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More Heat Stress – Effects on Soybeans

I tried to shoo away this heat dome by writing *last* week about heat/drought stress in corn. It didn't work, so I'm trying again *this* week, focusing on soybeans.

We're well aware of how soybeans flip leaves over to reduce transpiration, then curl or clamp completely to conserve moisture, both of which reduce growth and productivity – but allow the plant to survive. If things get even more severe, leaves may drop, but there are a lot of things going on we may *not* see as well.

For starters, very high soil temperatures (90 degrees F and above) can decrease nodulation and nitrogen fixation. This is typically more of an issue in fields without adequate canopy coverage, but even under grass cover at our some of our Mesonet stations (<https://mesonet.k-state.edu/agriculture/soiltemp/>), soil temperatures are approaching and even exceeding this threshold. Well-nodulated soybeans need seven to 14 functioning nodules on the tap root at flowering for best results.

Because a soybean might abort flowers to the tune of 20-80 percent (depending on stress...), we often don't notice day to day flower losses that may be occurring – until the stress sticks around for a while. Flower production can occur for more than a month, so as long as decent conditions return before too long, flowering continues and pods are set (temperatures above 95 degrees F have been shown to significantly reduce pod set...). Keep in mind as well, older pods will have priority for resources. When that prioritization takes place, you may see *some* increase in seeds per pod to compensate for the loss of other flowers and small pods. If drought/heat stress is intense, blooming/pod setting periods could be shortened and yields compromised. With any luck, this weather will subside sooner than later with soybeans able to produce new flowers and pods up to the beginning seed stage.

What if it doesn't subside or we see this again later this summer? Losses can occur during beginning seed swell through full seed on any pod on the plant as well, with reductions in pods per plant that can't be replaced by new blossoms and pods. With any luck, we won't have to worry about it. The Climate Prediction Center forecasts (<https://www.cpc.ncep.noaa.gov/products/predictions/814day/>) actually make the 8-14 day forecast look a little better. Let's hope that holds true.