Crop Weather
Rainfall, temperatures, degree-days and other current and historical weather data for a spot about two miles west of Lamberton, MN can be found at the University of Minnesota Southwest Research and Outreach Center (SWROC) website: http://swroc.cfans.umn.edu/WeatherInformation/index.htm.

As of August 5th, we were at 1547 degree-days (Base 50/86 °F). The long-term average is 1660 DDs for this date. The cool weather slowed accumulations. We picked up 106 degree-days and 0.49 inches of rain the week of July 30- August 5. Some nearby areas received higher rainfall amounts but every little bit helps in the dry areas like Lamberton. Soil moisture readings for August 1st are available at the above web address. They are below average but there is still moisture, mainly below the 24 inch depth. Soybeans could use some warmer temperatures.

Early planted corn is pollinated but still in blister (R2). Pollination went well in most cases. Early planted short season (1.4) soybeans are at beginning seed (R5).

How dry is dry, how wet is wet?
Rainfall has obvious importance in crop production and the effects of drought or drowning are obvious. Prolonged leaf wetness favors infections by fungal and bacterial pathogens of susceptible crops- insects and mites too.

At the scale of microbes, you don’t have to have rain to have a wet leaf. Within the canopy, 100% leaf wetness or free water can occur with high humidity or dew.
A single rainfall event will not stop an insect or mite outbreak with fungal disease; it takes a prolonged wet period. The two-spotted spider mite problems or 2012 collapsed from fungal disease during a drought. Cool mornings with lingering dew triggered a disease outbreak.

Soybean growth staging always cause questions. Here is a refresher on soybean pod and seed stages and how stress at these stages (including insects and mites) affects soybean yield:

### Soybean stages and yield

**R3.0**  
Beginning pod – A pod 3/16 inch long at one of the upper 4 main stem nodes with a *fully developed leaf*.  
*The R3 stage averages 9 days (5-15)*

**R4.0**  
Full pod - A pod ¾ inch long at one of the upper 4 main stem nodes with a *fully developed leaf*  
Beginning of critical yield developing period and sensitivity to stress  
Stress likely to cause pod abortion and reduces pod number  
*The R4 stage averages 9 days (4-26).*

**R4.5**  
Terminal cluster of flowers opens  
End of node production on main stem  
Flowering on main stem ends, branch nodes and flowers until 5.5

**R5.0**  
Beginning seed - A ⅛ inch seed is visible in a pod at one of the upper 4 main stem nodes with a *fully developed leaf*.  
Most nutrient uptake occurs  
Stress reduces pod number and seed number/pod  
*The R5 stage averages 15 days (11-10)*

**R5.5**  
Seeds fill ½ of the pod cavity at one of the upper 4 main stem nodes with a *fully developed leaf*  
N fixation declines  
Maximum vegetative development (nodes, height, leaf area)  
Start of rapid dry matter accumulation in seed.

**R6.0**  
Full seed - Seeds touch and fill the pod cavity at one of the upper 4 main stem nodes with a *fully developed leaf*  
End of leaf dry weight and nutrient accumulation  
Lower leaf senescence begins  
Pod abortion is now less likely. Stress reduces seed size  
*The R6 stage averages 18 days (9-30)*
Soybean aphids
Predators are still holding aphid numbers down in many fields. Multi-colored Asiatic lady beetles are more abundant. Aphids are able to reproduce more quickly in cool weather than many predators.

In other fields, populations continue to build. The usual areas (fields near wooded areas, smaller fields) are starting to reach levels that are likely to provide an economic return, the 250 aphid/plant economic threshold. Aphid populations less than this often collapse before economic injury (economic injury level/gain threshold) or even detectable injury (damage boundary) occurs. Once a population increases to 250 aphids/plant, an increase to injurious levels is more likely.

Geographic pockets of spotty, higher aphid populations are present in many parts of Minnesota but not all fields in these areas, near economic threshold. At the SWROC, populations are building but very spotty. We have some small pockets averaging 250 aphids/plant but no fields or experiments have reached economic threshold. We may treat a few fields and experiments by early next week...it depends on the aphid populations.

Why aren't aphid populations more uniform this year?
Soybean growth stage may be involved. Weather resulted in soybean planting that was neither timely nor orderly this spring. Later planted (including replants) or full season soybeans are now more attractive to winged aphids. Aphid populations can increase quite rapidly on early R6 stage soybeans and I suspect this may happen in some poorly scouted fields where the economic threshold is missed in R5.

Soybean genetics is a factor. Even before specific resistance genes were incorporated into soybeans some varieties seemed to have fewer aphids.

Seed applied insecticides or early insurance foliar insecticides may have delayed the onset of economic threshold in some fields. By delaying colonization and limiting natural enemies, seed applied insecticides may now be delaying vacations as they make late season aphid populations bit less predictable.

Plant nutrition may be a factor. Soybean aphids feed on phloem sap. This sap reflects biochemical processes within the plant as well as water and nutrient uptake. Where aphid populations are unexpectedly low (I'm an optimist), it may be worthwhile to look for problems in plant water and nutrient uptake. Winged aphids usually leave drought stressed soybeans. Look for potential SCN, root disease and stem disease problems that would impact water and nutrient movement. How about the soil fertility program compared to that in fields with more or fewer aphids? It makes sense that an insect with piercing/sucking mouthparts could be telling you your soybeans suck...doesn't it?

As we reach the middle of August, aphids may be triggered to move to buckthorn. A cold night may be all it takes to start the process. Look for wing pads on the nymphs.

Areas with more rainfall and heavy dews could see aphid numbers decline quickly from fungal disease. I hope so. The most common fungus attacking soybean aphids, *Pandora sp.*, does better at lower temperatures. The recent hail to the north was not good for aphids or soybeans there.

**Twospotted spider mites** – Watch for mites in dryer areas. The cool weather has slowed populations. Avoiding the removal of predators of spider mites is another reason to be conservative spraying aphids. Jason Fussy reports finding mites near Willmar area and they are starting to show up along dry field edges near Lamberton. Some rain and dew would fix things.

**Common Corn Rust**
Despite a lack of rain, we had some unusually pronounced symptoms of *Puccinia sorghi* at the SWROC. The chlorosis around the pustules on some hybrids is a bit unusual. You may be able to make out the extensive spore production on the photo.
Common rust occurs every year and is more prevalent during cool periods and late season. Most hybrids should have adequate resistance.

There are no clear-cut guidelines for treating common rust on field corn. If you wanted to experiment on a heavily infected field, you could try strips of a strobilurin or strobilurin + triazole fungicide. Weigh your options; you may be increasing your chances for aphid or spider mite problems. Adding an insurance insecticide can make things worse.

Yellow beans
We have had more iron deficiency chlorosis (IDC) than typical this year.

Yellow leaves with green veins on the upper part of the plant are IDC symptoms. Symptoms have lessened but are still visible in some fields. IDC is usually confined to the rims of low spots in Southwest MN. The possibility of soybean cyst nematode (SCN) associated with these areas was mentioned in an earlier issue. SCN can cause iron deficiency symptoms on higher pH soils.

Additional symptoms are showing up now. Rob Hauger mentioned soybeans in non-IDC areas showing yellow tops. This may be the result of temporary nitrogen or sulfur deficiency from rapid growth spurt but...

SCN should be one of the first suspects when yellow soybeans appear in August. It is likely that these symptoms are top die back. The fungus Diaporthae (Phomopsis imperfect stage) is usually cultured from plants with these symptoms. The tops of the plant eventually turn brown and die. I don’t think I have seen this disease without some SCN on the roots.

Potassium deficiency symptoms (right) are also showing up. Chlorosis of leaf margins is...
usually related to potassium but not just soil fertility levels.

Suspect low soil levels and poor nutrient uptake when symptoms occur on the whole plant. Suspect SCN, soybean aphids or clover mealybugs if the symptoms are on the top only. You are most likely to see these symptoms on lower pH and lower K testing soils.

Watch for symptoms of brown stem rot (below right) and sudden death syndrome or SDS (below left) as soybeans progress toward the R6 stage. Brown stem rot foliar symptoms are not as good an indicator of disease as areas of brown stem pith.

Both of these diseases are often associated with SCN.

Happy trails,

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