



Corn Pollination During Wet Weather

Pollination has the greatest impact on corn yield potential.¹ Prolonged wet and cloudy conditions prior to silking and through the early reproductive growth stages can reduce pollination and yield potential. wet weather it is not the only stress that can cause pollination issues. Poor timing of pollen shed (anthesis) and silk emergence can also lead to reduced seed set. This is sometimes referred to as the 'nicking' period and requires the overlap of flower emergence with the presence of viable silks to ensure good pollination and kernel set. Another term used for flowering synchrony is the anthesis-silking interval, which is the time from pollen shedding to silk emergence.² More often pollination issues are associated with stress from elevated temperatures and/or drought. Insect pests that feed on silks and reduce silk length to less than ½ inch can cause incomplete pollination.

Normal Reproductive Corn Development

Normal pollen shed:

1. Pollen shed (flowering) begins around the VT growth stage or tassel emergence stage.
2. Pollen shed happens when the tassel and anthers are dry from rain, high humidity, or dew.
3. The male flowers that open first and start to shed pollen are near the mid-portion of the main tassel spike and then pollen shed proceeds upward, downward, and outward.
4. New pollen is produced every day that the tassel is dry and can continue over a 10 to 14-day period with a peak pollen drop around the third day.
5. 2 to 25 million pollen grains are produced by a fertile male corn plant.
6. 2,000 to 25,000 pollen grains are produced for each silk on an ear, it takes one viable pollen grain to land on a viable silk to reach down through the silk to pollenate an ovule on the ear.
7. Pollen shed is not a continuous process but usually takes place in the morning from 9:00 to 11:00 when temperatures are cooler.
8. Pollen shed can occur again during the afternoon if temperatures cool down.

9. Weather that is cooler, cloudy, or humid will delay pollen shed, and shedding will not occur during rainy conditions but will continue when conditions are favorable.
10. Corn pollen is not killed by rainfall.
11. Pollen shed and viability can be affected by environmental stress.

Normal ear development:

1. The first silks begin to emerge (R1 growth stage) from the base or butt of the ear.
2. One silk is attached to each ovule (potential kernel) that can develop into a kernel after pollination.
3. Silks often emerge within two to three days of first silking.
4. After silk emergence, the entire length of each silk is receptive to pollen and once a pollen grain lands on a silk, pollination occurs within 24 hours if the silk is still viable.
5. Silks can grow from 1 to 1.5 inches in length each day usually reaching a maximum growth rate on the third or fourth day.
6. Silks can continue to grow after the fourth day, but at a decreased rate until they die in about 10 days.^{1,3,4,5}

Corn Pollination During Wet Weather

Why Prolonged Wet Conditions Can Cause Production Problems

Consecutive days of persistent rainfall, showers, or even heavy dew that keep tassels wet for many hours per day over several days can delay or interfere with anther exertion and pollen shed. During prolonged cloudy wet conditions, the amount of photosynthetically active radiation (sunlight) is limited and if this growing environment continues long enough it can reduce corn yield potential.⁵ If stress from overcast weather continues long enough, the lack of photosynthate (sugars) from the leaves or mobilized from the stalks can lead to abortion of some of the fertilized ovules which may be confused with a pollination issue. Any stress that a plant goes through during the growing process should be considered a production concern. And when stress occurs during the pollination process there is reason for additional concern because this is the growth stage that the corn plant is most at risk for yield loss.

Prolonged saturated soils during the rapid growth stage and before and during pollination may lead to pollination problems. The root system of a corn plant needs oxygen in the soil for the root system to grow and function properly and water saturated soils have very little soil oxygen which restricts proper root development and function. Limited root development limits nutrient uptake and Nutrient stresses during the development of the reproductive structures impact yield potential. Ear shoots removed from stunted, waterlogged plants may be developmentally delayed relative to those from healthier plants.⁶ Nutrient deficiencies can also lead to growth delays (stunted plant height and delayed reproductive development), which can delay pollination. If these conditions last for an extended period, it can cause incomplete pollination (Figure 1). A common stress that can also cause pollination problems are high temperatures and moisture stress that can negatively affect pollination success. It is recognized that temperatures above 90 °F can cause pollen to be non-viable.²



Figure 1. Poor pollination, delayed silking and poor ear development caused by restricted roots.

Conclusion

Abnormal ear development (and ultimately yield potential) in corn is a complex response to interactions and are likely the result of a combination of events.³ When pollination concerns surround an extended wet pollination period it is important to understand that pollination can occur during any opportunity window anytime during that 14-day pollination period. Since moisture does not kill the pollen or silks, pollination can take place anytime the tassel is dry, pollen is released, and viable silks are present to allow the plant to complete pollination during that time frame. However, if that extended wet period continues, without a break, beyond the 14-day pollination window then there can be a very real concern that complete pollination may not occur and that can have a serious impact on grain yield potential.

Corn Pollination During Wet Weather

Sources

¹Licht, M. 2021. The birds and bees of corn pollination. Iowa State University Extension and Outreach. Integrated Crop Management. <https://crops.extension.iastate.edu/blog/mark-licht-zachary-clemens/birds-and-bees-corn-pollination>.

²Lindsey, A. 2020-2022. Corn pollination. Ohio State University Extension. Agronomic crop network. C.O.R.N. Newsletter. <https://agcrops.osu.edu/newsletter/corn-newsletter/2020-22/corn-pollination#:~:text=Both%20high%20temperatures%20and%20moisture,temperatures%20climb%20to%20these%20levels>.

³Ortez, O.A., McMechan, A.J., Hoegemeyer, T., Ciampitti, I.A., Nielsen, R., Thomison, P.R., and Elmore, R.W. 2022. Abnormal ear development in corn: A review. Agronomy Journal. <https://acsess.onlinelibrary.wiley.com/doi/10.1002/agj2.20986>.

⁴Nielsen, R.L. 2020 Kernel Set Scuttlebutt. Agronomy Department. Purdue University. <https://www.agry.purdue.edu/ext/corn/news/timeless/kernelset.html>.

⁵Taylor, R. 2013. Corn pollination and the weather of 2013. Weekly corn update. University of Delaware. <HTTPS://SITES.UDEL.EDU/WEEKLYCROPUPDATE/?P=6169>.

⁶Nielsen, R.L. 2015. Waterlogged Corn: A Tale of Two Ears. Agronomy Department. Purdue University http://www.kingcorn.org/news/articles_15/TwoEars_0715.html.

Web sources verified 05/30/23.

Legal Statement

Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

Bayer and Bayer Cross are registered trademarks of Bayer Group. All other trademarks are the property of their respective owners. ©2023 Bayer Group. All rights reserved. 1214_245360

