WYFFELS HYBRIDS®
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DELAYED PLANTING

THE EFFECTS OF DELAYED PLANTING ON CORN DEVELOPMENT

As the wet weather and cool temperatures continue to delay planting in some regions of Wyffels' marketing area, many people are beginning to question their original cropping plans. One of the major concerns with delayed planting is getting the hybrid to mature prior to a fall freeze. Logic would dictate that if a hybrid takes 140 days to finish when planted on April 15, it would take the same number of days to finish if planting was delayed to May 30. The fault in this logic is that plants have an uncanny ability to adapt to their environment, as demonstrated in the research discussed below.

Experiments were conducted at Purdue and Ohio State Universities to determine the effect of delayed planting on corn development. Three hybrids of widespread relative maturities were planted at three relative planting timings at four locations. As shown in the graph below, the number of days from planting to emergence, silking, and kernel black layer (maturity) were measured.

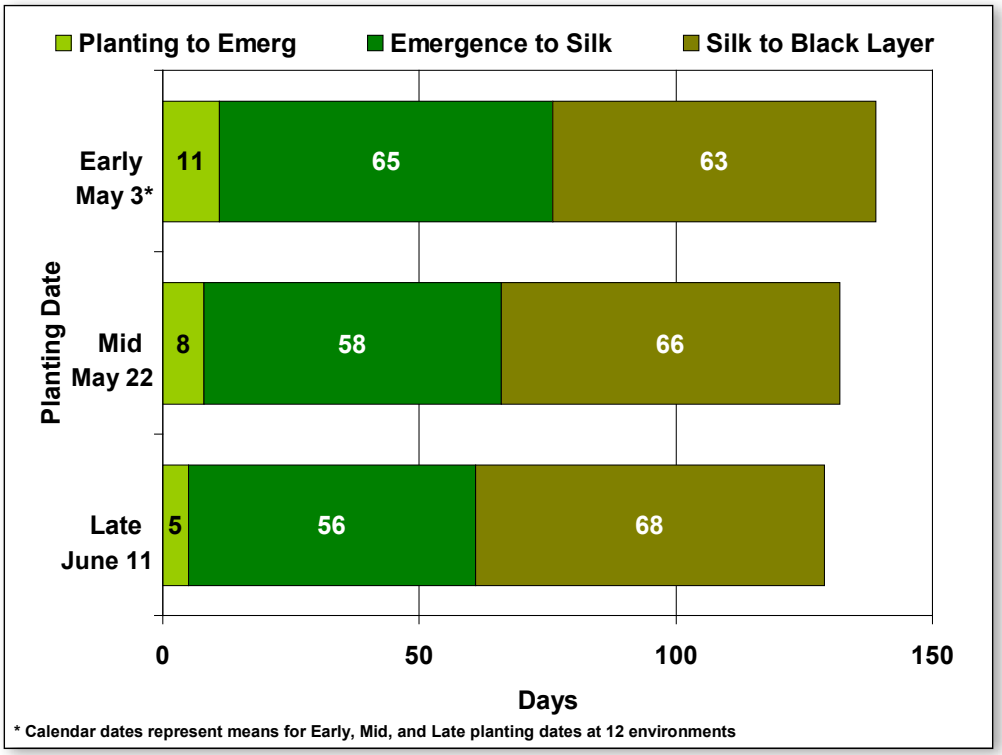
Results

Fewer days were required for later planted hybrids to mature than earlier planted hybrids. Although this shorter time did not fully compensate for the delay in planting date, these results demonstrate how corn plants adapt to later plantings. The Growing Degree Units (GDUs) required for a corn plant to mature is also reduced when planting is delayed. Nielsen and Thomison reported that when planting is delayed beyond May 1, the number of GDUs from planting to black layer decreases by about 6.8 GDUs per day of delayed planting.

This adaptation allows hybrids that are normally grown in a given maturity zone to finish prior to a typical fall frost, even when planted a few weeks outside the ideal planting window.

In the Nielsen study, the harvest moisture of a 115-day hybrid did not vary much when it was planted and harvested early (May 3/ Sept 23) versus planted and harvested late (June 11/Nov 5). However, a 106-day hybrid in the same trial was 3.6% wetter when it was planted and harvested late versus early planting and harvest.

Graph 1.
Days to emergence, silking, and black layer for three relative planting dates



Drydown after kernel black layer formation will be heavily influenced by weather conditions.

Lost yield potential

Another issue with delayed planting is lost yield potential. In most of the Midwest, the optimum planting window for full yield potential is mid-April to early May. These dates will vary from north to south, but probably not as much as one might expect. Dr. Chad Lee, extension professor at the University of Kentucky, recently reported that the ideal planting date for Kentucky is the second to third week in April. In the recent issue of the University of Illinois IPM Bulletin, Dr. Emerson Nafziger reported maximum yields were attained in their trials when corn was planted on April 6 for southern Illinois and April 16-17 for central and northern Illinois. Iowa State University reported hybrids reached 100% yield potential in their trials when planted between April 20 and May 5, and 99% of their yield potential for planting dates up to May 20. Yields will start dropping off around the middle of May, regardless of hybrid maturity; so switching hybrid maturities will not resolve this issue.

Growers who may consider switching to soybeans because of planting delays should know that Iowa State University has reported yield losses up to 0.6 bushels per day past the optimum planting date (April 25 to May 1).

It is not advised to mud in a crop in order to get it planted by a certain calendar date. And, consideration must be given to soil temperature. The soil needs to be 50°F for corn to sprout and emerge evenly. In southern environments, farmers like to get their corn planted in April to "beat the heat" during pollination. While this is a valid point, it entails a lot of assumptions about future weather conditions.

How to use this information

Example: W9121 planting was delayed in Sigourney, IA until June 1

- Using Table 1., find the approximate GDUs needed for black layer for a 117-RM hybrid (2800 GDUs)
- Identify the fall frost date using Table 2. (Oct 13)
- Total the average GDUs from planting to the average fall frost date using Table 2
  A June 1 planting date would require:
  625 + 757 + 699 + 479 + (249 x 1/3) = 2643 GDUs until black layer
- Now we need to adjust for the hybrid's adaptation to the delayed planting, using 6.8 GDUs per day past May 1 (6.8 x 30 days = 204). Subtract 204 from the hybrid's normal GDU requirement to get the compensated GDU requirement: 2800 – 204 = 2596
- Comparing the average GDUs available until the average frost (2643) to the required GDUs (2596), it is determined that there would be time for W9121 to finish before a normal fall frost.
- If the calculated GDUs needed are greater than the GDUs available to an average frost, then switching to an earlier maturing hybrid would be advised.

Table 1. Range of GDUs to kernel black layer for relative maturity groups.

Relative Maturities	GDU range to black layer
98 - 100	2,400 – 2,500
101 - 103	2,450 – 2,550
104 - 106	2,500 – 2,600
107 - 109	2,550 – 2,650
110 - 112	2,650 – 2,750
113 - 117	2,700 – 2,800

Table 2. Average monthly GDUs and spring, fall frost dates.

	Average Monthly Growing Degree Units*							Average Frost Dates**	
	Apr	May	June	July	Aug	Sep	Oct	Spring	Fall
Iowa									
Sheldon	167	375	561	673	616	408	198	May 4	Sep 27
Algona	167	381	577	681	623	418	203	Apr 28	Oct 3
Cascade	169	375	571	692	631	414	212	May 2	Oct 1
Tipton	180	383	585	694	629	433	230	Apr 29	Oct 4
Sigourney	205	410	625	757	699	479	249	Apr 19	Oct 13
Des Moines	206	418	640	778	722	485	244	Apr 20	Oct 12
Oakland	218	409	620	729	678	485	258	Apr 28	Oct 1
Wisconsin									
Madison	152	348	526	654	593	384	184	May 10	Oct 2
Beloit	164	363	563	683	618	430	211	Apr 23	Oct 9

Table 2. Average monthly GDUs and spring, fall frost dates.

	Average Monthly Growing Degree Units*							Average Frost Dates**	
	Apr	May	June	July	Aug	Sep	Oct	Spring	Fall
Illinois									
Rockford	168	379	575	705	651	435	214	Apr 30	Oct 6
Kewanee	183	387	592	713	653	450	229	Apr 26	Oct 9
Watseka	182	399	602	707	651	476	252	Apr 26	Oct 7
Quincy	227	438	655	785	731	515	276	Apr 10	Oct 20
Decatur	256	467	656	761	727	538	308	Apr 23	Oct 11
Belleville	308	515	698	806	752	573	364	Apr 14	Oct 12
Albion	297	515	714	818	793	596	358	Apr 9	Oct 27
Indiana									
Washington	302	512	713	821	774	580	340	Apr 13	Oct 21
Madison	279	471	673	789	760	570	332	Apr 16	Oct 28
Kentucky									
Henderson	322	534	719	824	778	598	376	Apr 9	Oct 24
Russellville	318	513	661	777	746	569	356	Apr 13	Oct 21
Lexington	263	467	662	786	750	553	311	Apr 15	Oct 25
Berea	327	507	677	785	749	576	343	Apr 13	Oct 24

*Average monthly GDUs: http://mcc.sws.uiuc.edu/climate_midwest/mwclimate_data_summaries.htm

**Spring/Fall frost dates: http://www5.ncdc.noaa.gov/climatenormals/clim20supp1/freezefrostpage.html. There is a 50% chance that the temperature will reach 32° F or lower: after the listed spring dates; before the listed fall date.

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