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Editor: Albert Tenuta - Plant Pathologist (519) 674-1617
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Let the Scouting Begin – Soybean Aphids are Here

Tracey Baute, Field Crop Entomologist, OMAFRA, Ridgetown

My gratitude goes to David Townsend of Syngenta Seeds for notifying me as soon as they started to see soybean aphids in their field plots in Arva, Ontario. To our surprise the aphids were already on every plant in the plots, and were reaching pretty high numbers for this time of year. OMAFRA staff quickly co-ordinated a scouting survey across southern and eastern Ontario to get a sense of what the aphid populations were like elsewhere.

Thankfully, scouting efforts for the past week have indicated that for the majority of the fields in the province, aphid populations are low to non-existent, with natural enemies moving into these fields to help to reduce the aphid population. This is what we normally experience this time of year. In fact I am quite pleased with how many natural enemies are moving in so quickly to help us out.

Natural Enemies found this week feeding on soybean aphids.

Figure 1. Syrphid larva

Figure 2. Ladybeetle Larva

Figure 3. Parasitized Aphid Mummy

We are seeing everything from minute pirate bug adults, syrphid fly larvae (**Figure 1**), ladybeetle adults and larvae (**Figure 2**) and mummies from a fungal pathogen that is killing off some of the aphids. Today's scouting turned up the biggest surprise of all. I am already seeing parasitoid wasps killing off our aphids (**Figure 3).** That is incredible for this early in the year.

Based on what I am seeing, we are not concerned about these fields at this time. In these fields growers

should be able to follow the established provincial soybean aphid management recommendations of "spray only if aphid populations are actively increasing above 250 aphids per plant on 80% of the plants in the field from the R1 up to and including the R5 stage of soybeans." I do recommend that you start scouting your fields this week and continue to do so weekly, so that you can determine if aphids are present and are being kept in check by their natural enemies.

However, I am concerned about a few of the fields in the Arva/Thorndale area. Soybean aphids were found at very high levels only in certain fields, those that are currently in the V3 stage of soybeans. Aphid populations in these fields are over 200 per plant on 100% of the plants in the field (Figure 2). Fields in the same area that are in V1 and V2 stages do not have this same level of aphids. This same scenario is taking place in a few sites in Michigan, where some fields that are currently in the V3 stage of soybeans have very high levels of aphid populations.

Figure 4. Soybean aphids in V3 stage soybeans in a field in Arva Ontario, June 13, 2007.

What happened? We suspect that a larger mass of winged aphids arrived from a long distance flight from buckthorn somewhere in the US. For the first time ever, suction traps set up in the Midwest starting catching soybean aphids in May. They usually do not start collecting soybean aphids until mid summer when the aphids start to take long distance flights to new regions. If they did come from afar, when they arrived they dropped into those fields that were just emerging, which were the earliest ones planted in each area. This has never happened before this early in the summer in all of the 6 years that aphids have been here. Typical early summer populations start up from our own local buckthorn plants where the aphids only do short distance flights to a nearby field to start up small pockets of colonies.

With this new scenario comes uncertainty. We do not have any thresholds for the stage of soybeans. There has been very little work done on spraying aphids in the V stage crop and work that has been done could not show a yield advantage to spraying in the V stages of soybeans. The vegetative stages of soybeans tend to be very tolerant to stresses, compared to the reproductive stages. Anyone who has over-applied their herbicide has witnessed how well the plants recover as they put out new leaves and grow. Perhaps this is the same case for aphids that are sucking on the plants, as long as new leaves keep coming out. The plant does not have to put its energy into producing seed yet so yield may not be as impacted. But we just don't know. There is a real possibility that if we spray now, we could do more harm than good. Spraying will kill off any of the natural enemies that are starting to feed on these aphids. Any aphids that survive the spray (and some always do) will build up again and could reach threshold again in July or August without their natural enemies there to take them down.

One thing is for certain, we do not want to alarm everyone to the point that growers starts to spray as soon as they see aphids, just in case. We need to remember that the majority of the fields in Ontario have the normal scenario taking place. But please get out and scout your fields. There still could be isolated fields in different regions that experienced the same mass immigration. If you are one of the unlucky few who have fields in the early V stages that are reaching 100 or more aphids per plant on at least 80% of the plants in that field, contact me at 519-674-1696 before taking any action. We would like to conduct research in these fields so that we have a better understanding of whether management is even necessary in the V stages.

Once we have flowers starting on these plants, which should only be a few weeks away, we will be back to what we are more familiar with, monitoring aphids in the R stages of soybeans.

"Good" Stress or "Bad " Stress

Emerson Nafzinger, Plant Physiologist, University of Illinois (Modified from Illinois Bulletin-June 15, 2007)

As the dry weather continues in some parts of the province, anxious thoughts increase regarding the effects of so-called stress on crops.

Many agronomists have observed over the years that "some" stress in June can be favorable, in that drying surface soils tend to cause roots to develop deeper. We also link the lack of moisture with warm temperatures and a lot of sunshine, which favor corn growth.

Although we do not have a good, easy way to measure this, the fact that the corn crop has grown well in some areas where the surface soil

has been mostly dry for a month or more is a strong indication that the roots are in, and are growing into, soil with more moisture than can be found in the top few inches of soil. Crop color is excellent in most fields, reflecting the effect of high amounts of sunlight and good mineralization of nitrogen from soil organic matter. Low humidity has also meant very little development of fungal disease. In general, the effect of low-rainfall "stress" in some areas this season has been more positive than negative.

At some point, of course, lack of rainfall will mean depletion of soil moisture near the roots and will decrease the crop's ability to continue to grow roots deeper into moist soil. How soon this happens is linked to the stage of the crop and to soil conditions. Along Lake Erie's north shore, where there has been little rainfall in some areas for the past month, leaves can be seen curling this week by early afternoon, meaning that much of the afternoon sunlight is doing the crop no good. It is easy to see where field operations such as tillage and less-than-favorable planting conditions have resulted in restricted roots in fields and parts of fields in this area. Affected plants may not be much smaller than in less-stressed areas because they've had enough water to grow on so far. But they are now showing leaf curling earlier in the day and more severely than in less-stressed areas, and their growth rate is being restricted by lack of soil water.

Rates of water use by the crop increase as plants get larger. These rates are measured using both the evaporation rate, which is calculated from weather data (relative humidity, wind speed, temperature), and the crop coefficient, which is an estimate of the percentage of evaporation that the crop actually uses in a day. The crop coefficient rises from 0 in corn at emergence to almost 1 (the maximum) at silking. The crop coefficient is about 0.9 in the most advanced corn now and 0.4 to 0.5 in corn that is knee-high. Evaporation on a warm, windy day is as high as 0.28 inch, ranging down to 0.2 inch if it is warm but with moderate wind. Thus the crop is using perhaps 0.75 inch to 1.5 inches of water per week now, depending on its size. Where the leaves are curling in early afternoon, water loss is decreased considerably, but photosynthesis and the ability to grow are also decreased.

The stress indicated by leaf curling in corn is negative for crop growth during the time the leaves are curled, but the overall effect of such stress on yield potential depends on how long it lasts and the crop stage when the stress is taking place. In fields where stress has been severe since the plants were small, such that they are not growing well, the crop will behave much like late-planted corn, with yield prospects decent only if it rains soon. Such fields are likely to need more consistent rainfall to prevent stress throughout the remainder of the season as well, because root growth is unlikely to catch up even as plants develop rapidly once they get water. In the crop that has reached V7 or V8 and continues to grow well, leaf curling in the afternoon is decreasing the overall growth rate, but crop prospects have not been compromised greatly up to now.

Overall, then, dry weather and dry soils have not greatly decreased the

prospects for the corn crop so far. The remarkable ability of corn to take up water from deep in the soil, and the ability of soils to store water, means that short-term dryness tends to have minimal effects on yield.

Soybean tolerates early-season water deficiency at least as well as corn does, but afternoon wilting means that the plants are not photosynthesizing or growing much that day. As long as they are revived by rainfall before early July, and as long as they retain leaves and otherwise show some signs of growth, we don't think this crop will have suffered much loss in yield potential. We need only to go back to 2005 to see a soybean crop that was seriously stressed for most of the season before early August but ended up yielding quite well. One difference from corn, though, is the possibility that aphids, spider mites or other pests might build in soybean more rapidly if the crop remains under stress.

Scout for Spider Mites too!

Tracey Baute, Field Crop Entomologist, OMAFRA-Ridgetown

Some regions have had a bit of rain, but others haven't seen rain in a while. Roadside grass is starting to dry up and get cut, which means spider mites move into soybean fields soon. So while you are out scouting for soybean aphids, check the field edges too for symptoms of mite damage.

Scouting for spider mites begins by monitoring the edges of your soybean fields. Initially, the mites disperse by crawling, so infestations tend to spread from the field edge. Non-mated female mites will mass at the top of the plants and spin webs that serve as a "balloon" allowing strong winds to pick them up and carry them off to another plant either in your field or into the neighbouring fields.

The upper surface of leaves may initially have white or yellow spots on them as plant cells collapse from their feeding. Eventually the leaf will dry up, curl and fall off. Turning the leaf over reveals fine webbing and from the naked eye, very small black moving dots may be visible. Shack these leaves onto a white piece of paper to see the actual mites moving around. Under a 10X hand lens you can see the mites crawling around (**Figure 1**).

Figure 1 – Two-spotted spider mite close-up (Photo courtesy of University of Missouri).

Four or more mites per leaflet or one severely damaged leaf per plant prior to pod fill is cause for concern. If mite numbers exceed the economic threshold, and the forecast calls for hot and dry conditions, an insecticide may be necessary. If caught early enough, only a spot treatment may be necessary to treat the hot spots on the edges of the field where the mites are moving in from. If rain is in the forecast, spraying should be delayed; prolonged wetness will usually reduce the number of mites to insignificant levels. Also, continue monitoring every two to three days as infestations can increase rapidly and treated fields can have re-infestations occur.

For information on chemical control options, refer to the OMAFRA Publication 812, Field Crop Protection Guide available on the OMAFRA website and resource centres.

Barley Yellow Dwarf - Tale of Two Viruses

Albert Tenuta, Field Crop Plant Pathologist, OMAFRA, Ridgetown

Winter wheat samples (displaying yellow dwarf symptoms) submitted to the Pest Diagnostic Clinic (U of Guelph) has confirmed the presence of Barley Yellow Dwarf Virus (BYDV-PAV strain) and Cereal Yellow Dwarf Virus (CYDV-RPV strain). Both of these various are very common in Ontario and until recently were grouped as different strains of BYDV. What was once described as BYDV-RPV has been reclassified and put into the cereal yellow dwarf virus group and is now referred to as CYDV-RPV.

Although BYDV-PAV and CYDV-RPV strains are very difficult to distinguish based on visual symptoms there are however some subtle differences. The majority of the BYDV-PAV samples had typical late season symptoms – yellow or red upper leaves (especially the flag) with brown/dead tips. Yellow stunted plants were positive for CYDV-RPV. Many of the samples however had a combination of these symptoms and as expected (thankfully!) they had both viruses present.

The impact on yield for BYDV-PAV infected plants can be serious but most likely will be low (5-10%) in most fields but some fields may be higher if other problems exist. The CYDV-RPV strain virus is often more damaging then BYDV-PAV and based on the field symptoms this year, yield losses will be higher since many of the plants are severely stunted and are prematurely dieing.

How about resistance genes? Although resistance genes are being incorporated into wheat varieties but it has been slow and will take some more time.

Figure 1 – BYDV-PAV strain on wheat. Note yellow colour and red tip. (Tenuta, OMAFRA, 2007)