

Sheep as a potential tool for in-season cotton weed management

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Background

- Current row crop production relies heavily on herbicides to control weeds throughout the growing season.
- This reliance on chemical weed control has left farmers dealing with herbicide resistant weeds and limited options.
- Sheep herbivory has potential as a weed management option due to preferential grazing habits and an aversion to cotton gossypol content (Figure 1).
- Weeds such as Palmer amaranth (*Amaranthus palmeri*), field bindweed (*Convolvulus arvensis*), and junglerice (*Echinochloa colona*) are major pests in Texas, but they are also palatable for sheep.



Figure 1. Sheep at the beginning of a grazing treatment.

Objective

Determine if sheep grazing throughout the cotton growing season is a viable weed control option for growers seeking organic or reduced herbicide systems.

Materials and Methods

Experimental Design

- Location: San Angelo, TX
- Two years: 2022 & 2023
- Randomized Complete Block Design with four replications

3x3 Factorial

- Three grazing initiation timings (4-leaf, 8-leaf, and mid-bloom growth stages)
- Three grazing termination indicators (70%, 90%, 100% weed removal)
- Weed free check (WFC) and Weedy check (WC)

Plot management

- Rambouillet ewes
- WFC was chemically and manually controlled
- WC had no weed control
- Electrified net fencing placed on perimeter of plots
- Grazing treatments were maintained with sheep as weeds began to regrow.

Results

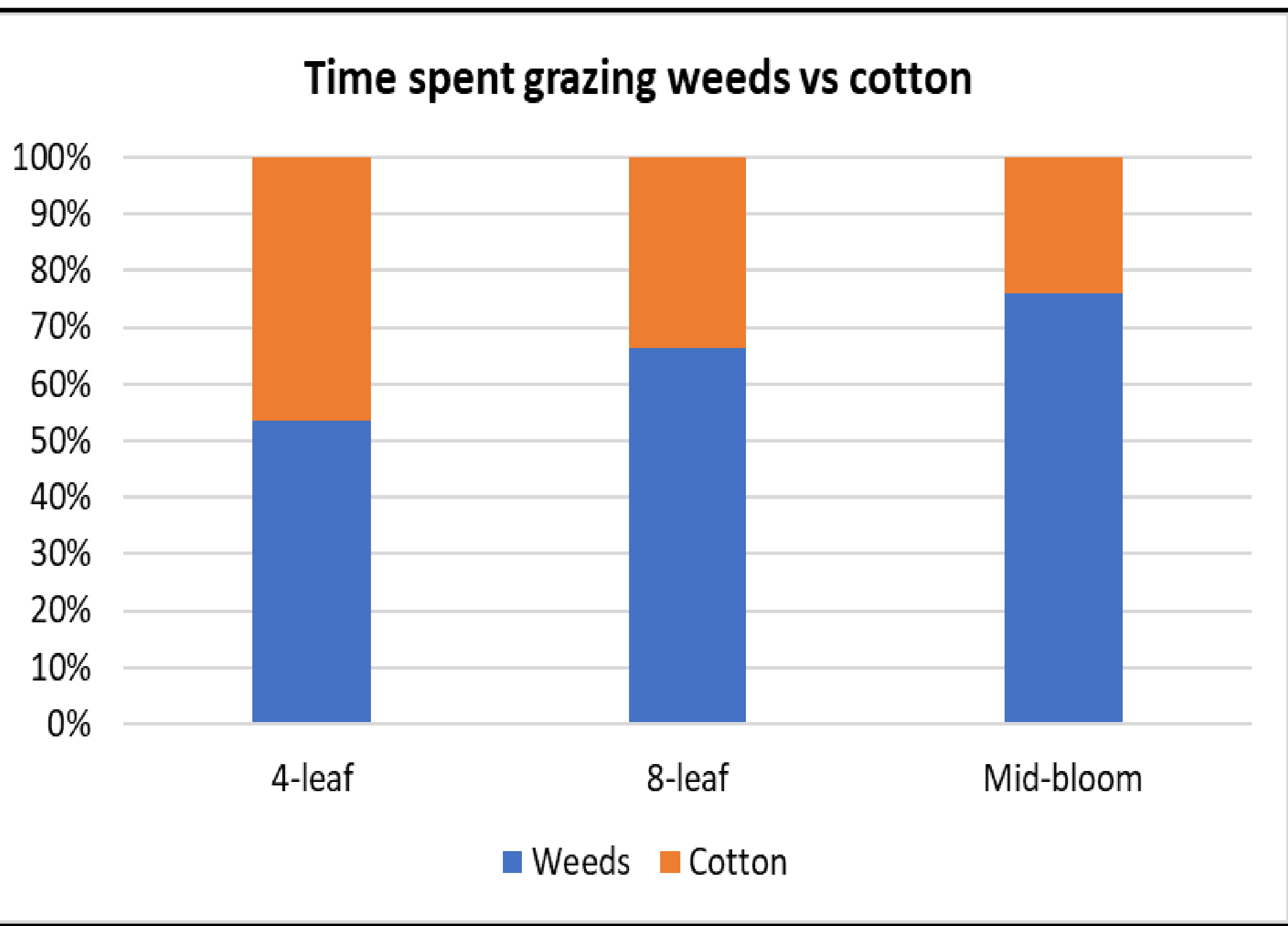


Figure 2. Cotton growth stage effect on sheep grazing selectivity for weeds vs. cotton.

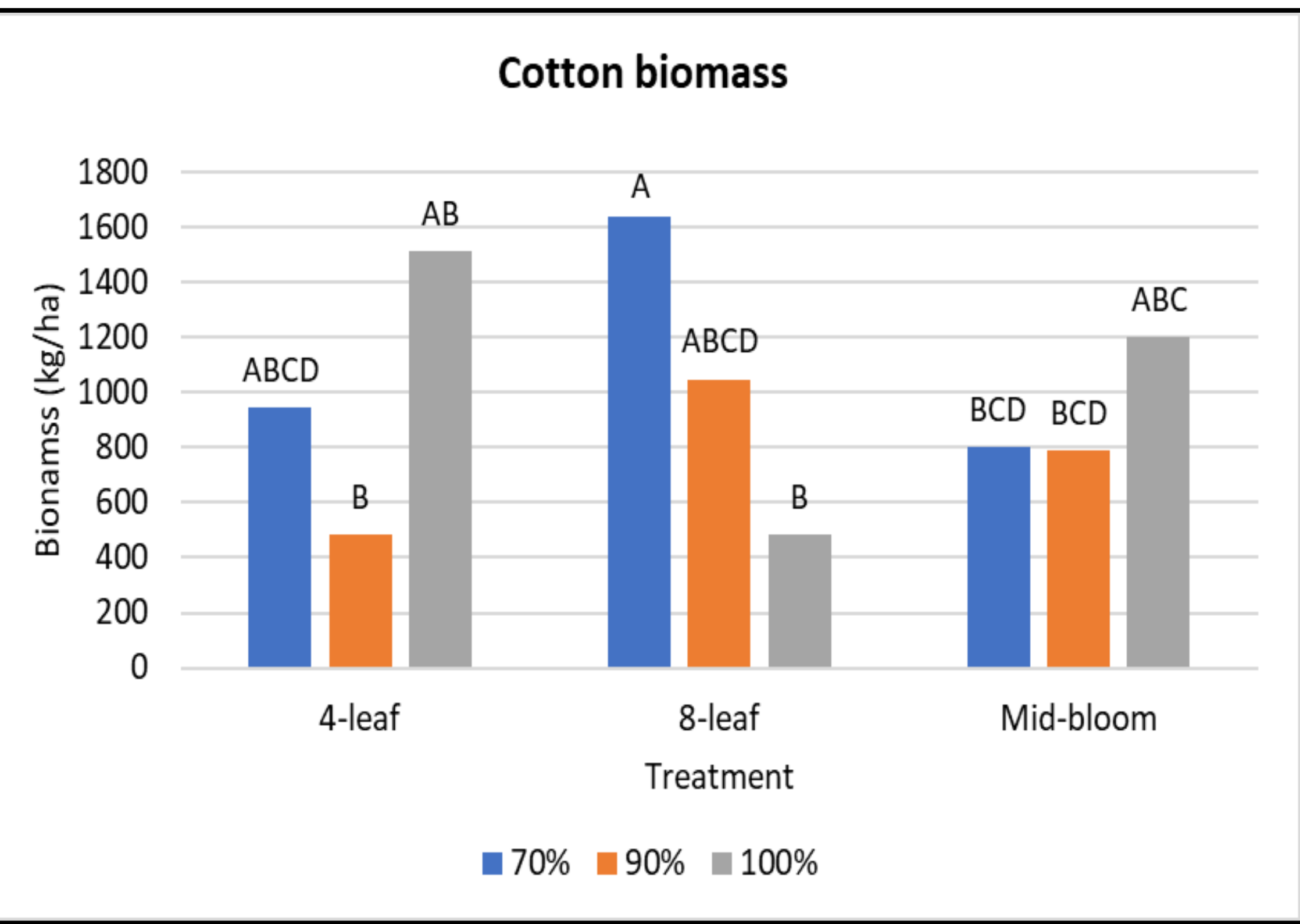


Figure 3. Sheep grazing treatment effects on final cotton biomass

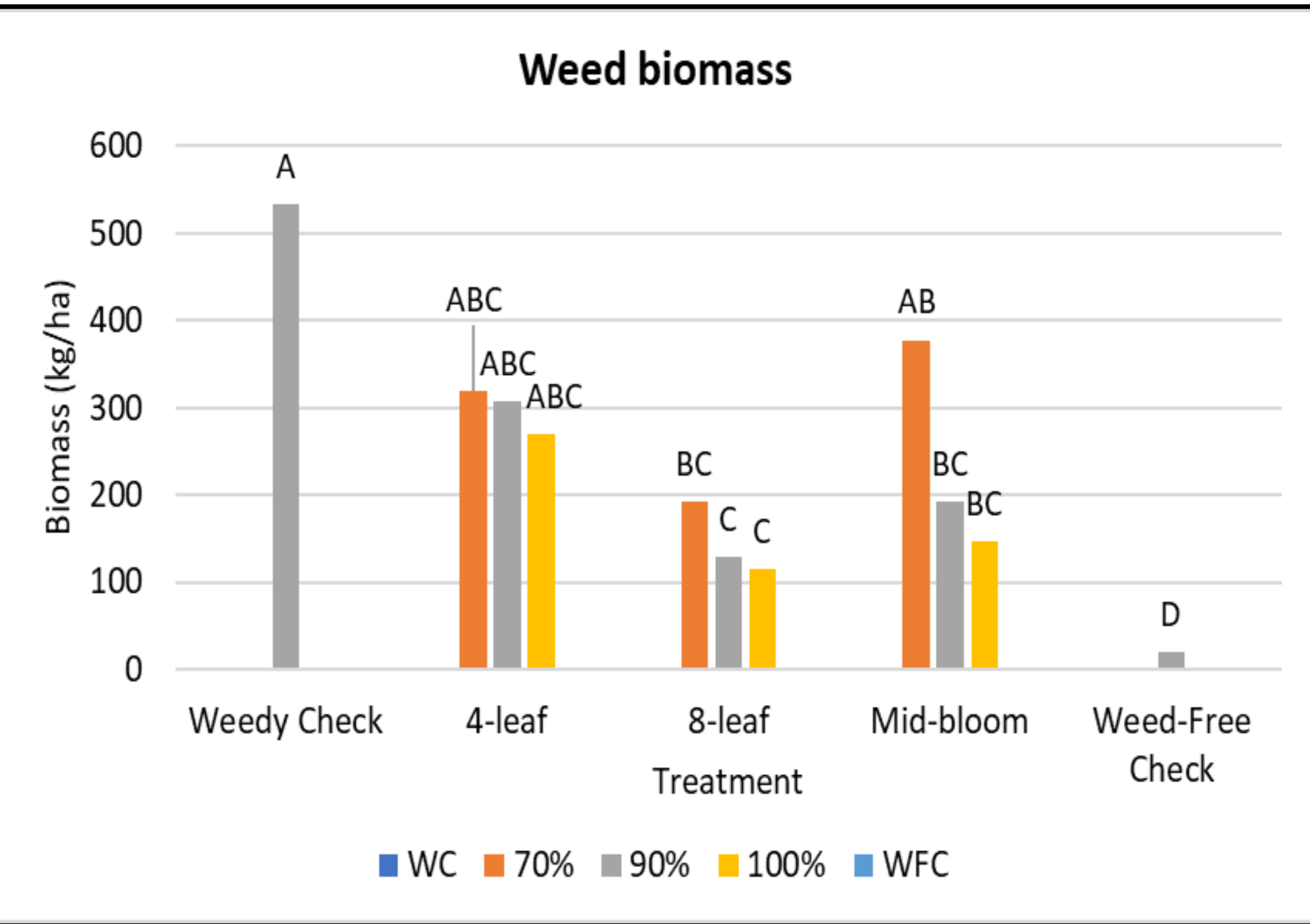


Figure 4. Treatment effects on final weed biomass

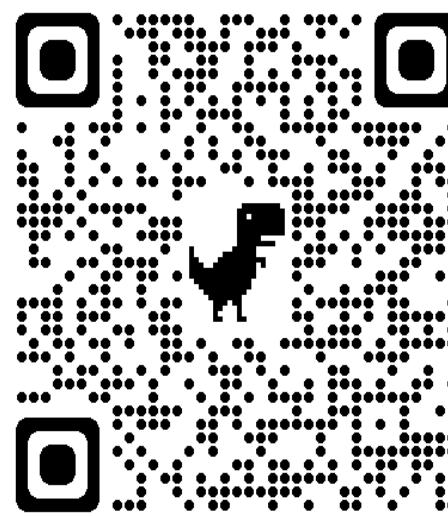


Figure 5. Weed population difference between a non-grazed plot (left) and grazed plot (right).

Discussion

- Sheep were more selective to graze weeds as cotton matured (Figure 2)
- More intense grazing had a negative effect on cotton yield at the 8-leaf stage (Figure 3). Possibly due to greater feeding on cotton.
- Final weed biomass tended to decrease with increasing grazing duration / intensity (Figure 4).

Figure 6. Video of sheep grazing in plots.



Conclusions

- Sheep herbivory has potential to be applied to reduce weed biomass in cotton systems.
- Integrated weed management systems may prolong herbicide efficacy and delay tolerance from rapidly developing.

Future Research

- Study efficacy of different sheep breeds and ages.
- Inclusion of a farm trial with cooperator.
- Comparison between this “Sheep weeding” system, mechanical weed control, and chemical weed control.

Acknowledgements

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