

## **The effect of integrated crop management on weeds and crop yields in wheat (*Triticum aestivum* L.).**

Uthpala Ekanayake<sup>1</sup>, Rob Gulden<sup>1</sup>, Chris Willenborg<sup>2</sup>, Jonathan Rosset<sup>1</sup>, Dilshan Benaragama<sup>1\*</sup>

<sup>1</sup>Department of Plant Science, Faculty of Agricultural and Food Sciences, University of Manitoba, 66 Dafoe Road, Winnipeg, MB, R3T 2N2, Canada

<sup>2</sup>Department of Plant Science, College of Agriculture and Bioresources, University of Saskatchewan, Saskatoon, SK, S7N 5A8, Canada

\*Dilshan.Benaragama@umanitoba.ca

### **Abstract**

Integrated Crop Management (ICM) that combines fertilizer and weed management practices is an underexplored strategy for sustainable weed management. Field experiments were conducted in 2023 and 2024 at the Carman Research Field-Manitoba to investigate the effect of ICM on weed management and spring wheat (*Triticum aestivum* L.) yields. The study used a four-way factorial design with two levels each; fertilizer application timing (spring, fall), placement (broadcast, banding), rate (50%, 100%), and weed management (IWM-Integrated Weed Management, standard). The IWM featured narrow row spacing (6"), high crop density (400 plants m<sup>-2</sup>) and early seeding, while the standard weed management had wider row spacing (12"), lower crop density (200 plants m<sup>-2</sup>) and late seeding. Treatments established as a split-block RCBD with four replicates. Results showed that IWM increased grain yield by 50% compared to standard in comparatively dry 2023 season while, IWM-fall-100% produced 55% higher yield than standard-spring-50% under wet 2024. A 90% reduction in weed biomass was observed with IWM-side banding compared with standard-broadcasting in 2023, while in 2024 there was a 65% reduction in IWM-side banding-50% compared with standard-broadcasting-50%-standard in 2024. The results show dependent interactive effects of fertilizer and cultural weed management on weed control and crop grain yields.