

Suppressing wild oat with spring wheat height and seeding rate

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Wild oat seeds

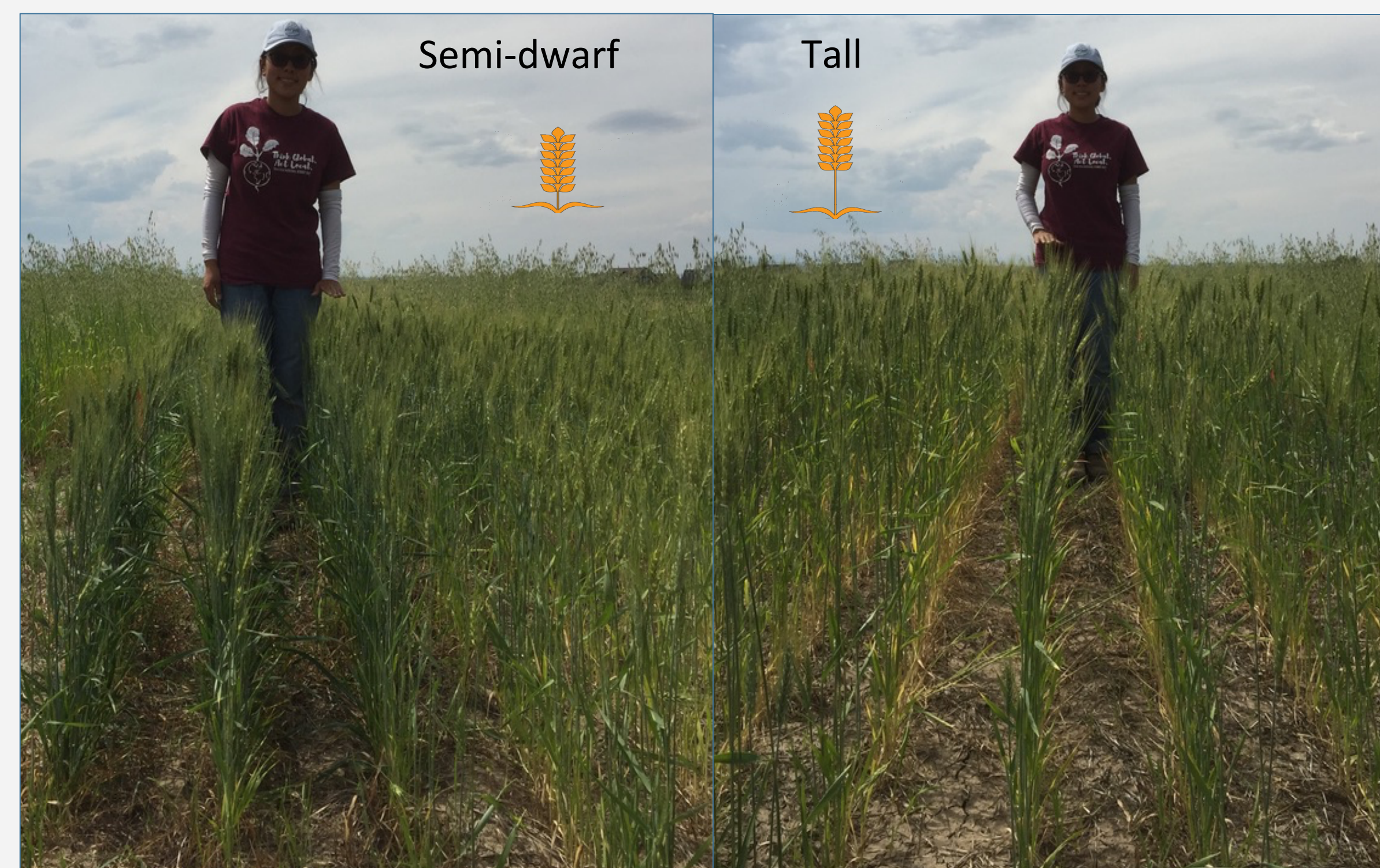
Wild oat (*Avena fatua* L.)

Introduction

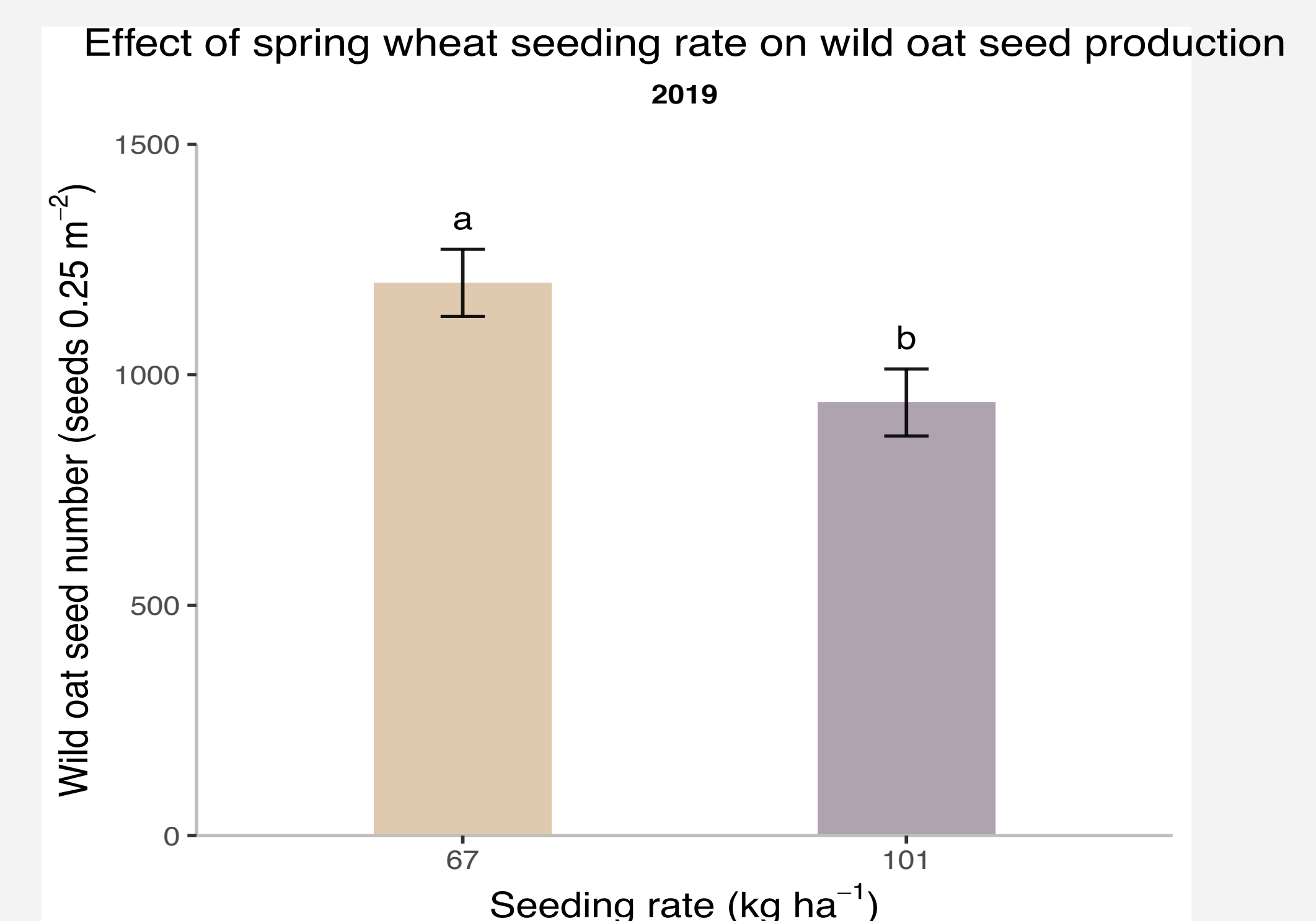
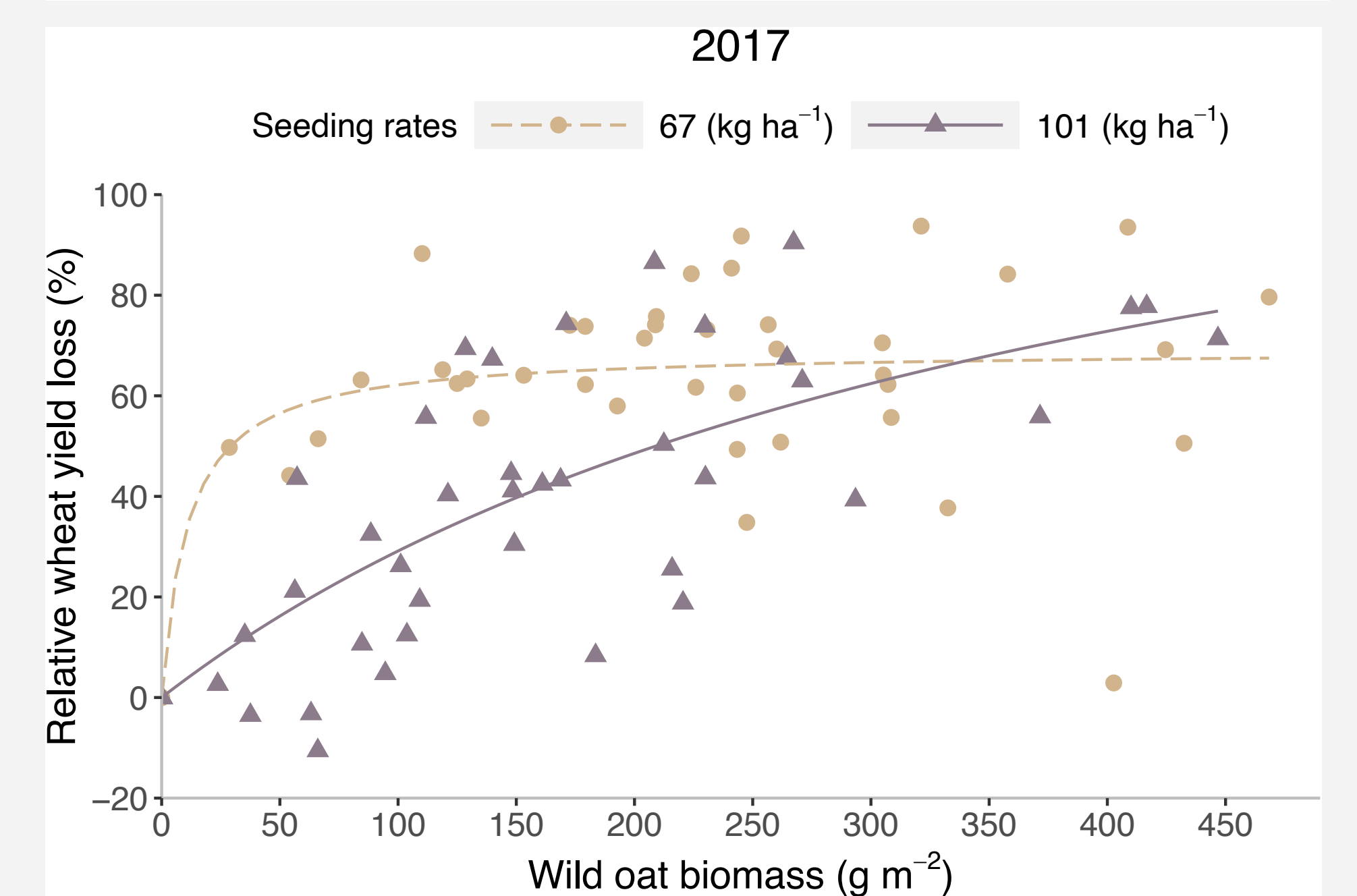
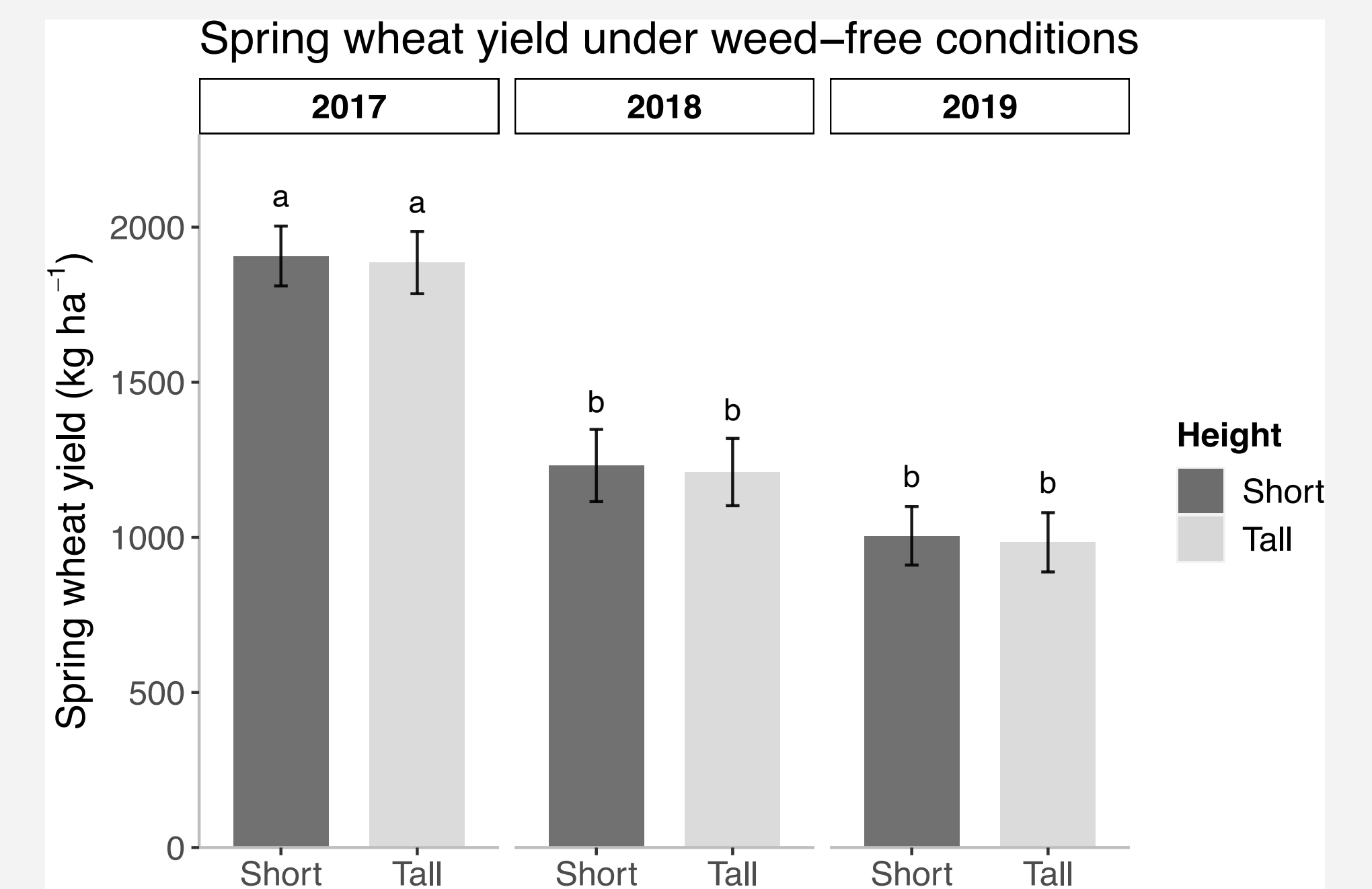
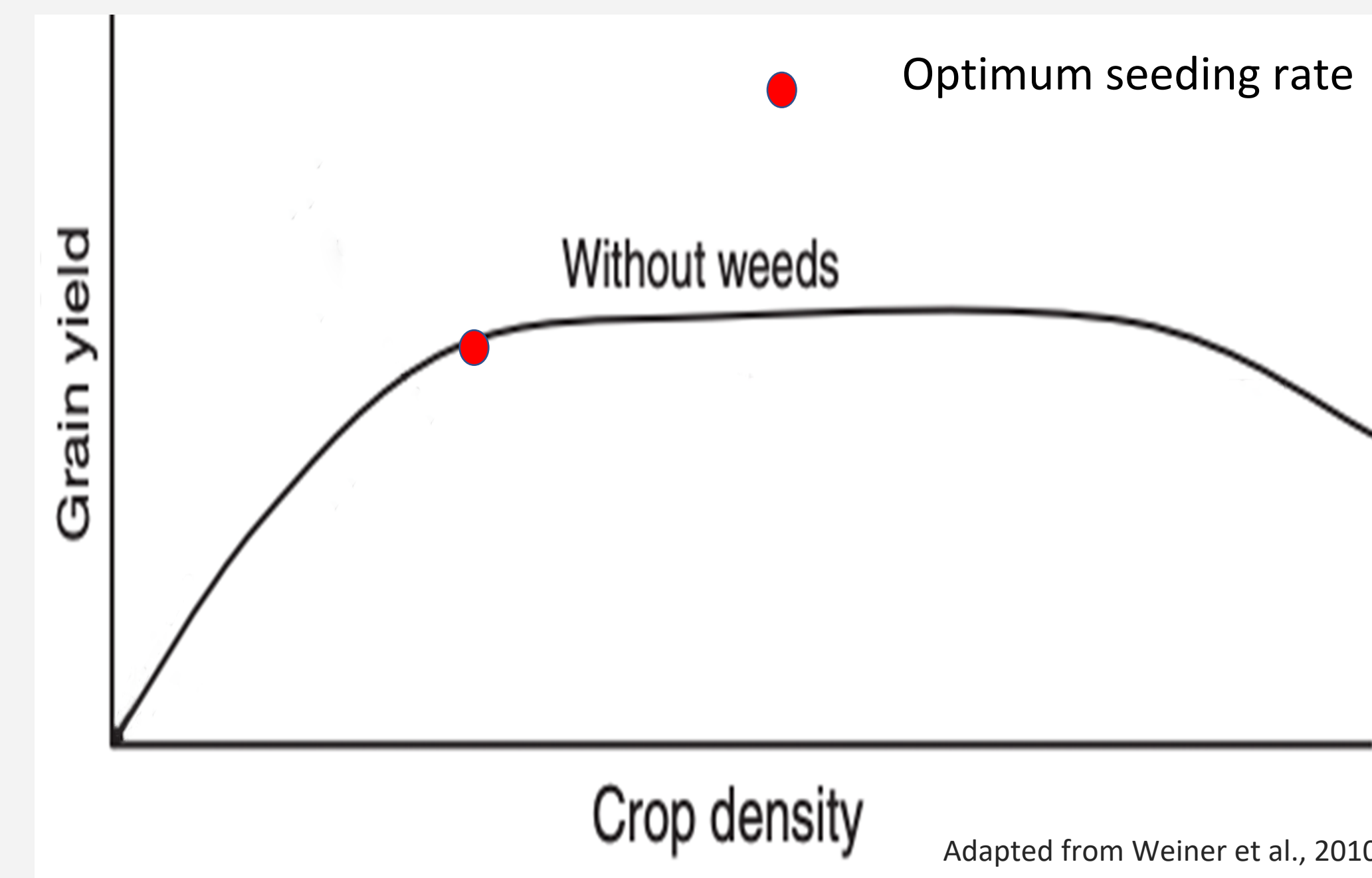
- Since the 1950s, worldwide weed management has shifted to almost total dependence on synthetic herbicides for weed control.
- Repeated use of herbicides has selected for herbicide resistant weed biotypes. Herbicide resistance is threatening the sustainability of agroecosystems (Liebman et al., 2016).
- Wild oat (*Avena fatua* L.) is one of the most economically detrimental annual weeds that have evolved multiple herbicide resistance in the Northern Great Plains (Lehnhoff et al., 2013).
- This study aims to determine whether the joint use of taller crop canopy with a higher crop seeding rate would be an effective integrated strategy to suppress wild oat. This strategy could be easily adopted by farmers as an alternative for weed control.

Near-isogenic lines:

Two lines of a spring wheat cultivar (Amidon) have a nearly identical genetic background except for the height.



Crop seeding rates:



Different letters are significantly different among treatments (alpha = 0.05, Tukey-adjusted)

Farmers can use a higher crop seeding rate to suppress wild oat and reduce yield losses caused by wild oat competition.

Randomized split-plot complete block design

2 x 2 factorial design:

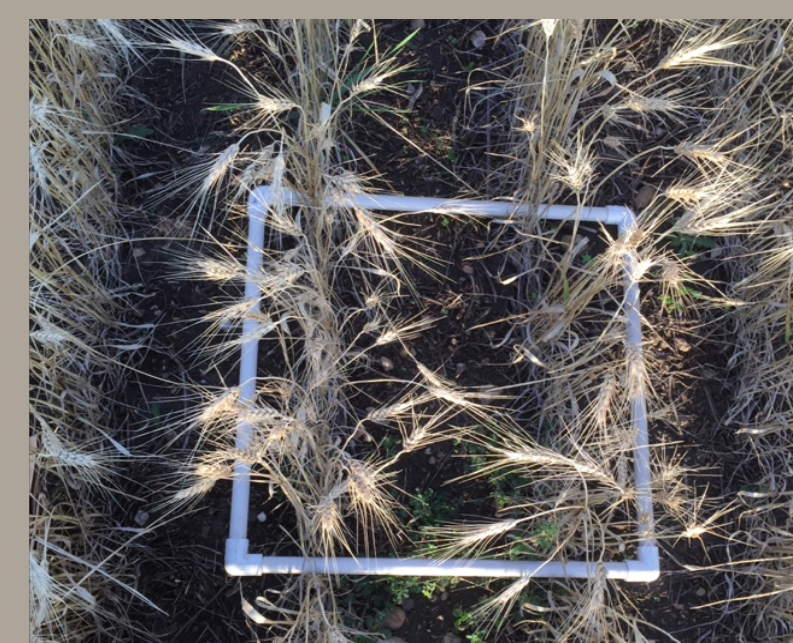
- near-isogenic lines: semi-dwarf vs. tall
- seeding rates: 67 vs. 101 kg ha⁻¹

Nitrogen application
2017: 112 kg ha⁻¹
2018: 0 kg ha⁻¹
2019: 56 kg ha⁻¹



Study site

Montana State University Post Agronomy Farm in Bozeman, Montana (2017-2019).



Measurements

Final wheat and wild oat tillers
Wheat and wild oat biomass
Wheat grain yield
Wild oat seed production

Conclusion

- The joint use of tall isogenic line and a higher seeding rate did not show a greater suppression against wild oat.
- Further research should strengthen the use of enhanced crop competitiveness strategy by adjusting nitrogen rate and row spacing together with crop varieties and seeding rates.

Acknowledgements

This project was funded by Montana Wheat and Barley Committee. We would like to acknowledge Edward Davis and Christian Lawson for their assistance with the experiment throughout three years. We thank all students from Montana State University who contributed to the fieldwork, sample collection and processing.



1/19/2021

Literature Cited

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