

## OPTIMUM PLANTING CONDITIONS AND SEED PLACEMENT FOR SOYBEAN

- Planting equipment should be serviced according to the guidelines found in the manufacturer's manual.
- Germination percentage, seed size, and seed treatments listed on seed bags and tags should be noted.
- Base seeding rates on germination percentage, field conditions, and seed treatments.
- Evaluate seed placement and spacing several times while planting.

### Equipment Maintenance

The planting of a successful soybean crop starts before going to the field. During the winter or early spring, the planter or drill should be serviced according to the manufacturer's manual, and the manual should be reviewed for any planting recommendations. Additionally, manuals for any added aftermarket equipment should be reviewed for proper servicing and planting recommendations. Sprockets, bearings, chains, gauge wheels, and other moving parts should be checked for excessive wear (Figure 1). Worn parts can be a hinderance to maintaining the desired seed drop and placement.



*Figure 1. Sprockets, bearings, chains, and other moving parts should be evaluated for wear and serviced according to the manufacturer's manual.*

### Determining Planting Rates

An important step is to make a note of the seed size, seeds per pound, seed treatments, germination percentage, and any specific planting recommendations for delivered seed. This information can be used to set the planting equipment for the desired seeding rate. The germination percentage helps to determine the proper seeding rate.

University research has shown that final soybean stands of 100,000 plants/acre can maximize yield potential and profitability.<sup>1,2,3</sup> In less productive fields or low-producing areas within fields, the final stand may need to be around 135,000 plants/acre.<sup>1,2</sup> It is highly unlikely that every emerged seedling will become a mature harvestable plant; on average the survival rate is 85%.<sup>3</sup> The survival rate is variable and is a function of field and environmental conditions, planting depth, soil type, individual seed product, and

planting date.

To determine an estimated seeding rate, use the germination percentage on the tag and an expectation for survival. For example, if the tag shows 90%, and 85% is used as the expected survival rate, multiply the two percentages ( $0.90 \times 0.85 = 0.765$ ). Divide the desired final stand (100,000 plants/acre) by the percentage factor (0.765):  $100,000/0.765 =$  a seeding rate of 130,719 seeds/acre.

Under most conditions, seed size has no impact on germination, vigor, or yield potential; however, large seed may have better emergence when planted deeper than desired, as large seed has a greater amount of stored energy.<sup>4</sup> In general, soybean seed should be planted at a depth of 1 to 1.5 inches.

# OPTIMUM PLANTING CONDITIONS AND SEED PLACEMENT FOR SOYBEAN

## Optimum Soil Temperature for Planting

Soybean seed can germinate at a soil temperature of 54°F; however, 60°F is optimal.<sup>5</sup> Placing seed into soils with temperatures below 60°F increases seed vulnerability to disease, insect feeding, and delayed emergence. Insect and disease prevalence may be higher in fields with heavy residue because insects are protected, soils can be cooler and be moister, and some pathogens overwinter in crop debris (Figure 2). Seed treatments can help protect the seed from insects and seed and seedling diseases. Based on the treatment, seeding rates may be reduced because more seeds are likely to become established plants.



**Figure 2. Planting into heavy residue can affect emergence, harbor soil insects, and because of cooler and moister soils, seed and seedling diseases may develop.**



**Figure 3. A stop to evaluate seed placement is a good time to inspect equipment for proper operation.**

## Planting

Electronic monitors can provide valuable information regarding actual seed drop when planting equipment is rolling. However, it still is a good idea to stop, dig, and measure to determine if seeds are being placed at the depth and spacing desired. As field conditions change or if there are major changes in soil type, evaluations should be conducted again. Additionally, as seed products are changed, new evaluations should be conducted. This is a good time to inspect planting equipment to help ensure furrow openers, closing wheels, press wheels and other machinery pieces are operating properly (Figure 3).

## Germination and Stand Evaluation

As seedlings emerge, evaluate the stand and begin scouting for insect activity and disease development (Figures 4 and 5). Insects to be aware of



**Figure 4. Germinating soybean seed.**



**Figure 5. Evaluating emergence.**

include grape colaspis, garden symphylan, wireworm, seedcorn beetle, and bean leaf beetle. Pythium, Rhizoctonia, Fusarium, and Phytophthora seed and seedling rots are diseases that may be present. Properly treated, seeds and seedlings can be protected from these insects and diseases.

## Sources

- <sup>1</sup> Conley, S. and Smith, D. 2019. The soybean seeding rate conundrum. Cool Bean. University of Wisconsin Extension. University of Wisconsin. <https://coolbean.info/2019/04/19/the-soybean-seeding-rate-conundrum/>.
- <sup>2</sup> Rees, J., Thompson, L., and Mueller, N. 2018. What on-farm research has taught us about soybean seeding rates. CROPWATCH. University of Nebraska-Lincoln. <https://cropwatch.unl.edu>.
- <sup>3</sup> DeBruin, J. and Pedersen, P. 2007. Soybean seeding rates: The balance between cost and yield. Integrated Crop Management. IC-498. Iowa State University. <https://crops.extension.iastate.edu/>.
- <sup>4</sup> Staton, M. 2016. Soybean planting depth matters. Michigan State University Extension. <https://www.canr.msu.edu/>.
- <sup>5</sup> Shipp, M. 2003. Crop profile for soybeans in Louisiana. Louisiana State University AgCenter. <https://ipmdata.ipmcenters.org/>.

## Legal Statement

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. ©2020 Bayer Group. All rights reserved. 3011\_S1