Twospotted Spider Mites Emerge in Some Dry Areas of the State

Hot, dry weather and twospotted spider mites go together. Reports of spotty infestations are beginning to surface in some areas of the state. Robert Bellm, crop systems educator in the Edwardsville Extension Center, reported on August 9 that twospotted spider mites could be found in several southwestern Illinois counties, including Clinton, Jersey, Montgomery, and Washington. Robert indicated that soybean plants along field edges were most severely infested (see photo on p. 134), particularly where the ditch banks had been mowed or sprayed for weeds. His description matches the typical scenario, in which spider mites begin moving toward greener and more succulent plants, such as border row soybeans. As hot and dry conditions persist in some areas of the state, the mites could become an increasing problem. Producers are encouraged to watch this potential development closely and make sure they scout fields, especially border rows, for this pest.

Spider mites have piercing and sucking mouthparts that they insert directly into leaf cells and use to remove fluid. As mite injury intensifies, small discolored spots (yellow or white stippling) become apparent (see photo on p. 134). Stipples may appear on both sides of leaves, but they are most noticeable on the undersurface. Damage to soybean plants is caused by the reduction in chlorophyll within leaf tissues, resulting in reduced photosynthetic efficiency. Soybean plants that are severely damaged become bronzed, and the leaves fall prematurely from the plants. During outbreak years, such as 1988, yield reductions of 40% to 60% are common in many Illinois fields.

All life stages of twospotted spider mites may be found on soybean plants—eggs, one six-legged larval stage, two eight-legged nymphal stages, and adults. The speed of development is temperature-dependent, and generations may be completed in a range of 4 to 14 days. Although mites cannot fly, they are quite efficient at dispersal, moving to leaf tips on crowded plants from which they are easily blown to other plants in the field or to adjacent fields.

The suggested economic threshold for twospotted spider mites is to consider a rescue treatment when 20% to 25% of plants are discolored before pod set or when 10% to 15% discoloration is observed after pod set. Border row treatments also should be considered in lieu of treating entire fields. Harvest restrictions will need to be adhered to if rescue treatments become necessary. For Lorsban 4E, a treatment should not be made to soybeans within 28 days before harvest. Dimethoate has a 21-day harvest interval. These are the primary insecticides that have been used to limit spider mite injury in previous outbreak years. Before using either of these products, growers should consult the labels and follow all pertinent label instructions.
If you find spider mites becoming more of a problem in your area, please share your observations and I’ll pass the information on to other readers.—Mike Gray

### Plant Diseases

**Charcoal Rot Appearing on Soybean in Dry Areas of Southern Illinois**

Symptoms of charcoal rot, caused by the soilborne fungus *Macrophomina phaseolina*, are beginning to appear in dry areas of southern Illinois. Symptoms in affected fields appear as individual plants or patches of wilted and dead plants (see photo below). In affected plants, gray to black “specks” will be apparent on the lower stem when the epidermis is shaved off with a knife (see photo on p. 135). These “specks” are the survival structures of *Macrophomina* known as microsclerotia. Charcoal rot thrives in hot and dry weather, and it may exist in other areas of the state where these conditions prevail.

Management of charcoal rot requires an integrated approach. Although no soybean varieties have complete resistance to the disease, varieties can differ in their

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Twospotted spider mite injury to border row soybean plants near the border of Clinton and Washington Counties, August 9. (Photo courtesy of Robert Bellm.)

Twospotted spider mites and stippling on soybean leaf. (Photo courtesy of Robert Bellm.)

Wilted soybean plants affected by charcoal rot.
Dark specks (microsclerotia) can be observed inside the lower stems of soybean plants affected by charcoal rot.

levels of susceptibility. *Macrophomina* has a wide host range, which includes corn, sorghum, and sunflower, so crop rotation alone may not provide complete management. Practices that reduce drought stress may help, including avoiding high seeding rates and using conservation tillage practices that conserve soil moisture. Foliar and seed treatment fungicides do not provide protection against charcoal rot.—*Carl A. Bradley*

**Crop Development**

**Good Root Systems May Prove Important As Soybean Seeds Fill in The Heat**

Temperatures have remained high over the last few weeks, and in a few areas, dry soil conditions are a concern. Illinois temperatures have been 2 to 4 °F above normal daily averages over the last 30 days, and 3 to 7 °F above over

the past 7 days. The southern region has been the farthest above normal and has been the driest. Over the last 30 days Illinois has ranged drastically in rainfall; areas in the north and west are 3 to 7 inches above normal, and areas in the central, east, and south are normal to 2 inches below normal (*Figure 1*). Unfortunately, the areas rated above normal received much of their precipitation from heavy rainfall events that also caused late-season flooding damage.

The last week has been starting to put us on the drier-than-normal side, with little rain in the near-future forecasts.

For the most part, however, soybeans look pretty good, with few visual signs of drought stress so far across much of the state. Some fields have plants that are curling leaves in the heat of the day to conserve water, and many fields could use rain due to the critical yield-setting growth stages currently developing. August rainfall is always a primary factor in yield-determining models, and this year will be no exception. The August 8 USDA report has soybeans 94% blooming and 71% setting pods, numbers that are ahead of the 5-year averages by 4% and 5%, respectively. In our trials, fields planted in mid-June are approaching R4 or full pod, when pods are 3/4 inch long at one of the upper four nodes. The earlier-planted fields (April to Mid-May) are approaching R6, or full seed, when a pod on one of the upper four nodes has its cavities filled with seed. A pod from one of the upper four nodes from a May 5 planting in Champaign has seed cavities 50% to 70% full (see photo on p. 136).

The great majority of acres in the state are somewhere between full pod and full seed, so seed fill is occurring rapidly. The entire R5 growth period of beginning seed to full seed is a very critical time for avoiding plant stresses. Under limited heat and drought stress, the total crop growth rate, and thus the total plant dry weight accumulation, remains high.
Soybean pod with seed partially filling the seed cavity; from an upper node of a May 5 planting near Champaign.

The demand for water for evapotranspiration to move nutrients (N, P, and K) is thus also very high during these seed development stages. Throughout R5, the nutritional need of the plant to fill seeds is acquired roughly half from soil uptake and half from plant redistribution. This ratio favors soil uptake earlier in R5 and shifts slowly to plant redistribution later in R5. Because nutrient uptake from the soil is so critical and water demand remains high, root health may be crucial in determining yield in drier areas.

As you scout for the variety of diseases and insects that we have received reports about, pay attention to root health by digging roots in areas that show more or fewer drought stresses. A strong root system should have good depth from a relatively straight taproot, good secondary branching with plenty of active nodules (pink inside when split), and minimal or no signs of soybean nematode cysts (see photo on p. 137).—Vince M. Davis

Figure 1. Departures in 2010 from normal precipitation for July 11 (left) to August 9 and August 1 to August 9. Maps generated by the Illinois State Climate Office, Illinois State Water Survey, University of Illinois at Urbana-Champaign.

Corn to the Finish Line: Racing or Collapsing?

The development of the Illinois corn crop continues on its very rapid pace, with 78% in dough stage by August 8, about the same percentage as by this date in 2004 and 2007. In 2010, 29% of the crop was in the dent stage by August 8, compared with 31% in 2004 and only 14% in 2007.

The acreage of the corn crop rated as good or excellent (G–E) is currently at 64%, about where it’s been for most of this season. This contrasts with 74% rated G–E by this date in 2007 and 83% in 2004. A major contrast between those two earlier years was temperature: in 2004, the first week of August had temperatures 4 to 5 °F below normal, while in 2007, the same week had temperatures 8 to 10 °F above normal. This year, the first week of August was 3 to 4 °F above normal.

The 2009 and 2010 growing seasons represent two extremes in terms of temperatures and growing degree-day accumulations since planting. Planting was a full month earlier in 2010 than
Healthy root system with a good straight taproot, secondary roots and nodulation, and a few soybean nematode cysts; dug from a May 5 planting near Champaign.

in 2009, and GDD accumulations since planting are running as much as four to five weeks ahead of accumulations after planting in 2009. As an example, corn planted this year on April 15 (close to the median planting date) at Urbana has already accumulated more than 2,400 GDD. In 2009, corn planted here on May 20 (about the median planting date in 2009) had not yet reached 1,800 GDD by August 10, and it was September 12 before it reached 2,400 GDD.

Soil moisture ratings currently show 74% of fields with adequate-to-surplus topsoil moisture. This number was 80% in 2004 and only 43% in 2007. As is usually the case, some parts of the state, especially parts of central, eastern and southeastern Illinois, are dry or very dry, while other parts, mostly in the west and northwest, have had too much rain. Rainfall patterns have been close to ideal in some places. The effects of rainfall during the remainder of the season this year will be less than we would normally estimate during mid-August, only because the crop is so far along that water isn’t going to be a serious limitation if it hasn’t been limiting up till now. Exceptions to this are in replanted or late-planted fields, where more rainfall will be needed to finish out the crop.

Many people worry that the continued (and continuing) high temperatures have been hard on the crop and that we cannot expect it to yield as much as it might have with average or below-average temperatures in August. I would concur with that concern, not so much because the crop is filling grain poorly this year, but because it tends to continue filling for a longer period when temperatures are lower, in some cases producing the “bonus fill” that results in larger-than-normal kernels in years like 2004 and 2009. We can’t accurately forecast final kernel size, but it might be closer to the 85,000 to 90,000 kernels per bushel that we consider normal, and not the 70,000 to 80,000 that we can see under unusually favorable conditions during late grainfill.

Another widely reported issue this year is “tip-back,” which refers to abortion of some kernels on the tip of the ear. Conditions during and after pollination were generally favorable this year, and it’s not clear that kernel number per ear (or per acre) is lower than normal. But we have a tendency to view aborted tip kernels as lost yield potential. In some cases, when conditions after pollination are unfavorable and we end up with only 300 to 400 kernels per ear, this view may be accurate; the crop can usually fill more kernels than this unless filling conditions deteriorate. But if tip-back takes kernel counts down from 700 to 600 per ear (in fields with around 30,000 ears per acre), it’s quite possible that kernel size will increase a little as a result, and there may be little or no loss in yield.

Rapid development and early maturity will be among the more memorable aspects of the 2010 corn crop. In our planting date trial at Urbana, corn planted on April 5, April 21, May 10, and May 28 had by August 10 accumulated about 2,575, 2,400, 2,200, and 1,920 GDD, respectively. At current accumulation rates of about 28 GDD per day, a hybrid that needs 2,750 to mature needs only about 6 more days to reach black layer, and the same hybrid planted on May 10 needs about 20 more days to reach maturity. These projections generally seem to track with what we’re seeing in the field.

When the crop reaches maturity as early as it will this year, warm temperatures help it to dry-down rapidly; under normal temperatures in early September, we can expect field drying rates to approach 1 point per day if the weather is sunny and there is some breeze. Grain moisture at black layer (maturity) tends to be a little lower when maturity is reached during warm weather, and so should be in the low 30s this year. It’s thus no stretch to guess that we will have harvest well underway in some areas by the end of August or early September.

Remember that as grain dries below 20% moisture, harvest loss (shelling at the corn head) increases. As rapidly as
we expect dry-down to take place, it may be difficult to get most of the crop harvested before moistures drop below the 18% to 22% that usually represents the best balance between low drying costs and increasing harvest losses. Drying with unheated air typically works much better in early September than later, and some may want to consider starting to harvest in the mid-20s in order to decrease the number of acres harvested at moisures below 16%. If that’s the plan, be sure to start monitoring the crop as soon as it reaches black layer, which is approximately when the husks lose all green color. It’s easy to underestimate drying rates and to be surprised at how dry the grain is if you wait the normal few weeks after maturity before checking it.

Though early planting and rapid development of the Illinois corn crop have helped it in general this year, 2010 has not been without its challenges. Loss of nitrogen and damage to root systems are both common in the large part of the state that received too much rain in May and June (and, in places, July). Those who have flown over fields generally report lots of problems, including places without corn plants. In general, how late into grain-filling the canopy stayed healthy and green will be very closely tied to final yields in 2010.

Many people feel that the high temperatures, which we commonly hear reported as the “heat index” (which dramatizes temperature by combining it with humidity into a “human misery” measurement) have been harmful. In reality, while high night temperatures are a negative factor, daytime temperatures in the 90s have not done much harm in areas where soil moisture has stayed adequate. Corn plants do not suffer from high humidity like we do, except indirectly: high humidity means higher night temperatures, and leaves may stay wet longer in the morning, which can increase disease development. Some insects also like higher humidity.

The first “objective” estimate of yield is being released by the USDA this week (on August 12). Compared to last year, it should have been much easier this year to count actual kernels, since the crop is so much farther along. One issue will be the many areas in some fields with missing or damaged plants, where yields would be estimated at or close to zero. To make estimates in your own fields, you can either include low-yielding areas or just estimate how much of a field is badly damaged and estimate yields only from the better areas, reducing the harvested area. (This is for “home use” only—all acres in harvested fields get counted for official purposes.)

Estimate kernel number in 1/1,000 of an acre by counting ears in that distance (17 feet, 5 inches for 30-inch rows) and multiplying ear count by the average number of kernels per ear, counted on three or four ears. Divide that number by 90 if you expect kernel size to be only average, or maybe by 80 if you expect kernel sizes to be a little larger. As an example, if there are 29 ears that average 580 kernels per ear, that’s 16,820 kernels, which at 90 (thousand) kernels per bushel would be 187 bushels per acre. Of course, this year many of us can wait a few more weeks and harvest the field, which will give us real, not estimated, yields. We hope most of the surprises will be on the positive side. — Emerson Nafziger

Regional Reports

Extension center educators, unit educators, and unit assistants in northern, west-central, east-central, and southern Illinois prepare regional reports to provide more localized insight into pest situations and crop conditions in Illinois. The reports will keep you up to date on situations in field and forage crops as they develop throughout the season. The regions have been defined broadly to include the agricultural statistics districts as designated by the Illinois Agricultural Statistics Service, with slight modifications:

- North (Northwest and Northeast districts, plus Stark and Marshall counties)
- West-central (West and West Southwest districts, and Peoria, Woodford, Tazewell, Mason, Menard, and Logan counties from the Central district)
- East-central (East and East Southeast districts [except Marion, Clay, Richland, and Lawrence counties], McLean, DeWitt, and Macon counties from the Central district)
- South (Southwest and Southeast districts, and Marion, Clay, Richland, and Lawrence counties from the East Southeast district)

We hope these reports will provide additional benefits for staying current as the season progresses.

Northern Illinois

A majority of the northern region has received 1 to 1.5 inches of rain or more since August 3, with a report of 3.8 inches at the Northern Illinois Agronomy Research Center near DeKalb. According to the Illinois State Water Survey WARM database, from April 20 to August 10, 2,104 growing degree days have accumulated at Freeport and 2,020 at DeKalb. Accumulated GDDs are above the 11-year average by 236 at Freeport and 136 at DeKalb. The recent hot and humid conditions are not ideal for the crops, but soil moisture has been adequate in most areas.

A few observations of sudden death syndrome and white mold in soybeans have been reported, but the conditions are not widespread at this time. Some producers continue to treat for potato leafhoppers in alfalfa.

Southern Illinois

Continued high nighttime temperatures and lack of rainfall are beginning to take their toll on potential corn yield, with kernel abortion at the ear tips being the most obvious symptom. Even so, the crop appears to be holding up well throughout most of the region. Given relatively early planting dates and high temperatures throughout most of the summer, harvest will begin much sooner than we’ve experienced the past two years.
Soybean development, other than double-crop fields, is at R5 (pod fill), and flowering is nearly complete. Few foliar diseases are apparent so far, though some SDS can be found along the northern edge of the region. Spider mite damage can be observed along field edges in drier areas, especially where waterways and roadside grasses have been mowed.

Growers are beginning to ask about seed wheat availability and quality, indicating a renewed interest in the crop for this fall.

**West-Central Illinois**

Rainfall up to 3 inches caused some localized flooding the evening of August 10, but most areas received little or no rain. High winds associated with the storm caused some minor lodging of corn. April-planted corn has dented and the milk line is 1/3 to 1/2 down the kernel. With temperatures forecasted to remain above normal, black line won’t be too far into the future. Diplodia ear rot can be seen to varying degrees in some fields. Many fields also have quite a few ear tips nosed back. Apparently the lack of a good root system coupled with the hot temperatures, disease pressure, and cloudy days have caused a little higher level of kernel abortion.

Soybean development ranges from vegetative to R5. SDS has been seen in some April- and May-planted fields. Other diseases present include frogeye leaf spot, septoria, and bacterial diseases.

**Contributing Authors**

Carl A. Bradley, carlbrad@illinois.edu, 217-244-7415

Vince M. Davis, davisv@illinois.edu, 217-244-7497

Mike Gray, megray@illinois.edu, 217-333-6652

Emerson Nafziger, ednaf@illinois.edu, 217-333-4424