The Influence of Nitrogen Stabilizers and Split Fertilizer Application on Agronomic Performance and Mitigation of N_2O Emission from Canadian Western Red Spring (CWRS) Wheat

Sawbhagya L.H.N[1*], Sparling B[1], and Tenuta M[1], St.Luce M[2], May B[3], Kubota H[4], Beres B[5]

[1]Department of Soil Science, University of Manitoba, Winnipeg, MB, Canada

[2]AAFC, Swift Current, SK, Canada [3]AAFC, Indian Head, SK, Canada

[4]AAFC, Lacombe, AB, Canada [5]AAFC, Lethbridge, AB, Canada

Canadian Western Red Spring (CWRS) wheat is a predominant type of grain commodity in Canada due to its high protein content and remarkable milling qualities. This study evaluates the combined effects of nitrogen (N) stabilizers, split N application, and reduced urea rates on the agronomic performance and reduction in N_2O emission from CWRS Wheat. A three-factor factorial randomized complete block design (RCBD) was implemented across five locations: Notre Dame (ND), Indian Head (IH), Swift Current (SC), Lacombe (LC), and Lethbridge (LB). Treatments included nitrogen stabilizers, timing of application, and nitrogen application rates, along with a 0% N control treatment. N_2O emissions for 0% and 100% N treatments were measured using static vented chamber methods and the HMR R package. Urea at planting produced the highest cumulative growing-season emissions at ND, SC, and LC, with values of 1.498 kg N_2O-N/ha, 0.090 kg N_2O-N/ha, and 2.131 kg N_2O-N/ha, respectively, in comparison with other treatments. Split application with eNtrench and ANVOL reduced the emissions by 16% (ND), 20% (IH), 15% (SC), 62% (LC), and 26% (LB) compared with the split application without inhibitors. The study continues with three more field seasons in all the sites to validate these emerging trends.

* Corresponding author's email address
lelwalan@myumanitoba.ca