Factors favouring invasion by *Caragana arborescens* in the southern boreal zone of Alberta, Canada

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Introduction

Caragana arborescens

Introduced and distributed on a large scale by the Prairie Farm Rehabilitation Administration (**PFRA**)

Has several traits indicative of high invasiveness:

High rate of seed set and germination

Suppresses neighboring plants

Fixes nitrogen

Grows in a wide range of habitats
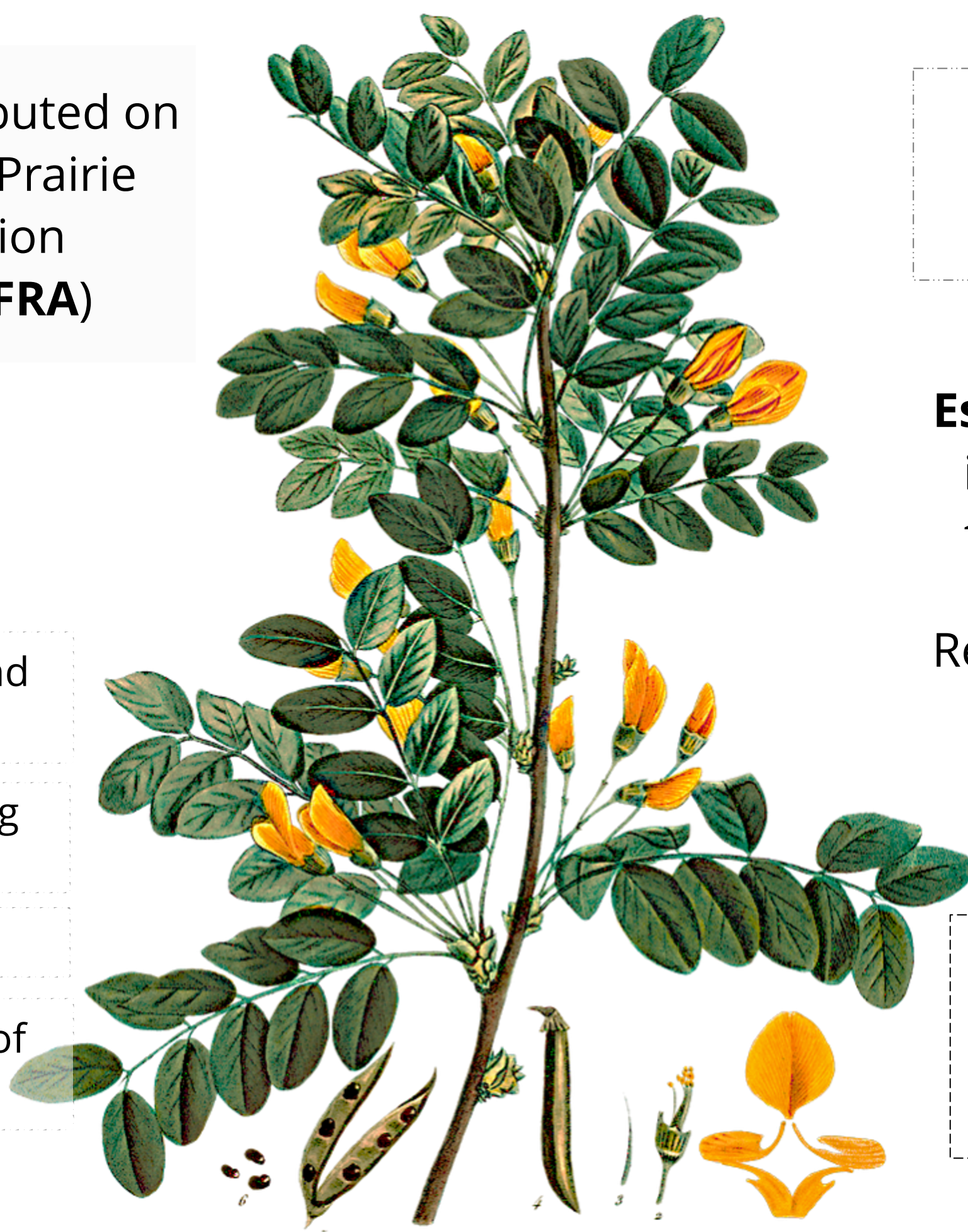
Non-native shrub from Eurasia

Escaping cultivation in Russia, Belgium, the USA, Manitoba

Recently escaped in a national park of Alberta

Not been designated as a noxious species in Canada

We aim to understand the ecological factors that facilitate *Caragana arborescens* invasions from shelterbelts

We expected that places with a higher light availability and sandy soil texture would favour *Caragana arborescens* spread
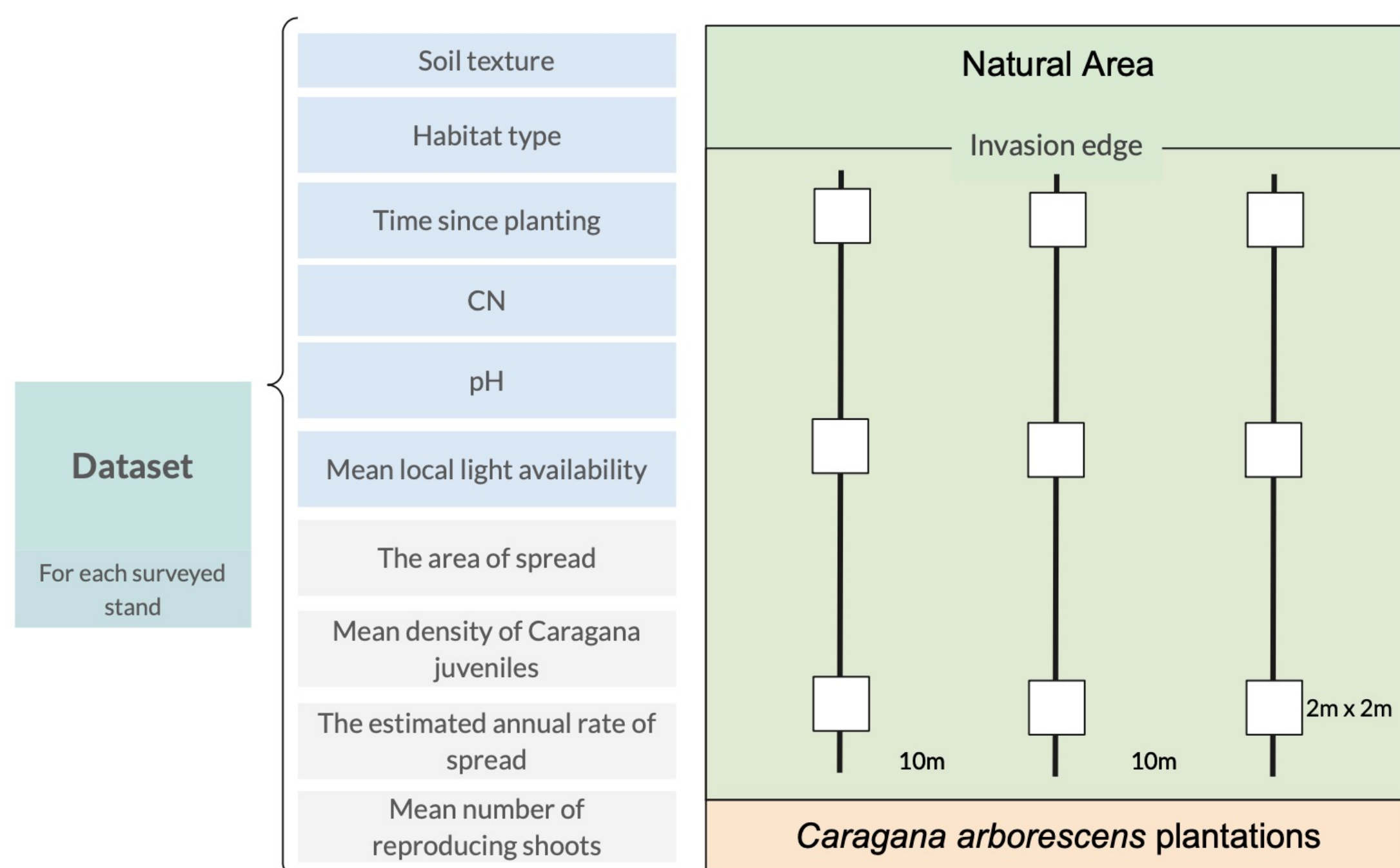
Methodology

1. Fieldwork

How are escaping populations related to environmental conditions?
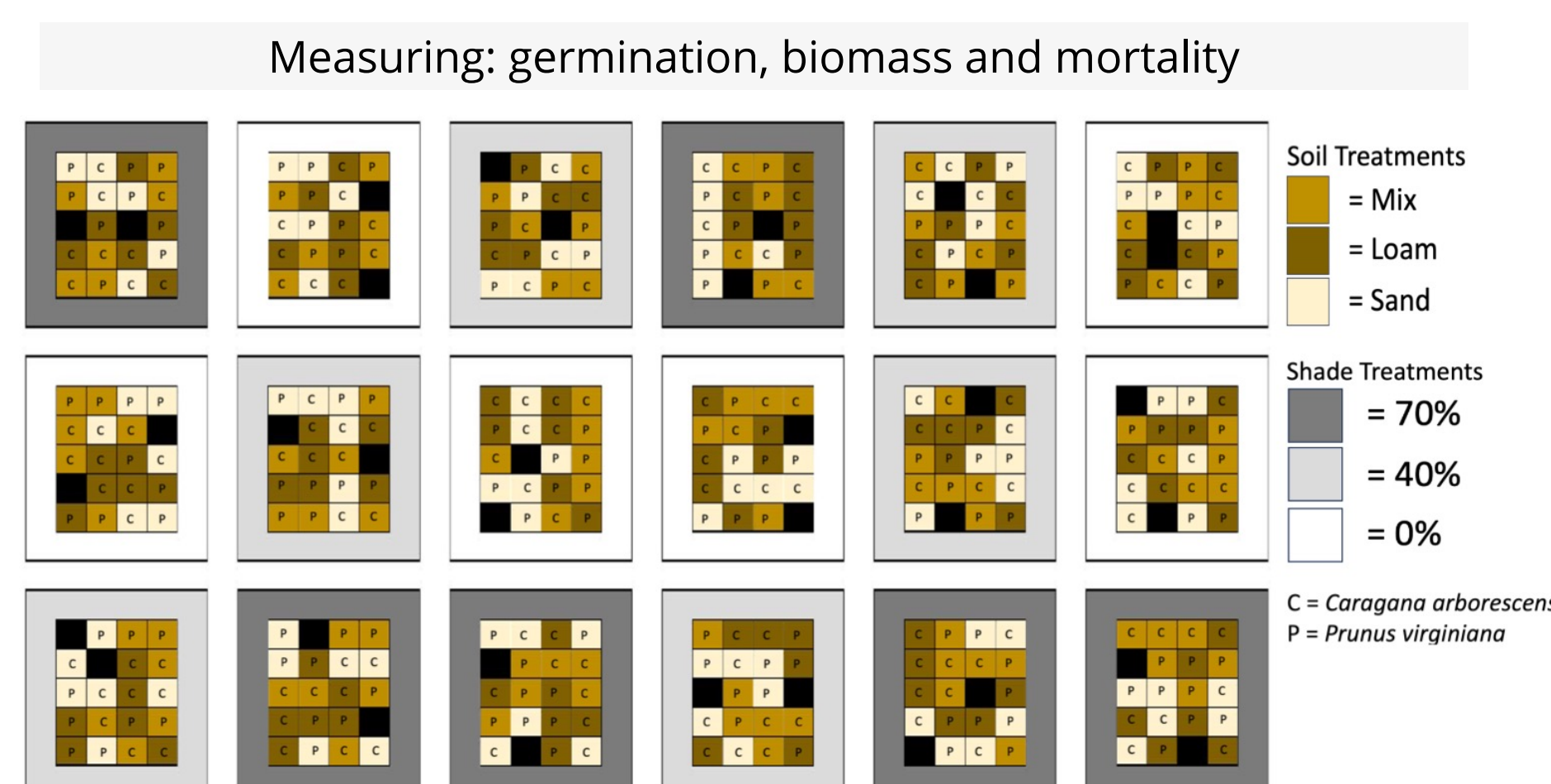
Using the PFRA database and road survey

Completed

2. Growth chamber experiment

How is the early establishment affected by soil texture and light availability under controlled conditions?
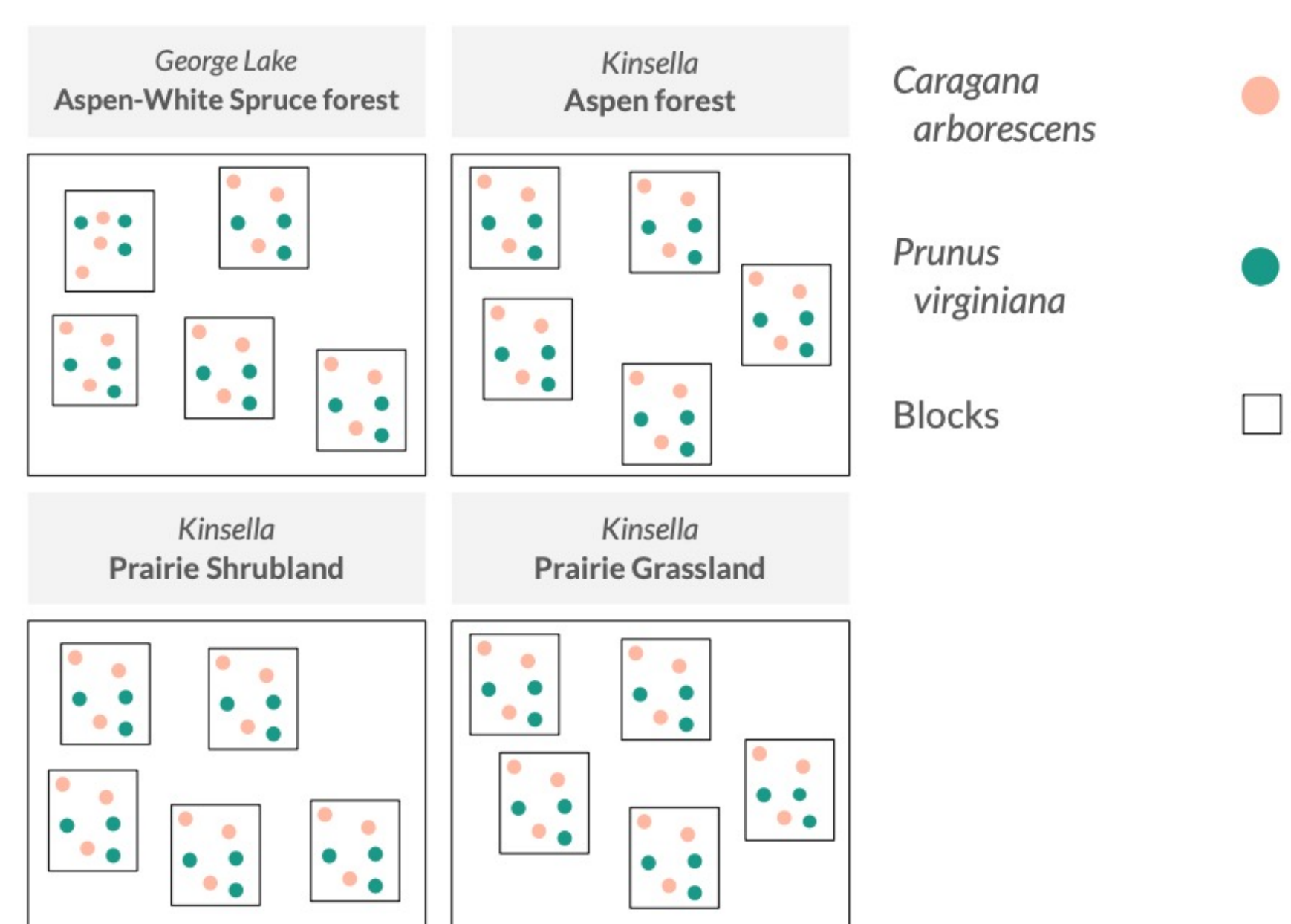
In-progress

Measuring: germination, biomass and mortality

Soil Treatments
= Mix
= Loam
= Sand

Shade Treatments
= 70%
= 40%
= 0%

C = *Caragana arborescens*
P = *Prunus virginiana*

3. Field experiment

How is the habitat type affecting the early establishment?

Measuring: germination, biomass and mortality

In preparation

Results

On average, invasions were larger in Alberta (4.5 acres) than in Saskatchewan (2.6 acres), and more common in aspen forests (51.8%), than in mixed aspen-white spruce forests (25.4%) and balsam poplar forests (7.9%).
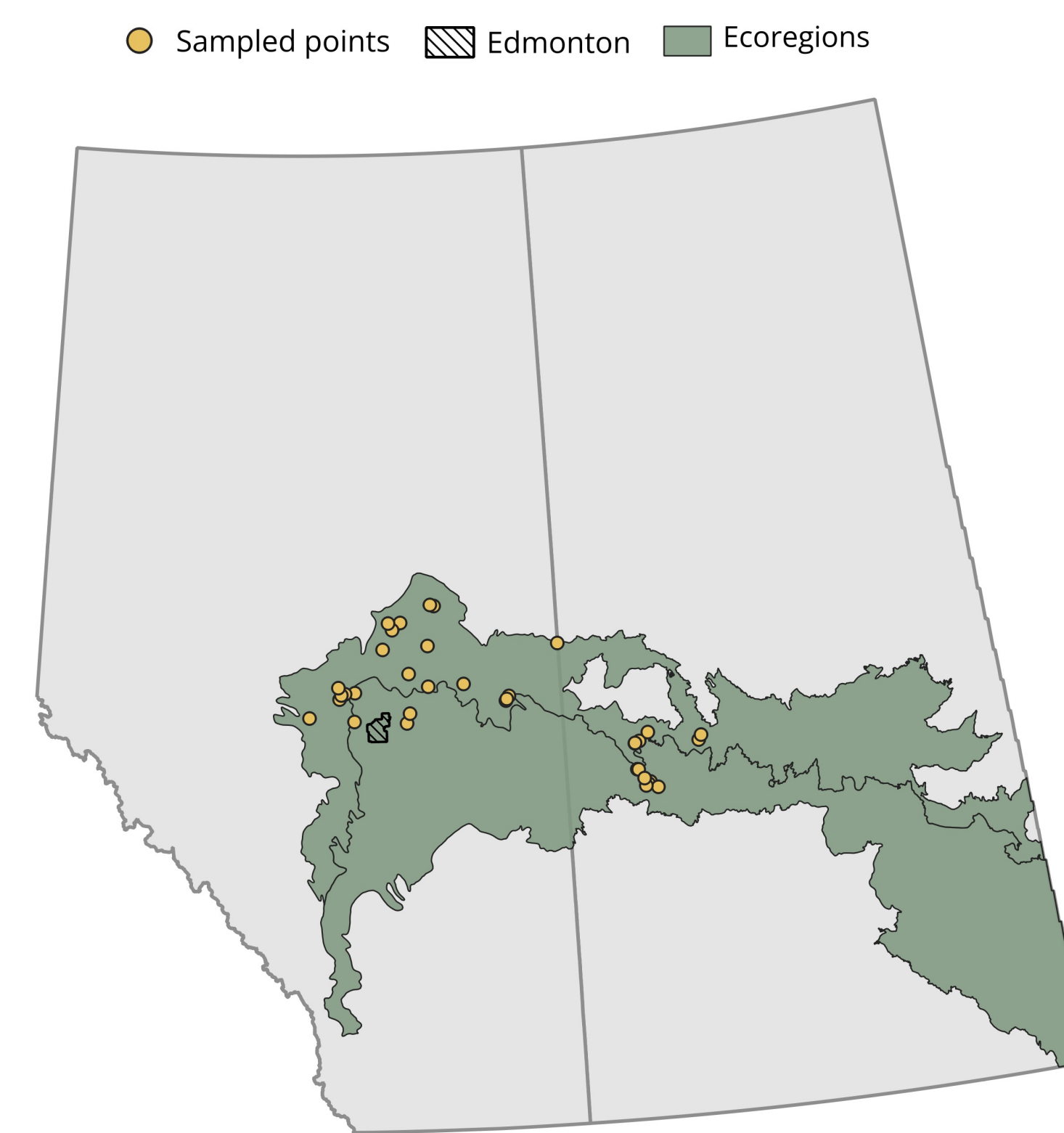

Fig 1. Map with the sampled sites (n = 38) in the Aspen Parkland and Boreal Transition ecoregions in central Alberta and Saskatchewan.
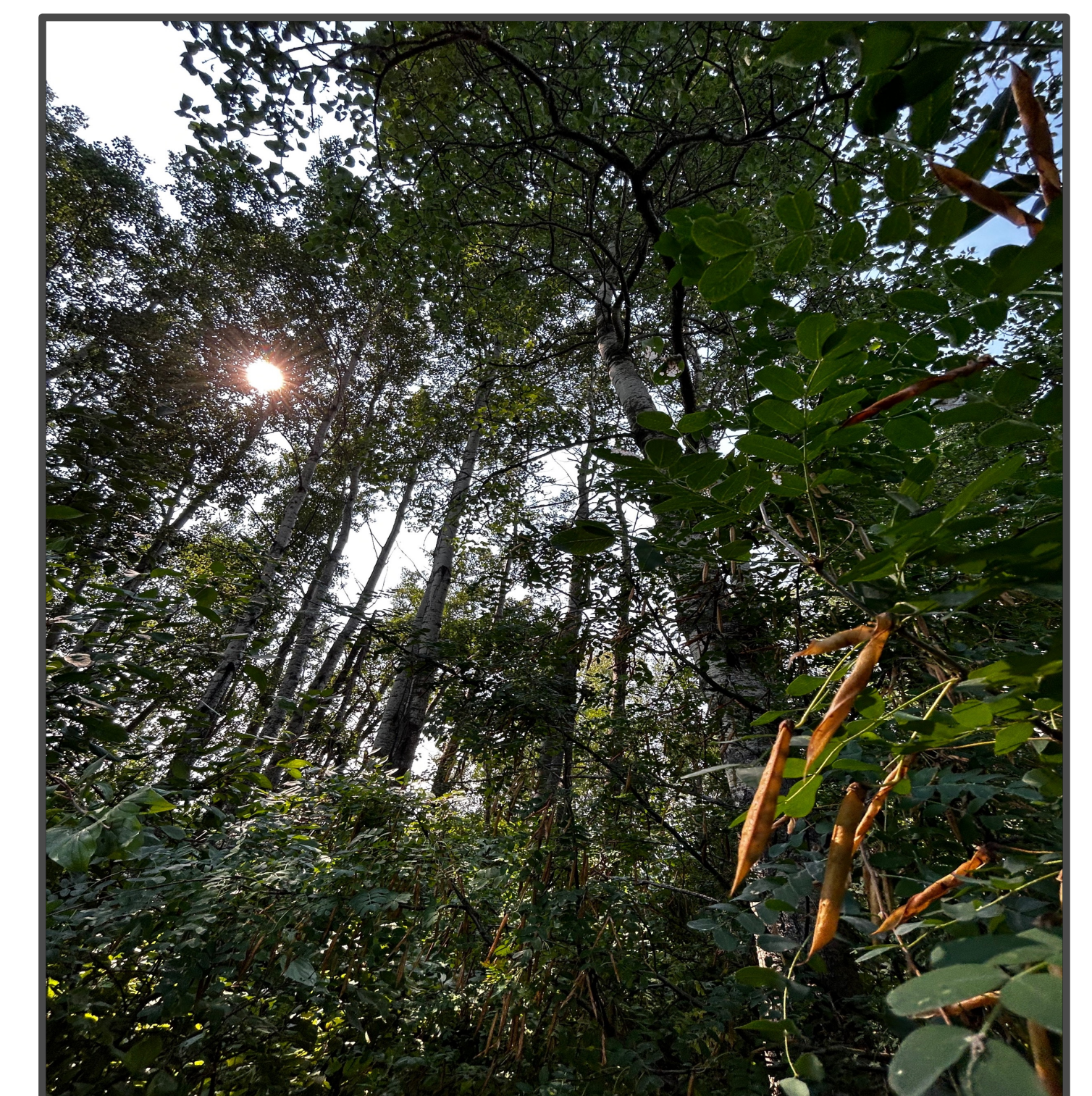

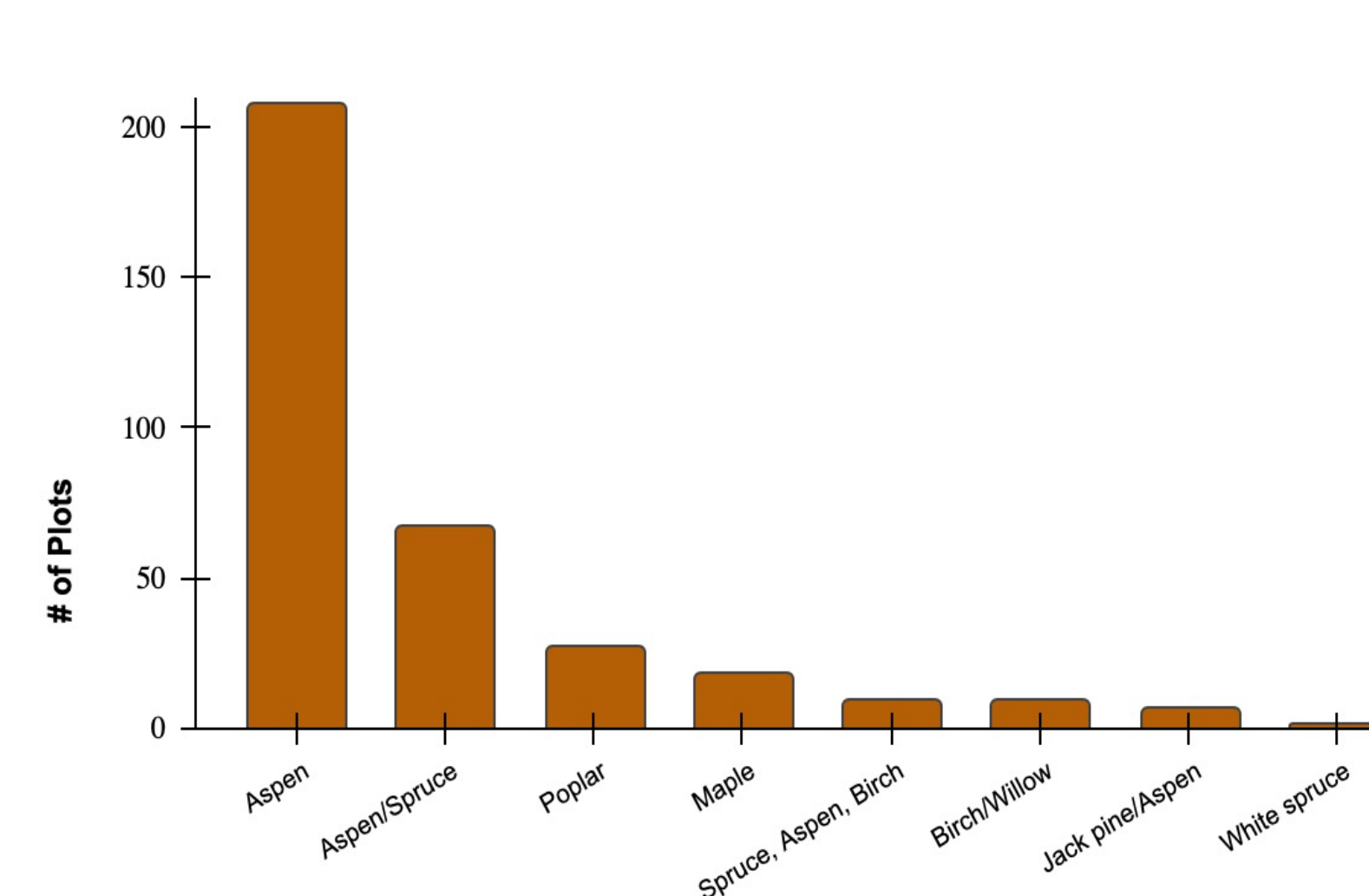**Fig 2**. Picture of *Caragana arborescens* escaping cultivation into a natural habitat.

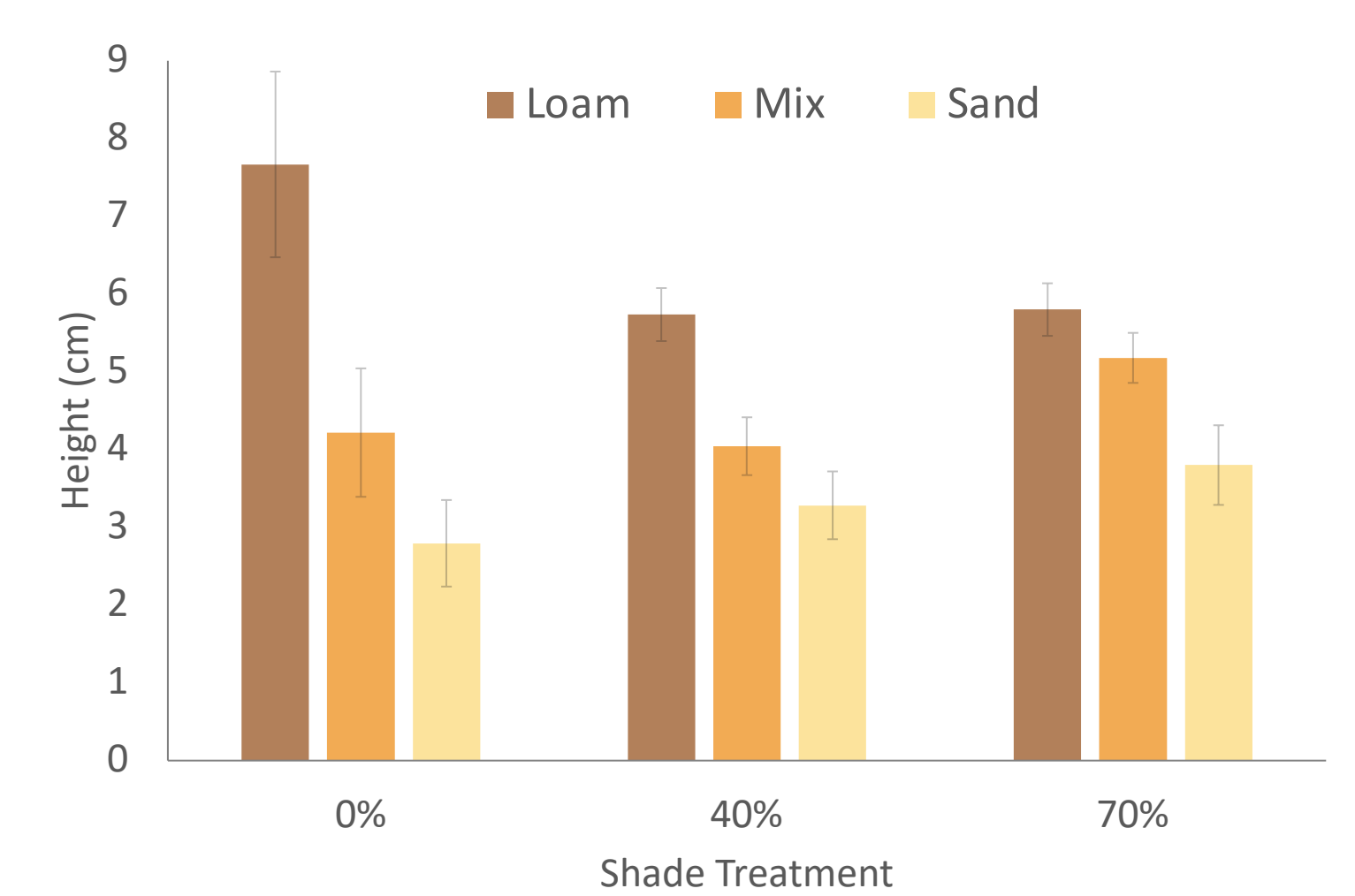**Fig 3**. Distribution of the number of sampled plots per habitat type (n = 342).

Fig 4. *Caragana arborescens* heights from a 3 months growth chamber experiment. 18 pots per soil type in each shade treatment (n = 54). We found significant difference for the soil type but not for the light treatment.

Conclusion

The results will provide a framework for understanding some of the factors that favor *C. arborescens* invasion

Will help to ensure the preservation of the diversity of biological communities and functional ecosystems which are critical to maintain ecosystem services that support human well-being.

The project's outcomes will have the potential to offer guidance to land managers, enabling them to make informed decisions, allocate resources effectively for invasive species monitoring, early detection and response, and long-term control.

Future efforts will focus on identifying the environmental factors facilitating *C. arborescens* invasion into natural habitats and assessing the ecological impacts of *C. arborescens* in the natural habitats of Canada's prairie provinces.

Acknowledgements

References:

UNIVERSITY OF ALBERTA

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