Department of Crop Sciences---University of Illinois

COLLEGE of AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES

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2005 Weather Data

	January	February	March	April	May	June
Air Temperature (F°)						
Monthly Average High	28.6	37.9	44.2	65.0	65.7	84.9
Monthly Average Low	14.9	25.5	23.8	38.9	44.8	60.6
Daily Average	22.3	31.3	33.5	51.9	57.3	73.3
Departure from Average (39 year)	+1.9	+5.7	-3.3	+2.8	-2.9	+3.3
Observed High (date)	50.5 (12)	53.2 (5)	76.4 (30)	83.1 (18)	85.5 (8)	93.4 (7)
Observed Low (date)	-4.3 (18)	7.9 (18)	6.5 (3)	29.1 (24)	23.3 (3)	46.9 (19)

	July	August	September	October	November	December
Air Temperature (F°)						
Monthly Average High	83.5	81.9	79.9	64.9	49.6	39.4
Monthly Average Low	59.7	58.1	53.4	40.7	30.2	12.4
Daily Average	72.1	70.3	66.1	52.4	39.8	19.8
Departure from Average (39 year)	-1.3	-0.6	+2.6	+0.4	+1.0	-6.4
Observed High (date)	95.4 (24)	92.2 (9)	90.9 (13)	89.3 (4)	71.0 (3)	39.4 (27)
Observed Low (date)	48.0 (2)	48.3 (24)	34.3 (30)	24.3 (28)	10.7 (17)	-12.2 (7)

2005 Precipitation (Inches)

Month	Total	Departure from Average	Year Accumulation	Total Departure 124 Yr
January	1.83	+0.29	1.83	+ 0.29
February	1.58	+0.14	3.41	+ 0.43
March	0.51	-1.94	3.92	- 1 51
April	1.37	-1.84	5.29	- 3.55
May	2.08	-1.90	7.37	- 5.45
June	2.87	-1.28	10.24	- 6.73
July	1.86	-1.73	12.10	- 8.46
August	3.36	-0.30	15.46	- 8.76
September	1.40	-2.20	16.86	- 10.96
October	0.68	-2.12	17.54	- 13.08
November	2.05	-0.34	19.58	- 13.42
December	0.52	-1.35	20.11	- 14.77

2005 Growing Degree Days (Base 50)

Month	GDD	29 Yr. Ave.	Departure	4/15 to EOM	Ave YTD	Departure
April (15-30)	102.2	111.9	- 9.7	102.2	105.5	- 9.7
May	316.4	381.6	- 65.2	418.6	482.3	- 74.9
June	656.5	564.4	+ 92.1	1075.1	1046.7	+ 17.2
July	656.5	673.1	- 16.6	1731.6	1719.8	+ 0.6
August	612.1	610.1	+ 2.0	2343.7	2329.8	+ 2.6
September	519.9	424.7	+ 95.2	2863.6	2739.5	+ 97.8
October (1-15)	186.5	117.3	+ 69.2	3050.1	2791.8	+ 167.0

Weather note as relates to yields at NIARC:
Although the year was the driest year on record (from our records), we did receive some timely rainfall. Major rainfall periods were: from June 27 – July 4: 2.8"; from August 10 – 12: 1.59"; and from August 18 – 20: 1.77". These rains combined with low

disease pressure, good growing degree accumulation, early planting, low insect numbers and good soil conditions at planting time gave the conditions for nearly record yield levels at the Research Field.

University of Illinois Oat Drill Plots - DeKalb

2005			2004		2 Year Average			
Name	Yield (bu/A)	Test Weight (lbs/bu)	Yield (bu/A)	Test Weight (lbs/bu)	Yield (bu/A)	Yield Rank	Yield % of Mean	Test Weight (lbs/bu)
Spurs	122.7	36.6	144.5	33.6	133.6	1	120	35.1
Leonard	121.1	32.0	121.4	27.3	121.3	2	109	29.7
Rodeo	117.2	31.7	119.8	29.9	118.5	4	106	30.8
Sesqui	108.3	33.7	126.9	32.5	117.6	5	106	33.1
Wabasha	106.3	33.6	133.6	32.8	120.0	3	108	33.2
Jim	100.6	32.2	134.2	32.3	117.4	6	105	32.3
Classic	99.8	32.7	127.4	31.5	113.6	7	102	32.1
Blaze	99.6	33.2	120.6	33.6	110.1	9	99	33.4
Ogle	99.5	32.3	101.7	26.9	100.6	13	90	29.6
Don	97.4	34.7	96.9	28.1	97.2	14	87	31.4
Gem	96.8	34.0	120.5	32.0	108.7	10	98	33.0
Jay	95.0	35.4	125.4	31.5	110.2	8	99	33.5
Chaps	93.5	32.8	120.2	30.4	106.9	11	96	31.6
Winona	87.1	33.1						33.1
Moraine	80.9	32.7	121.1	32.4	101.0	12	91	32.6
Dane	71.6	29.9	115.6	28.6	93.6	15	84	29.3
GRAND MEAN	**102.2**		**124.3**		**111.3**			

Data courtesy of Frederick Kolb, Norman Smith, and Eric Brucker.

University Variety Trials: Complete yield results for variety trials for all crops can be found on the internet at the web site: vt.cropsci.uiuc.edu.

Nitrogen rates:

New nitrogen application recommendations for corn have been released. Extension specialists from several states in the Midwest reviewed available recent nitrogen response work. Following the review, nitrogen application recommendations were changed from being based on yield and previous crop credits to recommendation ranges of rates for corn following soybeans and corn following corn.

The nitrogen rate ranges are based on the price of corn and nitrogen. The new ranges for northern Illinois for corn at a price of $2.10 are:

Continuous corn

N Price:	Nitrogen range
20¢	182 - 227
30¢	153 – 201
40¢	140 – 178
50¢	127 – 160

Corn following soybean

N Price:	Nitrogen range
20¢	122 - 160
30¢	109 – 141
40¢	96 – 127
50¢	85 – 115

A nitrogen application rate calculator is available on a web site so you can change the relative prices of nitrogen and corn to determine the best rate range to use at your cost of nitrogen and your best guess for the value of your corn. The goal of the calculator is to select the range of nitrogen rates based on available data that give maximum return to the additional nitrogen within a $1.00 net value range. The web site address for the calculator is: www.extension.iastate.edu/soilfertility/nRate.aspx

At this point the calculator uses whole states as the base for data interpretation. In the future, the Illinois may be divided into more areas to more accurately reflect the nitrogen response curves for different areas. As you use the calculator, the state of Iowa may be a better indicator of rates for northern Illinois than using the whole state of Illinois as the base.

Additional work has been done on nitrogen rates for wheat. The results from limited number of years (2-4 depending on location) show that are definitely geographic differences in wheat yield response to nitrogen. Overall, the nitrogen rate recommendations in the current edition of the *Illinois Agronomy Handbook* are relatively accurate. From this limited data, the recommendation may be too low for lower

organic matter soils and too high for higher organic matter soils.

With a wheat price of $3.25 the following values would have been the optimum rates of nitrogen from research data from a 2 to 4 year period at the following locations:

N Price	DeKalb	Monmouth	Brownstown/ Dixon Springs
20¢	66	83	135
30¢	43	60	123
40¢	21	38	111
50¢	0	16	99
Years:	2	4	2

A chart of optimum nitrogen rates for NIARC based on the price of nitrogen and the value of wheat is at the end of the newsletter (table2). Use these results with caution as they vary somewhat from the *Illinois Agronomy Handbook* The rates and recommendations in the Handbook were established prior to the rapid price increase in the cost of nitrogen and therefore may be higher due to that fact.

Corn Population

Eric Adee, Principal Research Specialist, Monmouth compiled the results of all population work from Monmouth, DeKalb, and Urbana from the past three years and published the results in his newsletter as follows:

With the cost of inputs continuing to increase, every input involved in corn production is being scrutinized more closely to determine if there will be a return for the investment. Seed corn costs have risen noticeably in the 10 years I have been at NWRC. In the 90's it was big news when the price for a unit of seed reached $100. In the last couple of years, it has not been uncommon to hear of a unit of seed corn with stacked traits selling for $200. While the benefits of individual or stacked traits needs to be evaluated carefully, the expected return for investment of seed cost has been studied at U of I research centers the last several years.

Several plant population studies for corn have been conducted at the Northern Illinois Agronomy Research (DeKalb), NWRC (Monmouth), and Crop Sciences Research and Education Center (Urbana) since 2003. In these studies, the corn was over-planted, then thinned to the appropriate population at the V-6 to 8 growth stage. There were at least 5 hybrids used in these studies for a total of 48 data points for each population.

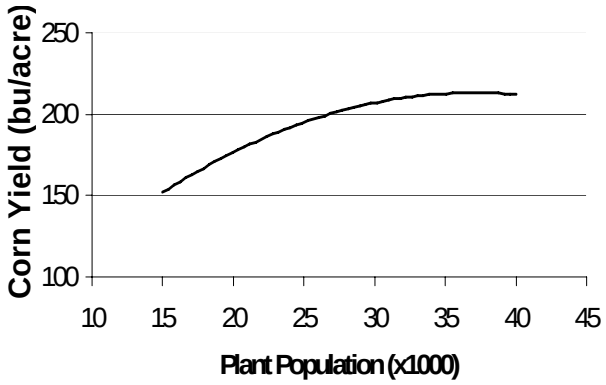
A yield response curve was fit to the average yields for each population. Using the equation for the curve: yield = $36.1238 + 9.7095x - 0.1338x^2$ (x = plant population) (Fig. 1), the optimum plant population was calculated based on the cost of seed and the price paid for corn. By definition, the optimum is when the last seed purchased pays for itself in increased yield. Table 1 shows the optimum number of plants per acre at several different seed cost and corn price combinations. As the seed cost increases and/or the price for corn decreases, the optimum plant population decreases.

It should be noted that the corn population figures are for **plants per acre**, not seeds planted per acre. The cost for the seed was adjusted to assume 85% stand establishment, which basically means that there are 85 plants for every 100 seeds planted. A seeding rate can be calculated by dividing the plant population by the expected stand establishment (e.g. 30,000 plants/85%=35,294 seeds/acre).

Conclusions

Based on this data, the optimum **plant** population ranges from 29,000 to 33,700, depending on the cost of seed and price paid for grain. Using 85% stand establishment, the seeding rate would range from 34,100 to 39,650 seeds/acre. With the worst case scenario of high priced seed corn and low priced grain, a farmer will still be making money planting 34,000 seeds per acre. Since many farmers are planting less than 34,000 seeds/acre, these results show that cutting seeding rates are not a place to cut costs. Granted, this data is from a limited number of environments and hybrids, but we can be fairly confident that farmers haven't been wasting seed by planting too much.

Fig. 1. Effect of Plant Population on Corn Yield (Dk, Mon, Urb 2003-2005)



(Lyle Note): The use of 85% stand establishment is conservative for what we have seen in recent years. We have tended to get stands of 90% or more of what we have planted at NIARC.

Seed Cost	**Corn Price ($/bushel)**				
$/unit	**1.50**	**1.75**	**2.00**	**2.25**	**2.50**
120	31.9	32.5	33.0	33.4	33.7
140	31.2	31.9	32.4	32.9	33.2
160	30.4	31.3	31.9	32.4	32.8
180	29.7	30.6	31.4	31.9	32.3
200	29.0	30.0	30.8	31.4	31.9

Table 1. Optimum plant population (x1000) for corn, with seed cost calculated assuming 85% stand establishment. Data from University of Illinois Research Centers at DeKalb, Monmouth and Urbana, 2003-2005.

Table 2: Total Nitrogen for Wheat Recommendations Based on Nitrogen Price and Value of Wheat

N Price	Price of Wheat								
	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75	$4.00	$4.25	$4.50
$0.20	52	58	62	66	69	72	74	76	78
$0.25	38	44	50	55	59	62	65	68	70
$0.30	23	31	38	43	48	52	56	59	62
$0.35	9	18	26	32	38	43	47	51	54
$0.40	0	5	14	21	27	33	38	42	46
$0.45	0	0	1	10	17	23	29	34	38
$0.50	0	0	0	0	7	14	20	25	30

These recommendation rates are based on the results of 2004 & 2005 nitrogen work at NIARC.
Research Center soils > 3% organic matter; for wheat following soybeans
Additional comments: Add 20 lb N if OM <3%, but >2%
Add 40 lb N if OM < - add 40 lb N
Subtract 20 lb N for alfalfa or clover seeding
Add 20 lb N if no-till (Steve Ebelhar, Dixon Springs, suggestion)