Late Corn Planting Recommendations

Late planting of corn can occur every year due to various delays. Usually, the delay is caused by weather and most of the time it is the result of precipitation, either too much or not enough. Occasionally other factors, like replacing a failed stand with corn or replanting corn due to a poor stand, lead to later than planned planting.

The conventional wisdom to achieve maximum yield in the Corn Belt states is to plant corn from mid-April to mid-May. The window opens about two weeks earlier in the southern part of the Corn Belt and about two weeks later in the northern part of the Corn Belt. Conversely it closes about two weeks earlier in the Northern part of the Corn Belt. This time frame usually provides a balance between adequate soil temperatures in the spring and the first killing frost in the fall. However, while it is important to plant corn within the appropriate window for the specific geography, planting date is not the only driver of yield potential. Other factors, such as the management of weeds, diseases, and pests, rainfall in July and August, and temperatures during pollination can impact yield potential.

What is the expected yield penalty for late planted corn?

In general, a loss of 1 to 2 bushels per day when corn is planted outside the recommended planting window can be expected. HOWEVER, other yield influencing factors play a very large role in determining the final yield. For example, heat and drought stress during pollination and grain fill, nutrient availability, final plant stand, and pest pressures all can negatively impact the final yield of the crop regardless of planting date.

Tillage Considerations

Weed management will be important for delayed

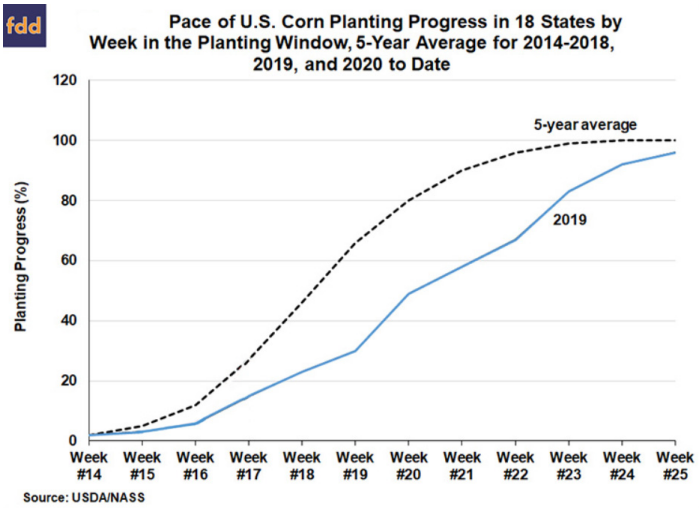

Figure 1. Average corn planting progress (2014-2018) and the planting progress in 2019 in 18 states.

Source: National Agricultural Statistics Service-USDA.

planting, especially if a residual herbicide was not applied in the spring. In some cases, weeds may be outside of the recommended height to achieve adequate control with a herbicide and tillage may be necessary. In conventionally-tilled fields, herbicides should be applied prior to tillage and planting.

- In fields where spring tillage was completed after initial fall tillage, soil conditions should be dry enough so that field operations do not result in soil compaction or a poor seedbed.
- If spring tillage was conducted but a planting was unable to be accomplished, shallow tillage is recommended prior to planting. Timing is based on the soil conditions being suitable and emerged weeds killed. In these situations, a stale seedbed weed management tactic can be used, where a tillage operation is completed earlier in the season and planting subsequently delayed. The earlier tillage stimulates weed seeds to germinate and when conditions are suitable a shallow tillage operation is performed immediately prior to

planting. This helps to prepare the seedbed and kill any germinating weeds in the tillage zone.

- Other tillage systems such as vertical tillage or strip tillage should be shallow. Vertical tillage may decrease the drying time by removing plant debris from over the row.
- In no-till systems, the impact of later plantings may be reduced when compared to more extensive tillage operations.[1]

Fertility Considerations

Because yield potential is usually reduced with later plantings, consider reducing the overall nitrogen (N) rate by 10%. University of Illinois recommends in situations where moisture has significantly delayed planting, 30 pounds of N per acre should be applied at planting or soon afterward, with the remainder applied in season.[3] Additionally, when planting in warmer soils have higher mineralization rates for providing N to the plant.

The challenge in determining the N application rate when planting is delayed by extended precipitation, is how much N has leached from either a fall or early spring application. If P and K were not applied in the spring, they can be delayed until fall as the warmer soil temperatures should not cause any cold temperature related deficiencies.[3] Another consideration is not including a starter fertilizer application because warmer soils should hasten emergence and reduce germination stress. Time may also be saved by not having to fill fertilizer tanks during planting.

Corn Product Characteristics and Plant Population Considerations

The recommended final plant population for a field does not need to be altered when planting is delayed. Fields with lower yield potential are usually planted to a lower plant population than fields with higher yield potential. For example, a lower yielding field final population target may be 26,000 plants per acre, while in a higher yield field it may be 36,000 plants per acre. Normally, farmers expect a corn emergence rate of about 90% when planting corn in the recommended time window. However, late planting into warmer soil and adequate moisture can lead to a 98% emergence rate. However, if the field conditions are not ideal for planting, consider increasing the seeding rate.[2]

Consider plant height when selecting a corn product for late planting. The stalk elongation phase, which starts at V6, is usually associated with warmer temperatures for later planted corn can lead to greater internode length compared to corn planted earlier. A tall hybrid with a higher ear placement will be even taller when planted later, which may result in a higher risk of lodging in the fall.[2]

What can be done to mitigate the risk of plant lodging in a taller corn product?

If switching to shorter stature corn product is not an option, consult with your seed provider about the recommended seeding rate range of the product and plant it at the lower end of the recommended range. At lower plant populations, the plant will not “stretch” to the same degree as it will at higher plant populations.

Pest Considerations

When an individual field in an area is planted later, it may silk and mature later than surrounding fields and should be scouted for corn rootworm beetles in August and September. Female corn rootworm beetles are attracted to fields that are silking and shedding pollen, so the later planted field may be very attractive to them when surrounding fields are more mature. Additionally, other silk feeders such as Japanese beetle may also be more numerous in the later planted field. European corn borer females are also attracted to fields with “green” silks and consequently, these fields are more at risk for the second generation of European corn borer.

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Relative Maturity

Many land-grant universities have developed recommendations for when to switch to lower relative maturity corn products when planting is greatly delayed. While full season corn products for the geography have the highest yield potential, a delayed planting increases the risk of a killing frost prior to the product reaching full maturity. Additionally, higher grain moisture in the fall may result in higher grain drying costs. A relatively new study conducted in Iowa in 2019, found that planting date contributed more to yield potential than relative maturity if the crop reached full maturity before a killing frost. This indicates that either a full season or short season corn hybrid can produce similar grain yields if they both mature prior to killing frost. Additionally, the results indicated that silking date was the best predicter of yield potential.[4]

Interestingly, the growing degree days (GDD) required to reach maturity is usually reduced when planting is delayed. For example, hybrids that are planted late can mature with fewer GDD than when planted earlier. Research from Indiana found that hybrids planted after May 1st can mature with about seven fewer GDD per day than when planted earlier. [5]

A useful tool to assist in estimating when a hybrid will reach full maturity for a specific location can be found at https://hprcc.unl.edu/agroclimate/gdd.php.

Why can corn hybrids planted later mature earlier than expected?[3]

Corn planted later experiences higher temperatures during early development. There are two main reasons why late planting might mature at a lower GDD accumulation then predicted. One is that the plant develops under higher temperatures, so the high-temperature "cutoff" of 86°F may be higher. Therefore, corn may grow at a faster rate at temperatures above 86°F. Additionally, root growth is reduced when planted late which may increase the stress associated with late season drought and heat, hastening the rate of development. However, late season conditions in September and October are usually shorter in daylength and lower in temperatures which are better conditions for grain fill.[3]

Upper Midwest (North Dakota, South Dakota, Northern Minnesota and Wisconsin)

Early to mid-season corn hybrids will likely out-perform late-season hybrids if planting is delayed beyond about May 15th. Research from South Dakota found that yield potential is reduced for plantings around May 20th for an early hybrid and May 5th for a full season product.[6] In Wisconsin, full season hybrids lost an average of 0.5 bushels per day for plantings around May 15th, but up to 2.5 bushels per day by June 1st.[7]

Central Corn Belt (Iowa, Northern and Central Illinois and Indiana)

In Iowa, a full season hybrid provided the highest yield potential until planting was delayed until June 1st.[8] In Northern Illinois, the recommended switch date is June 15th.

Eastern Corn Belt (Pennsylvania)

In Pennsylvania, the switch date for planting an earlier maturity hybrid is dependent on the maturity zones, with the switch date being late May for shorter season areas, mid-May for mid season areas, and late May for longer season areas.[9]

Southeastern US

An early maturing corn product is recommended when planting is delayed until June 10th to avoid the usual drought and heat stress that occurs in the first half of July. Planting any corn product after June 25th is not recommended as harvest can be severely delayed and freeze injury may occur.[10]

Additional Considerations

Consider the disease tolerance of the short season product if switching due to delayed planting. Short season products may not have similar disease tolerance when compared to a full season product, as some diseases such as gray leaf spot are not as common in the traditional area where the shorter season product is considered full season.

If planting is very delayed, like June 1st, ensure

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that the herbicide products used do not limit the next season crop choices because of plant back restrictions of the herbicide product.

Although the fuller season product may still reach physiological maturity when planted late, the amount of time to allow the grain to drydown may be limited. This may result in increased production costs for artificially drying the grain.[1] However, if the intended use is for silage or high moisture corn, then drying costs are not an issue. Generally, when two corn products have a difference of one day of relative maturity it will result in about a half a percentage point difference in grain moisture when planted on the same day.[11] Keep in mind that relative maturity ratings from various seed suppliers are not always comparable.

If corn planting is severely delayed, switching to soybeans or another alternative crop should be considered, particularly if corn planting coincides with crop insurance coverage cut off dates for corn.

Sources

[1] Lauer, J. 2019. Corn late-planting. University of Wisconsin Extension. http://corn.agronomy.wisc.edu/Management/L010.aspx.

[2] Nielsen, R. and Thomison, P. 2002. Late planted corn & seeding rates. Purdue University Extension. https://www.agry.purdue.edu/ext/corn/.

[3] Nafziger, E. 2019. Dealing with very late planting. University of Illinois Extension. https://farmdocdaily.illinois.edu/2019/06/dealing-with-very-late-planting.html.

[4] Baum, M, Archontoulis, S. and Licht, M. 2018. Planting date, hybrid maturity, and weather effects on maize yield and crop stage. Iowa State University. https://lib.dr.iastate.edu/.

[5] Nielsen, R. 2019. Hybrid maturity decisions for delayed planting. Purdue University Extension. https://www.agry.purdue.edu/ext/corn/news/timeless/HybridMaturityDelayedPlant.html.

[6] Kleinjan, J. 2020. Switching corn hybrid maturities. South Dakota State University Extension. https://extension.sdstate.edu/switching-corn-hybrid-maturities.

[7] Lauer, J. 2008. "Switch" date decisions for corn hybrids. University of Wisconsin Extension. http://corn.agronomy.wisc.edu/AA/A055.aspx.

[8] Licht, M. and Archontoulis, S. 2019. Late corn planting options. Iowa State University Extension. https://crops.extension.iastate.edu/cropnews/2019/05/late-corn-planting-options.

[9] Miller, D. 2019. Is it time to switch corn hybrid maturities? PennState Extension. https://extension.psu.edu/.

[10] Heiniger, R. 2018. Management for late planted corn. North Carolina State University Extension. https://corn.ces.ncsu.edu/corn-production-information/management-for-late-planted-corn/.

[11] Nielsen, R. 2018. Field drydown of mature corn grain. Purdue University Extension. https://www.agry.purdue.edu/ext/corn/news/timeless/GrainDrying.html.

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