

March 2, 2007

Special points of interest:

- Planting Corn in 2007
- Switchgrass information
- Grain sorghum planting dates and rates

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Cropping Systems Newsletter



Should I Jump on the Corn Bandwagon in 2007

Chad Godsey and Rick Kochenower

Over the last several months the price increase in the corn grain market has led many producers in the western part of Oklahoma to consider planting dryland corn. Four dollar a bushel corn does make this look attractive at first glance. Dryland corn is a crop that can be grown successfully in the many areas of Oklahoma but two variables that we have no control over greatly influence yield potential in the region. Those two factors are warmer average daily temperatures compared to farther north and unreliable rainfall patterns. We have been dealing with these factors for decades but with corn production these environmental considerations are extremely important.

Corn requires 24 to 30 inches of water to reach maximum yield potential when nothing else is limited (ie nutrients). This can be a combination of stored soil moisture, precipitation, and irrigation. At this time, a large portion of the state has replenished its soil moisture from last years drought, however, the north central part of the state still has very little available soil water in the profile (Figure 1). Figure 1 illustrates the current fractional water index which is a measure of plant available water present in the surface 30 in of soil.

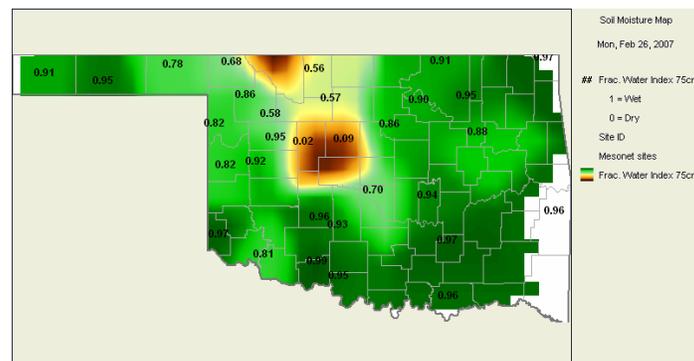


Figure 1. Fractional water index to a depth of 30 in (75 cm) as of 2/27/2007 (Oklahoma Mesonet).

Producers planting corn this spring in the drier areas will assume a lot of risk. Relying on precipitation alone to make a corn crop in Oklahoma is very risky to say the least. This is not to say that we couldn't have a wet spring and early summer. There are a few management practices that can be used to compensate for lower soil moisture conditions. One of these practices is plant population. Deciding the optimum plant population is always important but this year may be the biggest decision producers make.

Plant population affects water use by influencing the amount of leaf surface that is available to capture solar radiation, which is the energy source for corn growth. Planting at higher populations will produce more leaf area, which will increase the amount of water that is transpired by plants. By planting at a lower plant population you will reduce evapotranspiration by the plant.

When seeding corn the goal is to have a harvest population in the range of 17,000 to 22,000 plants per acre. Generally these rates will have the highest yields and produce the best ear size for harvesting. The impact on

corn grain yields are generally from too high of a seeding rate, but an extremely low seeding rate will also affect yields. Corn has the ability to flex the size of the ear if population is too high or too low. When population is too high the ears may be too small for proper harvesting, the ears get too small for the deck plates on corn header to strip from the stalk. If you are in an area that still has low soil moisture you may want to consider targeting the lower range of the recommended planting rate.

Optimum Planting Date

Peak water use for corn is during the reproductive stages of growth (tasseling, pollination, and kernel development (Figure 2). A few timely rains during this time of growth can greatly increase grain yields. This brings us to our next important management decision for efficient use of soil moisture, planting date.

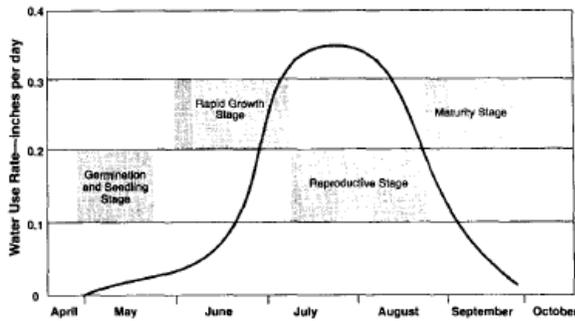


Figure 2. Typical water use (inches per day) of corn.

Generally a good rule of thumb is whenever the average daily soil temperature at seeding depth is greater than 50°F, which for north central Oklahoma is around the middle of March for most counties (Mesonet data).

The date for the panhandle region appears to be April 10 from research started in 1999. The April 10 date has always had the highest grain yields except for 2006. Two-hail storms in early June appear to have effected that date more than any other when compared to previous years. One thing the panhandle data demonstrates is planting earlier is better than planting late. The April 10 date in the panhandle also supports a planting date of mid march for the body of the state; generally soil temperature will warm up 2 to 3 weeks sooner there.

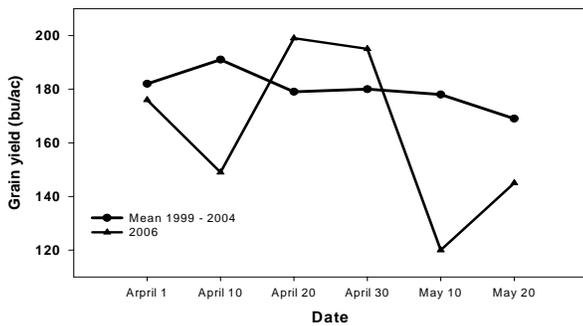


Figure 3. Mean corn grain yields bu/ac from 1999 through 2004 compared to 2006, which demonstrates the yield loss due to hail storms in early June 2006 at OPREC.

In summary, corn requires a consistent moisture supply. Current soil moisture conditions in parts of the state may not be suitable for corn production this year. The unpredictable nature of precipitation in Oklahoma makes planting dryland corn risky this year, especially in the north central part of the state where soil moisture levels are depleted. The decision simply comes down to how much risk you are willing to accept.



Dryland corn in north central Oklahoma in 2006.

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Switchgrass - Why the hype and is it time to plant it?

Robert Woods, Northeast Area Agronomist

In a nutshell, the technology for making ethanol from switchgrass is still in the developmental stages and a market for switchgrass for fuel production is several years away. Therefore anyone deciding to plant switchgrass now should anticipate that income will be from other uses, such as grazing or hay, rather than fuel production for several more years.

That said, recent media attention has created a lot of interest in switchgrass and consequently a lot of questions for local county OSU extension educators. So how did all this attention come to switchgrass?

Information presented during the 2006 Oklahoma Governors Conference on Biofuels reported that US Department of Energy (US DOE) initiatives call for cellulosic ethanol production to be practical and competitive by 2012. It is estimated that switchgrass could produce 500 to 1000 gallons of ethanol per acre. In 2004 corn produced 350 gallons per acre.

According to a paper authored by Fuentes and Taliaferro of the Oklahoma State University Plant and Soil Sciences Department, it was the US DOE that selected switchgrass as a model herbaceous species for development as a bioenergy feedstock. It was chosen because it is widely adapted to a large part of the contiguous United States, has a high yield potential on marginal soils, and has high tolerance to environmental stress.

In 1992 the US DOE initiated funding of a program to improve the production capacity of switchgrass and Oklahoma State University was chosen to be involved. In the resulting work, Fuentes and Taliaferro reported on 7 years of variety yield trials from 1994 through 2000, done at both the Eastern Research Station (ERS), near Haskell, and Chickasha Research Station. Of the varieties tested, Alamo and Kanlo performed the best, averaging a little more than 7.5 tons per acre at Haskell and about 2 tons per acre less at Chickasha. At ERS the lowest yield reported was 5.8 tons per acre, in 1997. The nitrogen fertilizer rate was 70 pounds per acre and 80 pounds per acre at Chickasha and Haskell, respectively.

Planting Switchgrass

Switchgrass is a slick seed that can be sown, in April or May, with conventional planting equipment. A call to a seed supplier in Oklahoma con-

firmed that Alamo variety is available now. They also have some Kanlo but it isn't from a pure stand. They said new stands are coming into production and they will have pure Kanlo available next season. Currently, Alamo variety is priced at \$13.25 per pound of pure live seed (PLS). The recommended seeding rate is about 5 pounds per acre so, just seed cost will exceed \$65 per acre. Establishment costs will easily exceed \$125 per acre, after adding fertilizer as recommended by a soil test, seedbed preparation and/ or herbicide application, and seeding. And, since switchgrass is slow to establish, it generally takes 2 to 3 years after planting to reach a full stand, during which it will require very limited use.

Haying Switchgrass

For hay production switchgrass should be harvested in the boot stage of growth or very soon after seedheads begin to appear. A good target date would be to harvest before July 10. According to information found in Southern Forages, crude protein can exceed 10% if harvested while in the boot to early-heading growth stage, or be less than 6% if harvested when fully matured. Yields in excess of 7 tons per acre, as reported in Fuentes and Taliaferro's work, were from an end-of-season harvest. So, yields from a July harvest will be lower. The re-growth that occurs after a July hay harvest could be grazed after frost, as is sometimes practiced on native hay meadows.

Grazing Switchgrass

Forages Fifth edition, by Barnes, Miller, and Nelson, indicates that grazing should begin in the spring when the switchgrass reaches 12 inches in height. Early in the season it can be grazed to 4 inches in height, and later in the season a minimum stubble height of 8 inches is recommended. An intensive early stocking system commonly used for grazing stocker cattle on native range could work well on switchgrass. Southern Forages recommends stocking it heavily, using rotational stocking, and allowing a rest period of 4 to 6 weeks.

Based on yield trials at the Eastern Research Station, when fertilized with 80 pounds of nitrogen per acre, the stocking rate for the 90 days between April 15 and July 15 could be 2 stockers or 1 cow per acre. For season-long grazing, 1 stocker per acre or 2 acres per cow. These are approximate and would vary depending on the production capabil-



Picture of switchgrass plot west of Stillwater, OK.

"It is estimated that switchgrass could produce 500 to 1000 gallons of ethanol per acre. In 2004 corn produced 350 gallons per acre."

ity of the variety, soil type, and rainfall.

Switchgrass for Ethanol

As stated earlier, the technology for making ethanol from switchgrass is still in the development phase. In my opinion, there are currently too many unknowns to recommend planting switchgrass solely for this purpose. But, fortunately, switchgrass has other uses if someone wants to plant some now.



Grain Sorghum Planting Dates and Seeding Rates

Rick Kochenower, Agronomy Research and Extension Specialist

Planting dates

Planting date may have the largest impact on grain yields of sorghum than any other management decision a farmer can make. But, emergence of grain sorghum is dictated more by soil temperature than the calendar. Generally hybrids require a soil temperature of 65° F to germinate, although, there are hybrids that will germinate at soil temperatures of 58 ° F. Over the last 3 years, planting date studies have been established at Altus and Lahoma. The purpose of these studies are two fold; to determine the earliest date that sorghum can be planted with out freeze damage and the optimum date for highest grain yields. The planting dates at Altus have been April 1 and approximately every 15 days thereafter until July 1. At Lahoma the first planting date has been April 10 and again approximately every 15 days till July 1.

Grain sorghum needs to be planted and managed to avoid flowering during the last two weeks of July and the first three weeks of August. This is generally the warmest and driest period of the summer growing season. Water demand is the highest during flowering for most crops, therefore you want to manage to avoid peak water demand during the hottest and driest part of the season.

We have never been able to harvest the last three planting dates at Altus due to birds destroying the plots. Although not harvested, observation suggests that these plots would not have yielded as well as earlier planted plots. Data has only been collected one year at Lahoma. It seems that deer like the planting date plots and have eaten the plots the last two years. At Altus, the first year we only used a medium maturity hybrid, with an early and full season added in 2004. Results at Altus have shown that the earliest planted grain sorghum (April 1) have yields 13 - 15 bu/ac higher than those planted in Mid-April (Table 1). The results from Lahoma differ from Altus in that no difference exists between the first two planting dates. (Table 2). Planting date has larger impact on grain yield than maturity selection at both sites. Generally OSU recommends not planting grain sorghum during the month of May. However during the first week of May a shorter maturing hybrid can be utilized still be successful. During the last few days of May, a full season hybrid would work. When planting grain sorghum in late April it is better to utilize a hybrid with a red or bronze seed color. The hybrids with a yellow or white seed color generally have yellow endosperms and require higher temperatures for good germination

Table 1. Grain sorghum yields for selected planting dates at Altus.

Planting Date	2003†	2004-05
April 1	75.2	77.4
Mid April	60.3	64.4
May 1	47.5	42.5
Mid May	43.5	43.7

† Medium maturity hybrid only

“Planting date may have the largest impact on grain yields of sorghum than any other management decision a farmer can make. But, emergence of grain sorghum is dictated more by soil temperature than the calendar. Generally hybrids require a soil temperature of 65° F to germinate, although, there are hybrids that will germinate at soil temperatures of 58 ° F.”

Table 2. Grain sorghum yields for selected planting dates at Lahoma.

Planting Date	2003
April 10	61.3
April 25	59.1
May 10	29.5
May 25	12.8
June 10	22.3

Seeding Rates

A good general statement about seeding rates is that you want enough plants to avoid having to replant. Generally, if you have over 25,000 plants/ac you shouldn't have to replant. OSU recommendations for the body of the state are 40-45,000 plants/ac for a final stand. Although, high yields can be obtained with plant population lower than that. In 2005 yields of over 100 bu/ac were observed in the trial at Cherokee, OK with stands of 20,000 plants/ac. Early planted grain sorghum has the ability to compensate for lower stands by tillering. The trial at Cherokee averaged 3.12 heads/plant to compensate for the lower plant count (PT 2005-18). Although high grain yields can be obtained with lower plants per acre, a better management strategy is to plant for a final stand count of 40 - 50,000 plants/ac to obtain the highest yields possible. Oklahoma seeding rate studies for the body of the state have shown when the population is 60,000 plants/ac or more, that some plants will not have emerged heads. Even in years like 2004, when conditions were good for high yields the higher populations have plants without head emergence (Table 3). In other years, the number of plants without head emergence can be 10% or higher (Table 4).



Grain sorghum at maturity.

“OSU recommendations for the body of the state are 40-45,000 plants/ac for a final stand.”

Plant Population	Enid (double crop)		Cherokee	
	Grain Yield (bu/ac)	Heads/plant	Grain Yield (bu/ac)	Heads/plant
20,000	73.6	1.73	73.0	1.47
30,000	72.9	1.19	82.1	1.14
40,000	83.3	1.08	79.9	1.06
50,000	80.3	1.05	84.9	0.99
60,000	85.5	0.95	86.2	1.00
70,000	79.2	0.97	88.8	0.98
L.S.D.	NS	0.32	10.0	0.13

Plant Population	Enid 2001		Blackwell 2002	
	Grain Yield (bu/ac)	Heads/plant	Grain Yield (bu/ac)	Heads/plant
20,000	42.0	1.81	37.6	0.93
30,000	41.7	1.10	43.5	0.72
40,000	42.3	1.07	62.7	0.82
50,000	42.8	0.92	65.8	0.71
60,000	41.0	0.58	66.1	0.67
70,000	40.5	0.52	72.5	0.75
L.S.D.	NS	0.32	19.6	0.17

Table 3. Grain yields and heads per plant for selected locations in 2004.

Table 4. Grain yields and heads per plant for selected locations and years.

Upcoming Events/Meetings

- Oklahoma Soybean Expo—March 8, 2007
Rogers County Building, Claremore Expo Grounds
Call 918-343-2326 for more information
- No-till Meeting—April 10th
Alfalfa County Fairgrounds Exhibit Building
Call Alfalfa County at 589-596-3131 for more information and to RSVP

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Chad Godsey, PhD
Cropping Systems Extension Specialist
368 Agricultural Hall
Stillwater, OK 74078

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