

Corn Yield Effects in a Corn-Soybean Strip Cropping System

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Introduction

This project was designed to study the effects of planting corn and soybeans in 12-row strips as compared with planting corn as a single crop in a field. The reasoning behind planting corn and soybeans in strips is derived from the belief that corn plants will be better able to intercept light if more plants are exposed to an open edge like that found at the corn-soybean border.

Interest in this study was derived from an article in the popular press where corn yields were reported to increase by as much as 100 bushels/acre when planted to strips of corn and soybeans. This study was designed to determine if a yield increase is possible and to see which corn rows in the strip are contributing to the yield increase.

Materials and Methods

The first year of this study at the Southeast Research and Demonstration Farm was 2004. The experimental crop was planted into a field that was in a corn-soybean rotation where the previous crop was soybeans. The field was fall-disked and spring-field cultivated. A John Deere 7000 planter was set to plant 37,000 seeds/acre for corn and 178,000 seeds/acre for soybeans in 30-in. rows. However, a 38-in. row spacing was used between the corn and soybean strips to reduce the competition of the corn on the soybeans. A soil sample suggested that phosphorus and potassium levels were limiting, so these fertilizers were applied at twice the removal rate to compensate for this two-year study. In addition, 150 lb of nitrogen in the form of anhydrous ammonia was applied in the fall and 60 lb of nitrogen (28% UAN) was applied during May as a side-dressing to the corn. The soil sample also suggested that the soil had a pH of 5.70, but no adjustments were made.

In addition to planting the corn and soybeans in 12-row strips, each corn strip was planted to a short, medium, and tall hybrid. The short hybrid was planted in the two outside rows on each side of the strip, the medium-height hybrid was planted in the next two rows on each side of the strip, and the tall hybrid was planted in the middle four rows of the strip. This arrangement was designed to increase light interception across the strip. Finally, each corn hybrid was planted in separate blocks to determine the yield of each hybrid when planted as a single crop in an entire field.

Results and Discussion

Replicated yield results suggested that there was a substantial yield increase in rows 1 and 12 (the outside rows of the strip) as shown in Figure 1. However, rows 2 and 11 yielded substantially less. The yields in these two rows may have been reduced because of the competition from the medium-height hybrid that was planted in rows 3 and 10. Yields in rows 3 and 10 may have increased because these rows were able to intercept more light due to the fact that the short hybrid was planted in rows 2 and 11. Rows 4 and 9 yielded less, most likely because they were shadowed by the tall hybrid in rows 5 and 8. However, there was very little difference in yield when looking at the tall hybrid in rows 5, 6, 7, and 8.

When looking at the bulk corn planted in large blocks, it is evident that there may have been some yield differences among these three hybrids. This undoubtedly played a role in how the yields turned out in the strips. Still, the general trends discussed above seem valid.

The average yield of the strip was 228.4 bushels/acre. The average yield of the three hybrids planted in the large blocks was 215.5

bushels/acre. The difference was 12.9 bushels/acre in favor of the strips. However, this yield increase was substantially less than previously reported.

Finally, soybean yield results were not a factor that we were focusing on for this study. However, yield checks suggested that the

soybeans were ranging from approximately 53 to 60 bushels/acre.

Acknowledgments

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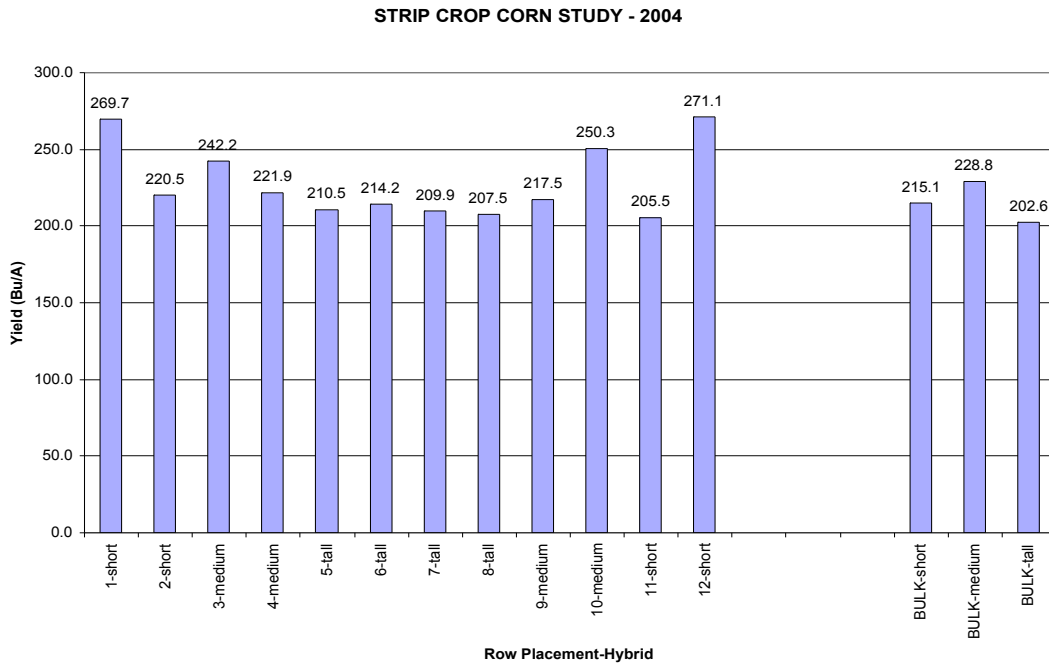


Figure 1. Effect of row placement on corn yield in strips and in blocks for 2004 at Crawfordsville, IA.