



Soil Health in a Changing Climate: A New Research Project

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Climate change is expected to bring more frequent summer drought and periods of intense rainfall to the Canadian Prairies. Crop growing conditions will be increasingly stressed and risk of yield losses and failure could increase. Crops need water to grow and the supply of nutrients is reduced under drought conditions, thus growth and yield are greatly reduced. Heavy rainfall washes away nutrients, seals soil, and damages crops. These changing growing conditions will shift disease pressures, especially Fusarium head blight (FHB), which could further exacerbate risks to crop growth and yield. Furthermore, as water and nutrient dynamics shift, so too will greenhouse gas (GHG) emissions and soil microbial biodiversity and thus the environmental footprint of agriculture. Agricultural producers will need to select management practices that give their agro-ecosystems the greatest resistance and resilience to potential changes. Reduced soil tillage intensity systems (e.g., no-till) lessen soil disturbance and promote soil structure that shifts water and nutrient fluxes. Crop irrigation relieves water stress and thereby promotes plant growth thus increasing soil organic matter input to soil. Reduced tillage systems and irrigation may on one hand promote healthy functioning soils that result in higher crop yields but on the other hand disease pressures and GHG emissions may increase. A balance must therefore be struck between practices beneficial for water and nutrient fluxes given predictions of increased incidence of drought and heavy rainfall events during the growing season and risks involved with greater potential for FHB and GHG emissions. Therefore, we propose to evaluate the impact of soil tillage intensity and irrigation on soil health, GHG emissions, soil and rhizosphere microbial biodiversity, and incidence and severity of FHB under drought and heavy rainfall conditions.