

Control of Glyphosate-Resistant Common Ragweed (*Ambrosia artemisiifolia* L.) in Glufosinate-Resistant Soybean

*Ethann Barnes¹, Peter Sikkema², Stevan Knezevic¹, John Lindquist¹, Amit Jhala¹

¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Guelph, Guelph, ON, Canada

E-mail: ethann.barnes@unl.edu

INTRODUCTION

Common ragweed

- Competitive weed in soybean production fields
- Emerges from mid-April through May in Nebraska
- 50% cumulative emergence obtained mid-April to early-May

Glyphosate-resistance (EPSP synthase inhibitor)

- Glyphosate-resistant common ragweed confirmed in Nebraska in 2013
- 14 other US states and Ontario, Canada
- 32 different weed species in the world

Glufosinate-resistant (Liberty Link) soybean

- An alternate system for control of glyphosate-resistant weeds
- Information is not available about control of glyphosate-resistant common ragweed in glufosinate-resistant soybean



OBJECTIVE AND HYPOTHESIS

Objective

- To evaluate the efficacy of preplant herbicides followed by glufosinate applied alone or in tank-mixture for control of glyphosate-resistant common ragweed in glufosinate-resistant soybean.

Hypothesis

- Preplant herbicides followed by a post application of glufosinate will provide season long control of common ragweed.

MATERIALS AND METHODS

- A field experiment was conducted in 2015 in Gage County, NE at the field where glyphosate-resistant common ragweed was confirmed in 2013
- The experiment was laid out in a randomized complete block design with four replications
- Preplant herbicides were applied 3 weeks before planting, whereas PRE herbicides were applied at planting
- Early-POST and late-POST herbicides were applied at 4 and 8 weeks after planting
- Observations of visual common ragweed control, density, biomass reduction, and soybean yield were recorded
- PROC GLIMMIX procedure in SAS 9.4 was used to conduct multiple comparison ANOVA analysis

Table 1. Herbicide treatments, application timing, and rates for common ragweed control

Code	Herbicide Treatments	Trade Name	Timing	Rate (g ai ha ⁻¹)
T0	Nontreated Control			
T1	Saflufenacil + Imazethapyr + Dimethenamid-P Glufosinate	Optill + Outlook Liberty	Pre-plant Early-POST	95 + 1100 740
T2	Sulfentrazone + Cloransulam-methyl Glufosinate	Authority First Liberty	Pre-plant Early-POST	314 740
T3	Flumioxazin + Chlorimuron-ethyl Glufosinate	Valor XLT Liberty	Pre-plant Early-POST	140 740
T4	S-metolachlor + Metribuzin Glufosinate	Boundary Liberty	Pre-plant Early-POST	2050 740
T5	Chlorimuron-ethyl + Flumioxazin + Thifensulfuron-methyl Glufosinate	Enlite Liberty	Pre-plant Early-POST	94 740
T6	2,4-D amine Glufosinate + Imazethapyr	2,4-D Amine Liberty + Pursuit	Pre-plant Early-POST	1180 740 + 70
T7	Paraquat dichloride Glufosinate + Chlorimuron-ethyl + Acetochlor	Gramoxone Inteon Liberty + Classic + Warrant	Pre-plant Early-POST	1120 740 + 13.1 + 1680
T8	Saflufenacil Glufosinate + Acetochlor	Sharpen Liberty + Warrant	Pre-plant Early-POST	150 740 + 1680
T9	Saflufenacil + 2,4-D amine Glufosinate + Acetochlor	Sharpen + 2,4-D Amine Liberty + Warrant	Pre-plant Early-POST	150 + 1180 740 + 1680
T10	2,4-D amine Sulfentrazone + Metribuzin Glufosinate	2,4-D Amine Authority MTZ Liberty	Pre-plant Pre-emerge Late-POST	1180 5.7 740
T11	Sulfentrazone + Metribuzin Glufosinate	Authority MTZ Liberty	Pre-emerge Late-POST	6.3 740
T12	Flumioxazin + Chlorimuron-ethyl Glufosinate + S-metolachlor Glufosinate + Acetochlor	Valor XLT Liberty + Prefix Liberty + Warrant	Pre-plant Early-POST Late-POST	112 594 + 1480 594 + 1260

RESULTS

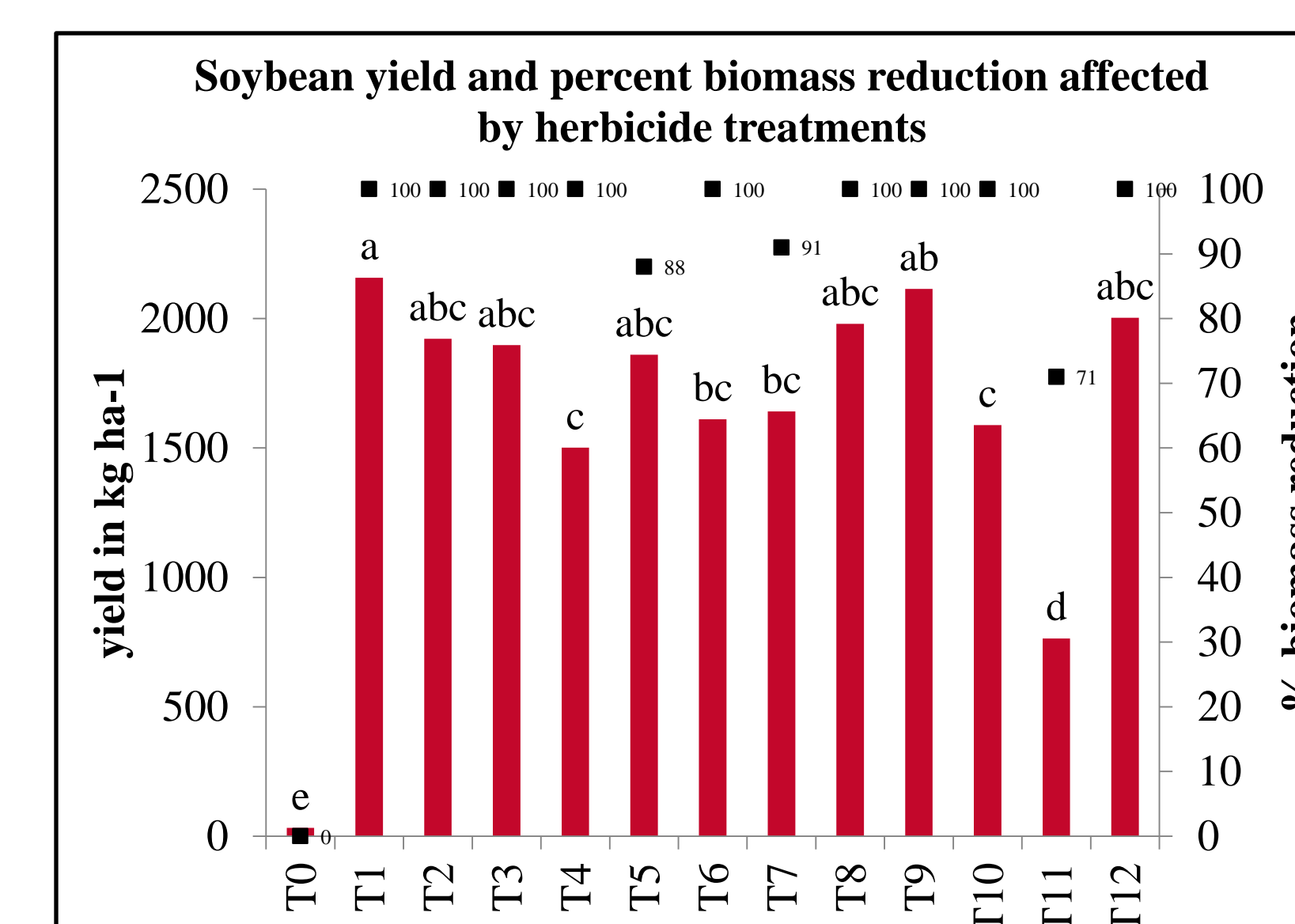
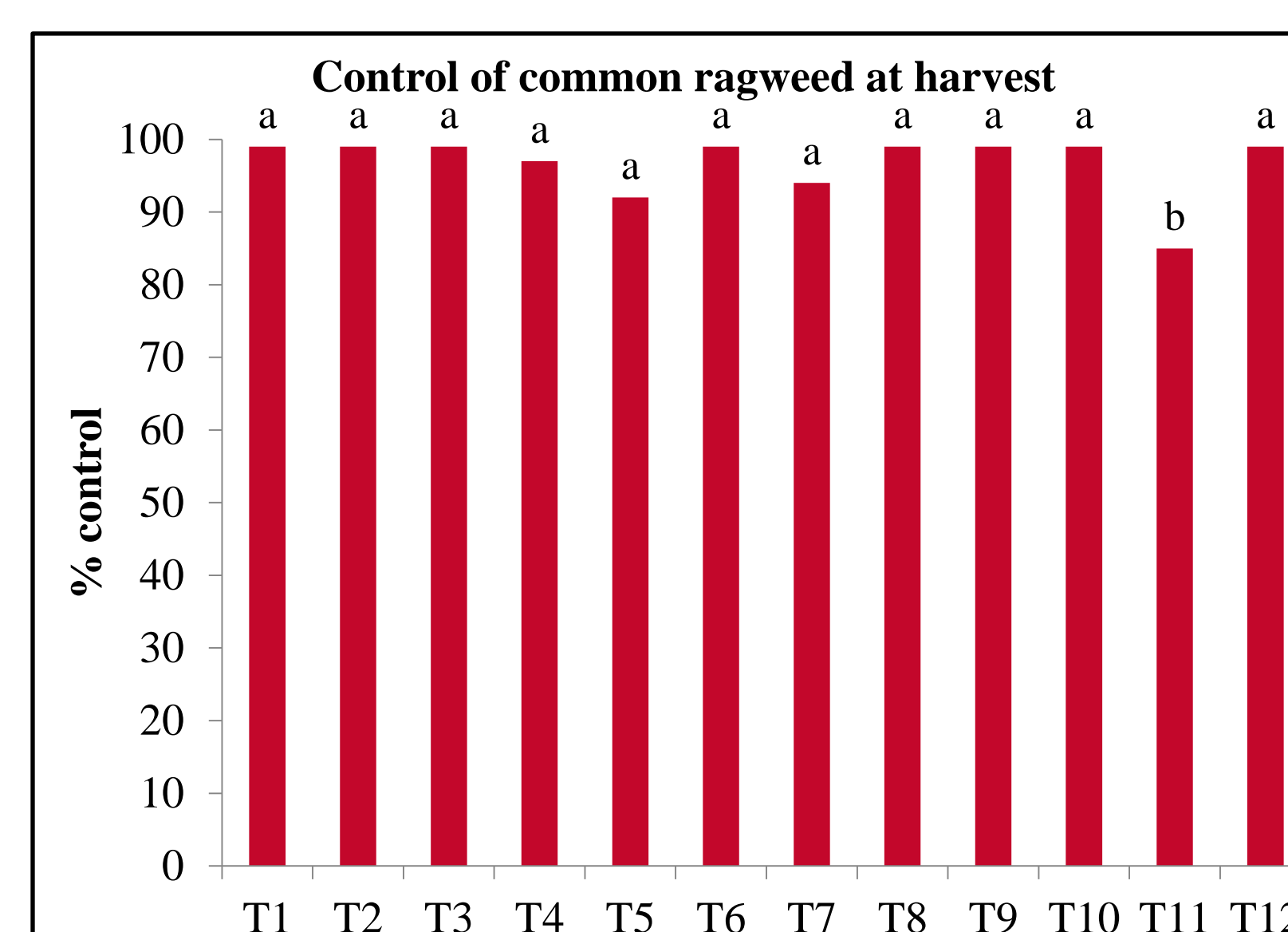
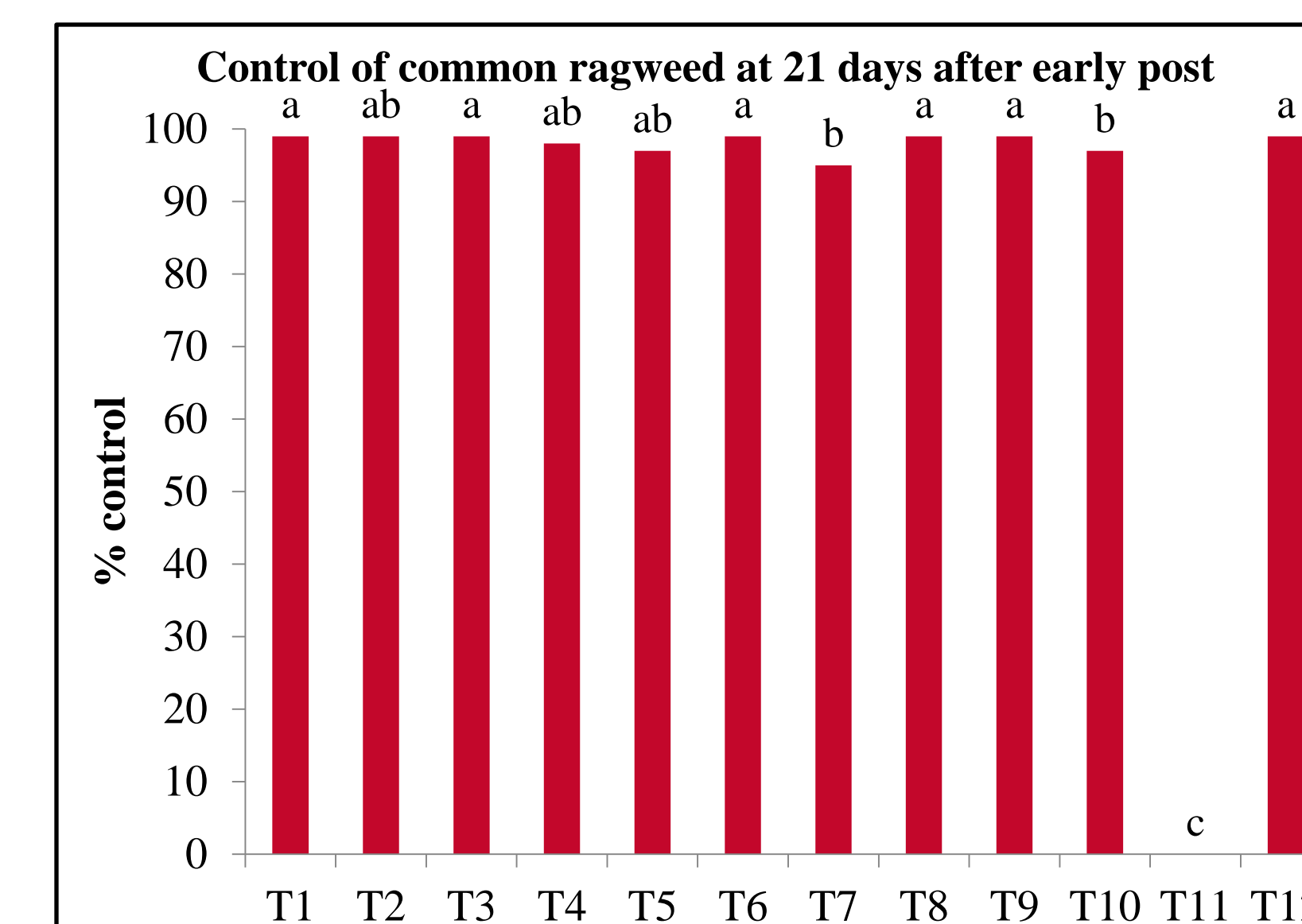
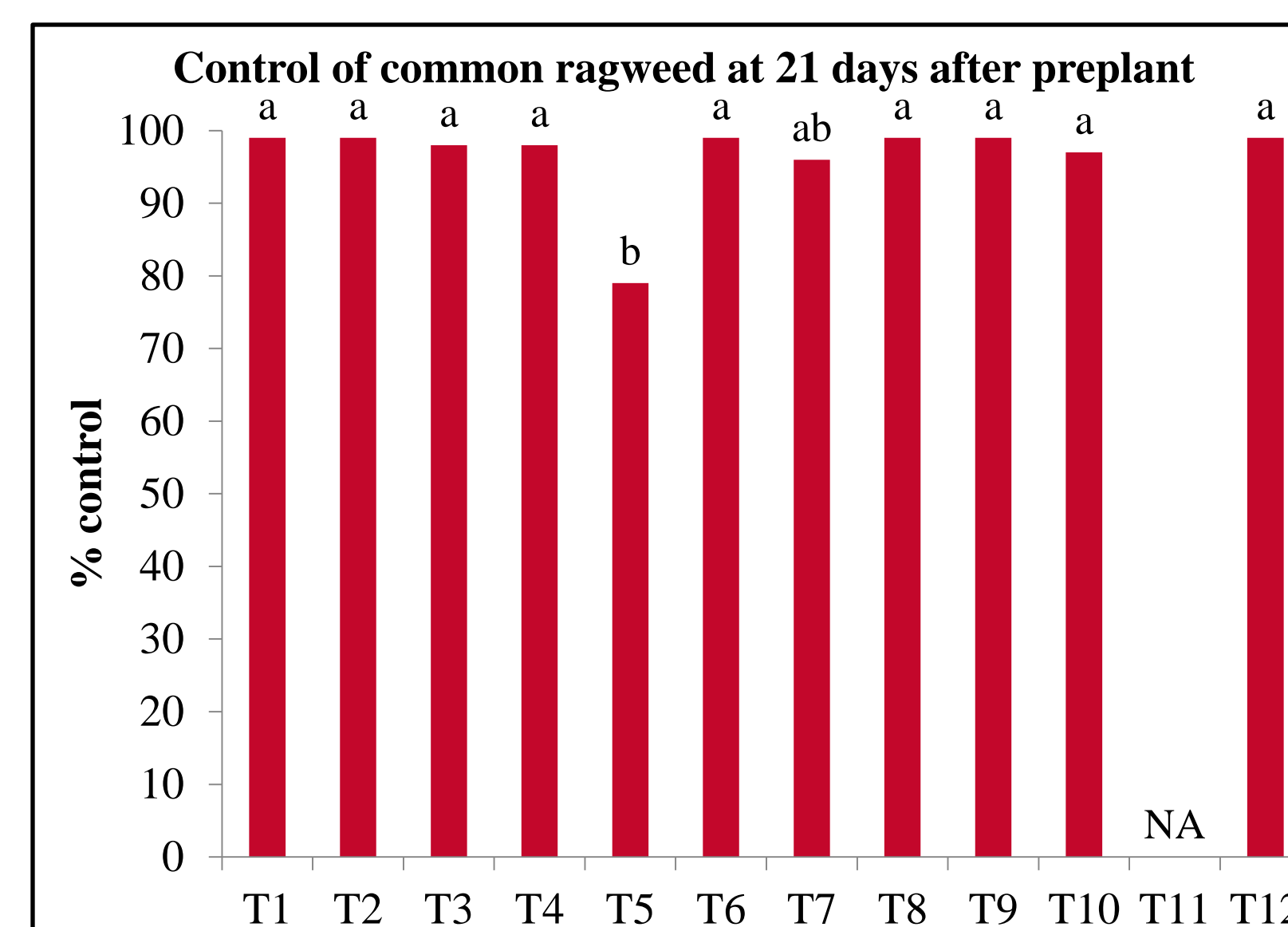


Figure 1. T0 Nontreated control 7 days after late-POST



Figure 2. T5 Chlorimuron-ethyl + Flumioxazin + Thifensulfuron-methyl (preplant) fb Glufosinate (early-POST) 7 days after late-POST



Figure 3. T11 Sulfentrazone + Metribuzin (PRE) fb Glufosinate (late-POST) 7 days after late-POST



Figure 4. T12 Flumioxazin + Chlorimuron-ethyl (preplant) fb Glufosinate + S-metolachlor (early-POST) fb Glufosinate + Acetochlor (late-POST) 7 days after late-POST

CONCLUSIONS

- Most of the herbicides applied preplant provided $\geq 96\%$ control of common ragweed at 21 days after treatment (DAT).
- A POST application of glufosinate after preplant or PRE herbicides was effective and resulted in $\geq 84\%$ control.
- Herbicides applied preplant followed by a POST application of glufosinate resulted in season-long control ($\geq 93\%$) of common ragweed, reduced common ragweed biomass by more than 88%, and resulted in soybean yields of more than 1,588 kg ha⁻¹.
- Due to the early emergence pattern of common ragweed in Nebraska, the use of a preplant herbicide is important for early-season control of common ragweed.
- Goosegrass in Malaysia and Italian ryegrass in Oregon have been confirmed resistant to glufosinate. Therefore, herbicides with different modes of action should be included for weed control in glufosinate-resistant soybean.