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In this Issue:

1. Marestail (*Conyza canadensis*) Control in Soybeans

James R. Martin and J. D. Green, Plant and Soil Sciences

The glyphosate resistance issues associated with marestail makes it a challenge to manage this annual weed in soybeans. If marestail is present, it is prudent to assume that glyphosate resistance is likely and that alternative herbicides need to become a part of the weed management program.

Burndown applications of 2,4-D ester play a major role in controlling marestail in full-season no-till soybeans, yet they have their limitations. One of the primary drawbacks of using 2, 4-D in burndown applications is the risk of injuring soybeans. In order to minimize the risk, 2,4-D ester must be applied 7 to 30 days ahead of soybean planting. Treatments of 0.5 lb ae (acid equivalent) per acre, require a minimum of 7 days between application and planting; whereas, most 2,4-D ester products applied at rates > 0.5 to 1.0 lb ae/A require a waiting interval of at least 30 days. The label directions on rates and waiting periods may vary depending on specific product.

The following list of 2,4-D ester products illustrates the differences in formulations and recommended label directions concerning rates and waiting period between application and planting of no-till soybeans.

Table 1. Examples of products containing 2,4-D and waiting periods between spraying and planting soybeans.

PRODUCT (formulation)	**WAITING PERIOD**	
	7 days	**30 days**
Salvo *(5 lb ae/gal)*	12.8 oz/A	*
Weedone (LV 4EC) *(3.84 lb ae/gal)*	1 pt/A, 16.6 oz/A	2 pt/A, 33.3 oz/A
Weedone (LV6) *(5.4lb ae/gal)*	0.67 pt/A	1.33 pt/A
Weedone 638 *(2.8lb ae/gal)*	1.33 pt/A	2.67 pt/A

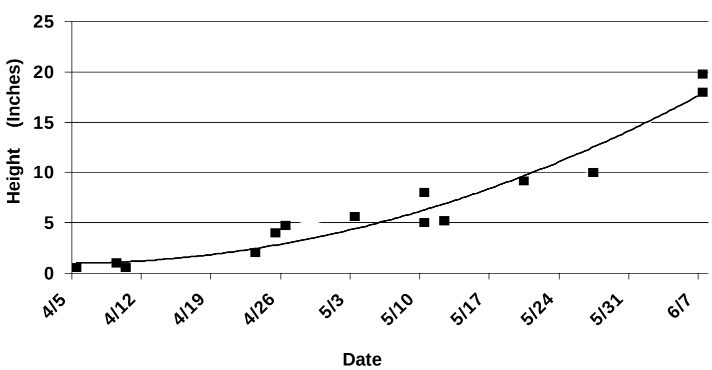
* Salvo applied at 25.6 oz/A requires a minimum waiting period of 14 days.

While the persistence of 2,4-D in soil is considered a risk to injuring soybeans, it is not great enough to provide long-term preemergence control of marestail following burndown applications. Under the right conditions in Kentucky, marestail can emerge throughout much of the summer; consequently, newly emerging seedlings following burndown applications could potentially become a problem.

The following comments may help growers who are trying to manage marestail this spring:

Figure 1. MARESTAIL HEIGHT AT VARIOUS DATES IN W. KY

(Collected from herbicide evaluation trials 2002-2005).



1) Monitor fields

Monitor fields well in advance of soybean planting for emergence and size of marestail. Ideally burndown treatments with 2,4-D ester should be applied before marestail exceeds 6 inches in height. The emergence and growth patterns of marestail will vary depending on residue cover and the growing season. Based on the observations from various studies in western Kentucky during the last few years, marestail reaches 6 inches around the first week of May (see Figure 1).

2) Soil-residual herbicides

When applying well in advance of soybean planting, consider including a soil-residual herbicide such as Canopy (chlorimuron + metribuzin), Canopy EX (chlorimuron + tribenuron), FirstRate (cloransulam), Sencor (metribuzin), or Valor (flumioxazin) to provide preemergence control of marestail plants. The fact these options offer alternative mode(s) of action compared with glyphosate is another benefit for including them in the overall management of marestail

3) Paraquat or glyphosate

Include paraquat or glyphosate with 2,4-D as a part of the overall burndown treatment to control other weeds and help provide additional stress on marestail. While paraquat alone is not a good option for controlling marestail, it can be beneficial when using 2,4-D for the burndown control of small plants. It also provides another mode of action that is different than glyphosate. However, the benefit of paraquat may diminish as average plant size increases to 4 to 6 inches in height.
While resistant marestail plants are tolerant to glyphosate, they usually show some stunting as an initial response to glyphosate. This herbicidal activity along with that from the 2,,4-D ester can be helpful in managing marestail.

4) Taller marestail

Achieving consistent burndown control of marestail diminishes when plants exceed 6 inches in height. If plants exceed this height, consider applying 2,4-D ester at the high rate and include glyphosate along with FirstRate, or Canopy. Using the high rate of 2,4-D ester (1 lb ae/A) can improve control but the extra time in delay planting of soybeans is an obvious draw back when applying this rate.

5) ALS-resistance

Be on the look out for ALS-resistant marestail. Although this type of resistance has not been confirmed in Kentucky, there are cases of it in Ohio and Indiana. FirstRate, Canopy EX, Classic (chlorimuron), and Synchrony XP (chlorimuron + thfensulfuron) are examples of ALS–containing products that will not control ALS-resistant marestail.

6) No-till double-cropped soybeans

There are no good options for managing glyposate-tolerant marestail in no-till double-cropped soybeans. The best defense is to have a good stand of wheat to limit the emergence and growth of marestail. Marestail will probably be more of a problem in double-cropped soybeans this season due to erratic wheat stands caused by the dry weather during wheat planting last fall.

2. Time- A Key to Managing Soybean for High Yields

D.B. Egli, Plant and Soil Sciences

Time permeates our lives. There is not enough time. It takes too much time. I don't have enough time. I'm not on time. Time seems to rule our very existence and it is difficult to escape from this constant obsession with time. Perhaps it is not surprising that time is also an important part of soybean production – we can't forget about time if we want to produce high soybean yields.

There are two important aspects of time in soybean production that I want to discuss. The first relates to the growth of the plant – what is it doing and when is it doing it? The second relates to the producers' activities – what are they doing and when?

Soybean plants (and all other grain crops for that matter) go through three phases of growth: first they grow vegetatively, producing stems, leaves and roots, then they start flowering and setting pods, and finally, the seeds grow and fill the pods and the crop is ready to harvest. In a sense, the crop first produces the machinery (leaves, stems, roots) to produce yield, then the container for yield (pods and seeds), and finally it fills the container (seed filling). Surprisingly, most of the soybean plant's life is devoted to preliminary events, growing leaves and setting pods, while the seeds and yield are produced only during the final stages of growth. Only about 30% of the time from planting to physiological maturity is actually used to fill the seeds.

Following the soybean growth staging system (a system that all producers should be familiar with, the box at the end of this article contains more details), flowering and pod set begins at growth stage R1 (beginning bloom – one open flower at any node on the main stem) and ends at roughly growth stage R5 (beginning seed – seed 3 mm (1/8 inch) long in a pod at one of the four uppermost nodes on the main stem with a fully developed trifoliolate leaf, i.e., a leaf that has unrolled sufficiently so that the edges are not touching). Vegetative growth continues during flowering and pod set, but both end at the beginning of seed filling. Seed filling begins at R5 and ends at growth stage R7 (beginning maturity – one normal pod on the main stem has reached its mature pod color, brown or tan depending on the variety). Seed filling actually begins a little before R5 and pod set continues for a while after R5, but R5 is a good indicator of the change from one phase to the other. Growth stage R7 is a good indicator of physiological maturity, defined as maximum seed dry weight. All the yield is there at growth stage R7, but the seeds are about 55% moisture, so harvest cannot begin until the seeds dry. These comments apply, with only subtle differences, to soybean varieties with indeterminate (generally maturity group IV and earlier with only a few exceptions) or determinate (maturity group V and later) growth habits.

Which of these three phases is most important for high yields? Without a doubt, flowering and pod set is the most important because the number of pods and seeds the plant will produce is determined during this stage. Good weather (plenty of rain) during this period will produce lots of seeds (a large yield container) which is always the first step to high yield.

The yield container must be filled, so seed filling is also a very important phase. Stress (dry weather) during this phase will produce smaller seeds (often because of earlier maturity) and reduce yield. When stress during flowering and pod set reduces the number of pods and seeds the plant can compensate (assuming the weather improves during seed filling) by making larger seeds. There is a limit to this compensation (no one has ever seen a soybean seed the size of a baseball or even a golf ball), so it's better to have a large yield container than to bet on seed size.

Surprisingly, vegetative growth is the least important of the three. Yes, you must have a certain amount of machinery to produce maximum yield, but most soybean varieties in narrow rows produce more than enough machinery (leaves). If you have more than enough you can lose a little without affecting yield. The key is that there must be enough leaf growth to provide complete ground cover by flowering or soon thereafter; if you can see the soil between the rows after flowering (growth stage R1), yield will probably not be as high as it could be. Stress during vegetative growth often has no affect on yield, because there are still enough leaves left to provide complete ground cover. An English scientist once asked the question "Is your vegetative phase necessary?" and concluded "Yes, but not as necessary as one might think". This conclusion is definitely true for soybean.

The timing of the reproductive phases – when they occur during the summer- can also be important. In a good year with lots of rain or in a terrible drought it won't make much difference, but in a normal Kentucky summer when it doesn't quite rain enough and we get short dry spells, the timing of flowering and pod set and seed filling can be critical.

Growth Staging Systems

If what the soybean plant is doing and when it is doing it is important, a clear and simple description of the stages of soybean growth is needed to describe what the plant is doing at any time. A growth staging system will work only if everyone uses the same system and the stages are easy for everyone to understand. Older systems that used very general descriptions (for example, leaves yellowing), which could have quite different meanings to different people, have been replaced by more precise definitions (for example, one brown pod on the main stem) usually based on counting or measuring plant parts. Everyone can understand these stages, improving communications among those involved in soybean production.

The original soybean growth staging system was developed by soybean breeders Walt Fehr (Iowa State University) and Chuck Caviness (University of Arkansas) and first published in 1971, and in a revised form in 1977. The current system contains only a few minor changes from the 1977 Fehr and Caviness system. The current system is linked on the University of Kentucky soybean website (http://www.uky.edu/Ag/GrainCrops/soybean.htm) under "Production". That link also provides information on purchasing the Iowa State University publication.

We can control time in some of our management decisions. When to plant and what variety to use are two decisions faced by all producers. Planting in May or early June will usually give you about the same yield. Things change about June 10 to 15 in Kentucky and yields begin to decline (~ 1.5 % per day, on average) as planting is delayed. Paying attention to when you plant can increase soybean yield without increasing input costs. Double-cropping soybean after wheat forces us to plant late and that's why yields are often lower.

Variety maturity and planting date determine when reproductive growth occurs during the summer. Approximate dates for growth stages R1, R5 and R7 from May and late June plantings at Lexington, KY are shown in Table 1. If we could get a perfect weather forecast for the entire summer we would know what variety to plant and when to plant it to match flowering, pod set and seed filling with good weather to insure high yields. Such a forecast may be available in the future, but for now we can only play the averages that say that generally the yield of maturity group III is roughly 10% less than group IV varieties in Kentucky while maturity group V is, on the average, 10 to 15% less than group IV. Any advantage for maturity group II varieties is probably pretty small and they may yield less in some years. There can be, however, lots of variation among maturity groups in any year, depending on which one gets the most rain during the critical reproductive growth phases. Growing varieties from several maturity groups will usually give more consistent yields from year to year since a short dry spell will probably not hit the critical phases of all of them.

Time is important in soybean production. What the plant is doing and when it is doing it has something to do with yield. Thinking about time and the three phases of yield production can help you manage your soybean crop and make it more profitable. Remember, as Charles F. Kettering once said "Thinking is one thing no one has ever been able to tax".

Table 1. Planting date and maturity group effects on timing of reproductive development, Lexington, KY. Adapted from Egli, D.B. and W.P. Bruening. 2000. Potential of Early-Maturing Soybean Cultivars in Late Plantings. Agron. J. 92: 532-537.

Maturity	Early planting (May 18)			Late planting (June 25)		
Group	R1	R5	R7	R1	R5	R7
II†	June 28	July 30	Sept. 1	Aug. 1	Aug. 24	Sept. 26
III	July 3	Aug. 8	Sept. 9	Aug. 3	Aug. 28	Oct. 2
IV	July 8	Aug. 14	Sept. 20	Aug. 6	Sept. 1	Oct. 6

† Two varieties per maturity group. Average of three years at Lexington, KY.

3. Early soybeans in Kentucky

Chad Lee, Dennis B. Egli and John H. Grove, University of Kentucky

In Kentucky, Maturity Group IV (also referred to as 'group 4') soybean varieties typically yield more than soybean varieties in other maturity groups. Early group 5 soybean varieties in the southern and western part of Kentucky and late group 3 varieties in central and northern Kentucky also typically yield well.

Group 4 soybean varieties planted in May will be filling seed during August, which is typically a dry month in Kentucky. If water becomes limiting during seed filling, yields will be reduced. Shallow soils are more prone to water-limiting conditions than deep soils because shallow soils hold less water. Group 2 varieties may be a very good fit on shallow soils by going through seed filling early enough to avoid the typically dry August period. So, on these drought-prone soils, group 2 varieties may actually yield the same as, or more than, group 4 varieties.

Studies were conducted in central Kentucky for the past three years to determine if group 2 varieties could yield as well as group 4 varieties. The varieties were planted across several landscape positions. These positions had different soil depths, which created differences in drought potential. The backslopes and shoulders have shallower soils than other slopes and are more prone to drought. The studies did not experience any extended dry period in 2003 and 2004. In 2005, the only month with surplus precipitation was August! The past three years did not follow the long-term weather trends, having a dry August, so we could not test our hypothesis regarding group 2 varieties on shallow soils.

Field landscape position did not significantly affect yield in any of the three years, but there were significant differences in yield between varieties from different maturity groups. Group 4 varieties yielded about 10% more than group 3 and 20% more than group 2 varieties (Table 1). Group 4 varieties yielded about 10% more than group 5 varieties the first two years, but group 5 varieties yielded about 12% more than group 4 soybeans in 2005. The yield advantage of the group 5 varieties in 2005 was likely due to the late season rainfall in an otherwise dry year. The earlier-maturing varieties were too mature to benefit from the late-season rainfall.

Differences in yield between varieties from different maturity groups were not as great in the Kentucky Soybean Performance Test. The three highest yields from each maturity group were averaged and compared to the three highest yields from the other maturity groups. Group 4 varieties averaged about 3% and 5% more yield than group 3 and group 5 varieties, respectively. Year-to-year differences in yield fluctuated some. For example, group 4 varieties yielded more than group 5 varieties in every year but 2005. Again, late-season rainfall benefited the group 5 varieties.

The expectation that group 2 soybean varieties will out-yield group 4 varieties on shallow soils in some years is speculation at this point. However, farmers considering group 2 varieties for their early harvest and market advantages should try to plant group 2 varieties on drought-prone soils when possible. If you try group 2 varieties, it may be a good idea to have no more than 10 to 20% of your total soybean acreage in group 2 soybeans. Also, group 2 varieties should be planted at a full season date (April 15 to May 15) to maximize growth. Late plantings of group 2 varieties will cause the plants to be too short and will reduce yield. One other concern with group 2 varieties is the difficulty in identifying high-yielding varieties for Kentucky. Group 2 varieties have not been fully tested in the Kentucky Soybean Performance Test.

Group 2 varieties may be a useful component to an overall soybean production operation; however, the current research indicates lost yield potential with group 2 varieties. Producers are advised to weigh the disadvantages of reduced yield of group 2 varieties against the benefits of time management and market premiums for an early harvest.

This research was funded, in part, by the Kentucky Soybean Promotion Board.

Table 1. Average yields of two soybean varieties from each maturity group across landscape near Lexington, KY.

Year	Maturity Group	Landscape Position summit	shoulder	back	foot	toe	average	difference[1]	
		Yield							
		bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	%
2003	II	33.7	43.7	41.4	42.3	54.4	40.7	-10.9	-21
	III	45.5	49.7	44.3	46.4	45.9	46.4	-5.2	-10
	IV	47.9	54.0	51.4	56.2	47.6	51.7	0.0	0
	V	40.7	41.7	36.2	43.6	39.5	40.2	-11.5	-22
2004	II	31.2	29.2	33.0	32.3	32.4	31.3	-14.6	-32
	III	41.4	35.7	42.4	40.4	40.5	39.9	-6.0	-13
	IV	49.1	49.9	39.7	41.1	47.8	45.9	0.0	0
	V	36.1	40.7	37.0	35.6	31.4	37.1	-8.8	-19
2005	II	21.2	29.0	26.9	42.2	48.6	30.9	-7.8	-20
	III	28.8	36.3	31.2	45.4	45.3	35.8	-2.9	-8
	IV	34.6	32.9	36.9	49.5	53.1	38.8	0.0	0
	V	41.7	41.1	41.3	55.9	36.5	43.4	4.6	12

[1] Comparison between average yield from Maturity Group IV soybean yield and each other maturity group.

4. Soybean Populations and Yield

C. Lee, J. H. Grove, J. Herbek, L. Murdock and E. Lacefield, Plant & Soil Sciences

For several years, the University of Kentucky has been investigating the effects of lower plant populations on seed yield. Those studies have indicated that final plant populations under 100,000 plants per acre are often adequate for maximum yield (Table 1). The Kentucky Soybean Promotion Board funded projects to investigate seeding rates and yield in 2005. All of the studies, to date, were conducted with 15- or 16-inch rows. Small-plot drills were used to deliver the seed.

The results from one of the studies conducted in 2005 were mixed. The lowest seeding rate that reached maximum yield was 80,000 seeds per acre at Lexington and Princeton and 180,000 seeds per acre at the Western Kentucky University, Henderson and Marshall locations (Table 2).

The unusual weather patterns in the 2005 growing season may explain some of the variability in soybean yield response to seeding rates. The 2005 growing season experienced low rainfall totals for most of the state (Table 3). August was the wettest month of the summer and it is typically the driest! Consider the extreme weather of 2005 when evaluating the results from these seeding rate studies.

In another study at Princeton, KY, maximum yield was obtained with 50,000 seeds per acre for two soybean varieties (Table 4). In a separate study at Lexington, KY, maximum yield was obtained at about 35,000 seeds per acre for the full season planting dates. However, for the short season planting dates, maximum yield was obtained at about 122,000 and 190,000 seeds per acre (Table 5). Again, weather played a role in crop response to seeding rates.

There is evidence that high yields can be obtained with lower seeding rates in Kentucky. The dry weather from 2005 does bring into question just how low of a seeding rate is warranted for maximum yields. There was considerable variation in the final stand achieved in the 5-location study (Table 6). A final stand of around 100,000 plants was generally needed to optimize yield (Figure 1), regardless of yield potential.

Even with the mixed results observed in 2005, we are confident that full season soybeans at a final stand of 100,000 plants per acre will achieve maximum yield. Based on the irregular emergence observed in Table 6, we are much less confident about how many seeds it takes to reach 100,000 plants per acre. The inoculants tested in one study and the insecticide seed treatments tested in another study did not improve stands or final yields. Seed vigor, tested in another study, did not improve stands either.

Concerning short season planting dates (double crop soybeans), seeding rates at the highest end of our recommendations are still encouraged (167,000 seeds per acre for 15-inch rows). We are going to investigate this issue more.

The results from studies in 2005 illustrate why the University of Kentucky sometimes appears slow in changing recommendations. We are trying to gather as much data as possible to provide the best possible recommendation for Kentucky producers. We will continue to investigate low populations and try to better understand why poor emergence occurs some of the time.

This research was funded, in part, by the Kentucky Soybean Promotion Board.

Table 1. Minimum population needed for maximum yield from soybeans planted near Lexington, KY, 2003 and 2004.

Seeding Date	Season[1]	Cultivar	MG	Minimum Population[2] plants/acre
24-Apr-03	Full	Stressland	4.5	42,500
24-Apr-03	Full	CF 461	4.6	53,400
24-Apr-03	Full	CF 492	4.9	49,800
21-May-04	Full	B283	2.8	92,300
21-May-04	Full	B336	3.3	72,100
21-May-04	Full	CF 461	4.6	85,800
21-Jun-04	Short	B283	2.8	91,400
21-Jun-04	Short	B336	3.3	93,100

[1] Full season and short season. The short season was planted into no-till residue but did not follow wheat.
[2] Exponential rise to maximum, 3 parameter model: density required for 95% of yield that was achieved at maximum plant density.

Table 2. Seeding rate effect on soybean yields, averaged over inoculant treatment, 2005.

Location	Seeding Rate per Acre (X 1000) 20	80	100	120	180
	Yield (Bu/A)				
Lexington	26.9	29.9	30.9	31.5	28.4
WKU	13.2	50.3	50.8	56.1	59.6
Princeton	26.1	53.6	53.8	53.8	53.0
Henderson	19.3	48.4	63.0	63.9	75.0
Marshall	33.4	56.0	59.9	58.2	63.5

Table 3. Rainfall departures from normal for the 2005 growing season.

Location	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
	Precipitation (Departure from Normal, inches)							
Lexington	-0.91	-0.41	-1.83	-1.38	-1.95	+2.17	-2.31	-6.62
WKU	-1.58	+1.47	-2.49	-2.30	-0.42	+4.43	-3.25	-4.14
Princeton	-0.83	-0.19	-3.42	-0.76	-1.90	+7.53	-1.16	-0.73
Henderson	-2.03	-0.54	-1.18	-1.45	0.00	+1.66	-0.68	-4.22
Marshall [1]	-1.38	-1.24	-4.35	-0.32	-1.63	+1.32	-2.47	-10.02

[1] Mayfield data the closest location to Marshall County site.

Table 4. Seeding rate effect on soybean yield, Princeton, KY, 2005.

Seeding Rate[1] (viable seeds/A)	Avg. Final Stand[2] (Plants/A)	Soybean Yield[2] (Bushels/A)
50,000	45,000	73 a
75,000	65,000	72 a
100,000	85,000	75 a
125,000	110,000	73 a
150,000	130,000	74 a
175,000	150,000	74 a
200,000	175,000	74 a
225,000	195,000	72 a

[1]Seeded May, 25, 2005 in 15-inch rows.
[2] Avg. approx. final stand of two varieties.
[3] Avg. of two varieties (3.9 RM and 4.7 RM). Varieties were not significantly different.

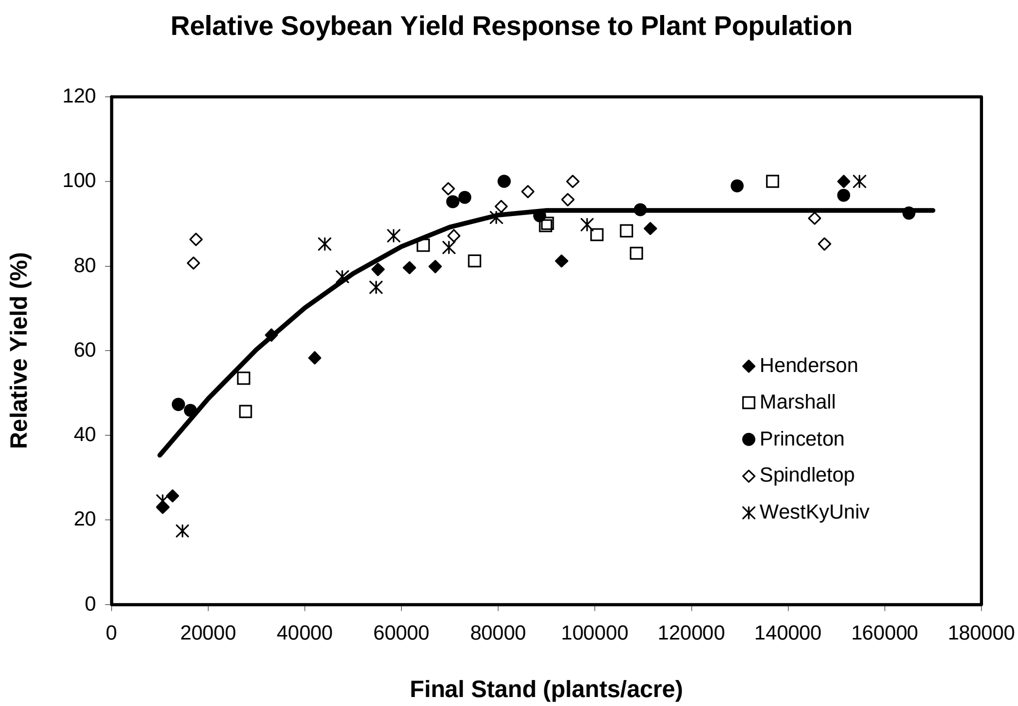
Table 5. Seeding rate on soybean yield, Lexington, KY, 2005.

Population	Full Season		Short Season	
	B283	B336	B283	B336
	Yield			
seeds/acre	Bu/acre			
17,400	17.1	23.9	27.1	28.8
34,800	23.9	35.5	33.4	33.6
70,000	15.6	35.5	38.0	38.7
121,800	16.3	35.6	49.4	44.3
192,000	12	31.2	50.1	46.5

Table 6. Seeding rate effect on final soybean stand, averaged over inoculant treatment, 2005.

Location	Seeding Rate per Acre (X 1000)				
	20	80	100	120	180
	Final Plant Population (plants/A x 1000)				
Lexington	17.2	70.3	83.4	95.0	146.5
WKU	12.7	49.4	58.8	69.0	126.6
Princeton	15.1	71.9	84.9	119.4	158.2
Henderson	11.6	37.6	58.4	80.0	131.5
Marshall	17.6	69.8	95.4	99.2	121.7

Figure 1. Relative yield of soybean to plant population across five locations in Kentucky, 2005.



5. Control Seed Costs to Manage Profits

Sam McNeill, Biosystems and Agricultural Engineering

Typical seed costs on a per acre basis can vary between $40 to $70 for corn and $25 to $50 for soybean, depending on the desired plant population, variety/lot, seed quality and seed cost per bag. A spreadsheet tool has been developed to help farmers and crop managers easily calculate their actual costs and easily compare total costs for two seeding rates for a number of different varieties and/or seed lots. By entering seed tag data (germination, purity and weight per bag for corn or number or seeds per pound for soybeans) and a desired plant population, the weight and number of seed per acre is calculated along with the weight of seeds in a 200-ft planter calibration strip. Enter the number of acres for each variety and cost per bag to compute the number of bags needed for each variety, cost for each variety/lot and acre, number of bags, seed cost for the grain enterprise and average cost per acre.

Figure 1 shows a typical range in corn seed costs at different plant populations for 100, 500 and 1000 acre operations. Note that the total cost difference between desired stands is $209 per 1000 plants/100-acres for this specific mix of seed quality and varieties.

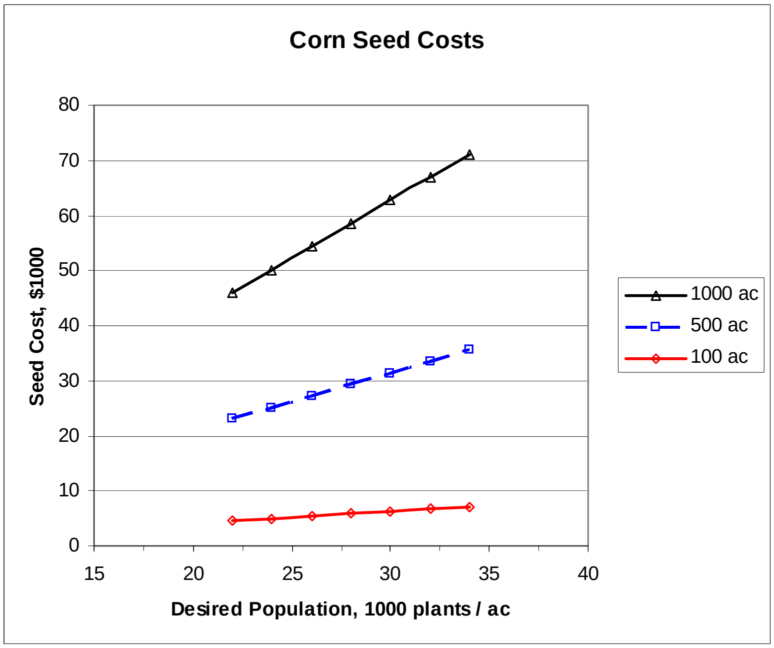


Table 1 illustrates an example comparing seed corn costs for 26,000 and 30,000 plants per acre on 30-inch rows for four different varieties on a 1000 acre farm. Note that the difference between these populations is $8365 or $8.36 per acre for the seed lots shown. Growers are encouraged to use this spreadsheet tool to help record and control seed costs. It can be used to quickly calculate seed costs for other scenarios with corn or soybean and is available on the web at www.bae.uky.edu/ext/Grain_Storage/Calculators/.

Figure 1. Typical range in corn seed costs at different plant populations for 100, 500 and 1000 acre operations.

Table 1. Illustration of the calculator for comparing corn seed costs for two different plant populations on 30-inch rows, based on seed tag/bag data (weight, germination and purity) and cost per bag (80,000 kernel unit). The number of acres for each variety is also entered to calculate the total number of bags needed for each population and the total and average seed cost. A calculation is also made for a drill or planter calibration at both seeding rates (weight and number of seeds per acre and weight of seed [grams] in a 200-ft strip).

Seed tag data							
Variety	Lot No.	No. Seeds per bag	Weight per bag lb	Germ %	Purity %	Cost per bag	No. Acres
Corn	xx1	80,000	**39.80**	**95**	**99.0**	**$ 125.00**	**250**
Corn	xx2	80,000	**41.23**	**85**	**99.0**	**$ 150.00**	**250**
Corn	xx3	80,000	**44.08**	**92**	**99.0**	**$ 150.00**	**250**
Corn	xx4	80,000	**49.30**	**95**	**99.0**	**$ 180.00**	**250**
						Total	**1000**

Desired stand 1000/ac	Lot No.	gm / 200 ft of row	lbs seed / acre	actual seeds / acre	No. bags	Cost per seed lot	Cost per acre
26	xx1	72	13.8	27,645	86	$ 10,799	$ 43.20
	xx2	83	15.9	30,897	97	$ 14,483	$ 57.93
	xx3	82	15.7	28,546	89	$ 13,381	$ 53.52
	xx4	90	17.2	27,927	87	$ 15,709	$ 62.84
			Total (and average)		359	$ 54,372	($ 54.37)

Desired stand 1000/ac	Lot No.	gm per 200 ft of row	lbs seed / acre	actual seeds / acre	No. bags	Cost per seed lot	Cost per acre
30	xx1	83	15.9	31,898	100	$ 12,460	$ 49.84
	xx2	96	18.4	35,651	111	$ 16,711	$ 66.84
	xx3	94	18.1	32,938	103	$ 15,440	$ 61.76
	xx4	103	19.9	32,223	101	$ 18,126	$ 72.50
			Total (and average)		415	$ 62,737	($ 62.74)

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