**Effects of Row Spacing on the Yield of Soybeans [Glycine max]**

**Student name**

**Mentor Name**

**Purpose:**

 Soybeans are an essential tool in crop rotations used in present agriculture. Prior studies in various regions have shown that soybean [Glycine max] yields are increased when the placement of rows is narrower. Traditionally, rows are placed 30 inches apart whereas narrow rows entail placement 8.5 inches apart. Yield increases were seen in soybeans planted in narrow rows, but only under irrigated systems where optimal amounts of moisture were available to the crop. Under normal conditions, however, there were no yield increases realized from planting soybeans in narrow rows (Lee, 2006). Supporting that finding, results from a study completed by Alessi and Power suggested that while eight inch rows enhance water use prior to flowering, in extreme drought conditions where there is less water for pod fill, ultimately, yields are reduced due to the narrow rows (1982).

Thus, an alternative reason cited for yield increase has been greater light absorption. A study conducted by Bullock et al. determined that earlier closed canopies utilize light more efficiently, which leads to increased yields (1998). In comparison to narrow rows, wide rowed systems, arguably, intercept the same amount of light and, therefore, have the same capability for increased production.

 It is also thought that an increased emergence rate is observed in wide rows due to a greater amount of seeds needed per row to meet the recommended population density. With the increased number of seeds, there is an enhanced push—push pertains to the power needed for seeds to reach the soils’ surface—through the soils’ crust. Comparatively, narrow rows require less seeds per row to meet the recommended population density and associated, subsequent push, so more rows are usually planted per acre.

This experiment will test the effects of row widths on the yield of a modern soybean cultivar.

**Methods and Materials:**

 This experiment will be conducted on approximately 12 acres of land subdivided into one acre plots. Three different treatments will be applied to the plots with four replications of each treatment. Treatment A will be plots planted with row spacing at 8.5 inch rows; treatment B will be planted with row spacing at 17 inches; and treatment C will be planted with row spacing at 34 inches. The treatments will be arranged randomly in the 12 plots. All of the plots will be planted with the same planter at the recommended population setting for the selected cultivar. Hence, each plot will have approximately the same population density. The only difference between the plots will be the number of seed tubes that apply the seed into the soil.

 Fertilizer will be added according to the soil test, and lime was applied in the early spring to bring the pH to the desired level of 6.2. The type of soybeans that will be planted is a Round-Up ready variety, which will allow for better weed control compared to other cultivars. A weed control program will be used on all of the plots. The exact cultivar will be determined closer to the planting date, and a concise pesticide program will be implemented once the growing season has started.

 An initial stand count will be conducted on each of the 12 plots once the seedlings have emerged. Another stand count will be performed after harvest. The stand counts will provide a more accurate representation of the population that is growing in each of the plots than the approximate population to which the planter will be calibrated.

Rep. 4

Rep. 3

Rep. 2

Rep. 1

**Diagram of Plots**

Each plot will be ~ 43 ft. wide

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A**Each Plot will be ~ 1000 ft long | **B** | **C**Treatments Randomly Arranged | **B** | **A** | **C** | **C** | **A** | **B** | **B** | **C** | **A** |

**Timeline of Activities**

* Planting of Plots – Mid-May
* Stand count – After plants have emerged
* Harvest – October
* Stand count – Post harvest
* Data Analysis – October – November

**Budget:**

Soybean seeds, 50 lbs: $32.00. The rest of the supplies will be provided for by the farm.

**Works Cited**

Alessi, J. and Power. "Effects of Plant and Row Spacing on Dryland Soybean Yield and Water- Use Efficency." Agronomy Journal 74(1982): 851-854.

Bullock, D., Khan, S. and Rayburn, A. "Soybean yield response to narrow rows is largely due to enhanced early growth. " Crop Science. 38: 1011-1016. (July-August 1998): 1011(6). Academic OneFile. Gale. Delaware Valley College. 12 Mar. 2009.
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source=gale&userGroupName=delvalco\_main&version=1.0.

Lee, Chad D. “Reducing Row Widths to Increase Yield: Why It Does Not Always Work.” *Reducing Row Widths to Increase Yield: Why It Does Not Always Work.* 28 Feb. 2006. Department of Plant and Soil Sciences, University of Kentucky. 22 Apr 2009. http://www.plantmanagementnetwork.org/pub/cm/review/2006/wide/.