

Pigweed Control with an Integrated Systems Approach in Soybean

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Introduction

- Herbicide resistance to glyphosate, ALS- and PPO-inhibiting herbicides is common in pigweed in Kansas.
- Intensive selection pressure is being placed on dicamba and glufosinate as effective herbicides in soybean.
- To reduce the future risk of glufosinate and dicamba resistant pigweed, an integrated pigweed management strategy must be considered.

Objective

Evaluate the effectiveness of an integrated systems approach to manage pigweed in soybean including cover crop, row-crop cultivation, and row spacing.

Materials and Methods

EXPERIMENT LAYOUT

- Two locations
 - Manhattan, KS, Ashland Bottoms experiment field.
 - Ottawa, KS, East-Central Experiment Station.
- Natural population of Palmer amaranth and common waterhemp at Manhattan and Ottawa, respectively.
- Plot description
 - Plot size 10 ft x 25 ft with four replications.
 - Randomized complete block design.
 - 8 treatments consisting of all combinations of three row spacings, presence of a cover crop, and row-crop cult.

FIELD OPERATIONS

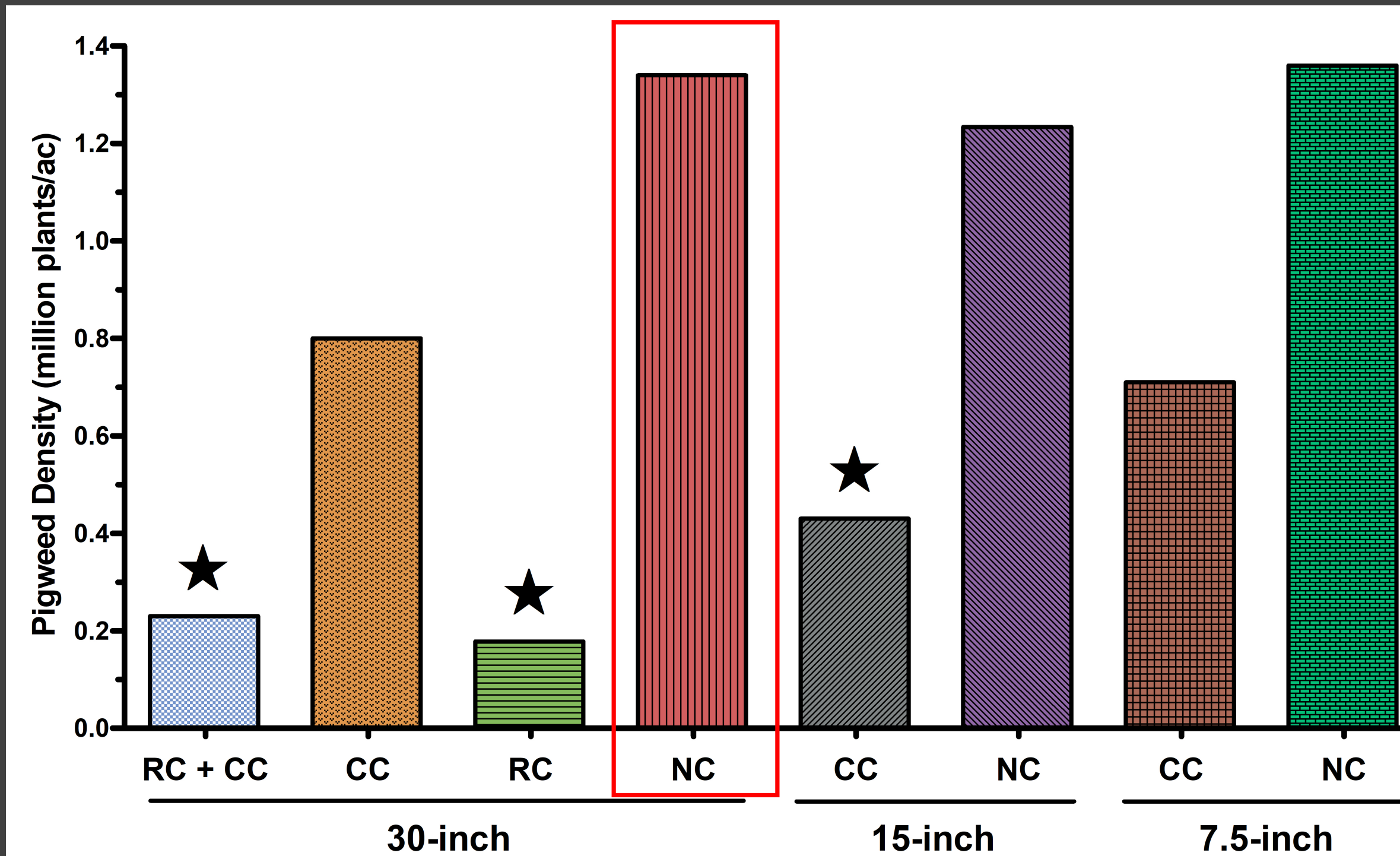
- Cover crop
 - "Gallager" winter wheat was drilled in the fall of 2016 at 120 lbs/ac.
 - 50 lbs/ac. of nitrogen was top dressed at green-up.
 - Winter wheat was terminated with glyphosate at anthesis in early May.
- Soybean establishment
 - Entire plot area was sprayed with paraquat prior to soybean planting.
 - LibertyLink® 3.6 maturity group soybean was no-till drilled at 160,000 seeds/ac on June 1.
 - Due to poor stands, soybean at both locations was terminated and replanted June 15.
- Row-crop cultivation timing
 - A Buffalo 6200 no-till cultivator with coulters and 20-inch sweeps was used at both locations.
 - Cultivation was implemented at a 2-inch depth 2.5 weeks after replanting.

DATA COLLECTION AND ANALYSIS

- Visual assessment for percent control, pigweed density, and pigweed biomass was recorded 3 and 8 weeks after planting (WAP).
- Data were subjected to ANOVA with means separated by Fisher's Protected LSD $\alpha = 0.05$.
- Significant interactions across location were not observed; therefore, data was combined.
- 3 WAP assessment revealed a significant interaction of row spacing by cover crop by row-crop cultivation; whereas there was no interaction in 8 WAP season assessment therefore only main effects were considered.

Results and Discussion

3 WAP Pigweed Density



3 WAP Pigweed Biomass

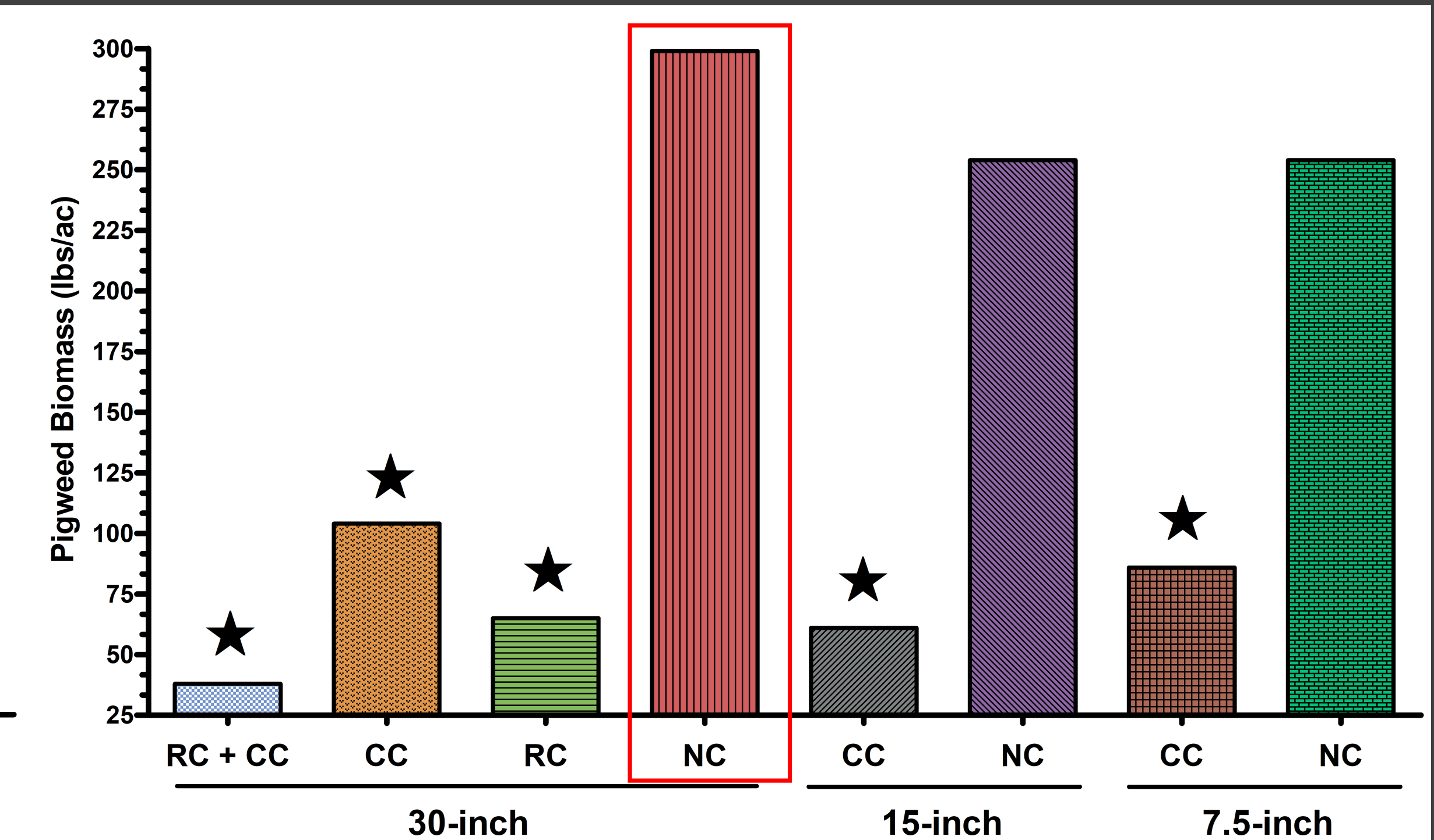


Figure 1 - 3 WAP pigweed density and biomass as result of row-crop cultivation (RC), cover crop (CC), no cover crop (NC) across three row spacings. Star indicates a significant difference from the NC 30-inch row spacing treatment.

8 WAP Pigweed Control

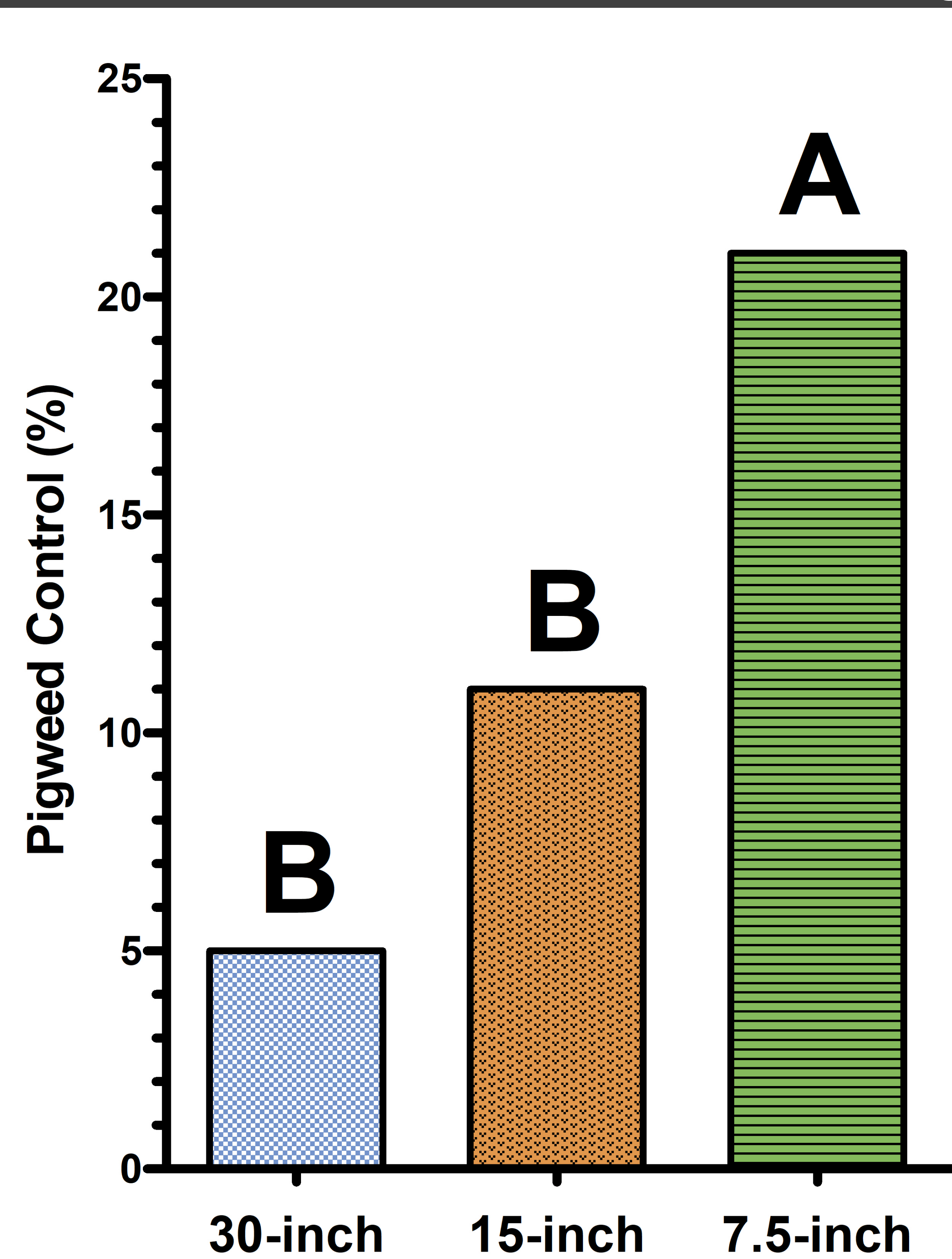


Figure 2 - Late season pigweed control as provided by row-spacing pooled across the presence or absence of a cover crop. Bars with different letters indicate significant differences.

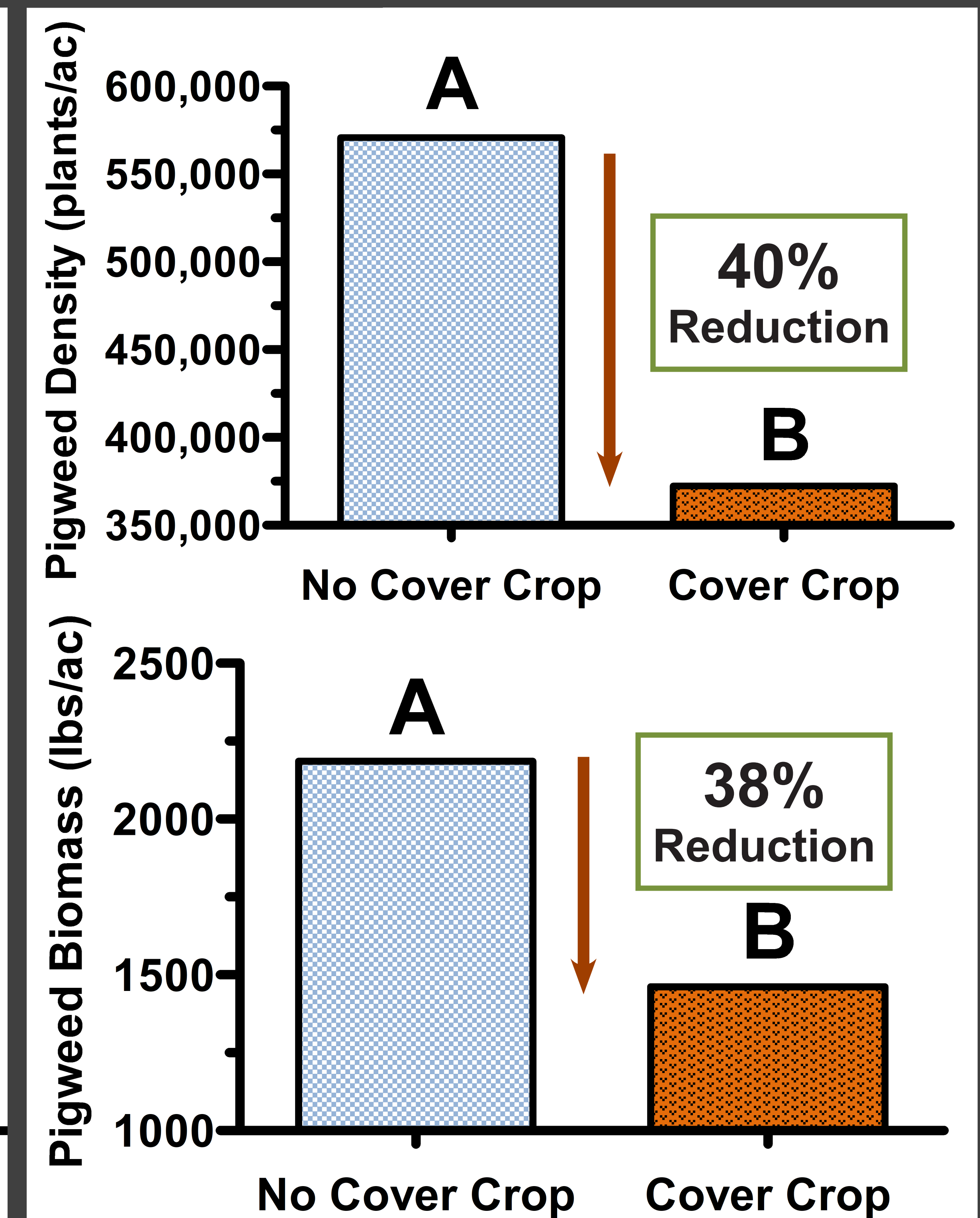


Figure 3 - Late season pigweed density and biomass as influenced by the presence or absence of a cover crop pooled across row-spacing. Letters indicate significant differences.

Conclusions and Future Research

- Row-crop cultivation and the presence of a cover crop tended to decrease pigweed density and biomass.
- More pigweed suppression occurred with narrow row-spacing.
- Repeat these studies at at Manhattan, Ottawa, and Hutchinson in 2018.

Funding Acknowledgement

