The Effect of Integrated Crop Management on Weeds and Crop Yields in Wheat (*Triticum aestivum* L.)

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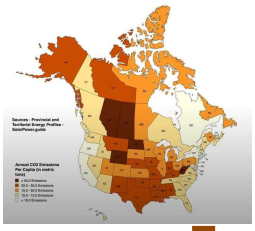
Strategies for Winning Agronomic Battles: A case study on Herbicide Resistant Weeds

Introduction

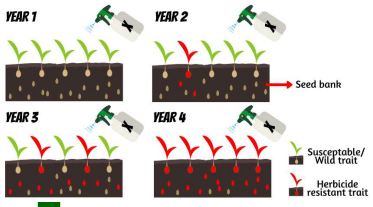
Greenhouse gas emission

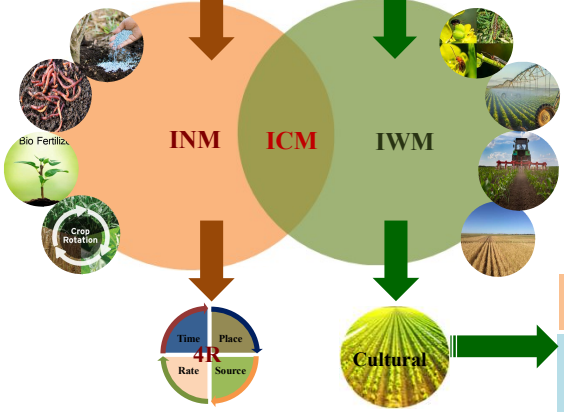
- Agriculture accounts **7.9%** of Canada's total GHG emissions



Herbicide Resistance

- **523** unique cases globally
- **124** in Canada





Increasing the **crop competitiveness**

- ❖ Narrow row spacing
- ❖ High density
- ❖ Early seeding time

Goal

To determine the combined effect of cultural weed management and 4R nitrogen management on weed suppression and wheat yield.

Hypothesis

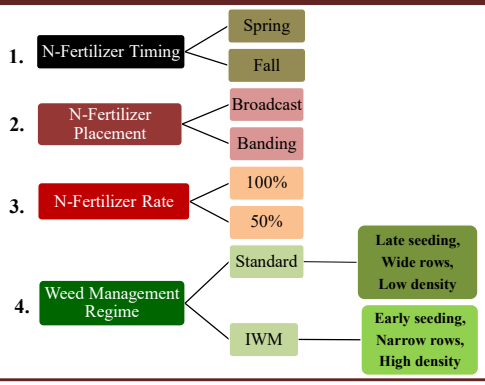
Cultural weed management strategies combined with 4R nitrogen management can augment weed control benefits and wheat yield.

Experimental Design

- Split-Block RCBD
- Split by Fertilizer Timing

- 16 Treatments
- 4 replicates

Treatments



Results

Carman 2023

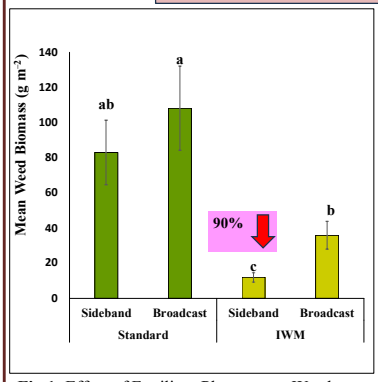


Fig.1: Effect of Fertilizer Placement x Weed management on weed biomass

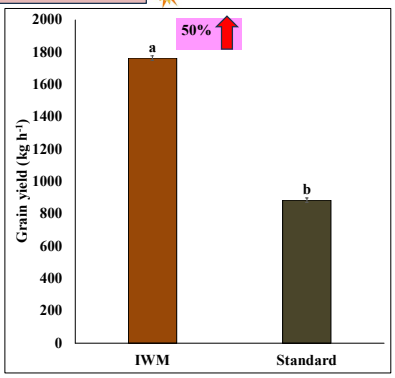


Fig.2: Effect of Weed management on wheat grain yield

Carman 2024

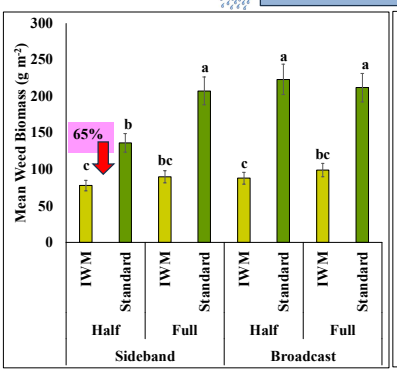


Fig.3: Effect of Fertilizer placement X Rate X Weed management on weed biomass

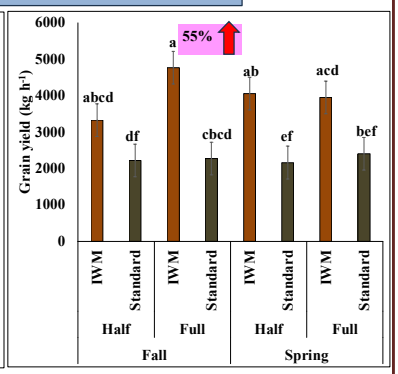


Fig.4: Effect of Fertilizer Timing X Rate X Weed management on wheat yield

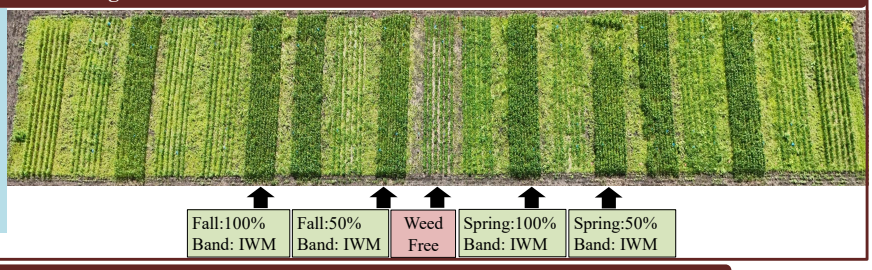
Findings

2023 Dry year

1. Weed biomass was 90% lower in IWM-side banding N compared to SWM-broadcast N application.
2. Grain yield was mainly affected by IWM, with 50% greater compared to SWM.
3. Fertilizer management did not have any impact on grain yield.

2024 Wet year

1. IWM-50%N-side banding had 65% lower weed biomass compared to SWM-50%N- broadcast.
2. IWM- Fall-100%N combination provided the greatest crop yield (55%) compared to the lowest yielding SWM-spring-50%N combination.



Conclusion

During good growing conditions, IWM with N fertilizer management can provide additive benefits in managing weeds and increasing wheat yields.
IWM still benefits weed management and wheat yields, irrespective of N fertilizer management strategies and growing conditions.
The benefits of 4R in weed management and crop yields depend on growing conditions.

Reference

Funders: Manitoba Crop Alliance, Sask Wheat Development Commission, Mitacs