

# Department of Crop Sciences---University of Illinois

## COLLEGE of AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES



### February 2008 Newsletter

Issue 25:1

Lyle Paul - Agronomist  
David Lindgren - Farm Foreman  
14509 University Rd.

Shabbona, IL 60550

Phone/Fax 815/824-2029

e-mail [lylepaul@uiuc.edu](mailto:lylepaul@uiuc.edu)

<http://www.cropsci.uiuc.edu/research/rdc/dekalb>

#### 2007 Weather Data

	January	February	March	April	May	June
<b>Air Temperature (F°)</b>						
Monthly Average High	31.6	21.8	50.2	56.8	77.0	79.2
Monthly Average Low	18.6	6.9	32.9	35.0	51.1	57.1
Daily Average	25.4	14.8	41.5	46.0	64.5	68.1
Departure from Average (41 year)	+4.7	-11.0	+4.8	-3.3	+4.4	-1.9
Observed High (date)	48.5 ( 5)	45.6 (21)	75.9 (26)	84.2 (22)	89.1 (24)	90.5 (16)
Observed Low (date)	1.1 (31)	-14.1 ( 8)	12.2 ( 4)	19.3 ( 7)	39.5 (17)	44.1 ( 9)
	July	August	September	October	November	December
<b>Air Temperature (F°)</b>						
Monthly Average High	80.9	81.4	79.9	68.1	45.9	30.32
Monthly Average Low	58.1	62.3	50.4	45.0	27.6	17.1
Daily Average	69.6	71.5	65.2	56.5	37.0	24.2
Departure from Average (40 year)	-3.8	-0.6	+1.6	+4.5	-2.5	-1.3
Observed High (date)	88.6 (31)	89.0 ( 1)	90.6 (24)	88.4 ( 7)	63.5 (12)	47.0 (23)
Observed Low (date)	50.5(2,23)	49.0 (31)	31.9 (15)	28.2 (28)	13.5 (30)	-4.2 ( 6)

#### 2007 Precipitation (Inches)

Month	Total	Departure from Average	Year Accumulation	Total Departure 126 Yr
January	0.88	-0.67	0.88	-0.67
February	1.00	-0.44	1.88	-1.11
March	3.68	+1.25	5.56	+0.14
April	3.46	+0.26	9.02	+0.40
May	2.01	-1.95	11.03	-1.55
June	3.91	-0.23	14.94	-1.78
July	8.29	+4.71	23.23	+2.94
August	14.08	+10.42	37.31	+13.38
September	0.58	-3.01	37.86	+10.37
October	1.90	-0.88	39.79	+9.49
November	1.12	-1.27	40.91	+8.22
December	2.50	-0.64	43.41	+8.86

#### 2007 Growing Degree Days (Base 50)

Month	GDD	31 Yr. Ave.	Departure	4/15 to EOM	Ave YTD	Departure
April (15-30)	135.7	113.1	+ 22.6	135.7	112.4	+ 22.6
May	473.6	381.3	+92.3	609.3	490.7	+118.6
June	557.1	565.7	- 8.6	1166.4	1056.7	+109.7
July	601.9	671.5	-69.6	1768.3	1730.5	+37.8
August	672.6	611.8	-60.8	2440.9	2340.3	+100.6
September	455.1	426.6	- 28.5	2869.0	2766.0	+103.0
October (1-15)	198.0	122.3	+75.7	3094.0	2885.8	208.2

### Update on Status of NIARC:

If you remember, in the summer of 2006, a Task Force Committee was appointed to review the College of Agriculture Consumer and Environmental Sciences (ACES) field stations. This group made several recommendations for the reorganization and revitalization of the Field Research and Educational Center system. Some of their recommendations were to close some Centers and combine their operations. There continue to be questions on the status of the NIARC from people in the local community. Some individuals assume that the Research Center was sold when the almost 900 acres of the other Wright Trust Farms were sold and that we have closed. Neither of these are correct.

At this time, we have been given assurances from Dean Bob Easter, Dean of the College of ACES and Dr. Bob Hoelt, Head of the Crop Sciences Department that there are no major changes planned in the foreseeable future in the support for the Research Centers

Representatives of the DeKalb County Farm Bureau and other interested people have again met with Dean Robert Easter, Dr. Bob Hoelt and Dr. Jozef Kokini, ACES Associate Dean for Research of ACES. This meeting was to discuss potential future local area support for NIARC. In my opinion, any decisions on the operations and future of the Research Centers will be partially based on finding new sources of long term funding.

### Crop Rotation and nitrogen effects:

Many farmers have planted more second year corn in 2007. Most of the corn after corn did well. In our crop rotation – nitrogen rate study, the yields were much closer than history would predict at the higher rates of nitrogen. Our study area has been chiseled every year in both the continuous corn and corn-soybean rotation. Each nitrogen rate has been applied to the same areas every corn year for the 9 years of the study.

Year(s) & Rotation	Nitrogen Rate pounds/acre					
	0	45	90	135	180	225
2007 CC	103	140	175	185	199	195
2007 SB-C	130	168	183	196	197	199
99-07 CC	79	112	142	159	174	176
99-2007 SB-C	118	156	176	185	189	194

The nitrogen rate responses during the past couple of years has changed the anticipated yield response to nitrogen to a degree. The nitrogen estimator at the web site

<http://extension.agron.iastate.edu/soilfertility/nRate.aspx?mode=advanced>. The web site has three areas for use in Illinois and Illinois has the more data on nitrogen trials than any of the other states taking part at this web site. Given the high price of nitrogen and the value of the corn crop, this site should give good information to help determine the most profitable rate

of nitrogen to use. It allows you to change the price of nitrogen and the value of corn to match your own cost and price projections.

### Crop Rotation:

Following are the results from a study that was started in 2002. The field at the Research Center was all in soybeans in 2000 and all in corn in 2001. In 2002, all of the crop rotations were started. All rotations were in place and had completed a full cycle by fall of 2004. Some of the rotations have been in place much longer, continuous corn was in its 7<sup>th</sup> year in 2007 and the corn soybean rotation had been in place at least since 1980. Following are this year's results and the average results of the rotations from 2004 - 2007. The yields are for the crop and crop position in the rotation during that growing season that is listed in bold type.

	2007	2004-2007
<u>Crop Rotation</u>	<u>Yield Bu/Acre</u>	
<b>Continuous corn</b>	190	178
Corn – soybean - <b>Corn</b>	215	209
Soybean – <b>Corn</b>	205	206
Soybean – corn – <b>Corn</b>	196	192
Corn – <b>Soybean</b>	46.1	53.1
Corn – Corn – <b>Soybean</b>	43.6	54.0

In the three year averages, the yields of second year corn have been better than the yields of continuous corn. The whole trial has been chiseled, yearly. The nitrogen rate for corn following soybeans is 180 #/acre and for corn following corn is 220 #/acre. The differences this past year were smaller, but the continuous corn had lower yields than second year corn and both had lower yields than corn grown in some rotation with soybeans.

### Corn Planting Date: Has It Changed?

Dr. Eric Adee, Northwestern Illinois Agricultural Research and Demonstration Center looked at the date of planting studies that we have had at the Centers the past three years. The following are his conclusions: Several factors influence corn planting date including the following: work load/acres to cover, soil conditions, and bragging rights. However, what is best for the plant, assuming that what is best for the plant is best for yield? And has that changed over the years with the changing hybrids?

In the late 1980's a planting date and population study for corn was conducted at U of I research centers at Monmouth (NWRC) and Urbana. April 25 was found to be the optimum planting date with the hybrids used then. Since that time there have been many changes in hybrids as the corn-breeders have selected for improved seedling vigor, cold germination and disease resistance. Additionally, there have been changes made in the seed treatments that offer more protection to the seed and seedling from diseases and insects, especially in colder soils.

To revisit the question of corn planting date using the hybrids of today, corn planting date and population studies were conducted at U of I research centers around the state starting in 2005. The data shared in this newsletter is from the studies conducted at DeKalb and Monmouth (NWRC) from 2005 through 2007 and focuses just on the planting date. The yield data discussed are averages from plant populations of 30, 35, and 40 thousand plants per acre. Plant population data was addressed further in the February 2007 newsletter from NWRC, available on our website:

<http://www.cropsci.uiuc.edu/research/rdc/monmouth/>

The hybrids from Pioneer HiBred Int. used at both locations were: 34A24 in 2005, 34A18 in 2006, and 34A20 in 2007. The studies were conducted on tilled soil following soybeans. Not included in this summary of the yield data is the first planting date at NWRC in 2005, which had 97% of the plants killed with an early May frost.

Averaged across the 6 location/years, the highest corn yield was when corn was planted on April 15 (Fig. 1), with less than 1 bushel difference +/-5 days of that date. The maximum corn yield of 229 bu/acre (bpa) was 2 bpa more than that planted April 25, which was the optimum planting date when the study was conducted 15+ years before. While this is not a large difference in yield potential, it does indicate that the advances in genetics and seed protection of current hybrids can allow them to be planted earlier than was possible several years ago.

It is apparent in Figure 1 that the yields are dropping off faster the longer planting is delayed. To graphically demonstrate the loss in yield potential, Figure 2 shows the average yield loss per day increases the farther the planting date varies from the optimum on April 15. However, it should be noted that the numbers are averages for a given time period. The yield loss at the end of that time period will be greater than at the beginning. For example, the average yield loss per day for corn planted on May 5 is 1/2 bushel per day counting back to April 15, but the actual yield loss on May 5 is 1 bushel per acre. By May 15, the yield lost each day planting is delayed is over 1.5 bushels per day and increasing.

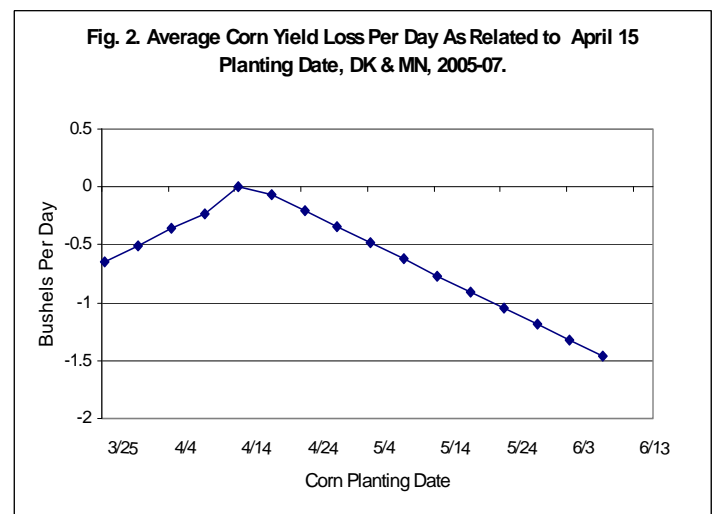
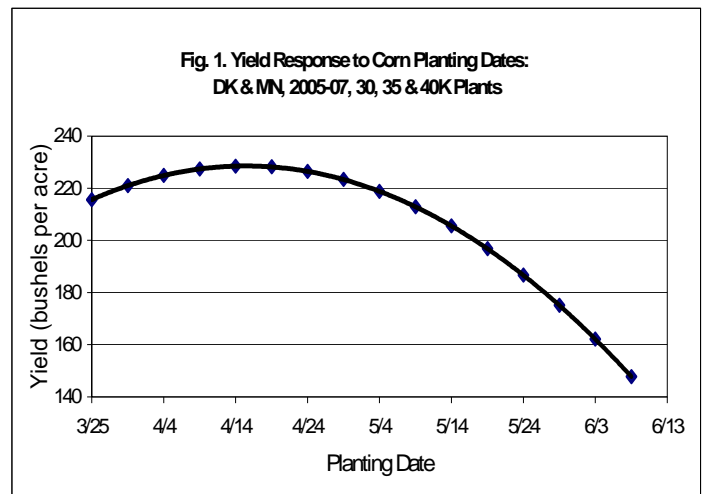
From this data, it appears that the planting date and corresponding rates of yield loss have moved 10 days earlier than previous work done over 15 years ago. While much of this shift to an earlier planting date can be attributed to improved genetics and seed treatments, are there other factors that may be contributing to this earlier planting date?

Warmer soil temperatures and accumulation of Growing Degree Days (GDD) are possible factors allowing for earlier planting. The soil temperatures for March, April and May under 4 inches of bare soil for the 3 years of the study averaged 52.8°F compared to 51.3° for the previous 10 years. The average date in April for which the monthly GDD reached 110 (the average needed for emergence) was 19<sup>th</sup> for this study compared to the 16<sup>th</sup> for the previous 10

years. (For NIARC the average for 05-07 was April 18 and April 22 for 95-04) These two measurements indicate the conditions at planting time were somewhat warmer than earlier years, and possibly two or three days of the 10 day earlier planting date may be attributed to warmer soils. It is still probably fairly safe to say that the advances in the seed industry can allow for planting a week earlier than previously shown in northern Illinois.

So how early can I plant corn? This data shows that there is not a lot of yield drag planting the first week of April. However, the yield losses per day are approaching 1 bushel per day when planting is earlier than that. Additionally, these yield averages do not include the 1 out of 6 location/years that the corn planted late March was killed. Other locations for this study in Illinois also have had corn at the late March/early April planting date damaged or killed by a late frost.

While more location/years will improve confidence in the data, what can be concluded this far? If soil conditions are favorable, be ready to take advantage of the improvements in today's hybrids to withstand more cold soils than those a few years ago. But realize there are risks and no yield advantage if planting is pushed into March.



### **Improving Continuous Corn Yields:**

Various methods have been suggested to improve the yields of continuous corn. One set of recommendations would be to increase tillage, increase fertilizer and to increase the plant population. This set of recommendations is from information and suggestions gathered from an individual that has had record corn yields while using continuous corn.

A study to look at these suggestions was started at two locations in 2003. The DeKalb and Orr fields were added in 2004, but that year, DeKalb had standing water in the study area and did not harvest any yield results. The study was moved in the fall of 2004. The study consisted of a standard treatment of chisel plow, 220 # of nitrogen, 92# of  $P_2O_5$ , 150# of  $K_2O$ , and a harvest 32,000 plants/acre harvest plant population.

The variations that were studied were:

More tillage, either with a tool with deeper tillage shanks or the mini-moldboard plow instead of the coulter chisel. Increase fertilization by an additional 100# per acre of nitrogen, 80# per acre more  $P_2O_5$  and 120# per acre more of  $K_2O$ . Increase the harvest population from 32,000 to 40,000 plants per acre.

Each of these variations was in all combinations with the base levels of the various practices. The following table contains the results with all other factors combined other than the factor being evaluated.

The most positive response to change was increasing the fertilizer applications. The net average gain (2005-2007) to that was 5 bushel per acre. The cost of the additional nitrogen would have been more than value of the average yield increase.

		<b>2007</b>	<b>2005-07</b>
<b>Variable</b>	<b>Level</b>	<b>Bu/acre</b>	<b>Bu/acre</b>
<b>Tillage</b>	<b>Normal</b>	<b>204</b>	<b>204</b>
	<b>More intense</b>	<b>205</b>	<b>207</b>
	<b>Difference</b>	<b>1</b>	<b>3</b>
<b>Fertility</b>	<b>Normal</b>	<b>199</b>	<b>203</b>
	<b>Higher</b>	<b>210</b>	<b>208</b>
	<b>Difference</b>	<b>11</b>	<b>5</b>
<b>Population</b>	<b>32,000</b>	<b>205</b>	<b>205</b>
	<b>40,000</b>	<b>204</b>	<b>206</b>
	<b>Difference</b>	<b>1</b>	<b>1</b>