



Smooth Brome Invasion into Alberta's Native Grasslands

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Globally, invasive species pose one of the greatest threats to biodiversity and ecosystem function. Forage species that are widely planted and bred represent a source of potentially invasive species, due to their ability to colonize and disperse into surrounding native grasslands. Smooth brome (*Bromus inermis* Leyss.) is one such species. It was introduced to North America in the late 1800s as a forage crop, and it is still being bred and actively planted in Canada. It escapes planted areas, and is found aggressively invading native habitats across Canada. Where it is long-established, smooth brome forms dense patches in the landscape. Since smooth brome is also an economically important species, it is necessary to understand the mechanisms and consequences of its invasion across Alberta's grasslands.

A study across the province by researchers from the University of Alberta at 8 sites with varying moisture and productivity (from Grande Prairie to the border with Montana) revealed smooth brome had a consistently negative impact on other plant species. Over half of other plant species were excluded from smooth brome invaded areas, mostly due to shading. This consistent impact is likely explained by the introduction of different cultivars, bred to perform well under varied conditions. Interestingly, although smooth brome consistently reduced native species richness, its impact on exotic plant species was variable, having no impact on exotic species in several sites. This can have important management consequences, potentially resulting in secondary invasions or an even greater impact on native species richness.



Example of a transect used to monitor smooth brome invasion and its impact on community structure and function.



University of Alberta researchers sampling along transects of smooth brome invasion. Photos by Gisela Stotz.

However, smooth brome success and dominance may not be long lasting. Although no evidence of ‘invasion retreat’ has yet been observed, smooth brome performance is likely to decrease over time due to negative feedbacks within the ecosystem. Smooth brome alters soil conditions where it invades, increasing nutrient availability. In contrast, brome growth and competitive ability decreased when growing in its own soil relative to soil from native-dominated areas. Although further investigation is needed, evidence points to the accumulation of soil pathogens. This may offer an important opportunity to manage the impact and further expansion of smooth brome.

Results from this project demonstrate the importance of evaluating and taking into account the impact planted forage species can have on natural ecosystems when assessing whether to continue planting or introducing new cultivars. Further studies are also needed, as understanding the mechanisms of invasion may help to continue taking advantage of these economically important species, while preventing further losses in biodiversity. For more information on this project, please contact Dr. Edward Bork (edward.bork@ualberta.ca).



Smooth brome patch in a native grassland in the U of A Roy Berg Kinsella research station.



Smooth brome patch from above. Photos by Gisela Stotz.

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