Grain yields for 2000, 2002, and 2004 corn-bean rotation

INTRODUCTION

Based on the regression equation for the 3-yr average, the amount of total available N needed to maximize grain yield was 257 kg N ha⁻¹, or 285 kg N ha⁻¹ -¹ AN for the low and high N treatments for corn and soybean, respectively. Estimated N rate is required to produce one Mg of corn grain near maximum yield was 20 kg N ha⁻¹. Free.

Nitrogen use efficiency (NUE) by corn and soybean is based on grain removed (Y) or grain yield as a function of total nitrogen (N) (soil + fertilizer + irrigation water N) for each N treatment.

Soil: Fort Collins clay loam
Tillage: No-Till (NT)

Soybean and corn hybrids, tillage and irrigation management were the same across years. Irrigated, NT corn-soybean rotation as reported for the NT continuous corn system (Halvorson et al., 2006). Improved soybean cultivars for this area would make a corn-soybean rotation a viable production system. Short soybean plant height (30-40 cm) and shattering made combine harvest difficult, resulting in significant grain loss. Improved soybean cultivars are needed for this area to make a corn-soybean rotation a viable production system.


The corn in the NT corn-bean system responded similarly to AN supply when compared with the CT system reported by Halvorson et al. (2006). Corn yields at low fertilizer N rates benefited most from having beans in the rotation.

Soil N: 0-90 cm depth
Fertilizer N: 0-110 cm depth
Irrigation: 0-90 cm depth

Nitrogen fertilizer N (N) rates, effects on irrigated, corn (Zea mays L.) and soybean (Glycine max L.) grain yields in northern Colorado. "Grain yields for 2000, 2002, and 2004 corn-bean rotation were evaluated for 3 yr on a clay loam soil to determine the viability of irrigated, no-till corn-bean rotation systems in northern Colorado. Soybean, corn, and soybean N yields at CT and NT sites were not significantly different. Soybean and corn yields increased by N fertilizer levels of 3 yr in the rotation, but soybean grain yields (Y) did not respond to N fertilizer, averaging 0.78 Mg ha⁻¹. Three year average corn grain yields were maximum with an available N (AN) (soil + fertilizer + irrigation water N) rate of 224 kg N ha⁻¹ at this site for the same years. NT-CB rotation exceeded the grain yields for CT-CC and NT-CC at this site for the same years.

1) Determine N fertilizer needs for optimizing corn and soybean grain yields and the influence of AN level and residue N on soybean and corn yields in northern Colorado

OBJECTIVES

1) Determine N fertilizer needs for optimizing corn and soybean grain yields and the influence of AN level and residue N on soybean and corn yields in northern Colorado

Soil N uptake did not vary significantly with N rate or year, averaging 14 kg N ha⁻¹. Producing a harvestable and economical crop of soybean in this area appears to have required a N treatment of 224 kg N ha⁻¹. N fertilizer rate (kg N ha⁻¹)

Corn residue N (kg ha⁻¹)

Residual soil NO₃-N was constant across N rates. Excellent model fit was found for both corn and soybean N uptake.

The corn in the NT corn-bean system responded similarly to AN supply when compared with the CT system reported by Halvorson et al. (2006). Corn yields at low fertilizer N rates benefited most from having beans in the rotation.

Summary

1) Corn grain yields were near maximum with an available N (AN) (soil + fertilizer + irrigation water N) level of 257 to 285 kg N ha⁻¹.
2) The corn in the NT corn-bean system responded similarly to AN supply when compared with the CT system reported by Halvorson et al. (2006). Corn yields at low fertilizer N rates benefited most from having beans in the rotation.
3) Slow early spring plant development and delayed budding was not observed in NT corn-soybean rotation as reported for the NT continuous corn system (Halvorson et al., 2006).

Acknowledgments

1) N fertilizer treatment was not significantly different with N rate or year, averaging 14 kg N ha⁻¹. Producing a harvestable and economical crop of soybean in this area appears to have required a N treatment of 224 kg N ha⁻¹.

For More Detail, See References Below
