Plant & Soil Sciences Extension Newsletter

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In this issue ...

The Effects of Planting Date and Maturity Group on Soybean Production

By Chad Godsey

This article is a brief summary of a soybean planting date study conducted at OSU in 2009. Historically, soybean planting recommendations have been divided into 2 different concepts. The first concept being the Early-season concept, which would be planting a MG 3 or early MG 4 as early in April as possible. The second concept is the full/late-season soybean concept, where MG 4 and 5 soybeans are planted early in June (June 1-June 15). Planting after June 15 is believed to reduce yield potential. A recent review of soybean trial data from around Oklahoma indicates that recommendations related with planting date and maturity group (MG) need to be revisited. With a wide selection of planting dates available for Oklahoma soybean producers we need to know what the effects of planting dates are on certain MG.

The objectives of this study were to determine the effects of planting date and maturity group on soybean yield. Varieties and MG used for the trial are provided in Table 1.

Best management practices were conducted according to Oklahoma State University recommendation practices. Soybean was planted in 30 inch rows at 125,000 plants/ac.

Yields of MG 3.8 variety was significantly lower compared to MG 4.4 and MG 4.8 (Figure 1 on page 2). Yields were similar for MG 4.4 and 4.8 varieties. When comparing planting dates in the early-season production system, the two April planting dates were similar; however, yields did decrease when planting in May.

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Table 1. Target planting dates and soybean variety and maturity groups for the Early and full/late-season studies.

Early-season		Late/Full-season	
Planting date	MG	Planting date	MG
9-Apr	3.8	20-May	4.4
24-Apr	4.4	10-Jun	4.9
20-May	4.8	20-Jul	5.2
			5.5
			5.6

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Soybean production (cont.)

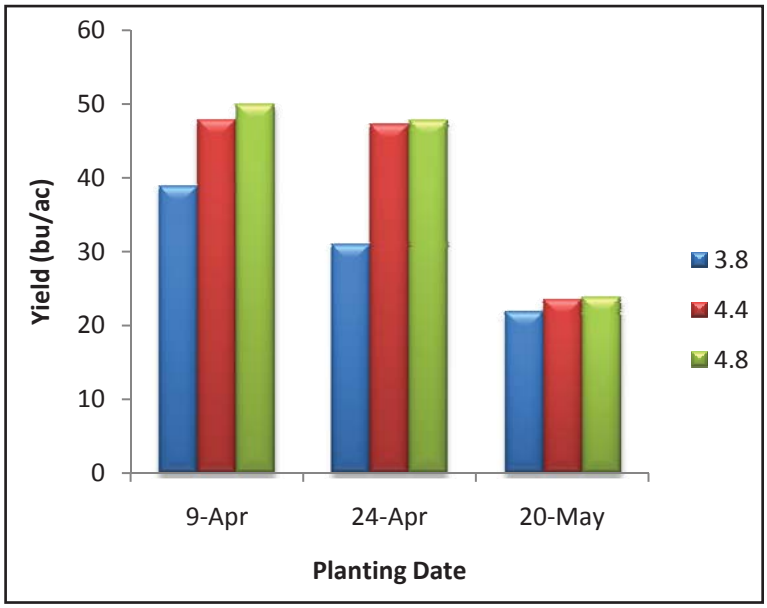

Figure 1. Soybean yield of the early-season planting dates.

When explaining the yield loss from the May 20 planting date it clearly comes from the reduced number of reproductive nodes (data not shown). All of the MG's planted on May 20 were shorter and therefore had less reproductive nodes.

For late/full-season, yield differences were not significant between varieties (MG). However, significant differences in yield between planting dates (20-May, 10-Jun, 20-Jul) were observed. On average, a reduction of 1.7 bu/ac per week was observed when planting after May 20th (Figure 2).

Considering early-season and full-season, difference in bloom dates between planting dates was minimal (3-7 days), due to soybean being a photoperiod sensitive plant.

In conclusion, for this first year of study, considering early-season, the varieties which presented greater yield potential were MG 4.4 and MG 4.8, when planted in April (average of 49 bu/ac). In recent years we have observed a shift away from planting MG 3 varieties because of their poor performance. For late/full-season, there was no difference in yield among MG; however, the maximum yield was observed in the planting date May-20 with an average of 37 bu/ac. This study needs to be conducted for at least another year to determine trends. Growing conditions in 2009 suited early planting so this may have influenced the results observed. Full-season growing conditions were not bad but perhaps not as favorable as early-season growing conditions.

These results reinforce the need to diversify Oklahoma soybean production systems. This can be done by selecting a range of MG (MG 4 to MG 5) and varying the planting date. Also, when planting after the middle of June one can expect a decrease in yield potential. More information on soybean production can be found at www.oilseeds.okstate.edu.

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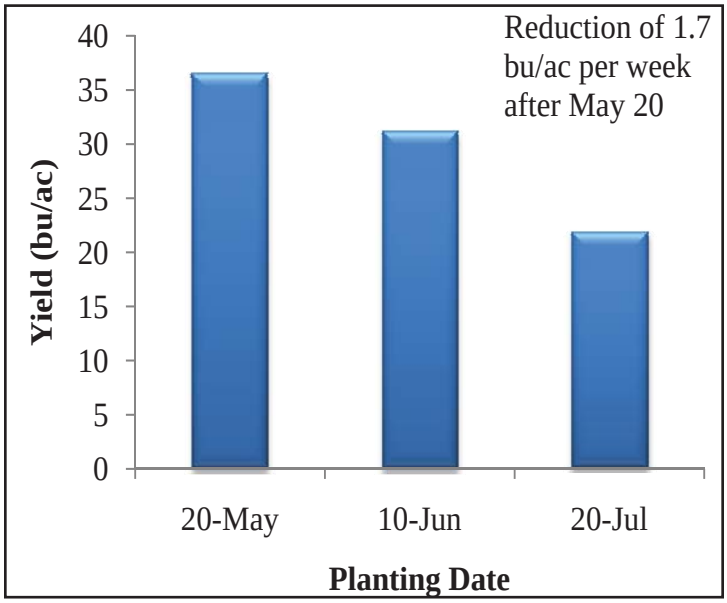

Figure 2. Average soybean yield for the three different planting dates.

Nitrogen stabilizers

By Brian Arnall

Nitrogen stabilizers are not new technologies to the fertilizer market. Products like Agrotain and N-Serve have been used for many years, but with the emergence of more technologies such as Nutrisphere-N ,I feel this is a good time to discuss what the processes involved in N loss and how and when N stabilizers can be beneficial.

Urease inhibitors

Of the nitrogen stabilizers currently available, urease inhibitors probably have the greatest potential for topdress applications to wheat in Oklahoma. These compounds stop the breakdown of Urea into NH3 (ammonia) by the urease enzyme for about two weeks. This is important as NH3 is a gas and can be lost if the reaction occurs on the soil surface. The change from NH3 to NH4 (ammonium) is very rapid and if urea hydrolysis occurs in the soil instead of the surface most, if not all, of the N will be retained. These products insure that the urea will be dissolved and moved into the soil before Urea-NH3 conversion takes place. Urea (46-0-0) is the primary fertilizer that this technology impacts. Liquid UAN (solution 28 or 32) is also impacted but only 50% of the N in UAN is in the urea form.

What follows is a short list of circumstances where the use of a urease inhibitor may or may not be beneficial. Keep in mind there are several small factors that can impact the results.

Circumstances when urease inhibitors may be of benefit:

1) Surface applying urea when temps are approx 50+°F and no rain or irrigation is expected for more than 7 days. It is also important to note:

- Soils with a high pH, greater than 7.5 will increase loss.
- High residue situations will potentially increase loss.
- High humidity and high winds can increase loss.

2) Summer time application of urea in pastures when no rain or irrigation is expected for 7+ days.

Circumstances when urease inhibitors have no or little benefit:

1) Urea applied and incorporated within 7 days.

2) Urea applied and ¼" to ½" rain, snow, or irrigation occurs within 7 days of application.

3) Soil and Air temps are <50°F

4) Dry soil surface conditions will reduce urea loss due to volatilization.

5) Banding or localized application of urea, as it slows urea hydrolysis and reduces loss.

6) When you need protection for more than 14 days. Urease inhibitors only work for so long; each product has a different window of activity but most begin to lose their efficacy after 14 days.

Nitrification inhibitors:

Nitrification inhibitors are widely used throughout the corn-belt where irrigation and tile drainage is prevalent. Nitrification inhibitor prevents the NH4 from being converted to NO3 (nitrate) which can be leached or lost to denitrification. Since nitrate is very mobile in the soil, it can be leached in high rainfall areas or irrigated soils that are well drained or have tile drainage. Additionally, in very poorly drained soils where water stands for long periods of time, microbes convert NO3 to gaseous

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Nitrogen stabilizers (cont.)

forms of N that can be lost, this process is called denitrification.

What follows are short lists of circumstances were the use of a nitrification inhibitor may or may not be beneficial. Keep in mind there are several small factors that can be of an impact.

Circumstances were nitrification inhibitors may be of benefit:

1) Very heavy soils where water will stand for more than 4+ days at a time (anaerobic).

2) Very well drained (sandy) soils in a high rainfall region or under irrigated.

3) Irrigated soils with tile drainage.

Circumstances were nitrification inhibitor have no or little benefit:

1) Arid or low rainfall areas.

2) Well-drained loamy soils that allow water to move through the profile and not stand but not so rapidly that leaching is likely.

3) Locations where NO3 losses through leaching is not a major concern.

Consider cost too:

One point to consider when making the decision of using a stabilizer should be the cost of the product relative to the cost of N. When N is cheap, it may be more economical to just apply more N to compensate for losses. When the price of N is high, however, the addition of stabilizers may be more economical when used in the right environment.

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Army Cutworms Reported in Canola

By Frank Peairs
Colorado State University

Although we normally think of army cutworms as a pest of winter wheat, they are also a concern in canola, a crop that is expanding in Oklahoma. I wrote an article about army cutworms in wheat back in February, but field reports from Heath Sanders indicate that canola is taking a hit in Blaine, Custer and Dewey counties. Thus, canola growers need to keep a vigilant eye on their canola crop. Army cutworms can cause severe stand loss in canola if not controlled. Cutworm damage often goes unnoticed through the winter because the caterpillars grow slowly and don't get big enough to cause noticeable damage until temperatures warm in the spring. They can cut out stand as they feed, killing the canola growing point. Because they like to hide below the soil surface during the day, they can go unnoticed unless they are physically brought up from their sleeping chambers. Sample a field by stirring or digging the soil to a depth of two inches at 5 or more locations. The cutworms will be "greenish grey", and will probably curl up into a tight "C" when disturbed. The suggested treatment threshold for cutworms in canola is 1-2 per row-foot. Current recommendations for control of army cutworms in canola are listed in CR-7667, Management of Insect and Mite Pests in Canola.

Successful weed control in no-till starts before planting

By Joe Armstrong

With spring weather moving in, winter weeds are quickly greening up and early summer weeds will soon be germinating. As soon as field conditions allow, it will be time to begin applying burndown treatments to ensure that all weeds are controlled prior to planting in no-till fields. I would recommend that burndown applications be applied one to four weeks prior to planting, depending on the products you use.

There are several reasons why weeds should be controlled ahead of planting. First, controlling weeds prior to planting will reduce competition between the crop and weeds and give the crop the early advantage. This also provides the opportunity to include herbicides that you might not otherwise be able to use at planting or in-crop. For example, many broadleaf weeds have become problematic in no-till production; in particular, marestail has become a bigger problem in soybeans and is increasingly more difficult to control with glyphosate alone. The best way to control broadleaf weeds in no-till is to include a 2,4-D ester (4 or 6 pound formulation) or dicamba product (Banvel, Clarity, others) with glyphosate for your burndown treatment. 2,4-D ester is labeled for use as a burndown treatment ahead of corn and soybeans. Some dicamba products are labeled for use ahead of corn, soybeans, grain sorghum, and cotton. To avoid crop injury, it is very important to follow the plant-back restrictions (Table 1). It is also important to always use a full rate of glyphosate (0.75 pounds acid equivalent per acre). This can vary from 20 to 32 fluid ounces of product per acre, depending on the product and formulation. For more information on glyphosate rates, see "Getting the field ready for wheat planting—again" from the October 14, 2009 newsletter, *http://pss.okstate.edu/extension/newsletter/2009/passnewsletter-vol2iss20.pdf.* As always, read each product's label for information regarding rate, required adjuvants, and plant-back restrictions for each crop.

Controlling weeds prior to planting will also give your planting equipment the best conditions for seed placement and seeding rate. Additionally, several winter annual

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Table 1. If using 2,4-D ester or dicamba as part of a burndown treatment, be sure to follow the appropriate plant-back restriction for the crop and rate used.

	Product rate per acre	Minimum plant-back restriction
	2,4-D ester (4 pounds active ingredient/gallon)	
Corn	≤ 1 pint 1 – 1.5 pints	7 days 14 days
Soybeans	≤ 1 pint 1 – 2 pints	7 days 30 days
	dicamba	
Corn	8 – 16 fl oz	Anytime
Soybeans	≤ 8 fl oz 16 fl oz	14 days 28 – 30 days
Grain sorghum	8 fl oz	15 days
Cotton	8 fl oz	21 days + 1" precipitation

Weed control (cont.)

weeds can serve as alternate hosts for insect, nematode, and disease pests. For example, henbit, field pennycress, and shepherdspurse have been shown to serve as alternate hosts for soybean cyst nematode and some plant diseases. Controlling these ahead of planting will eliminate their food source and reduce their impact after the crop is planted.

There are many soil-applied herbicides that can be applied with the burndown treatment to provide additional early-season weed control. These herbicides are very useful because they will reduce weed populations and slow their overall growth, which will help lengthen the window of time when postemergence herbicides should be applied to avoid yield losses due to crop-weed competition. There are many preemergence herbicide options available—choose one that will control the weeds in your fields and will fit into your crop rotation plans. Perhaps most importantly, including a soil-applied herbicide with the burndown treatment will also allow you to diversify your chemical weed control program by including additional herbicide modes of action. This is an essential step in designing a weed control program that will be proactive against the development and spread of herbicide-resistant and other difficult-to-control weeds. If you apply the preemergence treatment along with your burndown application, you can also save yourself the time and money of an extra trip across the field.

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Winter annual weeds, such as henbit (shown in the photo), marestail, and shepherdspurse, can be especially problematic in no-till fields. These weeds should be controlled prior to planting to provide the best planting conditions and give the crop the early advantage for moisture, nutrients, and sunlight.

Subscription Information

To receive an electronic copy of the OSU PASS Extension Newsletter, contact Janelle Malone at janelle.malone@okstate.edu. Please include "PASS Newsletter Subscription" and your name in the subject line.

Upcoming Events

Canola Field Day

April 22, 2010 *North Central Research Station*
Lahoma, Okla.
(More details to follow.)

OSU Wheat Field Days

May 4, 2010 *Marshall, Okla. - 10 a.m.*
Billings, Okla. - 2 p.m.

May 6, 2010 *El Reno, Okla. - 10 a.m.*
Homestead, Okla. - 6 p.m.

May 10, 2010 *Elk City, Okla. - 10 a.m.*

May 14, 2010 *Lahoma, Okla. - 8:30 a.m.*
Apache, Okla. - 5 p.m.
(Note new location: 1 mile south of Apache on HWY 62, around the corner, across the railroad tracks and behind house on north side of highway.)

OSU Plant Science Academy

June 6-8, 2010 *OSU Agronomy Farm*
Stillwater, Okla.
(Register by April 1.)