

AGRONOMIC Spotlight



Soybean Seeding Rates

In recent years recommended soybean seeding rates have been decreasing in response to advancements in weed control, seed treatments, and planters. Optimum seeding rates vary based on geography, soil type, and planting date.

Background

For several years, a general rule of thumb for soybean seeding rates in parts of the Midwest was 150,000, 175,000, and 200,000 seeds per acre in 30 inch rows, 15 inch rows, and drilled beans, respectively. In some geographies, like Ohio, it was not uncommon for farmers to plant upwards of 240,000 seeds per acre to compensate for potential stand loss from challenging clay soils and seedling diseases such as *phytophthora*.

Both historically and currently, a healthy, consistent, and uniform stand of 100,000 plants per acre (ppa) is generally considered the threshold for replant situations. Often 100,000 to 125,000 ppa at harvest is the optimum for profitability and possibly yield potential. This threshold was reinforced with data over three growing seasons from IA State (Figure 1).

Seeding Rate in 2010

While the threshold for replant situations may be around 100,000 ppa, the seeding rate recommendations to help attain maximum profitability and/or yield potential vary by geography and local conditions. In 2010, recommended soybean seeding rates from Iowa State University are lower and are not a function of row spacing (Figure 2). Other recommendations from Minnesota are based on maturity group (Figure 3). This

is to help compensate for the shortened growing season and therefore the reduced ability to produce as much vegetative growth to support ample podding sites.

Essentially, fewer seeds per acre are recommended in 2010 to attain the optimum harvest population, for profitability and/or yield potential. The ability to attain similar or higher yield potential with lower seeding rates is due in part to advancements in weed control options, seed treatments, planters and planter maintenance.

to pg. 2

Figure 2. Decision tree on how to get a final stand of 100,000 plants per acre using a planter.

Planting Conditions

- Good seedbed ("tillage")
- 1 to 1.5 inch planting depth
- Relatively new planter (<5 years old) or well maintained planter
- Moderate planting speed (<6 mph)
- Excellent seed quality

Determining Seeding Rate:

- If 5 of the Planting Conditions apply, the seeding rate should be 125,000 seeds per acre.
- If 4 of the Planting Conditions apply, the seeding rate should be 140,000 seeds per acre.

Modified from: P. Pedersen, IA State Univ. 2007. Decision Tree on How To Get To a Final Stand of 100,000 Plants per Acre Using a Planter? <http://extension.agron.iastate.edu> (verified 2-10-10)

Figure 3. Soybean seeding rate recommendations from Minnesota, based on maturity group.

Maturity Group	Live Seeds Per Acre
II	140,000
I	150,000
0	160,000
00	170,000

Source: Optimum Soybean Plant Population. 2009. Plant Health Initiative.

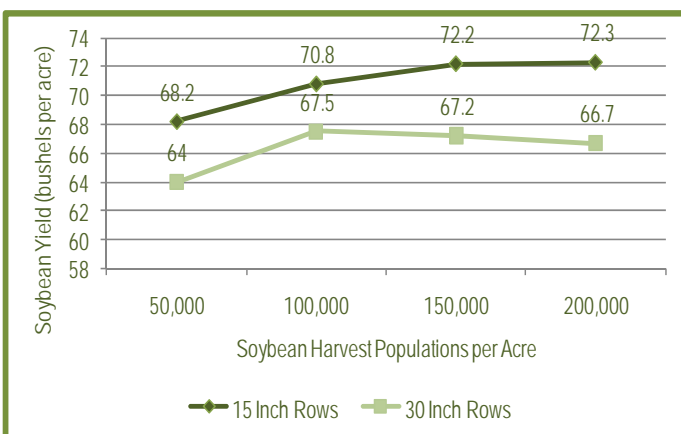


Figure 1. Effect of harvest population on yield of soybeans grown in 15 inch and 30 inch rows.

(Eight environments, 2004 to 2006, LSD (5%) = 1.4 bu/a).

Source: Palle Pederson. April 2, 2007. Soybean Seeding Rates: The Balance Between Cost and Yield. Integrated Crop Management. IA State Univ. Ext.

from previous page

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Agronomic Advancements

Weed control has changed dramatically over the past 15 years with the adoption of Roundup Ready® and Genuity™ Roundup Ready 2 Yield® technologies. These advancements have allowed for increased flexibility and improved weed control compared to the options that existed in the mid 1990s and prior. They alleviate some of the reliance on a quick and thick canopy (courtesy of high seeding rates) for good weed control.

Seed Treatments have made considerable progress in recent years. Previously, most seed treatments consisted of one or two active ingredients that primarily battled seedling diseases. In 2010, Genuity™ Roundup Ready 2 Yield® soybeans will be treated with Acceleron™ seed treatment products. With a much broader control spectrum, the 2010 Acceleron seed treatment products for soybean will offer four active ingredients to help provide protection from early season diseases such as *Pythium*, *Phytophthora*, *Rhizoctonia*, and *Fusarium*, early season insect pests such as first generation bean leaf beetle, and enhanced yield potential due to improved early season growth and vigor. The disease and insect protection and early growth benefits seen with the Acceleron seed treatment products for soybean help provide protection from some of the issues that were used to justify higher seeding rates in the past.

Planter Maintenance is critical for good seed to soil contact, which is one of the primary contributing factors to realizing a strong soybean stand. To help achieve a stand with the desired population and uniformity, the planter should be adjusted according to the recommendations found in the operating manual for the specific planter being used.

With the benefit on better planting equipment, comes the transition to having planting rates based on seeds per acre



versus pounds per acre. Historically, most soybean seed has been sold by bag weight. Genuity™ Roundup Ready 2 Yield® soybeans are being sold based on seed count, not bag weight, thus reducing the effect of variable seed size and simplifying the calculations for seed needs.

Summary

In general, recommended soybean seeding rates are lower due to advancements made in weed control programs, seed treatments, and planter maintenance. Recent studies have shown that while yield potential may be maximized at higher populations, the economic return for the additional seed investment may not be covered by the increase in yield potential. A final plant stand of 100,000 to 125,000 plants per acre may optimize economic return and yield potential. The seeding rate needed to attain that final stand will depend on geography, planting equipment, and other agronomic practices. Farmers are encouraged to experiment on a few acres with different seeding rates to better understand how their agronomic practices will influence final plant density on their own farm.

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