



# Corn & Soybean News

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## 1. **Corn replanting options**

Chad Lee and James Herbek, Plant and Soil Sciences

The warm weather in mid-March prompted many producers to plant corn early, putting those fields at greater risk for injury and stand losses. Every year farmers in Kentucky are faced with the question of letting a poor stand of corn remain or removing that corn and planting another field of corn.

Temperatures below 28°F for more than two hours will kill plant growth above the soil. The growing point of corn will remain below ground until corn has about six fully emerged leaves (V6 growth stage). Even though the soil surface will help to protect the growing point from cold temperatures, repeated nights of temperatures below 28°F will likely cause damage to some growing points.

If corn stands are damaged, then there are several factors that go into deciding between keeping the existing stand and replanting. Some of these factors include:

- 1.) current stand of corn and expected yield
- 2.) replanting date, replanting cost, and expected yield
- 3.) hybrid corn seed availability
- 4.) herbicide(s) that have a replant restriction
- 5.) methods for destroying the existing crop
- 6.) insect management changes, if any
- 7.) adjustments in soil fertility programs, if any

- Temps below 28°F can damage young corn plants.
- Replant decisions usually are not a simple "yes" or "no".

Expected corn yields based on planting date and plant population were estimated for Illinois in 1994 (Table 1). The information in Table 1 serves as a rough estimate for well-drained soils in Kentucky. In general, final stands between 27,000 to 33,000 plants per acre provide maximum yield on well-drained soils. Lower populations would be needed on poorer soils.

Table 1 indicates that maximum yield is achieved when corn is planted near the end of April. Ideal planting dates for western and central Kentucky are closer to April 17 to April 27 (Table 2). Plantings in mid to late May in western and central Kentucky will result in close to a 20% yield loss while plantings in early June will result in nearly 40% yield losses.

The dates in Table 1 and Table 2 can be shifted back seven days for eastern Kentucky. For example, the ideal planting dates in Table 2 are from April 17 to April 27, while in eastern Kentucky ideal planting dates are closer May 1 to May 7.

Table 1. Expected corn grain yield due to various planting dates and final plant populations.

Planting date	Plant population (final) per acre													
	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000
	<i>Percent of optimum yield</i>													
10-Apr	62	68	73	78	82	85	88	91	92	93	94	94	93	91
15-Apr	65	71	76	81	85	88	91	94	95	96	97	96	96	94
20-Apr	67	73	78	83	87	90	93	96	97	98	99	98	98	96
25-Apr	68	74	79	84	88	92	94	97	98	99	100	100	99	97
30-Apr	68	74	79	84	88	92	95	97	99	100	100	100	99	97
05-May	67	73	79	83	87	91	94	96	98	99	99	99	98	97
10-May	65	71	77	82	86	89	92	94	96	97	97	97	96	95
15-May	63	69	74	79	83	87	89	92	93	94	95	95	94	92
20-May	59	65	71	75	80	83	86	88	90	91	91	91	90	89
25-May	55	61	66	71	75	79	81	84	85	86	87	87	86	84
30-May	49	55	61	65	70	73	76	78	80	81	81	81	80	79

Source: Nafziger. 1994. J. Prod. Ag 7:59-62

Reprinted from: Nielsen, R.L. and P. Thomlinson. 2002. Late-planted corn & seeding rates. URL: [http://www.kingcorn.org/news/articles.02/Delayed\\_Planting\\_Populations-0510.html](http://www.kingcorn.org/news/articles.02/Delayed_Planting_Populations-0510.html)

Table 2. Planting Date Effect on Corn Yield at Princeton, KY.

Planting Period (Planting Date Avg.)	Planting Date Range Over Six-year Period	Corn Yield (Bu/Acre)* (Six-year average) (2000-2005)	Average Yield Loss	
			(Bu/A)	(%)
Early April (April 7)	April 3-10	196	-14	(7)
Mid-late April (April 22)	April 17-27	210	0	(0)
Early May (May 9)	May 5-13	193	-17	(8)
Mid-late May (May 24)	May 21-31	172	-38	(18)
Early June (June 9)	June 5-14	130	-80	(38)

\*Average of two medium maturity hybrids (Bt and non-Bt).

If corn is to be planted past May 1 in western and central Kentucky, then cornborer Bt hybrids are recommended. These cornborer Bt hybrids provide a yield advantage over non-Bt hybrids at later plantings.

Determine plant populations in fields by taking several stand counts in both injured and non-injured areas of the field, about 5 days after the injury event occurred. Tables 3 and 4 can be used to help make stand counts. Table 3 identifies the length of row needed to equal 0.001 acre. Counted plants can be multiplied by 1,000 to estimate plants per acre. If stands are erratic, then a longer row length may need to be counted. Table 4 provides plant populations for corn plants counted in 50 feet of row in 30-inch row widths. If 60 corn plants were counted, then final population would be about 21,000 plants per acre. Expected yield of the surviving stand can be determined from Table 1.

Once the surviving stand has been estimated, then other factors can be considered, such as hybrid seed availability. The demands for seed corn are strong and the availability of seed, especially seed from desirable hybrids is a real question mark for the 2007 growing season. If seed from good hybrids is not available, then farmers may have to stay with the existing corn stand or consider switching to grain sorghum or soybeans. Hybrids with relative maturities of 113 days or earlier should be considered for late corn plantings.

No changes in nitrogen fertilizer should be needed for replanted corn. Any nitrogen applied to the original planting of corn should be available to the replanted corn, as long as a flooding event has not occurred.

Details on herbicide options, insect management options and disease considerations are addressed in other articles of this newsletter.

**Table 3.** Estimating Corn Stand. Determine the length of row to count. Count the plants within that row. Multiply that number by 1,000. The product is the estimated number of plants per acre. This process should be repeated throughout the field in injured areas and non-injured areas.

Row Width (inches)	Length of Row to Count	Number of Plants in Row	Multiplication Factor	Estimated plants per acre
38	13' 9"		x 1,000	
36	14' 6"		x 1,000	
30	17' 5"		x 1,000	
20	26' 2"		x 1,000	
15	34' 10"		x 1,000	

**Table 4.** Number of plants per acre based on the number of plants counted in either 50 feet of row in 30-inch row widths

Row Width (inches)	Measured Row Length (feet)	Total Measured Area (ft <sup>2</sup> )	Number of Plants per Measured Area	Number of Plants per Acre
30	50	125	40	13,939
			60	20,909
			65	22,651
			70	24,394
			75	26,136
			80	27,878
			85	29,621
			90	31,363
			100	34,848

**Resources:**

Nafziger, E.D. 1994. Corn planting date and plant population. J. Prod. Agric. 7:59–62.

Nielsen, R.L. and P. Thomlinson. 2002. Late-planted corn & seeding rates.

URL: [http://www.kingcorn.org/news/articles.02/Delayed\\_Planting\\_Populations-0510.html](http://www.kingcorn.org/news/articles.02/Delayed_Planting_Populations-0510.html)

## 2. Change In Weather Could Affect Wireworms

Ric Bessin, Entomology

The drastic shift in cold weather toward the south could affect the damage caused by wireworms in field corn.

The colder weather will result in lower soil temperatures and retard seed germination and seedling growth in early planted corn fields. Slower germination and growth means that these seedlings will remain vulnerable to wireworm damage for a much longer period of time. This is often where we find the worst wireworm damage, early planted fields with conditions favoring slow seed germination and growth.



Wireworm.

Fortunately most corn planted in Kentucky is now coated with an insecticide to reduce losses to soil insect pests. This helps to prevent wireworm losses, but it does not prevent all losses. Growers are advised to monitor seed germination and emergence of these early planted fields closely through April. Early-planted fields with a history of

wireworm damage are at higher risk. Significant losses have been observed in early-planted high risk fields, even where

a seed treatment has been used. Unfortunately, there are no rescue treatments once damage begins to appear. If replanting is needed, then the decision needs to be made as early as possible to avoid yield reductions due to late planting.

Should you use an insecticide with replanted corn? This is a difficult question to answer. Generally, with later planted corn (mid to late April through early May), the soil temperatures will promote rapid corn emergence and growth which in itself will limit wireworm losses.

In my estimation, nearly all of the seed in Kentucky is treated with an insecticide (examples include but are not limited to Poncho and Cruiser) which should be enough protection in most all of these replanted fields. If a granular or liquid insecticide was used during the initial planting, then it would help to replant into the same furrow if possible.

- Cold weather favors wireworm damage to corn.
- Insecticides will help, but wireworm damage to corn is more likely in cold weather.

## 3. Corn Herbicides Affect Replanting Options

J. D. Green and J. R. Martin, Plant and Soil Sciences

Before replanting corn or an alternative crop following stand losses due to poor emergence, freeze damage, or flooding the first decision before replanting may depend on the previous herbicide(s) applied to corn fields. Most soil-applied herbicides do not have restrictions for replanting corn. Soil-applied herbicides containing atrazine have been the primary concern when replanting to soybeans in most years. In some cases where a postemergence treatment has been applied to corn, several of these herbicides can also cause significant injury to corn or an alternative crop. Listed below are corn herbicides and the potential risk associated with replanting to corn, grain sorghum or soybean. Consult the label of specific herbicide products that have been used for more details on crop rotation limitations.

Information on controlling corn as a weed is discussed in the previous issue of Corn and Soybean News (Vol. 7 Issue 4).

- Most soil-applied herbicides have no restrictions against replanting corn.
- Some postemergence herbicides have restrictions on replanting.

**Table 6.** Risk potentials for crop replanting following use of corn herbicides. (This table is a guideline. Consult the herbicide label for additional details.)

Herbicide	Risk Potential and Minimum Waiting Period Before Replanting <sup>1</sup>		
	Corn	Grain Sorghum	Soybean
<b>Accent</b>	No Risk	High: 10 months; 18 months if soil pH >7.5	Slight: 14 days
<b>Aim</b>	No Risk	No Risk	No Risk
<b>Atrazine</b>	No Risk	No Risk	Moderate Risk; Slight Risk in River Bottoms following a flood.
<b>Balance PRO</b>	No Risk	High: 6 months	High: 6 months
<b>Beacon</b>	Slight: IR or IMR hybrids may be replanted immediately; 14 days for other field corn hybrids	High: 8 months; injury may occur to sorghum if dry weather follows application	High: 8 months
<b>Bicep II Magnum, Cinch ATZ, etc.</b>	No Risk	No Risk; Use sorghum seed treated with a safener	Moderate Risk
<b>Callisto</b>	No Risk	High: 10 months	High: 10 months
<b>Camix</b>	No Risk	High Risk	Moderate Risk
<b>Celebrity Plus</b>	Slight: 7 days	High: 10 months; 18 months if soil pH > 7.5	Moderate: 4 months
<b>Dicamba [Clariety, Banvel, etc.]</b>	No Risk	Slight to Moderate: 15 days to 4 months depending on rate	Slight to Moderate: 15 days to 4 months depending on specific product, use rate, and rainfall
<b>Distinct / Status</b>	Slight: 7 days	Moderate: 4 months (see restrictions for low rate & rain > 1")	Moderate: 4 months (see restrictions for low rate & rain > 1")
<b>2,4-D</b>	Slight: 7 to 14 days	Slight to Moderate: 3 months	Slight: 7 to 30 days depending on amount used
<b>Equip</b>	Slight: 15 days	High: 9 months	High: 9 months
<b>Expert</b>	No Risk	No Risk: plant sorghum treated with a seed safener	Moderate Risk
<b>Glyphosate (Roundup, Touchdown, etc.)</b>	No Risk	No Risk	No Risk
<b>Gramoxone</b>	No Risk	No Risk	No Risk
<b>Guardman MAX</b>	No Risk	No Risk; Use sorghum seed treated with a safener	Moderate Risk
<b>Harness Xtra, Degree Xtra, FulTime, Keystone</b>	No Risk	Moderate Risk	Moderate Risk
<b>Hornet WDG</b>	No Risk	High: 12 months	High: 10.5 months; waiting period longer when dry or OM <2%
<b>Impact</b>	No Risk	High: 9 months	High: 9 months
<b>Liberty (LL-corn only)</b>	No Risk	Slight: 70 days	No Risk
<b>Lightning (Clearfield corn only)</b>	High risk for either conventional corn, ROUNDUP READY corn, and LIBERTY LINK corn hybrids (8.5 months); CLEARFIELD corn may be replanted anytime	High: 18 months	Moderate: 9 months
<b>Lumax / Lexar</b>	No Risk	High	High
<b>Marksman, etc.</b>	No Risk	No Risk	Moderate Risk
<b>Option</b>	Slight: wait 7 days	Moderate: 2 months	Slight: 14 days
<b>Permit</b>	Slight: 1 month; CLEARFIELD hybrids may be replanted anytime	Moderate: 2 months	High: 9 months
<b>Princep</b>	No Risk	Moderate Risk	High Risk
<b>Prowl</b>	High Risk	High Risk	No Risk
<b>Radius</b>	No Risk	High: 12 months	High: 6 months
<b>Spirit</b>	Slight: 1 month, CLEARFIELD hybrids may have more tolerance than regular hybrids	High: 10 months	High: 10 months, STS-soybean varieties have more tolerance
<b>Steadfast</b>	No Risk	High: 10 months, wait 18 months if soil pH >7.5	Slight: 15 days
<b>Steadfast ATZ</b>	No Risk	High: 10 months	Moderate: 10 months
<b>Stout</b>	No Risk	High: 10 months	Slight: 15 days

<sup>1</sup> Waiting period is defined as the time between herbicide application and replanting.

## 4. Diseases and Replanting Corn

Paul Vincelli, Plant Pathology

Delayed plantings of corn, or late replantings of corn, could result in increased outbreaks of several diseases.

**1. The "virus complex".** Infections of maize dwarf mosaic virus and maize chlorotic dwarf virus cause the virus complex. Both viruses overwinter in johnsongrass rhizomes. Maize dwarf mosaic virus is spread (vectored) from johnsongrass to corn by aphids while maize chlorotic virus is vectored by leafhoppers. Compared to corn planted on time, late-planted corn is at an earlier stage of crop development during periods of peak vector activity. Earlier infection of corn usually results in more severe disease symptoms. Also, research by University of Kentucky entomologists has shown that vector populations can be higher on late-planted corn.

**2. Fungal diseases of foliage.** Several leaf diseases, especially gray leaf spot, may be more severe where corn is planted late. This risk is especially high for fields in continuous no-till corn. Late-planted crops will be at a comparatively earlier stage of development during periods of high spore activity if weather is conducive for these diseases. Leaf infection early in plant development will reduce yields by decreasing photosynthetic capability and will increase susceptibility to stalk rots.

**3. Fungal ear rots.** Fall armyworm feeding can be more severe on late-planted corn. Wounds from fall armyworm feeding allow for fungal invasion of the plants, increasing the incidence of ear rot diseases.

**4. Fungal stalk rots.** Increased stalk rot diseases during could result from delayed planting. The shorter daylength and drier weather late in the season could add stress to late-planted corn that is trying to complete seed fill. The added stress can favor infection.

Growers who are still looking to plant corn late should seek hybrids with resistance to these diseases. Disease resistance is not as common in mid-season and short-season hybrids as in full-season hybrids. So growers are advised to be sure mid- and short-season hybrids have resistance to the above diseases.

- Corn planted in late May is more susceptible to several diseases.
- If possible, select hybrids with resistance to these diseases.



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