Effect of Heat on Corn Pollination

- Long stretches of days with hot temperatures can affect pollination of some fields.
- Hot temperatures can reduce viability, production, and release of pollen grains.
- Silks can desiccate under extreme high temperatures before they receive pollen.
- Timing of hot temperatures, silking, and pollination play a role in how heat affects the pollination process.

High Temperature Versus Drought Stress

High-temperature damage to corn typically coincides with drought stress. It is difficult to separate the effects of drought and heat stress. However, high temperatures alone are not believed to severely stress corn pollination when there is adequate soil moisture.1

Effects of Heat on Pollen Shed

An individual tassel can shed pollen for a week with peak shed occurring on the second or third day.2 Hot temperatures along with dry weather can hasten pollen shed. Each tassel produces millions of pollen grains providing adequate pollen in most conditions.2,3 Pollen production may be reduced by continuous hot weather occurring a few days before and during pollination as photosynthesis may not be efficient and carbohydrate production can be reduced.4

Pollen shed from anthers is called dehiscence and occurs when there is a drop in humidity as temperatures begin to rise.4 Typically, pollen shed begins in the early to mid-morning when temperatures are not as extreme with a second ‘flush’ of pollen shed sometimes occurring in the later afternoon with cooler temperatures. Humidity and temperature conditions can affect dehiscence, and a decrease in pollen shed has been reported when temperatures are greater than 86° F.2

Until all anthers have shed pollen from the tassel, new pollen continues to mature from anthers. Pollen grains have a thin outer membrane and remain viable for 18 to 24 hours in favorable conditions.3 Viability is reduced to a couple hours or less in extreme heat.4 Temperatures of 100° F or greater cause extreme heat stress that can sometimes desiccate pollen before it can successfully fertilize an ovule or kernel.2 High temperatures can also reduce viability before pollen grains are shed by anthers.4

Effects of Heat on Silking

Exposed corn silks can desiccate prematurely when humidity is low and temperatures exceed 95° F.1 Silks generally emerge at a rate of 1 to 1.5 inches a day and continue until fertilized. High temperatures do not significantly affect the rate of silk elongation.1 Consistent and timely silking is needed to allow for a viable silk and pollen grain to unite. Silks that become less receptive to pollen and senesce before pollen shed can lead to ears with reduced kernel set.

Summary

Kernel set can be irregular on ears when pollen shed and silk elongation are not synchronized. This is more common when moisture stress accompanies heat stress. Pollination can be successful during stretches of high temperatures if adequate moisture is supplied to the plant. Additional conditions that facilitate successful pollination include cooler nighttime temperatures, healthy soil structure, and corn products with close timing between mid-pollen shed and mid-silking date.

Sources:
3 Thomison, P. Corn pollination—an overview. The Ohio State University. AGF-128-95.

For additional agronomic information, please contact your local seed representative.

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Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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