

# Factors restricting the spread of plants at high latitudes

Species On The Move 2019

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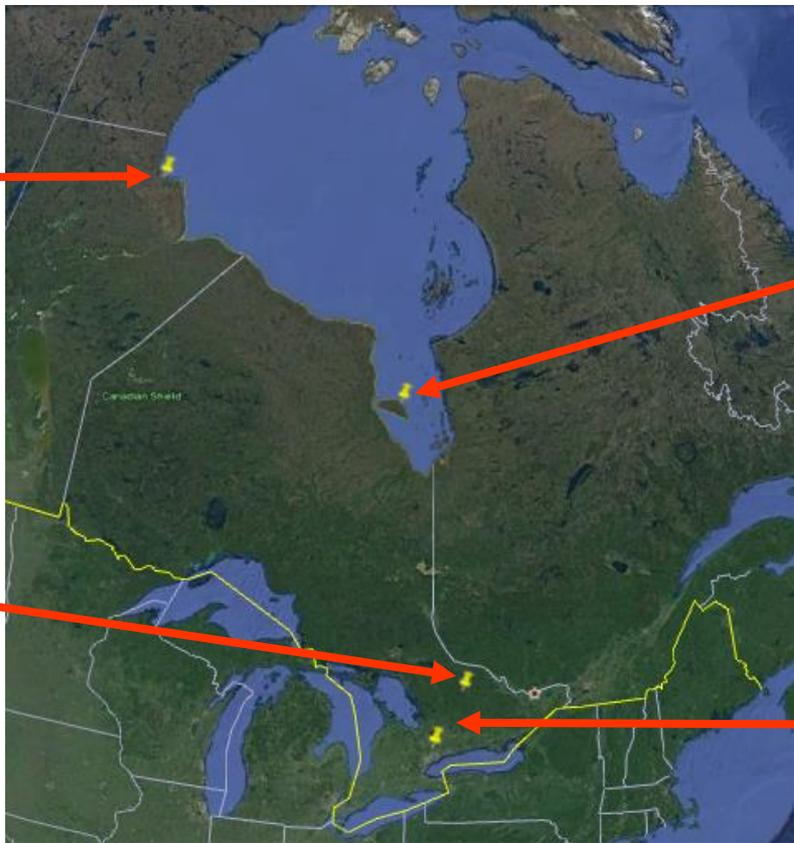


*Leucanthemum vulgare*  
(Oxeye Daisy)

# Most invasive plants in Canada are in the South



**Churchill**  
58°N (subarctic/arctic)  
~7000 km<sup>2</sup>  
107 exotics (20%)



Google Earth



**Akimiski Island**  
53° N (north boreal)  
2300 km<sup>2</sup>, 5 exotics (2%)



**Algonquin Park**  
44° N (north temperate)  
7600 km<sup>2</sup>, 283 exotics (26%)



**Koffler Scientific Reserve**  
44° N (temperate)  
3.5 km<sup>2</sup>, 178 exotics (28%)

# Churchill, Manitoba

- Population is about 800 (significant by northern Canadian standards)
- European settlement starting in 1600's
- Yet almost all invaders still are restricted to townsite and related areas;  
very few have entered surrounding tundra, boreal forest
- Why?



# 1) Propagule pressure

- Hudson Bay Company post since 1717, railway and grain port since 1929, townsite, former military base, centre for scientific research



*Thlaspi arvense*



*Linaria vulgaris*

- But at least some invaders abundantly flower, produce seed

## 2) Disturbance

- Townsite footprint (including dumps, waste areas) is highly disturbed and invaded
- But the area is crisscrossed by roads, trails, railway lines, etc., most of which are invader-free

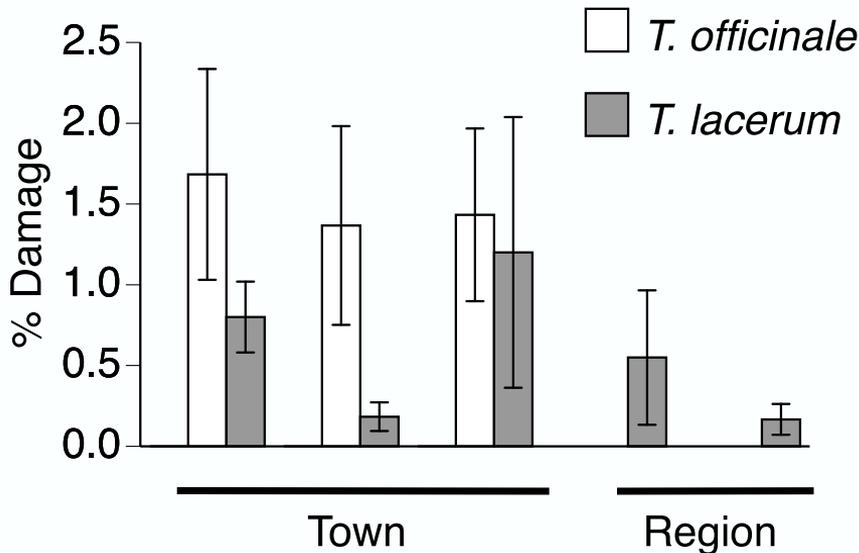


### 3) Herbivory

- Settlements can have reduced herbivory
- Hard to test, since most invaders are only in developed sites
- But not true for dandelions (*Taraxacum*)
- As well, damage levels very low



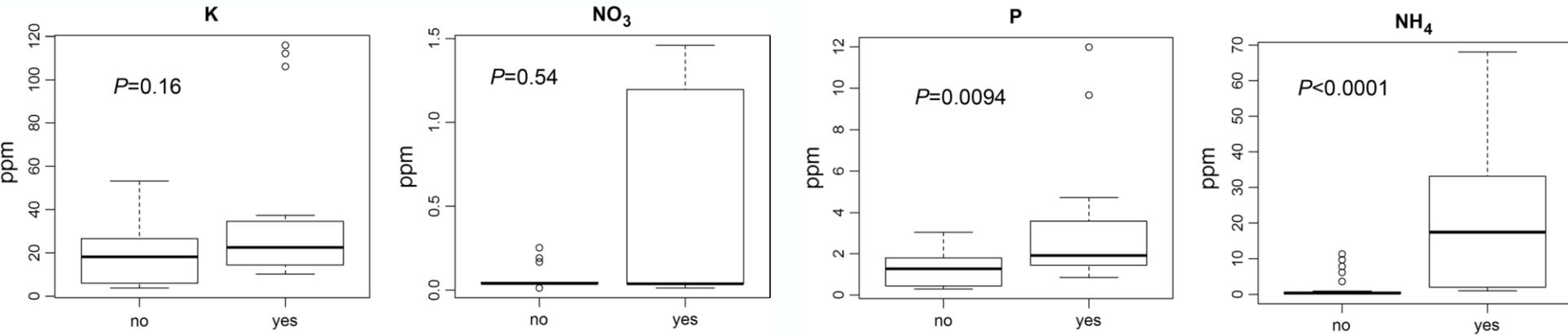
*Taraxacum officinale*  
(exotic)



*Taraxacum lacerum*  
(native)

## 4) Nutrients

- Invaded sites may have more soil nutrients
- But very weak evidence to date



Kent et al. (2018) Climate warming and the arrival of potentially invasive species into boreal forest and tundra in the Hudson Bay Lowlands, Canada. *Polar Biology* 41: 2007–2022

## 5) Microclimate

- Most invaders seem to occur in sheltered or south-facing areas
- But evidence so far is weak

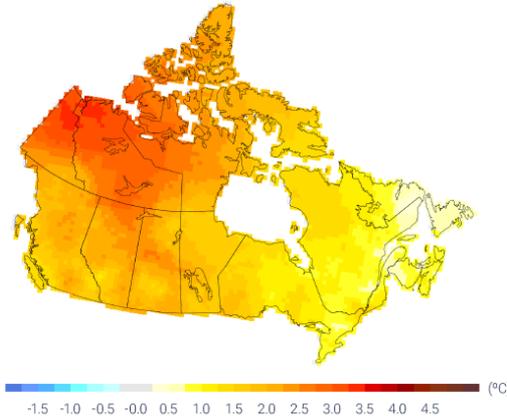


*Trifolium repens*

# Importance

- Canada's climate is rapidly warming, especially in the North
- If temperature is the key factor limiting non-native species, this may directly result in invasion of previously nearly pristine communities
- Towns like Churchill may be foci for these invasions
- Experiments may provide critical evidence on limits to invasion

a) 1948–2016



b) 1948–2016

