

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).

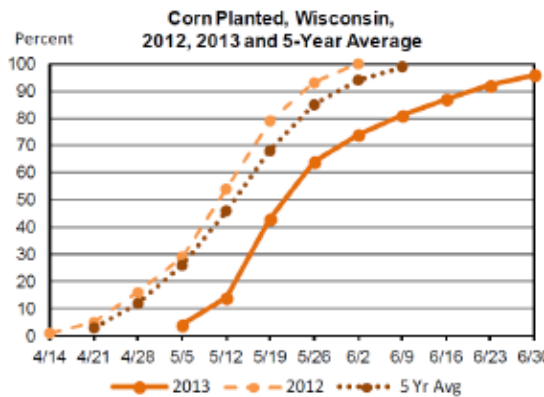


Figure 1. Wisconsin corn planting progress (Data source: USDA-NASS).

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.

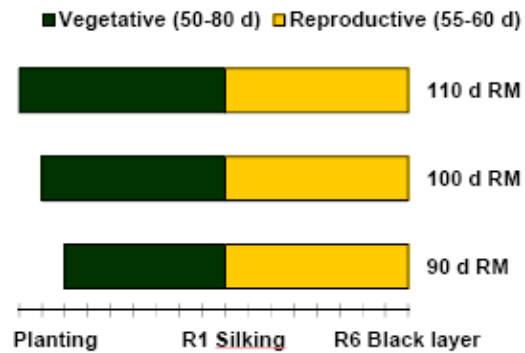


Figure 3. Typical time span of vegetative and reproductive stages during the life cycle of corn.

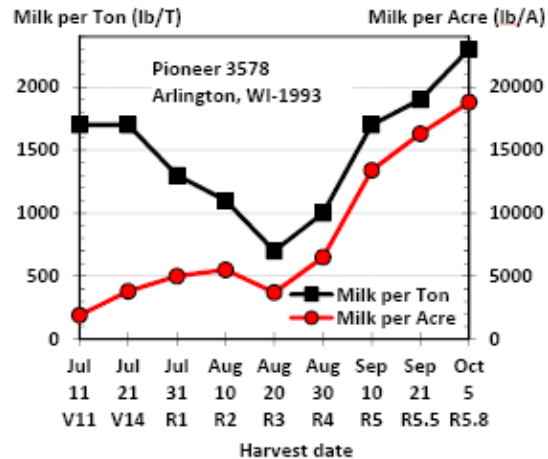


Figure 4. Corn silage yield and quality changes during development.

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

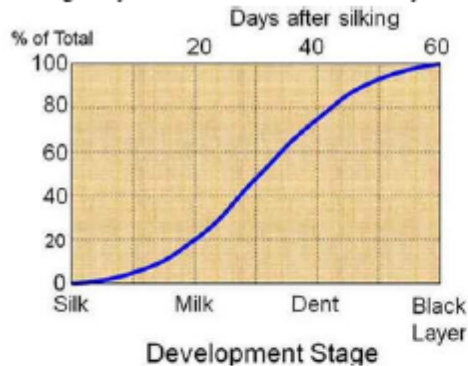


Figure 5. Typical corn kernel development in Wisconsin.

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.

Stage	Calendar days to maturity	GDUs to maturity	Percent of max yield		Moisture content (%)	
			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 at Arlington, WI.

	2009	2010	2011	2012
Planting dates	April 10-June 15	April 14-June 18	April 13-June 17	March 28-June 15
GDUs (May 1-July 15)	932	1156	1038	1253
GDUs (July 15-Oct 1)	1069	1327	1264	1309
Full-season Hybrid	Pioneer 35F40	Pioneer 35F40	Pioneer 35F44	Pioneer 35F48AM1
Relative Maturity (days)	105 d RM	105 d RM	105 d RM	105 d RM
R1: Silking date	July 24-Aug 16	July 16-Aug 11	July 20-Aug 9	July 9-Aug 6
R5: Denting date (DAS) †	Sep 3-Sep 28 (41-43)	Aug 16-Sep 21 (31-41)	Aug 18-Sep 14 (29-36)	Aug 10-Sep 9 (32-34)
R5.5: 50% Kernel milk date (DAS)	Sep 20-DNM (57-DNM#)	Sep 2-Oct 11 (48-61)	Sep 6-Oct 10 (48-62)	Aug 31-Sep 28 (48-53)
Forage yield (T DM/A)	11.0-7.2	10.0-7.5	10.1-7.2	8.7-7.3
Grain yield (bu/A)	224-118	255-51	224-155	236-106
Grain moisture (%)	24-40	15-40	17-29	19-50
Shorter-season hybrid	Jung 7426VT3	Jung 7426VT3	Dekalb DKC48-37	---
Relative Maturity (days)	96 d RM	96 d RM	98 d RM	---
R1: Silking date	July 25-Aug 17	July 16-Aug 12	July 19-Aug 7	---
R5: Denting date (DAS) †	Aug 31-Oct 1 (38-45)	Aug 18-Sep 18 (33-38)	Aug 20-Sep 12 (28-36)	---
R5.5: 50% Kernel milk date (DAS)	Sep 18-DNM (54-DNM)	Aug 30-Oct 12 (45-61)	Sep 4-Oct 7 (48-61)	---
Grain yield (bu/A)	271-144	235-138	231-177	---
Grain moisture (%)	20-41	13-39	15-27	---

† DAS= Days after silking; # DNM= Did not measure