August 2013 Field Crops 28.47-102

Predicting Maturity Date of Late-Planted and Uneven Corn

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During cool growing seasons, especially when planting is delayed due to wet spring conditions, growers are concerned about whether their corn is vulnerable and will reach maturity before normal frost dates. Often the range in planting dates have implications at harvest time, especially for silage because grain and dairy producers often negotiate the sale of corn in fields that are borderline for development (Figure 1).

Corn Planted, Wisconsin, Percent 2012, 2013 and 5-Year Average 100 90 80 70 60 50 40 30 20 10 0 5/5 5/12 5/19 5/26 6/2 6/9 6/16 6/23 6/30 4/14 4/21 4/28 • 2013 — • — 2012 • • • • • 5 Yr Avg

Figure 1. Wisconsin corn planting progress (Data source: USDA-NASS).

Most hybrids require about 55 to 60 days to develop from the silk stage to physiological maturity. Hybrid maturity differences in development time occur primarily



Figure 2. Corn silking (R1). Photo by W. Hoffman.

from emergence to silking, not from silking to maturity (Figure 3). Growers are concerned when corn does not reach the silk stage (R1-Figure 2) until early August or later. Killing frosts can easily occur by late September, so corn silking in early August would not be safe from major yield reductions due to frost until October.

■ Vegetative (50-80 d) ■ Reproductive (55-60 d)

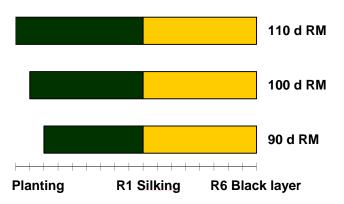


Figure 3. Typical time span of vegetative and reproductive stages during the life cycle of corn.

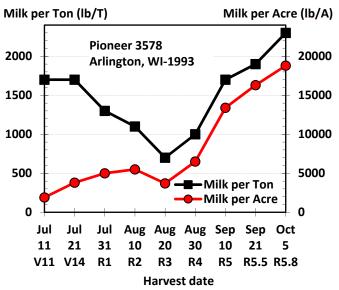


Figure 4. Corn silage yield and quality changes during development.

Figures 4 and 5 describe typical development of corn silage yield and quality and of a corn kernel. At the dent stage (R5), corn has accumulated 75-85% of silage yield and 60-75% of grain yield and needs about 27-32 days to avoid

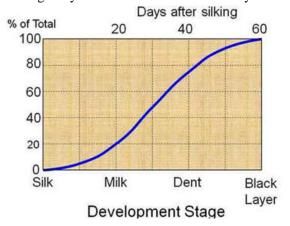


Figure 5. Typical corn kernel development in Wisconsin.

significant yield reductions due to frost (Table 1). In order to avoid yield reductions caused by frost, corn intended for silage should be silking by late August, while corn intended for dry grain should reach the dent stage by September 1.

Table 2 describes the effect of environment on kernel development of full- and shorter-season hybrids planted on different dates at Arlington, WI. The growing season of 2009 was characterized as cool and wet, while 2012 was hot and dry. The number of days to get from silking (R1) to the denting stage (R5) was 28-45 days depending upon the year and planting date. For kernels to develop from silking to 50% kernel milk required 45-62 days.

To predict whether corn will mature before frost note the hybrid maturity, planting date and tasseling (silking) date of the field. For silage planted early, add 42-47 days on to this date to predict 50% kernel milk, while for grain, add 55-60 days to predict maturity. These dates are guidelines which will require further in-season decisions as the season unfolds.

Table 1. The relationship between kernel growth stage and development of corn for normal planting dates.

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	Calendar days to	GDUs to	Percent of max yield		Moisture content (%)							
Stage	maturity	maturity	Grain	Silage	Grain	Silage						
R1: Silking	55-60	1100-1200	0	45-50		80-85						
R2: Blister	45-50	875-975	0-10	55-60	85-95	80-85						
R3: Milk	35-40	750-850	10-30	60-65	70-85	80-85						
R4: Dough	30-35	650-750	30-60	65-75	60-70	75-80						
R5: Dent	27-32	425-525	60-75	75-85	50-55	70-75						
R5.5: 50% Kernel milk	13-18	200-300	90-95	100	35-40	65-70						
R6: Black layer	0	0	100	95-100	30-35	55-65						

Table 2. Kernel development of full- and shorter-season corn hybrids for early and late planting dates at Arlington, WI.

	2009		2010		2011		2012	
	Early	Late	Early	Late	Early	Late	Early	Late
GDUs May 1-July 15 / July 15-Oct 1	932 / 1069		1156 / 1327		1038 / 1264		1253 / 1309	
Planting date	April 10	June 15	April 14	June 18	April 13	June 17	March 28	June 15
Full-season Hybrid-	Pioneer 35F40		Pioneer 35F40		Pioneer 35F44		Pioneer 35F48AM1	
Relative Maturity (days)	105 d		105 d		105 d		105 d	
R1: Silking date	July 24	Aug 16	July 16	Aug 11	July 20	Aug 9	July 9	Aug 6
R5: Denting date	Sep 3	Sep 28	Aug 16	Sep 21	Aug 18	Sep 14	Aug 10	Sep 9
(DAS) †	(41)	(43)	(31)	(41)	(29)	(36)	(32)	(34)
R5.5: 50% Kernel milk date	Sep 20	DNM ‡	Sep 2	Oct 11	Sep 6	Oct 10	Aug 31	Sep 28
(DAS)	(57)		(48)	(61)	(48)	(62)	(48)	(53)
Shorter-season hybrid	Jung 7426VT3		Jung 7426VT3		Dekalb DKC48-37			
Relative Maturity (days)	96 d		96 d		98 d			
R1: Silking date	July 25	Aug 17	July 16	Aug 12	July 19	Aug 7		
R5: Denting date	Aug 31	Oct 1	Aug 18	Sep 18	Aug 20	Sep 12		
(DAS)	(38)	(45)	(33)	(38)	(28)	(36)		
R5.5: 50% Kernel milk date	Sep 18	DNM	Aug 30	Oct 12	Sep 4	Oct 7		
(DAS)	(54)		(45)	(61)	(48)	(61)		

[†] DAS= Days after silking; ‡ DNM= Did not measure