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

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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

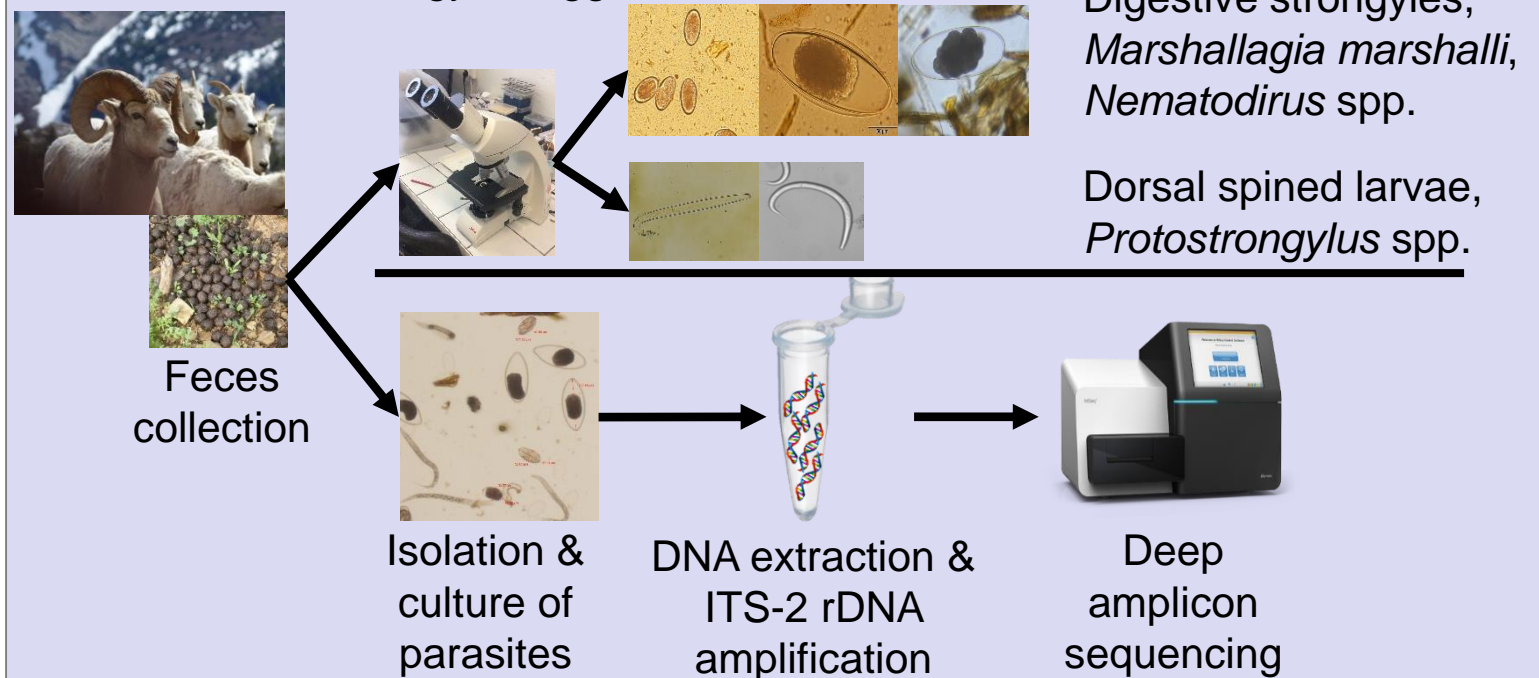
Quantifying parasitism and describing parasite diversity in different populations of bighorn sheep in Western Canada using classic parasitological techniques and a metabarcoding assay².

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

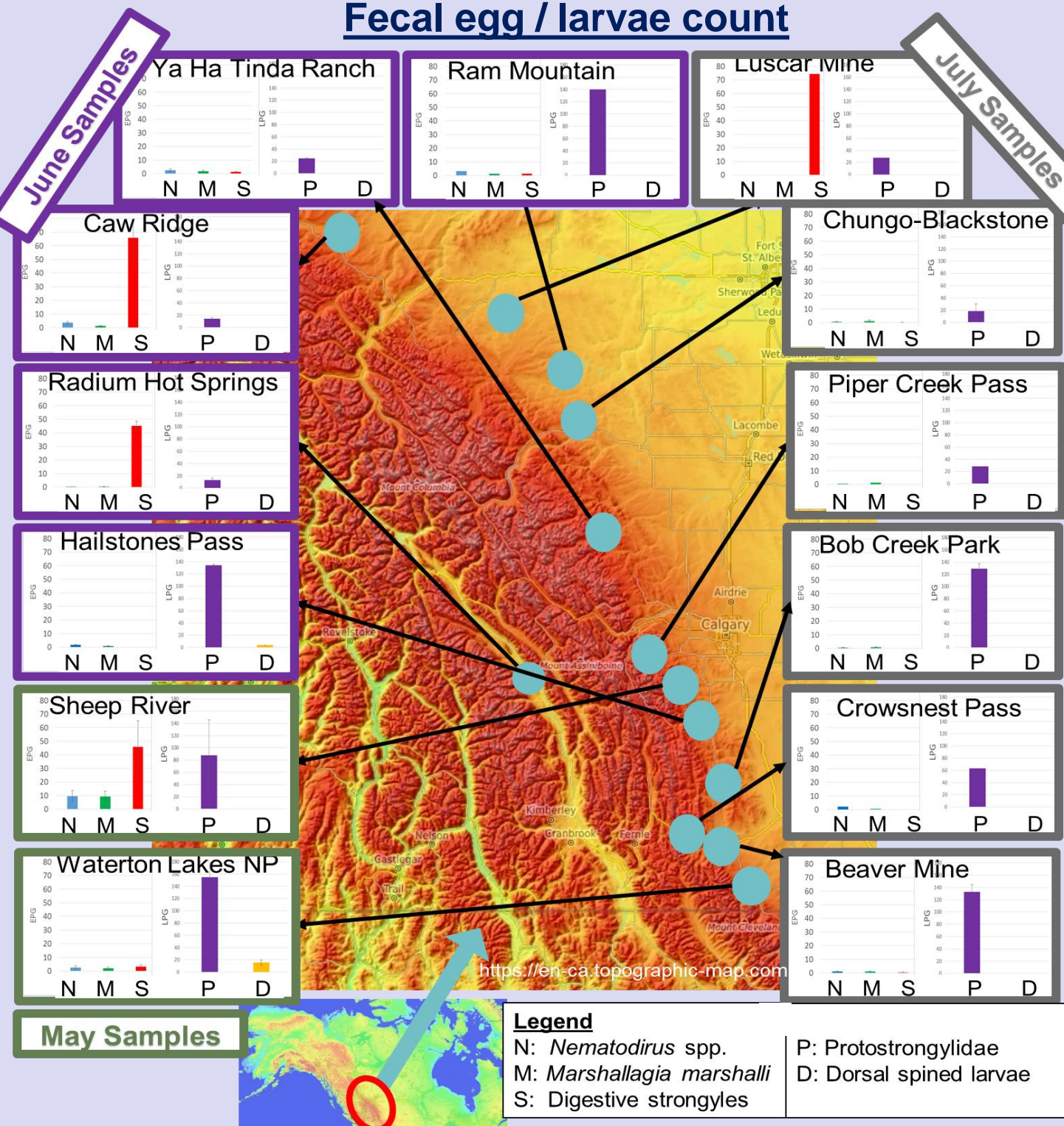
Isolation, identification and quantification of strongyles eggs and larvae



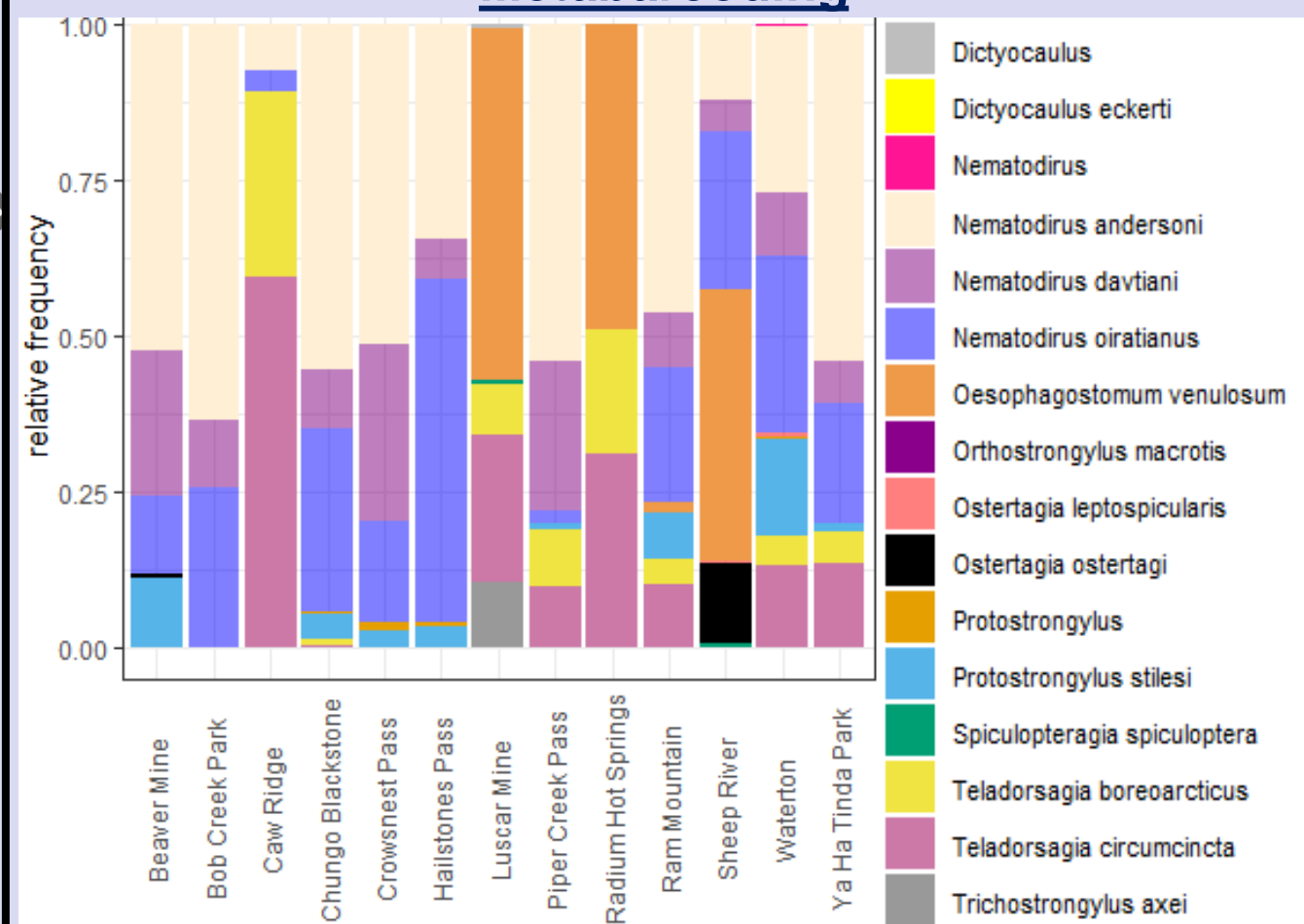
Metabarcoding

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.

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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.