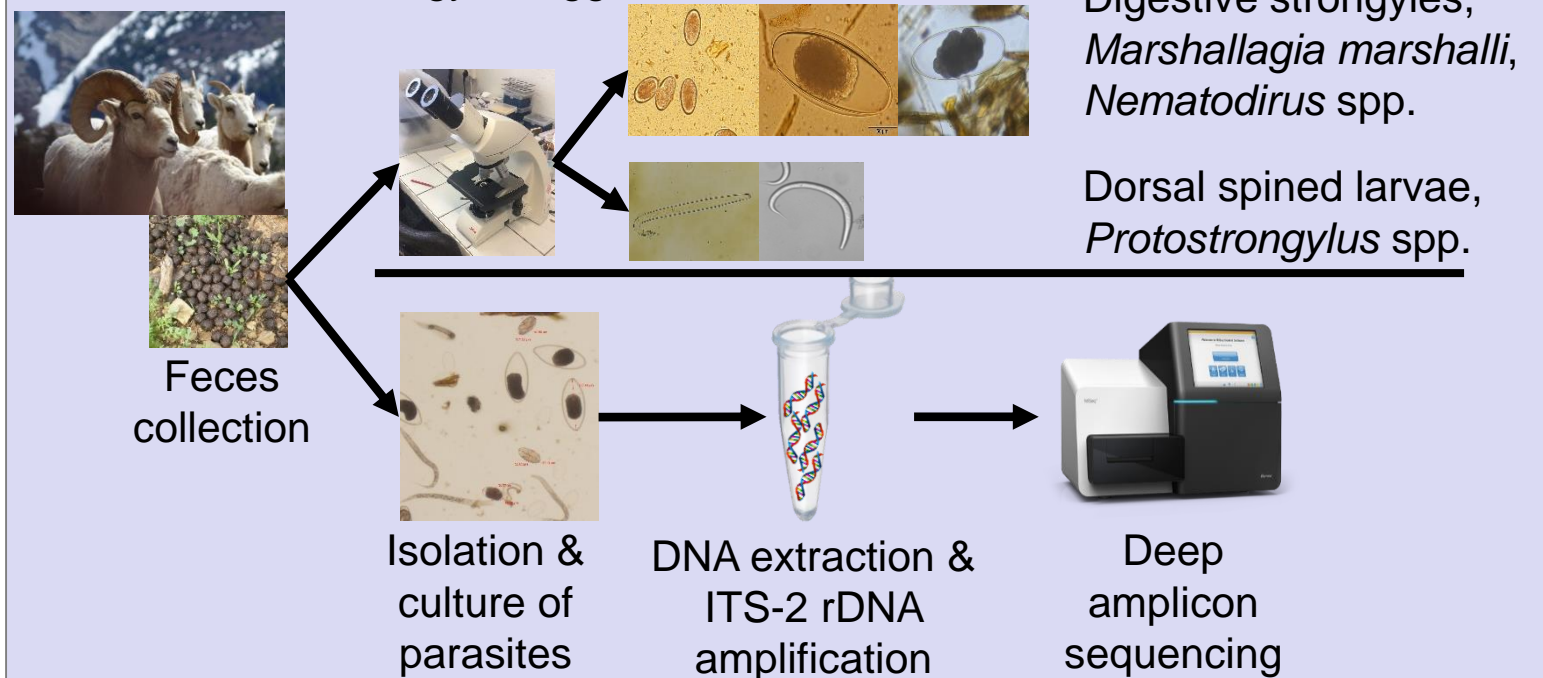
Quantifying parasitism and describing parasite diversity in different populations of bighorn sheep in Western Canada using classic parasitological techniques and a metabarcoding assay².

3- Material & Methods

- Fresh samples were collected from 18 different bighorn sheep populations in 13 areas in western Canada and shipped to the laboratory.
- 2 analyses:

Fecal egg / larvae count

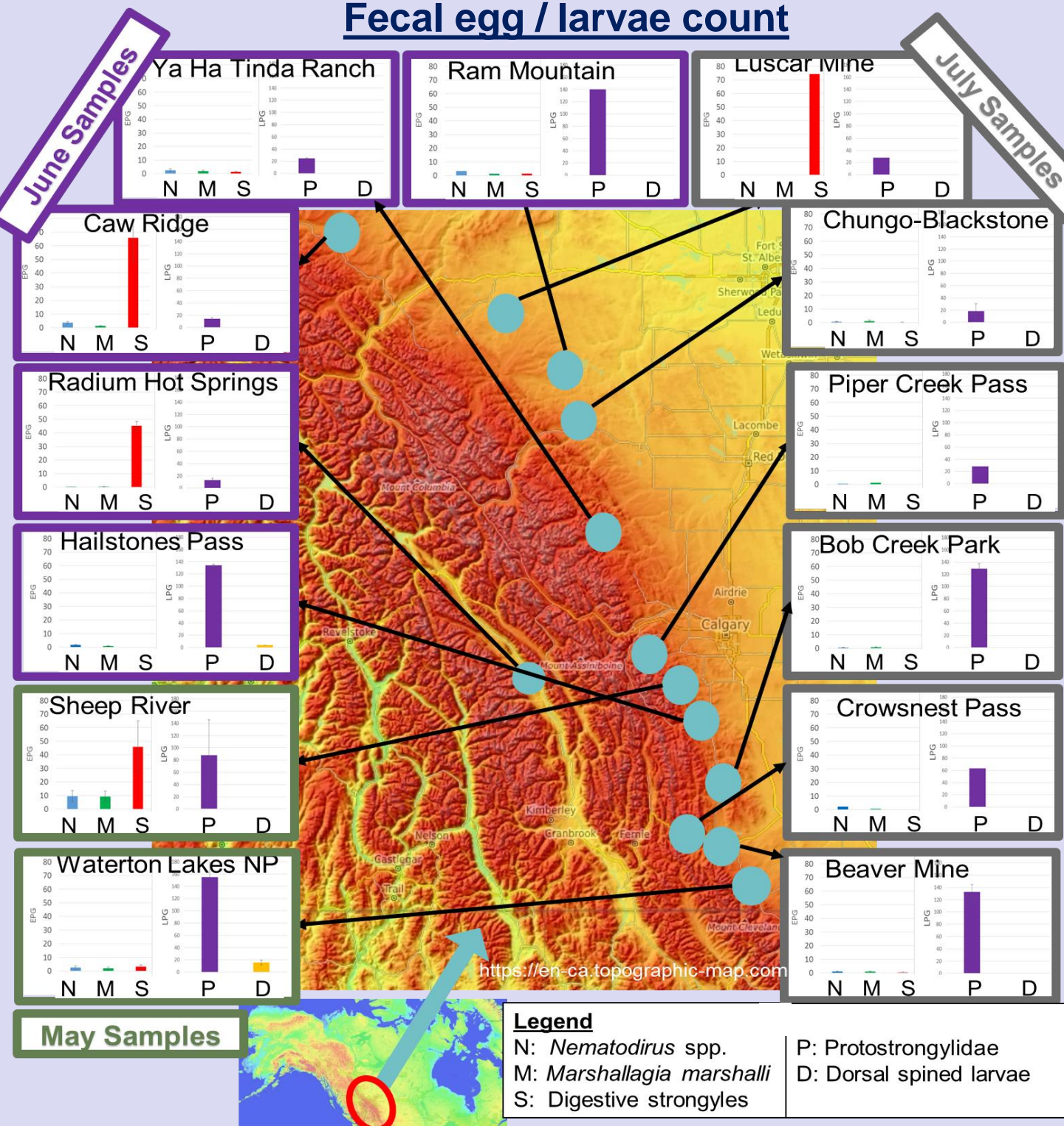
Isolation, identification and quantification of strongyles eggs and larvae



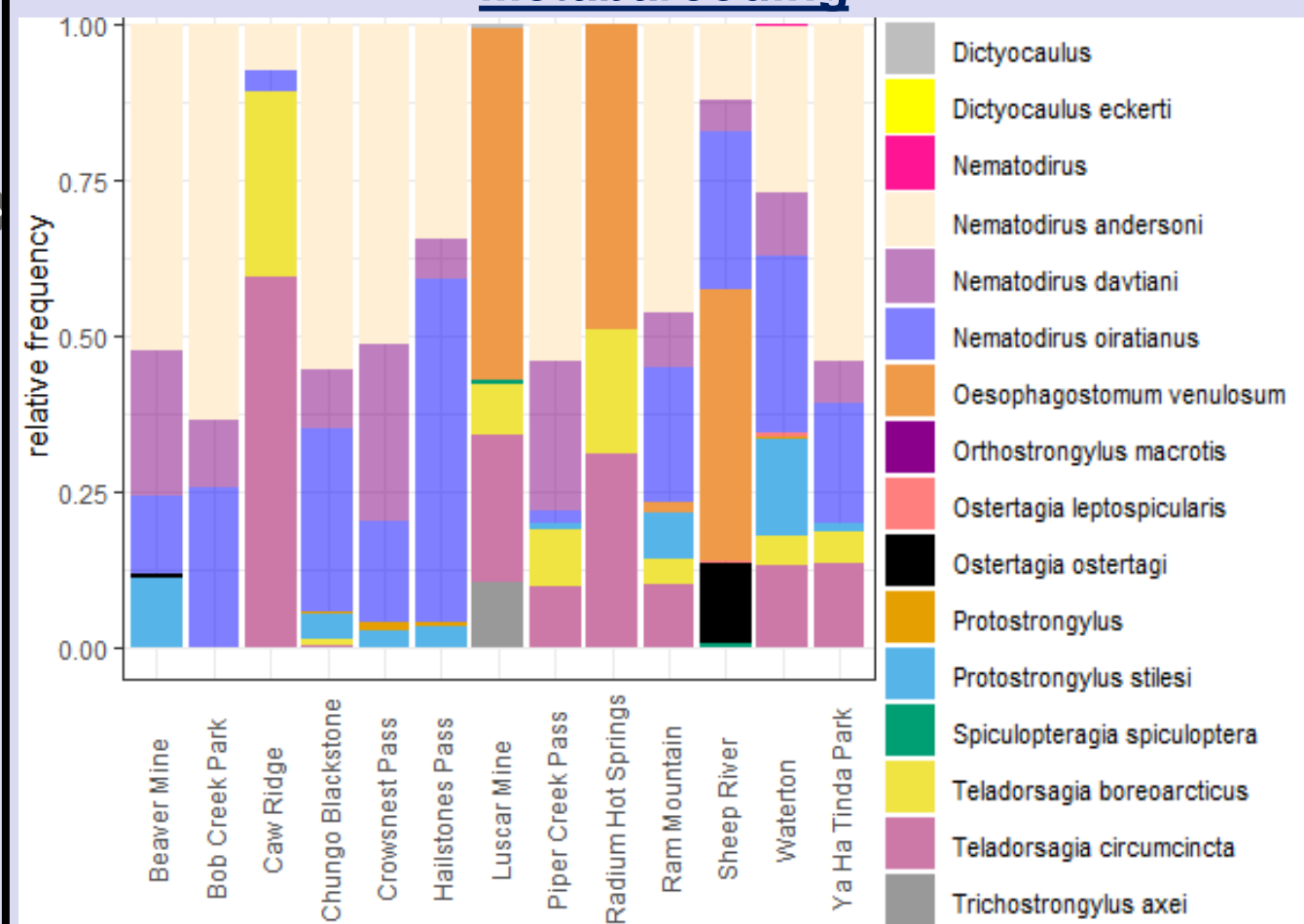
Metabarcoding

4- Results

Fecal egg / larvae count



Metabarcoding



Species composition of parasitic nematode communities in Bighorn sheep from 13 areas in western Canada (*Marshallagia marshalli* not included).

- Differences in parasite abundance among sampling areas, especially for digestive strongyles and *Protostrongylus* spp.
- 17 different genus/species detected in total, with 4-11 (mean = 7) genus/species per sampling area.
- Most parasite species are commonly detected in bighorn sheep. Some parasites are specialist of other host species, including livestock (e.g., *O. ostertagi*)

5- Conclusion

- Parasite heterogeneity among sampling sites might result from local differences in climatic conditions and in diversity and density of host species.
- Results suggest cross-contamination with domestic ungulates.
- Metabarcoding creates new opportunities in ecological studies on host-parasites-environment relationships.

Acknowledgements

To the Alberta Conservation Association for funding and support of this study; to AgreenSkills+ and Vetagro Sup; and to S Rijal, S Cherry, M Didkowsky, S Côté, M Festa-Bianchet, B Johnston, B Mac Callum, C Feder, G Chapman, A Hubbs, J Normandeau, J Kneteman, G Hale and trainees for diligence in collecting fecal samples.

Bibliography

- ¹Rose H et al. (2014) International Journal for Parasitology: Parasites and Wildlife 3: 209–219
²Avramenko R W et al. (2015) PLoS One 10: e0143559.