

## Timing of Pollen Shed in Corn

### Key Findings:

- Peak pollen shed resulting in peak kernel set occurs mid-morning after the dew dries and decreases as the day progresses.
- Pollen grains mature throughout the day and night and are released as anthers dehisce to open pores.
- If anthers are dry, anther pores open shortly after pollen grains mature.
- If anthers are moist, mature pollen grains are stored in anthers until anthers dry and dehisce.

### Pollen Shed in Corn

- Pollen shed in corn occurs over a period of multiple days but varies over the course of a day.
- Observations over the years indicate that pollen shed typically starts after the dew evaporates, peaks during mid-morning, and tapers as the day progresses. (Nielsen, 2018).
- A field study was conducted in 2021 to observe how the intensity of pollen shed changes throughout the day by observing kernel set.

### Study Description

- Ears in a field of Pioneer® P1082AM™ (AM, LL, RR2) brand corn were covered prior to the beginning of silk emergence.
- Silks of selected ears were exposed to pollen for a short time and then re-covered after this brief period of exposure.
- Intervals of exposure were from 7 to 10 a.m., 10 a.m. to 1 p.m., 1 to 4 p.m., 4 to 7 p.m., or from 7 p.m. to 7 a.m. the following morning.
- This study was conducted for four consecutive days – July 16, 17, 18, and 19, which were the second, third, fourth, and fifth days after the field was at 50% silk, and the first, second, third, and fourth days after the field was at 50% anthesis.
- Selected ears were harvested at maturity and kernel counts per ear were collected. There were six replications of each treatment timing for each day.

### Field Conditions and Observations

- The study field was under very little stress during pollination. The field received two inches of rain two days before pollen shed started.

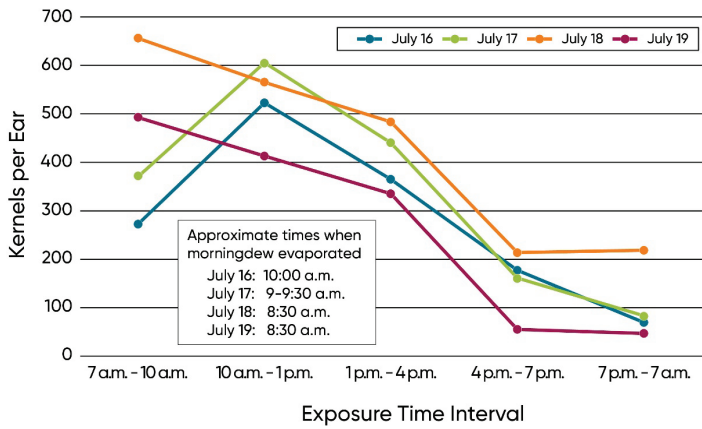


Figure 1. Corn tassel showing open anther pores.

- During the first week of pollination, skies were sunny and daily highs were in the mid- to high-80s (°F).
- The dew evaporated at approximately 10:00 a.m. on July 16, 9:30 a.m. on July 17, and at 8:30 a.m. on July 18 and 19.
- Pollen shed appeared to be heavy and silks were growing rapidly during the first two days of this study.
- Pollen shed appeared to be less intense on the third day.
- On the fourth day, pollen shed appeared to be less than that of the previous day and the rate of silk growth also decreased.

### Results

- Kernel set per ear varied dramatically based on timing of silk exposure to pollen (Figure 2).
- Peak times for pollen shed and subsequent kernel set occurred shortly after the dew dried in the morning.
- On July 16 and 17, the dew dried at or near the end of the 7-10 a.m. exposure window. Maximum kernel set on these two days occurred with silk exposure between 10 a.m. and 1 p.m.
- On July 18 and 19, the dew dried well within the 7-10 a.m. exposure window. On these two days, maximum kernel set occurred with silk exposure between 7 and 10 a.m.



**Figure 2.** Kernels set per ear with silk exposure to pollination at different times of day.

- For all four days, peak kernel set occurred shortly after the dew dried and decreased throughout the day (Figure 3).
- Total kernel set by day was consistent with perceived pollen densities in the field. Pollen densities appeared to be heavy during July 16 and 17, started to decline on July 18, and were substantially lower on July 19.
- Total kernel set with silk exposure on July 16, 17, and 18 was good, while kernel set with silk exposure on July 19 was reduced.
- According to Nielsen (2018), maximum pollen shed occurs on the second day of tassel shed and progressively decreases daily as the tassel completes its pollination life cycle.
- These field results for kernel set are consistent with the pollen shed information published by Nielsen (2018).
- For all four days, little kernel set occurred when silks were exposed during the 7 p.m. to 7 a.m. time interval. It could be that pollination occurred during the evening hours before the nighttime dew settled. No observations were recorded for when the nighttime dew appeared.



**Figure 3.** Representative ears showing the results of silk exposure to pollen at specific time intervals.





## Conclusions

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- Pollen release from anthers requires two events. First, pollen grains mature inside anthers. Secondly, pores of anthers open to release pollen.
- If anthers are dry, anthers open very shortly after pollen grains mature. Results of this study suggest that pollen grains mature inside anthers throughout the day and night.
- Successful kernel set throughout the day suggests anthers release pollen throughout the day because pores open shortly after pollen grains mature.
- Although pollen grains continue to mature during the night, few pollen grains are released during the night because nighttime dew keeps anthers too moist to open.
- Moist anthers retain pollen until the morning dew evaporates and then release newly matured pollen as well as stored mature pollen.
- Release of these stored pollen grains creates the opportunity for maximum pollen shed during the morning after the dew has dried.
- This sequence also explains why anthers do not shed pollen on rainy days or on days with high humidity but will shed a relative abundance of pollen on the next dry day or when anthers have the opportunity to dry.

## Acknowledgement

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## Reference

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Nielsen, R.L. 2020. Tassel Emergence & Pollen Shed. Corny News Network. Purdue University. <https://www.agry.purdue.edu/ext/corn/news/timeless/Tassels.html>

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