



Equipment Adjustments for Planting Soybean

// Proper Planter Settings Can Help Maximize Yield Potential

Maximizing soybean yield is dependent on non-manageable and manageable factors. Weather is the largest non-manageable factor. Two of the greatest manageable factors are 1) proper servicing and maintenance of planting equipment according to the manufacturer's equipment manual and the manuals of any aftermarket equipment manufacturers and 2) reviewing the seed tag or bag information for soybean seed size, germination percentage, and seed treatment information.

// Equipment Adjustments and Settings for Desired Planting Rate

Soybean planting rates should be based on the number of seeds per acre or foot of row rather than pounds of seed per acre. Equipment manuals should be consulted to help determine the recommended equipment settings to plant the desired seeding rate. Electronic monitors provide valuable information regarding seeding rates; however, it is always recommended that the planter or drill be stopped, and the actual seed drop and placement after planting be visually checked over a short distance after planting at full speed. Figures 1 and 2 may be referenced for initial planter recommendations.

// Seed Lubricants

Seed lubricants reduce friction and improve uniformity of planting. Fluency Agent Advanced Seed Lubricant can replace talc and graphite lubricants. Seed lubricants can help reduce the amount dust and seed treatment given off during planting.

If Fluency Agent Advanced Seed Lubricant is not used, graphite should be used in finger pickup planters and talc in vacuum planters. Additional graphite or talc should be used with seed-applied insecticides, with maximum amounts of graphite or talc used on high applications of seed-applied insecticides.

// High Speed Planting

Planters equipped with belts (rubber or brush depending on manufacturer) in the seed tube can place the seed in the seed trench with minimal bounce or rolling at higher planting speeds. The belt carries the seed to the bottom of the seed trench and releases it at the same speed as the planter is moving. Because of higher planting speeds, the downforce on each row unit and closing wheel force should be increased.¹

Kinze® high speed planting solution True Speed® uses a flighted belt and 92 cell, 30-inch soybean disc.²

Case IH Advanced Seed Delivery™ (Early Riser® planter) uses Precision Planting® SpeedTube flighted belt with vSet® 2 vacuum seed meter with vDrive® electric motor.³

John Deere ExactEmerge™ planters use BrushBelt™ delivery with two electric motors.⁴

// Planters with Vacuum Metering Units

Pneumatic metering type planters can plant most seed sizes when the appropriate disk size and air pressure settings are used per the manufacturer's recommendations specified in the manual. Air or vacuum leaks in the system can affect planting rates.

To select the proper seed disk, seed should be placed into the disk cells and observed for fit. A larger disk should be selected if one seed doesn't fit properly into a cell and a smaller disk selected if two seeds can fit in a cell. If sizing determines that two disks are nearly equal in fit, the smaller hole disk should be selected. It is better to increase the amount of vacuum to compensate for skips rather than to decrease the amount of vacuum to guard against double seed drops.

The top planting speed may have to be reduced if a seed disk with fewer cells is selected to plant larger seed to help ensure that the capabilities of the seed meter being used are not exceeded.⁵ A disk with fewer cells must rotate at more revolutions per minute (RPM) to maintain a given population relative to a disk with more cells.

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For example, if 140,000 seeds per acre is the desired planting rate in a 30-inch row spacing and seeds are to be placed 1.49 inches apart, an Advanced Seed Meter with a 100-cell disk should be operated at 40.30 RPM at a planting speed of 5.7 MPH. If a 130-cell disk is used for the same population and spacing, the RPM and MPH are 40.25 and 7.4, respectively. The operational range for a hydraulic drive Advanced Seed Meter is from 12 to 60 RPM and the ideal range would be 20 to 40 RPM.⁵

The Kinze® EdgeVac™ Seed Metering System has two recommended disks for soybean when there are 2,200 to 4,000 seeds/lb: 1) Black 60-cell and 2) Dark Blue 120-cell for high rate seeding.⁶ The disks used to plant edible bean seed could potentially be used for very large soybean seed (Dark Green 54-cell disk is recommended for 1,200 to 2,500 seeds/lb of edible bean seed).⁶ Daily planter maintenance should include disk and brush cleaning and a check for damage.

// Feed Cup or Radial Meter Type Planters

Sprocket and speed settings are important for feed cup mechanisms. The manufacturer’s manual should be referenced for initial sprocket settings based on soybean seed size. Seeds coated with seed treatment products could change how the seed is metered through the cups; therefore, field checks should be completed to determine actual planting rate. Planting speed should be adjusted accordingly to maintain the RPM of the feed cup if the sprocket size is changed. A slower moving feed cup could pick up more seed as it revolves, increasing seeding rate. Planting speed should not be greater than the maximum speed for the sprocket as defined in the manufacturer’s manual.

John Deere indicates radial bean meters allow for the seed to be singulated compared to seed cups. At higher planting speeds, seeding rates may be reduced with large soybean seed.⁷ At lower planting speeds, seeding rates may be increased with small soybean seed.

To adjust for different seed sizes, the indicator should be moved to (A) for small seeds (~3,700 to 4,500 seeds/lb), (B) for medium-small seeds (~2,800 to 3,700 seeds/lb), and (C) for large seeds (~2,000 to 2,800 seeds/lb).⁷ Daily maintenance should include inspection of the brushes, seed bowls, and the knockout assembly.

Planter Type	Large Seeded Soybean Recommendations
John Deere Vacuum	Use disk # A42586 (108 cell) for 1,700 to 3,500 seeds/lb and vacuum level of 8 inches. ⁷
Case IH Early Riser® ASM Seed Meter System	Seed disk B7698875 (10045-SB) or 377669A1 (8045-SB) and vacuum setting of 15 to 17 inches, baffle setting of 2, and singulator dial setting of 8 for 2,000 to 3,500 seeds/lb. ¹⁰
Kinze® Brush-Type Seed Meter	Use Dark Blue 48 cell soybean disc for 1,400 to 2,200 seeds/lb. ⁸
Kinze® EdgeVac® or True Rate® Seed Metering System	Black 60 cell for 2,200 to 4,000 seeds/lb; Dark Blue 120 cell for high rate seeding of 2,200 to 4,000 seeds/lb. ⁸
John Deere Radial Bean Meter	Use “C” setting for 2,000 to 2,800 seeds/lb. ⁷
John Deere Feed Cup	Use soybean cup and standard soybean seed guide. ⁷
Case IH Advanced Seed Delivery (Early Riser®)	SpeedTube™ flighted belt; vSet® 2 vacuum seed meter with vDrive® electric drive motor. ³
John Deere ExactEmerge™	BrushBelt™ delivery with two electric motors. ⁴
Kinze® True Speed	Flighted belt with 92 cell, 30-inch disc. ²

For Kinze planters with Brush-Type Seed Meters, the black 60-cell soybean disk is generally used for smaller seed. The dark blue 48-cell brush meter seed plate is recommended for larger seed (~1,400 to 2,200 seeds/lb).⁸

// Finger Pickup Equipment

Planter should be operated between half and maximum speed to optimize the planting rate. Planting too fast may result in multiple seeds being planted, poor depth control, and erratic seed spacing. Planting too slow may produce skips. The torque required to turn the finger pickup mechanism should be adjusted with the appropriate tension tool.



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// Grain Drills

Grain drills are designed for planting narrow rows (7 to 10 inches). One main challenge with drills is obtaining a uniform planting depth unless control wheels or bands are on the drill. Seeding depth can be too shallow when planting into firm soil and too deep in loose soil. Additionally, if planting into tilled, loose soil, tractor wheel tracks should be tilled out with a leveling device ahead of the drill. To help maintain good seed-to-soil contact, press wheel down-pressure should be adjusted.

If drills are equipped with fluted metering devices, large seed can be cracked, and seed placement may not be uniform. However, fluted meters normally plant small seed more uniformly and vacuum or seed-singulation devices can plant more uniformly.

Through the years, drill technology has improved to the point that seed drop for some drills can be controlled with electronics from the tractor cab. However, it is still wise to verify the seeding rate and spacing. Several methods based on partial acreage measurements are available to calibrate and determine seeding rate. In the field, seeds can be dug up and counted within a set distance and a calculation made to determine planting rate per acre. Prior to going to the field, seed can be collected from seed tubes and weighed after traveling a set distance. By using the seeds per pound from the seed tag, the distance traveled, and an acreage calculation, the seeding rate can be calculated. A good article on drill calibration by Mike Staton, Michigan State University, can be accessed at: https://www.canr.msu.edu/news/calibrating_soybean_drills.⁹

Sources:

- ¹ Darr, M. and Bergman, R. 2020. High speed planting technology. Integrated Crop Management. Iowa State University Extension and Outreach. <https://crops.extension.iastate.edu/cropnews/2020/03/high-speed-planting-technology>.
- ² True Speed®, High Speed Planting Solution. 2020. Kinze.com. <https://www.kinze.com/>.
- ³ Early Riser®, 2000 Series Planters. Case IH Agriculture. <https://www.caseih.com/northamerica/en-us/products/planting-seeding/2000-series-early-riser-planter>.
- ⁴ John Deere Planting Equipment. <https://www.deere.com/en/planting-equipment/?panel=plant>.

Planter Recommendations for 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 to 7 inches. Sprocket setting should be reviewed and planting speed may need to be reduced. ⁷					
Case-New Holland ASM Vacuum	Use regular soybean disc.		Use small soybean disc.			
Kinze® Brush-Type Seed Meter	Use black 60 cell soybean disc. ⁸					
John Deere Radial Bean Meter	Use “B” setting. ⁷		Use “A” setting. ⁷			
John Deere Feed Cup	Use soybean cup and standard soybean seed guide. ⁷			Use soybean cup and # 48005 seed guide. ⁷		
Case IH Advanced Seed Delivery (Early Riser®)	vSet® 2 vacuum seed meter with vDrive® electric drive motor. ³					
John Deere ExactEmerge™	BrushBelt™ delivery with two electric motors. ⁴					
Kinze® True Speed	Flighted belt with 92 cell, 30-inch disc. ²					

⁵ McClelland, Tony. 2012. Crop Production Sales Specialist. Case IH. Personal Communication

⁶ Kinze introduces edge-drop vacuum seed metering system. 2005. FarmProgress. <https://www.farmprogress.com/kinze-introduces-edge-drop-vacuum-seed-metering-system>.

⁷ OMA86807. 2008. Deere/Bauer Planters John Deere Components. Deere & Company. <http://www.deere.com/servlet/com.deere.u90785.productcatalog.view.servlets.PublicationsSearchServlet?>

⁸ Kinze black and blue soybean discs. <http://www.sloanex.com>.

⁹ Staton, M. 2011. Calibrating soybean drills. MSU Extension. Michigan State University. https://www.canr.msu.edu/news/calibrating_soybean_drills.

¹⁰ Early Riser Planter Productivity Tips. 2012. PL-3076-12. CNH America LLC. Bayer QA Seed Services Lab. Bayer. Waterman, IL

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.

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