

Comparison of Organic and Conventional Soybean Production in Arkansas

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INTRODUCTION

Organic production has become increasingly popular in the last few years as the public demand for organic foods increases. Very little organic soybean production research has been conducted in the Midsouth U.S., where the weed, insect and disease pressures are unlike other row crop areas in the U.S. The University of Arkansas Division of Agriculture initiated research to determine if organic soybean production is cost prohibitive in the state, in comparison to the other soybean production practices currently used by soybean producers. The biggest challenge soybean producers face in the Midsouth is weed control. During the 2015 growing season, preliminary research was started comparing weed control methods used in organic production (e.g., mechanical aid and physical labor) to the typical chemical weed control systems used in soybean production.

Figure 1: Untreated plot at mid-season



METHODOLOGY

- Location: Pine Tree Research Station, Colt, AR
- Soil Texture: Calloway silt loam
- Soybean Varieties:
 - UA 5213C (Organic & Conventional)
 - Asgrow AG5335 (Roundup Ready 2 Yield)
 - Stein 54LD00LL (Liberty Link)
- Treatments:
 - Untreated check
 - Organic system
 - Conventional herbicide system
 - Glyphosate herbicide system
 - Glufosinate herbicide system
- Replication: 2 per treatments

PLANTING

- Planting Date: June 17, 2015
- Seed Rate: 170,000 seed/ac
- Plot Dimensions: 4-15 inch row, 160 feet long
- Seed Bed: Conventional tilled
- Harvest Date: November 11, 2015

Figure 2: Organic plot at mid-season



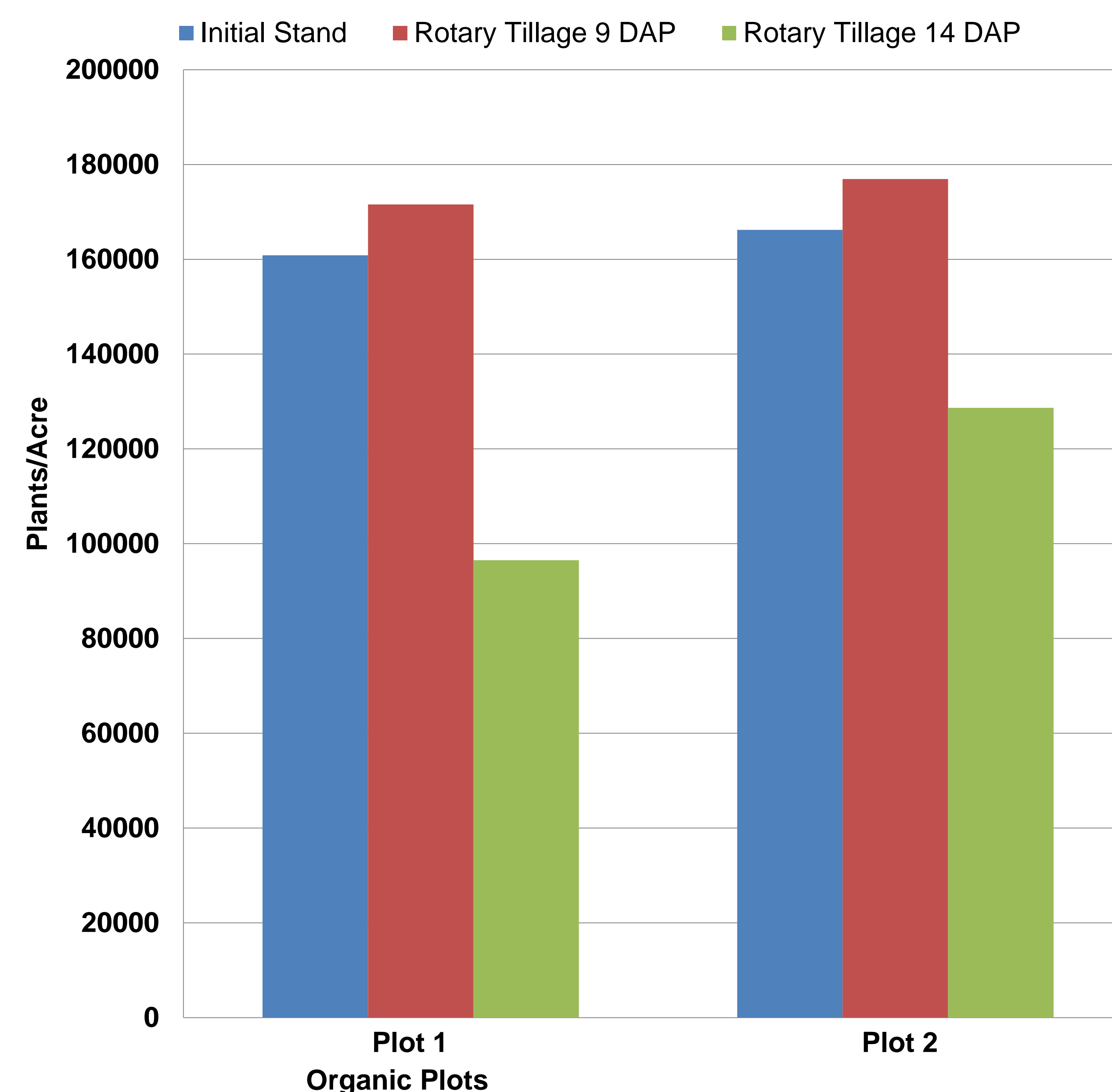
OBJECTIVE

The objective of this study was to determine if it is economically feasible to organically produce soybeans in Arkansas by comparing common production practices in the state.

Table 1. Soybean stand reduction after rotary tillage of organic treatment compared to initial plant stand.

Treatment	% Stand Reduction	
	9 DAP	14 DAP
Organic Plot 1	6.6	-43.8
Organic Plot 2	6.5	-27.3
Avg.		-35.5

Figure 3. Soybean plant stands before and after rotary till treatments.

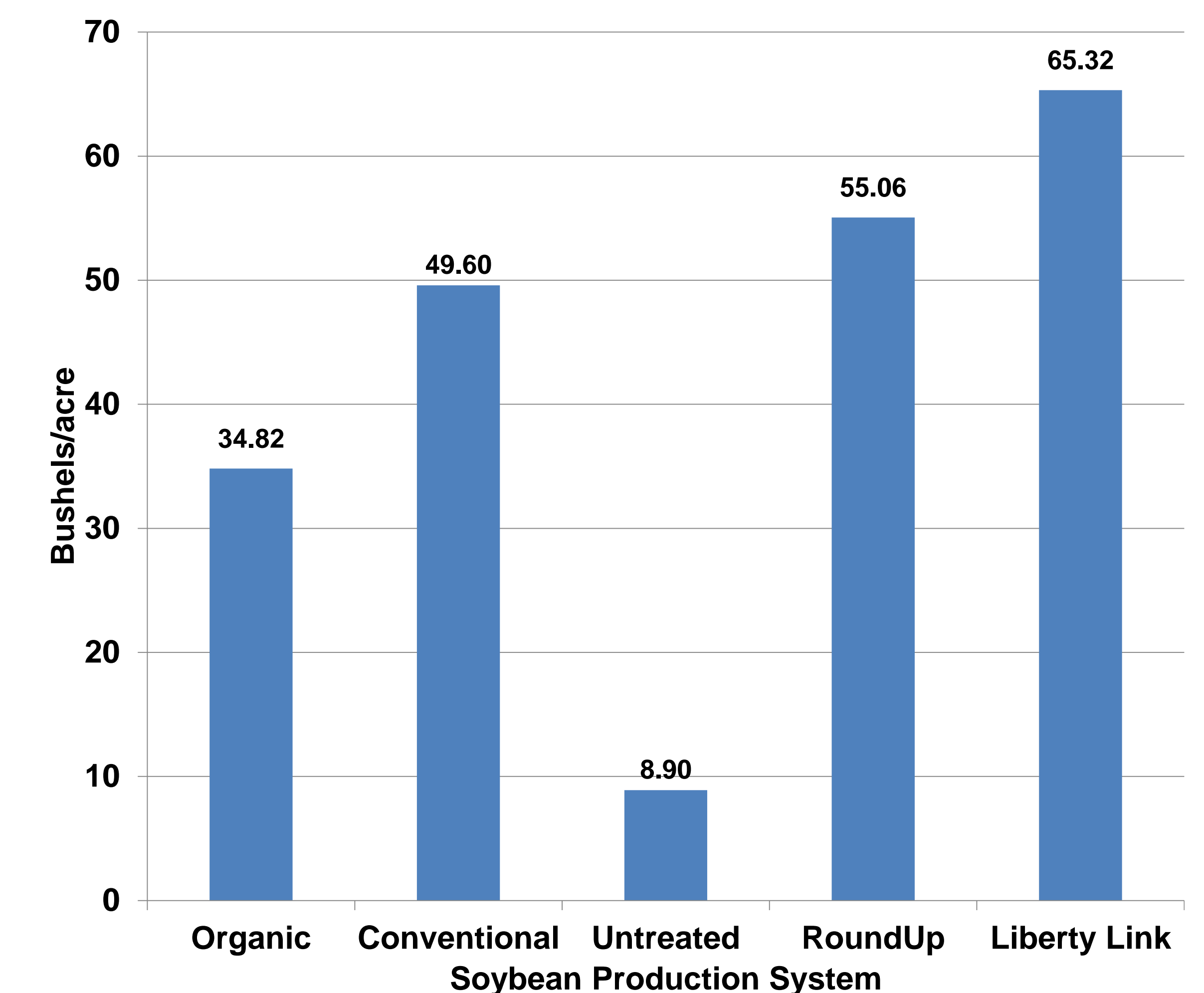


RESULTS AND DISCUSSION

Weed control is one of the biggest challenges in organic row crop production (Figure 1). At 9 days after planting, a 20 ft. rotary tiller was used across the organic plots for weed suppression. Stand improvements were seen at the 9 DAP timing as the dry, cracking soil was scratched to allow plants to continue to emerge (Figure 3). At the 14 DAP timing, an average stand reduction of 35.5% was seen (Table 1). Stand counts after the final rotary tillage in the organic system were lower in comparison to the conventional, untreated, and glufosinate by 55,000, 25,000 and 2,000 plants/acre, respectively. The organic stand was 10,000 plants/acre greater than the glyphosate treatment.

For the remainder of the season, hand weeding was used to control mainly grass weeds in the organic plots (Figure 2). A total of 17 man hours were spent weeding during July and August. Excellent weed control was observed in the conventional, glyphosate, and glufosinate treatments were standard used rates for each herbicide system.

Figure 4. Soybean grain yield for the five herbicide systems.



RESULTS AND DISCUSSION – Cont.

Soybean grain yields for each treatments is shown in Figure 4. Lower soybean grain yields were seen in the organic treatment when compared to the three herbicide systems due to the heavy grass pressure. In addition, reduced grain yields in the organic treatments could be a result of reduced plant growth caused by early season weed pressure. Soybean grain yields of the three herbicide systems could be due to varietal differences.

CONCLUSIONS

This first year of the organic study has shown that it is possible to grow an organic soybean crop in Arkansas, and still yield fairly well. In the future this study will expand to include other weed control measures, including cover crops, and methods for insect and disease control. More work will also be done on the economic profitability of organic soybean production compared to traditional produced soybean.

ACKNOWLEDGMENTS

We would like to thank the Arkansas Soybean Promotion Board for their support of our research programs.

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