

Kochia (*Bassia scoparia*) harvest date impacts nutrient composition, *in vitro* degradability, and feed value more than the pre-harvest herbicide treatment or herbicide resistance traits

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Introduction

- ✗ Kochia is an invasive annual broadleaf weed in north America
- ✗ Resistant to group 2, 4, 5 and 9 herbicides
- ✗ Difficult to control due to rapid spread of herbicide resistance traits – including glyphosate resistance
- ✓ Nutritive evaluation critical for integrated crop-livestock system for the control and utilization of this weed

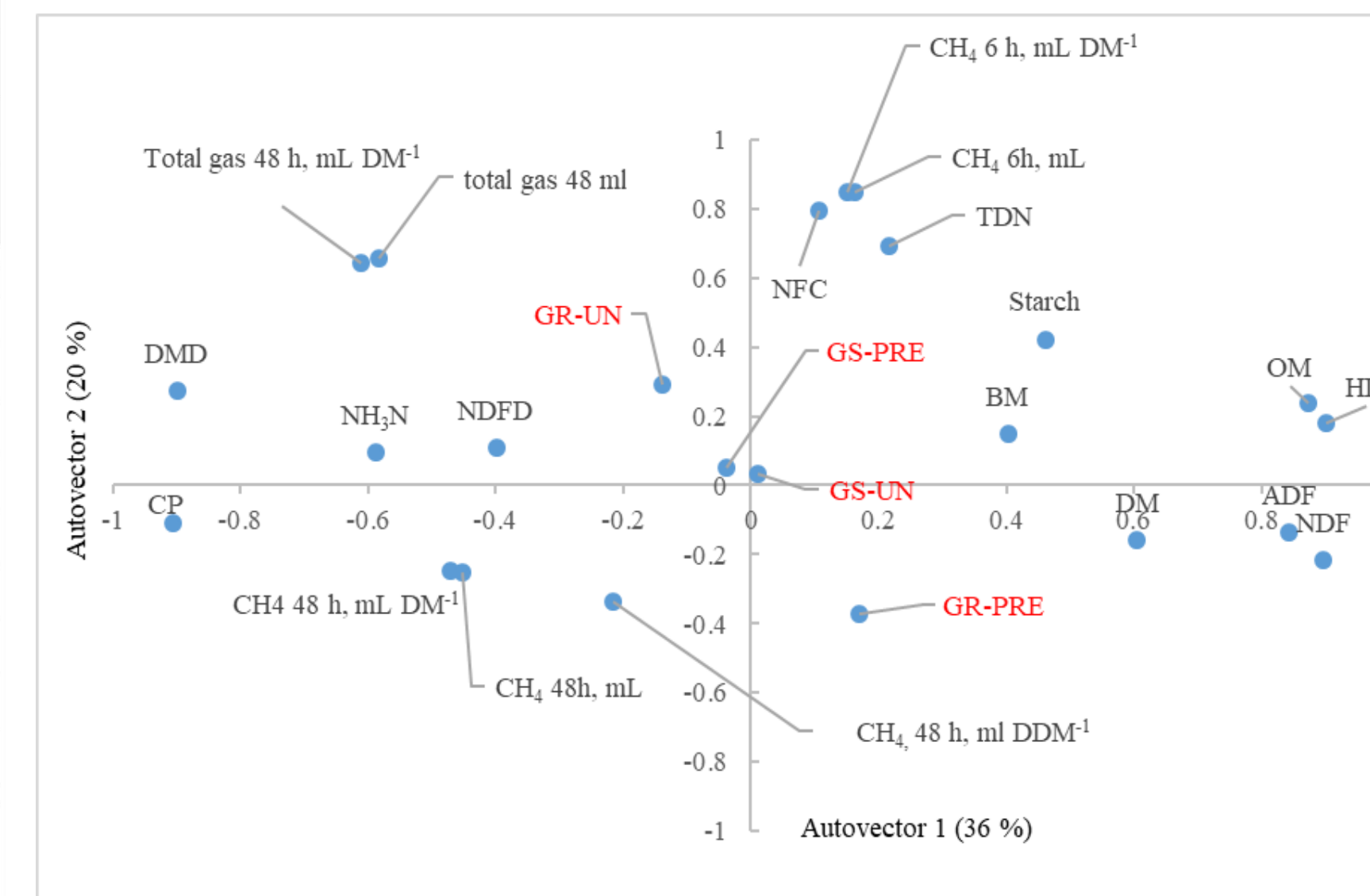
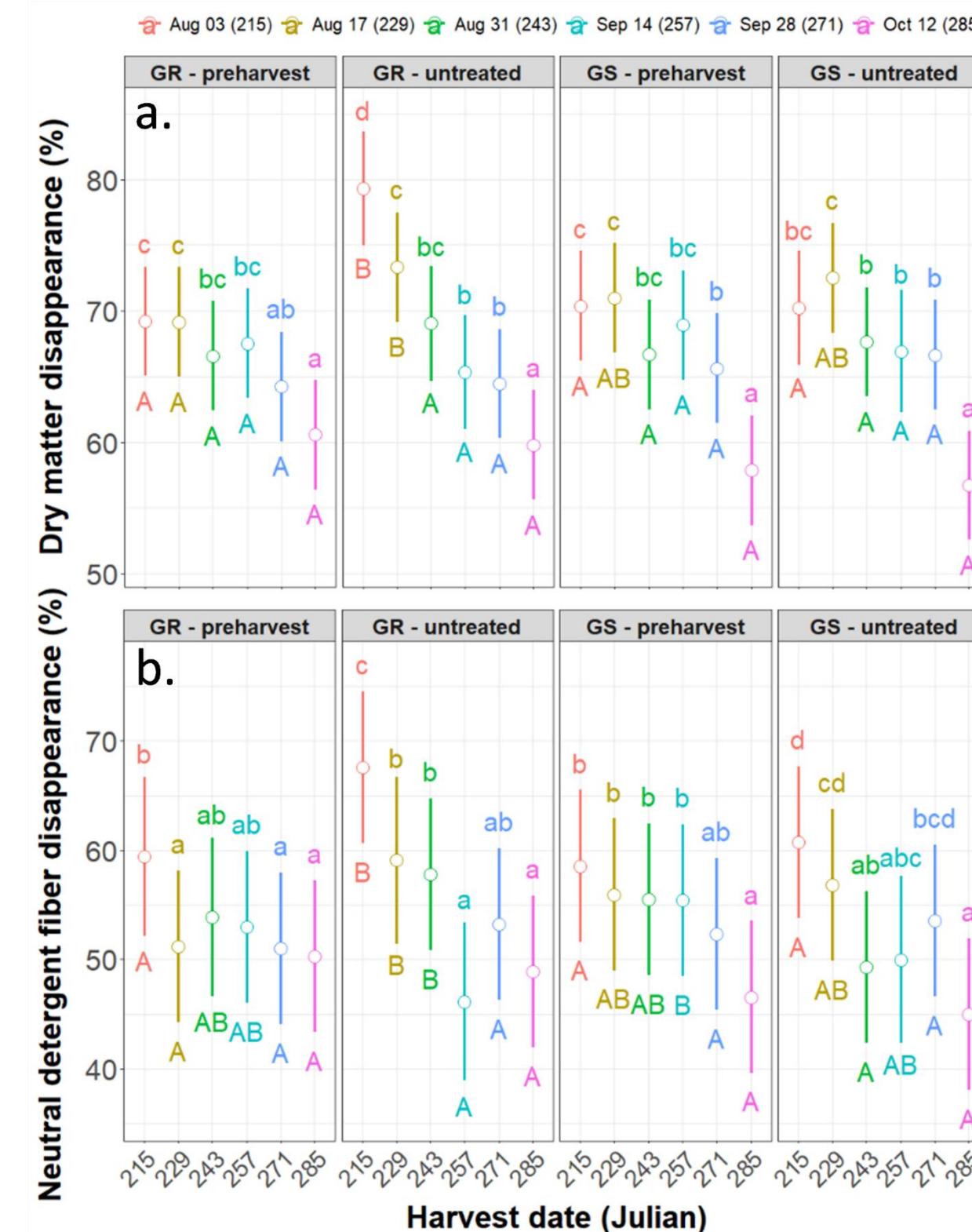
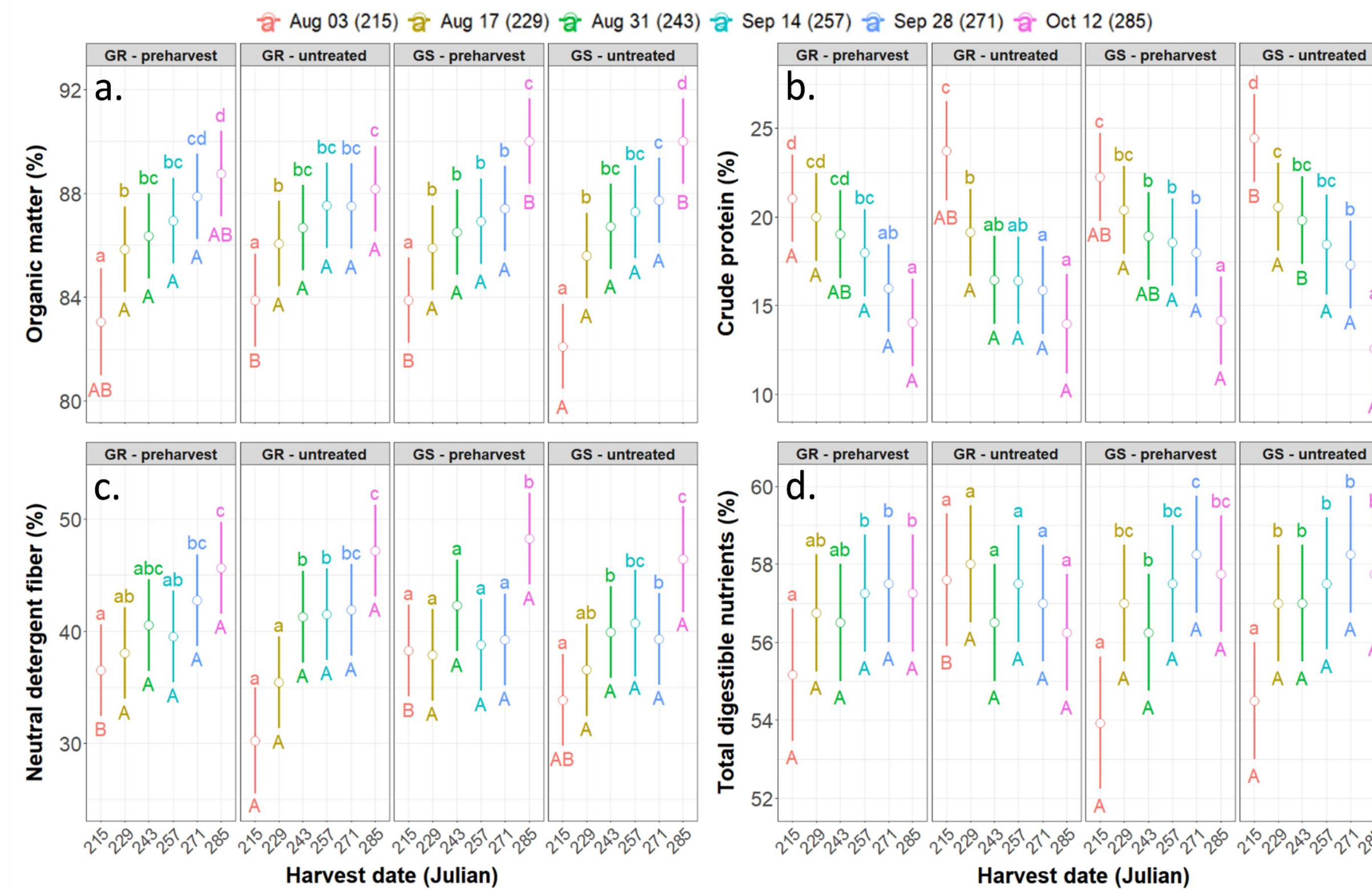
Hypothesis

Glyphosate resistance traits, preharvest herbicide treatment, and maturity at harvest will impact the nutrient composition, *in vitro* degradability and feed value of kochia populations

Materials and methods

- ✓ Two kochia populations used – glyphosate resistant (GR) and glyphosate susceptible (GS)
- ✓ Half of both kochia populations treated with glyphosate and saflufenacil preharvest
- ✓ Total of four kochia treatments – GR and GS kochia with (PRE) or without (UN) preharvest herbicide application i.e., GR-UN, GR-PRE, GS-UN, GS-PRE
- ✓ All treatments harvested at 6 harvest dates (HD 1-6) 2 weeks apart covering pre-bloom, mid-bloom, full-bloom with 50% open flowers, developing seeds, mid-mature seeds and fully mature seeds stages of maturity
- ✓ Chemical analysis included evaluation of nutrient composition, *in vitro* fermentation, dry matter (DM) and fiber (NDF) degradability

Results



Statistical analyses

- ✓ Data were analyzed using a linear mixed effects model framework in the 'lme4' package of R version 3.6.0
- ✓ Significant differences were declared based on Tukey's HSD ($P < 0.05$)
- ✓ Factorial analysis to assess the relationships between kochia nutrient composition and *in vitro* fermentation parameters

Discussion

- ✓ In most cases, the harvest date affected the chemical composition and *in vitro* degradability to a greater extent than kochia population or preharvest herbicide treatment
- ✓ Harvesting kochia at HD 4 or 5 for ensiling and/or haying would provide the highest digestible DM
- ✗ However, harvesting kochia at later HD (4 or 5) risks increased dispersion of mature weed seeds

Conclusion

- ✓ High crude protein concentration and fiber degradability of kochia at vegetative stage is promising for use in beef cattle diets
- ✓ Integrated crop-livestock system could be an effective tool to manage herbicide resistant kochia populations in annual crop lands

References

- ✓ Beckie et al., (2011, 2013, 2019, 2020)