Late Corn Planting Options

When planting is delayed, growers may consider planting an earlier-maturing corn product.

What to Consider

Delayed corn planting is often a result of unfavorable weather conditions. Planting into wet soils (Figure 1) can cause uneven stand establishment, poor root development, and sidewall compaction. Delayed planting can shift insect and disease pressure and yield potential can vary greatly based on the growing season.

Figure 1. A flooded field delaying corn planting.

GDU Accumulation and Maturity

Corn growth and development can be measured by calculating the number of growing degree units (GDUs) the crop has accumulated. Calculate GDUs by averaging the daily high (Tmax) and low (Tmin) temperatures minus the base temperature (Tbase), which is set at 50 °F for corn development. Tmax and Tmin are limited to 86 °F and 50 °F, respectively, as the maximum corn growth rate is reached at 86 °F and minimum, if any, corn growth occurs below 50 °F. Daily GDU accumulation can be calculated with the following formula: **GDU = ((Tmax + Tmin)/2) - Tbase**.[1]

For example:

- Tmax = 84 ˚F and Tmin = 53 ˚F
  ((84 + 53)/2) - 50 = 18.5 GDUs
- Tmax = 90 ˚F and Tmin = 65 ˚F
  ((86 + 65)/2) - 50 = 25.5 GDUs
- Tmax = 83 ˚F and Tmin = 48 ˚F
  ((83 + 50)/2) - 50 = 16.5 GDUs

The calculated number of GDUs can help determine crop growth stage (Table 1). GDU accumulation varies with maturity (Table 2). In general, corn products that need most of the growing season to mature have higher yield potential. However, an earlier-maturing corn product may be necessary if the growing season is shortened.

Table 1. Approximate GDUs required to reach different growth stages of a corn crop (planted on time, for a corn product that requires 2,700 GDUs to reach maturity).

Growth Stage		GDUs
VE	Emergence	115
V6	6 Leaf Collars	555
V12	12 Leaf Collars	945
VT	Tassel	1350
R1	Silk	1400
R3	Milk	1925
R5	Dent	2450
R6	Maturity	2700

Source: Nafziger, E. Corn Illinois Agronomy Handbook. University of Illinois Extension. http://extension.cropsciences.illinois.edu/.

Table 2. Corn product maturity classification.

Maturity	Days	GDUs
Early-season	85-100	2100-2400
Mid-season	101-130	2400-2800
Full-season	131-145	2900-3200

Source: Neild, R.E. and Newman, J.E. Growing season characteristics and requirements in the Corn Belt. Purdue University. National Corn Handbook. https://www.extension.purdue.edu/.

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Management Options

Consider the following prior to switching maturities:

- Full-season corn products typically have the highest yield potential.
- Daily GDU accumulation is minimal during planting as compared to flowering and drydown.
- Corn product maturities move closer together as planting is delayed.
- A primary reason for switching to an earlier-maturing corn product is to reduce the risk of immature and wet grain in the fall.
- The increased yield potential of full-season corn products can outweigh grain drying costs.
- The cutoff date to plant an earlier-maturing corn product is later for silage or high moisture grain than it is for grain corn.

Historical GDU accumulation data can help with deciding what maturity to plant and whether or not the corn product should mature before a killing frost (Figure 2). Switching to an earlier-maturing product should only be considered when there is concern with not having enough GDUs left in the growing season.

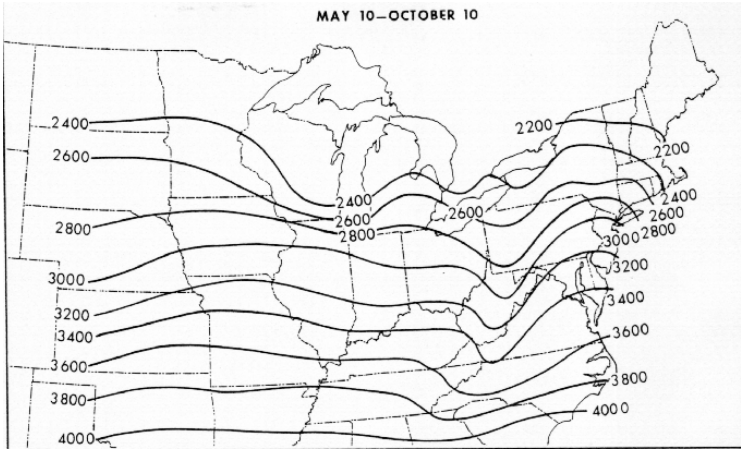

Figure 2. Estimated normal growing degree days.
Source: Neild, R.E. and Newman, J.E. 1990. Growing Season Characteristics and Requirements in the Corn Belt. Purdue University Extension. National Corn Handbook, NCH-40.

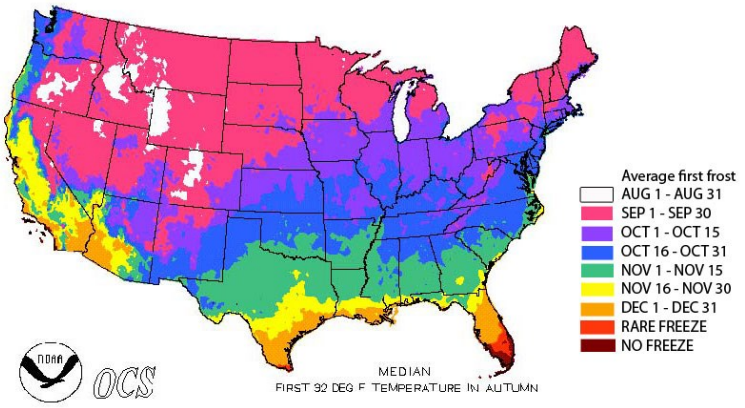

Figure 3. Median first frost (32 °F) dates for the continental United States.
Source: National Oceanic and Atmospheric Administration. Median first 32 deg F temperature in autumn. http://www.ncdc.noaa.gov/.

The yield potential of a late-planted corn crop varies by growing season. Plant a *B.t.* corn product to help reduce the risk of damage from increased insect pressure.[3] Planting rate should reflect the yield expectation and timely applications of fertilizer and herbicides is important because a late-planted corn crop will accumulate heat units faster than an earlier-planted corn crop.

Late-planted corn can have a higher chance of heat and drought stress during critical growth stages. Plant products that range in GDU requirements for flowering and physiological maturity to help reduce the chance that the whole corn crop flowers during a period of high heat or is damaged by frost later in the season (Figure 3).

Sources:
[1] Elmore, R. and Mueller, N. 2015. Growing degree units and corn emergence. University of Nebraska-Lincoln. https://cropwatch.unl.edu/.
[2] Corn Agronomy. 2014. Corn late-planting. University of Wisconsin. http://corn.agronomy.wisc.edu/.
[3] Heiniger, R. 2004. Management for late planted corn. North Carolina State University. https://www.ces.ncsu.edu/.
Web sources verified 04/12/18. 160502132006