

Soybean Dry-Land Maximum Yield

Rachel Vann, NCSU

In order to push soybean yields in N.C., growers must be willing to change the way they manage the crop. For many years, soybeans have not been as intensively managed as other crops in N.C., but growers that commit to an intensive systems-approach management style for soybeans are often rewarded. To determine which practices and products will result in the greatest yield increases, the NCSU has funded research through the checkoff known as the “Cadillac” test.

The project sought to identify practices and products resulting in the greatest yield increases for N.C. soybean production. It includes a “Cadillac” maximum yield treatment using many different inputs. Other treatments in the test subtract one input at a time to determine the influence the product/practice has in a relatively high-yield, non-irrigated environment. This trial was conducted at four environments in 2018 to complement data gathered from 2015-2017. Averaged over 14 environments, the **production practices with the largest impact on soybean yield included maximal variety selection, narrow row spacing and foliar fungicide use.**

soybean yield by about 6 bu/A on average, but three fungicide applications in one season is probably not profitable. The data indicates that fungicide applications made at R2 and R4 were more effective at increasing soybean yield than at R5. Based on other data generated in the N.C. State Extension Program, the impact of the R2 and R4 fungicide applications on soybean yield has more to do with the timing of the application and the susceptibility of the plant to disease at that stage than the products themselves.

Variety selection impacted yield in some environments in these trials. A Cadillac variety was selected for inclusion in this trial based on its ability to perform well in a high-yield environment, and then compared to a variety with more consistent performance over time. **Soybean variety selection is a critical component to maximize soybean yield.** Growers should be intentional about selecting maturity groups, herbicide packages and disease resistance packages to achieve maximum soybean yields using high-quality yield data.

Increasing plant population by 20% has a negligible impact on yield

of less than 1 bu/A, **indicating growers can save money by reducing seed populations to 120,000 seed/A or lower.**

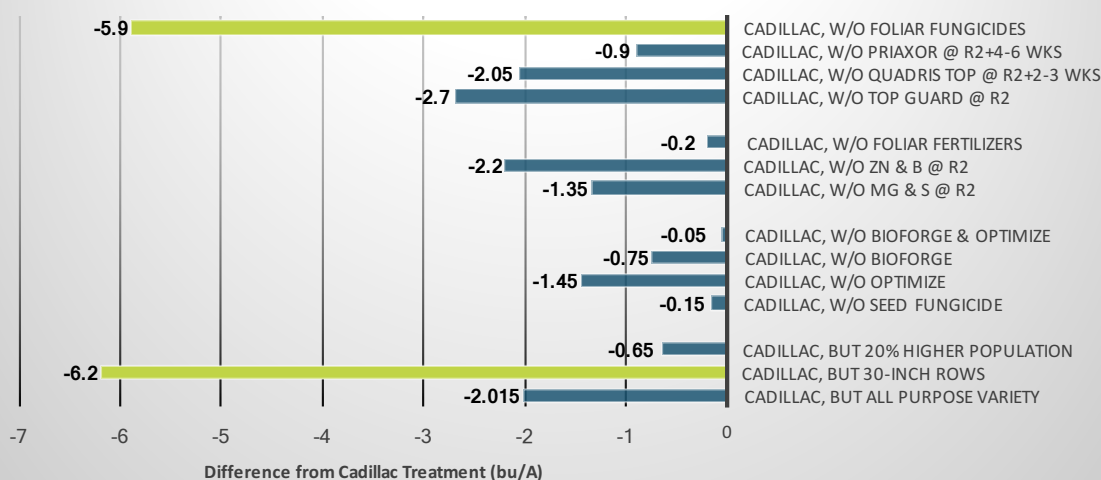
In general, **the use of a seed fungicide, seed inoculant or seed biological enhancement product did not impact soybean yield** despite claims these are important components of a high-yielding soybean system. However, a fungicidal seed treatment may be more important at earlier planting dates than were used in this trial.

Foliar fertilizer products had a variable impact on soybean yield in this test. The application of $MgSO_4$ at R2 did not impact soybean yield in most environments.

The application of Zn and B at R2 had an impact on soybean yield in some environments with an average of about 2 bu/A increase. Foliar fertilizers are believed to have benefits in situations where micronutrient deficiencies occur, which might have been the case at some environments where yield responses were observed. Growers should make educated decisions on foliar fertilizer use based on product cost, cost of application and potential yield increases.

Incorporating even one of these proven practices may result in yield increases or cost savings. **If growers commit to putting the time and energy into managing soybeans like they invest in some other crops, results will be positive.**

Maximum Dryland Yield 2015-2018



The **largest impact on yield came from decreasing row spacing**, with 15-inch rows yielding about 6 bu/A more than 30-inch rows. There are circumstances where wider row spacing may be more appropriate than narrow row spacing (i.e., when wide rows are being ripped or when bedded production is implemented), however all environments tested consistently saw yield benefit from narrow row spacing. Additionally, narrow rows have the benefit of quicker canopy closure, an increasingly important tactic for weed control in soybeans given the increase in herbicide-resistant weed management challenges.

The **second highest impact to yield came from a foliar fungicide application.** Three fungicide applications at R2, R4, and R5 increased