



CURRENT NEWS AND UPDATES

MONTHLY SEGMENT

Management for High Yield Soybeans

Intense soybean management has allowed some producers in the United States to reach yields of 100 bushels/acre. This tremendous yield potential, along with commodity prices and new technology have motivated many growers to improve yield goals for the 2012 season. Agronomic management related to seeding rate, row spacing, and fertility as well as chemistry of seed treatment and foliar fungicide can be adjusted to help achieve these goals.

Seeding Rate. In recent years, recommended soybean seeding rates have been decreasing in response to advancements in weed control, seed treatments, and planters. Minnesota seeding rate recommendations, based on maturity, are listed in Table 1.

Row Spacing. Narrow row spacing has not been shown to improve yields with increasing plant populations.¹ Rows spaced 22 inches apart may have a two-bushel yield advantage compared to rows spaced 30 inches apart. The yield advantage was five bushels per acre as row spacing was narrowed from 30 inches to 10 inches. Earlier canopy can also be a benefit of narrow row spacing when soybean planting is delayed.

Seed Treatment. Soybean seedling diseases have lead to almost 6 percent yield loss in Minnesota.² Fungi including *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Pythium* are causes of soybean seedling disease and root rot infection. In a 2001 soil survey, *Rhizoctonia* was found in 95 percent of Minnesota

Table 1. Soybean seeding rate recommendations from Minnesota, based on maturity group.

Maturity Group	Live Seeds Per Acre
II	140,000
I	150,000
0	160,000
00	170,000

Source: Naeve, S. 2008. Soybean seeding rates in Minnesota. University of Minnesota.

Hello and welcome to the January newsletter. As we are in mid winter, many of the cropping decisions have been made; however, this is a good time to really fine tune factors that maximize yield potential. Are we going to add additional nitrogen in season? Which pre herbicide will work the best? What will our plant population be this year? These are just a few of the decisions to focus on maximizing yields.

In this issue of Growing Knowledge®, we will discuss a variety of agronomic factors that effect soybean yields. Adjustments to a variety of management practices will help develop a positive yield response. Sometimes we are looking for that one big thing to increase yield; however, to get top end soybean yield potential we really need to look at doing all the large as well as small things to maximize yield potential.

Additionally, we would like to discuss weed control with the use of pre herbicides. The strategy to achieve best in class weed control is to keep fields clean and maximize yield potential in both corn and soybeans. There is also an update on the latest Monsanto research work on volunteer corn.



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Use three people when entering bins.

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Maximize Activity of Residual Herbicides for Corn and Soybean

Preemergent (PRE) herbicides should now be a key component for weed control with post applied herbicides following up to control weeds that break through. An herbicide program used in this way helps reduce the potential for weeds to be the yield-limiting factor in corn and soybean production. Effective PRE activity can be achieved by (1) choosing the right herbicide for the existing weed pressure, (2) using the right rate of herbicide, and (3) applying PRE herbicides at the right time.

Weed Free Periods for Corn and Soybean. PRE herbicide activity should be effective throughout the critical period of weed control. This is the time period where a crop needs to be kept weed free so it can establish dominance over late-emerging weeds. In corn, weed control needs to be effective until corn reaches 20 inches in height.¹ After this, emerging weeds are less competitive. It may be necessary to maintain a weed free period until soybeans reach the V4 growth stage to avoid yield losses.²

Preemergence Herbicide Selection. A comprehensive PRE can contain multiple residual herbicide modes of action with activity for the weed spectrum in the field. Soil-residual herbicides that are short-lived may not provide full-season weed control. Heavy weed pressure can lead to weed escapes with any residual herbicide application.

Weather. Too little rainfall can reduce the activation of residual herbicides; however, too much rain can cause movement below the weed seed germination zone. A common question is how much rain and when is it needed for activation of a soil residual herbicide. Typically 0.5 inch of rain within 7 to 10 days after a PRE herbicide treatment is sufficient for

good activation. However, the amount can vary depending on the soil type and moisture content prior to the rainfall event. A dry soil can require more rain because moisture is needed to wet the soil before significant movement of the herbicide can occur. Weed control failures, due to the reduction in PRE herbicide that is available, often occurs when soil moisture is limited during the first several weeks after planting.

Herbicide Rate. Recommended rates for most soil-applied herbicides are based on soil type. Residual herbicide rates need to be adjusted based on soil organic matter and texture. Soil pH can also influence the persistence of many residual herbicides, especially ALS inhibitors. Also, cloddy soils can reduce weed control since herbicides must come in contact with the developing weed seedling.

Regardless of soil type, PRE herbicide rates may need to be higher depending on the weed spectrum. Herbicides begin to break down as soon as they are applied, and a high enough concentration of the chemical needs to be available to kill weeds when they germinate. A full-rate PRE may be the best option as some weeds may emerge later than others. Low-rates of PRE herbicides may not be able to

control weeds long enough if weather delays POST applications.

Timing of Application. Spraying soil-applied herbicides too early in the spring can result in less residual weed control in-crop and later weed escapes. Spraying too late, after the weeds have emerged, can also reduce the level of weed control unless the residual PRE herbicide also has POST activity.



Figure 1. Weeds need to be controlled until corn reaches 20 inches in height to avoid yield losses.

Sources: ¹ Ohio State University, 2011. *Residual herbicide use with herbicide-tolerant corn. Corn & Soybean Digest.* Available cornandsoybeandigest.com (verified 1/3/2011).

² Van Acker, R. C. et. al. 1993. *The critical period of weed control in soybean [Glycine max (L.) Merr.]. Weed Science.* Vol. 41:194-200.

Volunteer Corn Control in Corn and Soybean

Corn seed may be left in the field for a variety of reasons including harvest problems, poor stalk quality, or storm damage. On average, 23% of corn seed remaining in a field after harvest may germinate and become volunteer corn. Inheritance of the glyphosate-resistance trait is expected in three out of four seeds.² With 75 percent of volunteer corn plants carrying glyphosate resistance, selective herbicides are needed when planning weed control in glyphosate-resistant corn and soybeans.

YIELD LOSS

Corn. Corn yield losses may depend on whether whole ears were dropped at harvest or grain was lost from combine header. High variability in the distribution and density of volunteer corn plants is possible and is related to how the

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corn dropped the previous season. Volunteer corn plants in ear clumps can be less competitive with the corn crop compared to evenly dispersed volunteers.¹

At high populations, volunteer corn may be competitive enough to reduce corn yields. Corn yields were reduced when volunteer corn populations were greater than 8,377 plants per acre in a 2 location study conducted in 2007 by the University of Minnesota.¹ High levels of volunteer corn plants are required as these plants are less competitive with F1 planted corn hybrids. With late emergence, they may be one to six leaf stages behind the growth stage of the planted hybrid.³

Soybean. Volunteer corn distribution of 75 to 100 whole ear corn clumps per acre could cause soybean yield loss of near one percent.² While this is a relatively low density of volunteer corn, a grass herbicide may still be economical management. Potential for early season competition, and dockage at the elevator from corn mixed with soybean seed influence management decisions.

MANAGEMENT

Corn. Volunteer corn should be controlled early to reduce any negative affect on yield potential. Delayed planting in the spring may increase the ability to control volunteers with herbicides or tillage. Some herbicides may have long plant back restrictions that make them impractical for use as a burndown prior to corn planting. Rotation to soybeans and control of volunteers with herbicides may be the best management option under high volunteer corn pressure.

Soybean. Most grass herbicides such as Select Max[®] (ACCase inhibitors) are very effective at controlling volunteer corn and many can be tank mixed with Roundup[®] brand agricultural herbicides. Please refer to individual product labels for specific tank mixing instructions. Adjuvants may need to be added to tank mix loads. Grass herbicides can be timed with the first glyphosate application for effective control of smaller corn plants.

Prevention. Management practices to avoid corn stalk lodging and ear drop will minimize volunteers in corn fields. Select corn products with good stalk strength and ear retention characteristics. Choose traits that can help to protect against European corn borer and corn rootworm damage that can lead to lodging. Fields at risk of lodging can be harvested first, and combines adjusted to minimize corn ear and kernel loss. Early fall tillage may stimulate germination and emergence of volunteer corn prior to a winter freeze, thus reducing the potential amount of emergence the following spring. If early tillage is not possible, it may be best to avoid fall tillage altogether.

Sources:
¹ Stahl, L. et. al. 2007. *Effect of glyphosate-resistant volunteer corn on glyphosate-resistant corn. University of Minnesota. North Central Weed Science Society Proceedings 62: 48.*
² Boerboom, C. 2009. *Start scouting for volunteer corn. Wisconsin Crop Manager. Vol. 16 No. 15, June 2009.*
³ Gunsolus, J. 2009. *Volunteer corn management in corn and soybean. University of Minnesota*



Figure 2. There may be greater yield loss if corn seed falls as whole ears because herbicide coverage may not be adequate to control plants growing in clumps.

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soil samples. Seed treatments including pyraclostrobin and metalaxyl can give excellent control of fungi. Under certain colder conditions, pyraclostrobin may improve plant health through more rapid and increased emergence of seedlings.

Foliar Fungicide. There can be increased disease pressure on soybeans planted early or in corn rotations with reduced tillage. In 2010, Monsanto trials near Monmouth, Illinois demonstrated soybean yield effects from foliar fungicide in (1) early and late planted soybeans and (2) conventional and strip tillage systems. Yield increases were observed in a strip tillage system when fungicide was applied at the R3 growth stage. In the planting date study, yields were greater on early planted soybeans treated with fungicide. There was also greater yield when soybeans were planted earlier compared to later regardless of fungicide application. Early plant-

ing date has been promoted to help maximize yield potential.

Fertility. Nutrient removal rates increase with additional soybean yield. A 50 bushel/acre soybean crop uses 48 pound per acre of P₂O₅ (phosphorus) and 187 pounds of K₂O (potassium) per acre. Phosphorus (P) requirements are greatest during pod and seed formation, and potassium uptake is greatest from flowering through early pod development. Consider a build-maintenance fertility program designed to increase low soil test levels of P and K to a certain level over a set time period. After reaching this critical value, producers apply P and K to keep soil test levels within a maintenance range.

¹ Naeve, S. 2008. *Soybean seeding rates in Minnesota*. University of Minnesota.

² Meyer, P.W. 2011. *Interaction of temperature, soil moisture, seed treatments, cultivar, and soybean cyst nematode in root rot of soybean* (Dissertation). University of Minnesota. Available conservancy.umn.edu (verified 12/31/2011).

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.

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