# DEPARTMENT OF AGRICULTURAL, FOOD AND NUTRITIONAL SCIENCE

## MSc Thesis Seminar

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| Supervisors: | **Drs. Edward Bork and Cameron Carlyle** |
| Date: | **Thursday, April 6, 2017** |
| Time: | **1:00 p.m.** |
| Location: | **318J Agriculture/Forestry Centre** |
| Title: | **Effect of Grazing on Litter Decomposition and Microbial Enzyme Activity across Agro-climatic Subregions in Alberta** |

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### ABSTRACT

Grasslands cover approximately 40% of the Earth's terrestrial surface and provide a wide range of ecologically and economically important services such as forage production, carbon (C) and nitrogen (N) storage, and wildlife habitat. Livestock grazing is a ubiquitous use of grasslands around the globe; however, our understanding of the direct and indirect effects of grazing on ecosystem processes including C and nutrient cycling, are largely unknown. To better understand how livestock grazing and associated shifts in plant community compositions affect ecosystem function, we studied litter decomposition and microbial extracellular enzyme activity (EEA) over 18-months using litterbags, placed inside and outside of long-term grazing exclosures at 15 sites across three grassland subregions, including the Central Parkland, Foothills Fescue and Mixedgrass Prairie. Overall, livestock grazing increased litter decomposition rates and litter EEAs, though this response varied among subregions and individual enzymes; decomposition was most rapid in the Foothills Fescue followed by the Parkland and Mixedgrass. While C cycling enzymes activities were enhanced by grazing, those associated with N and P cycling declined relative to their non-grazed counterparts. No effect of grazing on soil EEAs was detected. Litter sources also altered litter decomposition rates and EEAs regardless of subregion or grazing effects. *P. pratensis* had particularly high decomposition rates and EEAs, especially in the Foothills, and a similar pattern existed for *B. gracilis* in the Mixedgrass, suggesting increases in these grazing tolerant species may alter biogeochemical cycling, and therefore C accumulation. Results from this study suggested that grazing could play a critical role in regulating C and nutrient cycling in grassland.