

Planting Small-Seeded Soybean

Like most other things in agriculture, soybean seed size is determined by the interaction of genetics and environment. Hot and dry conditions, such as those experienced in some parts of the U.S. during the 2011 growing season, can result in smaller seed. Planting smaller seed may require adjustments to planting equipment.

Small Seed Yield Potential

It has been reported that within the same variety, small soybean seed and large soybean seed are equal in yield potential.^{1,2} Large seeds can provide the appearance of greater yield; however, small-seeded varieties have the ability to produce more pods and seeds than large-seeded varieties.² Yield potential, disease tolerance, and local adaptability are much more important in selecting a variety than seed size.

There is a range of seed sizes for each seed product every year. Depending on the environment and geography where the seed is grown, there could be a range of +/-500 seeds per pound versus the average for the product in any given year.

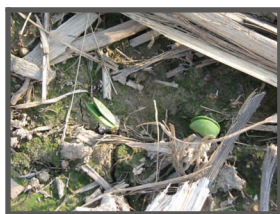
Phenotype Differences

Emerging seeds are dependent on the energy reserves held within them for sustenance until photosynthetic processes begin and seedlings become established. Larger seeds because of their size do have more stored energy compared to smaller seeds. This characteristic may allow larger seeds to be planted deeper.¹ Seeding depths for smaller seed should likely be no deeper than 1.0 to 1.5 inches. Avoid planting less than one inch as required moisture to sustain emergence may not be available consistently in the top one inch.



Soybean
Emergence

Seedlings resulting from large seeds are typically larger than seedlings from small seeds. Large seeds also require more energy to lift the larger cotyledons out of the ground. Despite these phenotypic differences, yield potential remains equal.



Seed Spacing

Overseeding can increase the potential for lodging and can provide an opportunity for certain diseases to develop such as white mold. Small seed can potentially improve seeding rate accuracy and seed spacing.

Importance of Variety Selection

Soybean variety selection is a critical part of maximizing yield potential. Some of the key selection elements to consider in

order of importance include varietal yield potential, disease tolerance, relative maturity (RM), plant height, and standability.

- **Yield Potential.** Varieties should maintain high yield potential and stable performance across multiple locations in the growing region. When possible, use multi-year data summaries to aid in variety selection.
- **Disease Tolerance.** Several diseases, including soybean cyst nematode (SCN), late season phytophthora, sudden death syndrome (SDS), southern stem canker (SSC), and brown stem rot (BSR), do not have rescue options and are primarily managed with variety selection.
- **Relative Maturity.** To mitigate the risk of poor weather during pod fill, and help maximize yield potential with fuller season varieties, a range of relative maturities can be selected.
- **Plant Height and Standability.** For fields with high fertility, a short or moderate plant height with good standability can help minimize lodging concerns. When planting in less fertile soils, taller plant types often set pods a bit higher, which allow for greater harvest efficiency.

Soybean seed might be smaller this planting season, but that should not overshadow the importance of selecting varieties based on performance.

Planting Adjustments

Prior to planting, the manufacturer's equipment manual should be reviewed for maintenance procedures and required adjustments for each seed size. Worn parts should also be replaced.

Drills

Small seed actually works better in a seed drill as large seed can be damaged in the seeding mechanisms.³ Small seed can improve planting accuracy and seed spacing.³

Adjustments and settings for drills include:

- In tilled soil, wheel tracks should be removed ahead of the drill.

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- Utilize a leveling-firming tool between the tractor and drill to help promote uniform planting depth.
- Double-disk openers should utilize depth bands or depth gauge wheels.
- Sufficient down-pressure on the press wheels should be used to help establish good seed-to-soil contact.
- Monitor planting speed as planting depth can increase as speed increases.
- Metering devices such as feed cup gates, should be adjusted to plant desired viable seeds per foot of row.

Planters (dependent on type)

Adjustments for planters include:

- Air or vacuum systems should be checked for any air or vacuum leaks.
- Vacuum or air pressure should be adjusted according to planter charts and field observations.
- Graphite or talc should be used per instruction manual recommendations.
- Seed disks should be checked daily and cleaned.
- Brushes should be checked daily for damage and cleaned with compressed air.
- Feed-cups should be potentially replaced yearly or after 60 to 80 hours of use.
- Radial bean seed meters instead of feed cups allow for seeds to be singulated.

All Planting Equipment

- Seeding rate should be checked in a field situation by collecting seed from planting units over a measured distance and at planting speed.
- Calibration should be completed on the basis of seeds per foot of row and not on pounds of seed per acre.

Summary

Small soybean seeds within the same product have the potential to have equal yield. However, planting equipment adjustments are usually required to not only plant small seeds correctly but large seeds as well. The manufacturer's manual should be referenced for adjustments.

Variety selection should be based on agronomic characteristics such as disease tolerance, standability, maturity, and soil adaptability. Seed company brochures and seed representatives can help with variety selection.

Sources:

¹ Pedersen, P. 2004. Soybean seed size is smaller this year. Integrated Crop Management. IC-492 (3), March 22, 2004. Iowa State University. <http://www.ipm.iastate.edu>. (verified 12/2/11).

² Egli, D. 2004. Soybean seed size—does size matter? Corn and Soybean Science Newsletter. Volume 4, Issue 1. March, 2004. <http://www.uky.edu> (verified 12/4/11).

³ Beuerlein, J. 2001. Adjusting a grain drill for planting soybeans. Extension FactSheet. AGF-114-01. The Ohio State University Extension. April, 2001.

⁴ Meyer, R. 2001. Check drill settings before planting soybeans. High Plains Journal.

Other sources utilized for this publication:
 Pedersen, P.. 2006. Soybean seed quality in 2006. Integrated Crop Management. IC-496 (5), April 3, 2006. Iowa State University. <http://www.ipm.iastate.edu>. (verified 12/9/11).
 Considerations for planting small soybean seeds. Agronomic Spotlight. Monsanto Company. January 18, 2008.

Equipment Adjustments to Plant Smaller Soybean Seed						
Planter Type	Seeds per Pound					
	3500	3700	4000	4100	4500	5000
John Deere® Vacuum	Use 64 cell cotton disc and vacuum levels of + 5-7 inches. Sprocket setting should be reviewed and planting speed may need to be reduced					
Case IH, New Holland ASM Vacuum	Use regular soybean disc		Use small soybean disc			
Kinze® Brush-Type Seed Meter	Use soybean disc					
John Deere Radial Bean Meter	Use "B" setting			Use "A" setting		
John Deere Feed-Cup	Use soybean cup and standard soybean seed guide			Use soybean cup and # 48005 seed guide		
John Deere 750 Grain Drill	Set Seed Index Notches to manual specifications for the rate in pounds/acre.					
Sources: QA Seed Services Lab, Monsanto Company, Waterman, IL. Small soybean seed meter considerations for planters. John Deere. http://www.deere.com (verified 12/9/11).						

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Monsanto and Vine Design® and Technology Development by Monsanto and Design® are registered trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2011 Monsanto Company. 12111LGM