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How to lower soybean seed costs

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Abstract
Seed costs for soybeans are determined by the cost of seed purchased (or saved from the previous crop), seed size (seeds per pound), and seeding rate (per acre). Cost per bag of purchased seed is determined by the seed company based on the supply versus demand of the variety and the cost of producing the variety. Varieties that include a tolerance to a specific herbicide cost more because of the research investment used to develop the variety. Recently released varieties have a greater demand and justify a higher price than older varieties.

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Soybean seed size is determined by the genetics of the variety and the environment where the seed was produced. Large-seeded varieties (<2,000 seeds per pound) usually produce larger seeds than intermediate- and small-seeded varieties grown in the same environment. The seed size, however, may vary several hundred seeds per pound depending on environmental conditions and pest pressure. Temperature and rainfall are the major environmental factors that affect seed size.

Weeds, diseases, nematodes, and insects also may create a stressed plant condition that may influence seed size.

The seeding rate for soybeans is determined by the desired harvest plant population to achieve high yield and the expected loss of plants (or seeds) between planting and harvest. Recent comparisons indicate that stand loss from V3 to R8 ranged from 10 to 15 percent. Additional stand losses due to germination and seedling diseases prior to stage V3 probably range from 5 to 15 percent. Therefore, the planting rate should be from 15 to 30 percent above the desired harvest plant population.

Table 1 shows the results of a three-year study at five locations in Iowa. Narrow rows (7.5 inches at one location, 10 inches at four locations) were compared with wide rows (30 inches). A soybean drill was used to plant the narrow rows and a planter was used for the wide rows. The target plant stand was the same for both row spacings; however, manufacturers' recommended machine settings for each stand resulted in different harvest stands, with the wide rows having fewer plants at harvest than narrow rows at each target stand. The highest target stands resulted in the largest gap between target stand and harvest stand for each row spacing.

Table 1. Effect of row spacing and plant stand on soybean yield at five locations in Iowa, 1994-1996.

	Narrow rows (7.5 and 10 inches)	Wide rows (30 inches)

Plant stand target	Harvest stand	Grain yield (bu/acre)	Harvest stand	Grain yield (bu/acre)
80K*	94K	47.9	73K	46.3
120K	133K	50.2	110K	49.3
160K	157K	50.9	135K	49.8
200K	186K	51.6	165K	50.6
240K	221K	51.4	189K	49.8

*K = times 1,000.

Grain yield did not differ significantly for harvest stands above 100,000 plants per acre in either row spacing. The narrow-row harvest stand of 133,000 plants per acre produced 50.2 bu/acre compared with 51.6 bu/acre with a stand of 186,000 plants. In wide rows, the harvest stand of 110,000 plants per acre produced 49.3 bu/acre and the stand of 165,000 plants per acre produced 50.6 bu/acre. A harvest population of less than 100,000 plants per acre produced a significantly lower yield than stands of 110,000 plants or more. These studies indicate that the producer should plant enough soybean seed to have a harvest stand of at least 100,000 plants per acre. The cost of additional seed, however, must be taken into consideration before planting excessively high plant stands.

Soybean varieties that were developed to tolerate certain herbicides, such as glyphosate, may cost more than $20 per 50-lb bag. Seed companies continue to sell soybean by weight rather than seed count. Therefore, a 50-lb bag of smaller seed (3,500 seeds per pound) will have 50,000 more seeds than a 50-lb bag of larger seed (2,500 seeds per pound). The extra 50,000 seeds could plant one-third of an acre.

Table 2 shows the different number of seeds per 50-lb bag with different numbers of seeds per pound and the pounds of seed required per acre for three seeding rates. Most commodity soybean varieties produce between 2,500 and 3,500 seeds per pound under normal environmental conditions. Environmental stresses may result in either larger or smaller size seed depending on the time and severity of the stress. Specialty soybeans for food use range from less than 1,500 to more than 6,000 seeds per pound depending on the intended use. Seed size should be on the label of each bag.

Table 2. Seed required for three seeding rates and different seed sizes.

		Seeding rate per acre		
Seed size (seeds/lb)	Seeds per 50-lb bag	150,000	175,000	200,000
		pounds of seed per acre		
2,000	100,000	75.0	87.5	100.0
2,250	112,500	66.7	77.8	88.9
2,500	125,000	60.0	70.0	80.0

2,750	137,500	54.6	63.6	72.7
3,000	150,000	50.0	58.3	66.7
3,250	162,500	46.2	53.9	61.5
3,500	175,000	42.9	50.0	57.1
3,750	187,500	40.0	46.7	53.3
4,000	200,000	37.5	43.8	50.0

Many producers could reduce their seeding rates by 50,000 seeds per acre and still produce high yields (Table 1). The differences in seed costs due to price per bag and planting rate are shown in the following example:

Target harvest stand	= 130,000 plants per acre	vs.	180,000 plants per acre	
Expected loss between planting and harvest = 20 percent				
Seeding rate at planting	= 162,500 plants per acre	vs.	225,000 plants per acre	
Seed size = 3,000 seeds per pound x 50 lb = 150,000 seeds per bag				
Seed needed per acre	= 1.08 bags (50 lb each)	vs.	1.50 bags	
Cost for seed per acre				
at $14/bag	= $15.17/acre	vs.	$21.00/acre, or	
at $24/bag	= $25.92/acre	vs.	$36.00/acre	
Difference in seed costs due to price/bag for 300 acres of soybeans	= $3,225	vs.	$4,500	
Difference in seed costs due to planting rate				
	162,500	vs.	225,000	Difference
@ $14/bag	$4,551	vs.	$6,300	$1,749
@ $24/bag	$7,776	vs.	$10,800	$3,024

The savings in seed costs per acre will vary with planting rate, seed size, and cost per bag of seed. Table 3 summarizes the cost of 150,000 seeds per acre at five different seed sizes and a range of six prices per bag.

Table 3. Seed cost for 150,000 seeds/acre with different seed sizes and costs/bag.

Seed size (seeds/lb)	Price of 50-lb bag of seed					
	$14	$16	$18	$20	$22	$24
	(cost [$] of seed to plant 150,000 seeds/acre)					
2,000	21.00	24.00	27.00	30.00	33.00	36.00
2,500	16.80	19.20	21.60	24.00	26.40	28.80
3,000	14.00	16.00	18.00	20.00	22.00	24.00
3,500	12.01	13.73	15.44	17.16	18.88	20.59
4,000	10.50	12.00	13.50	15.00	16.50	18.00

If the seed size is 2,000 seeds per pound, the cost of 150,000 seeds per acre is $21/acre (@ $14/bag) versus $36/acre (@ $24/bag). This difference of $15/acre is a significant increase per acre due to different seed costs per bag at the same seed size. With the seed size of 4,000 seeds per pound, and 150,000 seeds per acre, the cost ranges from $10.50 (@ $14/bag) to $18.00 (@ $24/bag). When the bag of seed costs $20.00, the cost to plant 150,000 seeds per acre doubles from $15.00 to $30.00 depending on the seed size of 4,000 seeds per pound and 2,000 seeds per pound, respectively. Seed cost for 150,000 seeds per acre will double for each bag price if seed size changes from 4,000 to 2,000 seeds per pound.

Soybean seed decisions will be made by most producers during the winter. To conserve seed input costs for next year:

0. select a high-yielding variety from a yield test with at least two years' data;
1. check the soybean seed bag for the seed size;
2. calculate the number of bags of soybeans needed for the acres to be planted at the desired population; and (4) calibrate the drill or planter to plant between 150,000 and 180,000 seeds per acre. The savings of a few dollars per acre (due to reduced planting rate, or smaller seed size, or less expensive seed) will add up over several acres.

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