VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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In This Issue

Time to Scout for Potato Beetles

(Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

The Colorado potato beetle (CPB) is one of the most devastating pests of potato crops and is something that you should be on the lookout for NOW! This pest overwinters as an adult in the soil or field margins surrounding last year's crop. The soils have warmed, the adults came out and eggs are now hatching throughout the state. The adults are quite distinct, a dull yellow-orange color and ovalshaped (1/4-1/3 inch long) with 10 black stripes along its back (Figure 1). The eggs are a deep yellow color and oval shaped (Figure 2). As they begin to hatch, the young larvae have a black head and rounded orange abdomen. As they grow, the larvae turn to a more pink-orange color and develop two rows of black dots on the sides of their bodies (Figure 3). Like many insect pests, the sooner you spot them in your crop and apply a treatment, the more effective that control measure will be.

Figure 1. CPB adult perched on a potato leaf. (Photo by John Obermeyer.)

Figure 2. Close-up of CPB egg masses on underside of potato leaf. (Photo by John Obermeyer.)

Figure 3. Early and late instar larvae feeding on potato. (Photo by John Obermeyer.)

When do I need to intervene? It depends. Potato can sustain up to 30% defoliation prior to or after bloom without affecting yield (Figure 4). During bloom, however, the tolerable level of defoliation drops down to 6-8% before yield is impacted. While all stages of CPB feed on the plant, the third and fourth instar are the most damaging and can defoliate a plant in 1-2 days. These larvae are approximately ½ inch long.

Figure 4. Defoliation from early instar larvae. (Photo by John Obermeyer.)

Crop Rotation This cultural control can be effective if you can rotate the location of your potato crop *at least* half a mile from the previous year's location. This distance requires the newly-emerging adults to walk and/or fly to the new location and few will make it that far.

Chemical Application CPB have been documented to develop resistance so careful selection and rotation of chemicals is key, regardless of organic or conventional use. For **organic producers**, Entrust® (a.i. spinosad), Trident® (a.i. *Bt tenebrionis*) and Azera® (a.i. azadirachtin and pyrethrin) have been shown to be the most efficacious products. For **conventional producers**, Coragen® (a.i. RynaXypyr), Blackhawk® (a.i. spinosad), Torac® (a.i. tolfenpyrad), Agri-Mek® (a.i. abamectin) and Cruiser® (a.i. thiamethoxam) seed treatment in various rotations and application rates are most effective. Refer to the *Midwest Vegetable Production Guide* for the most recent list of recommended products (mwveguide.org). Always follow label guidelines and recommendations; the label is the law.

Crucifer Caterpillars are (or will soon be) Active!

(Elizabeth Long, eylong@purdue.edu, (765) 796-1918)

It's around that time when your first crop of tender greens may be close to ready for first harvest! Growing kale, arugula, collard greens, and lettuce this year, I've been keeping a hawk's eye out for signs of caterpillar activity.

In the Lafayette area, I'm beginning to see signs of common caterpillar pests of these crops – individual eggs laid by the imported cabbageworm (Figure 1), and egg masses of cross-striped cabbageworms (Figure 2). Once they hatch, these common caterpillars will destroy/defoliate your crops if given the chance! Hopefully these images will help you recognize 'who' these eggs belong to and decide how to best manage them: either by squishing/removing them by hand if you have a small garden, or spraying with appropriate insecticides if you have a larger home or commercial garden.

Figure 1. An egg of the imported cabbageworm laid on kale.

Figure 2. Egg masses of the cross-striped cabbageworm laid on collard greens.

Watch a recording of "Caterpillars and other insect pests of cole and kale crops" (starting at 19 minutes, 50 seconds) from Purdue Extension's Vegetable Farming Webinar Series earlier this year to learn more about how to identify common caterpillars, as well as differences between feeding damage caused by caterpillars versus flea beetles and thrips on cole and kale crops.

Home gardeners can target caterpillars on cole and kale crops with products like Monterey Bug Buster-O® (active ingredient: pyrethrin), which is OMRI-listed for organic use, or Spectracide® Triazicide® Insect Killer for Lawns and Landscapes Concentrate (active ingredient: gamma-cyhalothrin), among others. Commercial producers can visit the Midwest Vegetable Production guide online to find insecticide options for these crops. Please always read pesticide labels carefully, observe the proper pre-harvest interval (PHI) for the crop you are spraying, and remember, there are beneficial insects in your garden too, so please use insecticide products judiciously!

Spray Pressure, Nozzle Type and Vegetable Disease

(Dan Egel, egel@purdue.edu, (812) 886-0198)

Many years ago, I was told that to successfully use fungicides on vegetables, one must use high spray pressures and hollow cone nozzles. However, I had trouble finding any research on this topic, just rumors. So, I did my own research. Dennis Nowaskie, Superintendent at the Southwest Purdue Agricultural Center (SWPAC) built a single row sprayer that could be used to vary nozzle types between flat fans and hollow cones and spray pressures from 30 to 150 PSI. We used the sprayer to conduct experiments on Alternaria leaf blight of cantaloupe during three years of field tests. The fungicide we used to try to manage this disease was the contact product chlorothalonil (trade names include Agronil®, Bravo®, Echo® and Terranil®). Phillip Harmon, now a professor at the University of Florida, was my co-author on this paper.

Try as we might, we could not find any statistical differences in disease severity or yield between any of the nozzle type or spray pressure treatments. We also used water sensitive paper to measure coverage at each treatment; we found no statistical differences in the coverage of water sensitive paper as a result of spray pressure or nozzle type. This research was on cantaloupe and Alternaria leaf blight. However, I have reason to believe that the research applies to other situations as well. Read on for research on other crops and diseases.

University of Florida researchers lead by Tom Kucharek found that regardless of whether flat fan or hollow cone nozzles were used, no difference in disease severity was observed in the following diseases: early or late leaf spot of peanut, bacterial spot of pepper and blast or purple blotch of onions. Kucharek also found that spray pressures ranging from 50 to 250 psi made no differences in disease control in early or late leaf spot of peanut.

In general, higher spray pressures (and to some extent, hollow cone nozzles) are often linked with smaller droplet size. Small droplet sizes are often associated with better coverage. If this is so, why wasn't I able to find better disease control or coverage using hollow cones and high spray pressures? One reason may have to do with where the spray ends up. If one watches a boom sprayer from a distance, it is often possible to see a mist that is generated by the spray that floats across the field. Clearly, this mist represents water plus active ingredients that may very well not end up in contact with the crop. It may be that while small droplet size helps to increase coverage, too high a population of small droplets increase the amount of non-target impacts.

I was not able to obtain funding for the question of how much water per acre to use for fungicide applications. My observations are that one should use between 20 and 50 gallons per acre. My personal opinion is the more the better, within this approximate range.

Based on this research and the work of others, it might be that we have overestimated the importance of high pressures and small droplets in protecting vegetables from diseases. It seemed reasonable that more drops would provide better coverage and less disease. However, the data doesn't indicate this at all. If buying a house is location, location, and location, then using fungicides on cantaloupe, and perhaps other vegetables, is all about timing.

The timing of fungicide applications is usually more important than nozzles and pressures. Some of my thoughts on fungicide timing are given in an earlier issue of the *Hotline* where I discuss the disease forecasting program **MELCAST**.

This article was updated from an article published on Aug. 2, 2018, in issue 648.

Southwest Purdue Ag Center Virtual Field Day

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Please join us for the Southwest Purdue Ag Center virtual field day! You will learn about many exciting research projects conducted at the research center. Topics on horticultural crops include:

– Rainfastness of fungicides
– What can IPM adoption in watermelons mean for pests, pollinators and profit?
– Strawberry production with alternative systems
– High tunnel specialty melon production
– High tunnel cucumber spider mites management
– Growing winegrapes: cultivars and management
– Produce food safety training and research

As well as many other farming-related topics. PARP credit is available.

After registration, you will receive instructions on accessing the project-related videos prior to the field day and be able to talk to specialists on June 24, 2021. Register the event at tinyurl.com/SWPACFieldDay21

Update Climate Normals Impact Led to a Cooler May

(Beth Hall, hall556@purdue.edu)

The month of May in Indiana was 2°F-4°F below normal across the state, based upon the new 1991-2020 climatological normals that were released last month. Climatological *normals* are roughly the 30-year average of weather variables and are updated every 10 years. Prior to the new normals being released, climatologists were using the 1981-2010 period for the climatological normals. However, since data from 1981-1990 were dropped and 2011-2020 were added, this modified the new climatological normals to account for climate change trends such as warmer temperature and either wetter or drier precipitation values depending upon the time of year. Therefore, the fact that May 2021 ended up being cooler *than normal* was likely due more to the use of the updated climatological normals being warmer than any other remarkable cause.

May's precipitation totals across the state was near normal throughout most of the central and northern counties. However, the southern third of Indiana was much drier with monthly totals falling within the 25th to 75th percentile of normal (Figure 1). This has led to the development and expansion of abnormally dry conditions in various counties in the south and the gradual elimination of abnormally dry conditions in the north (Figure 2). The climate outlooks for both June and the June-July-August periods are only slightly favoring above-normal precipitation, so forecasters and climatologists are keeping an eye on conditions to closely track whether or not drought develops further across the state or gets eliminated. At this time, there is not serious concern of an intense drought occurring such as what was experienced in 2012, but with increased temperatures and the potentially longer periods of dryness between rainfall events, water stress could occur. This will raise concern for those areas dependent upon groundwater, particularly where irrigation is occurring and groundwater supplies haven't fully replenished over the winter and early spring.

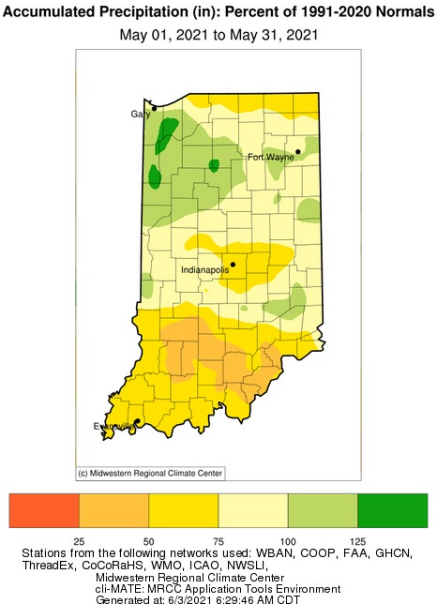

Figure 1. The accumulated precipitation percentage of normals for May 2021.

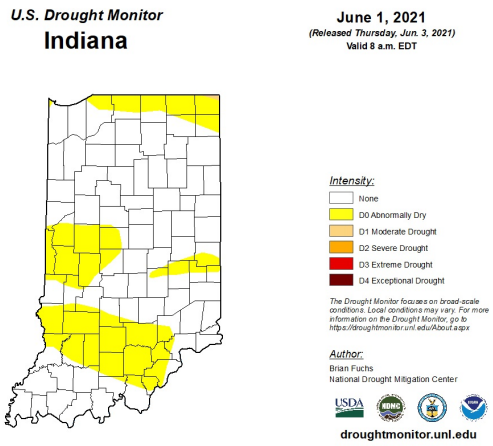

Figure 2. The US Drought Monitor status for June 1, 2021.

Modified growing degree-day (MGDD) accumulations since April 1 have started to catch up to near average for the 1991-2020 period. Northern counties are slightly ahead of normal MGDD accumulations and southern counties are still slightly behind normal (Figure 3). However, when compared

to just the past 4 years, 2021 accumulations are still well behind what they were in 2017 and 2018 (Figure 4) across the state.

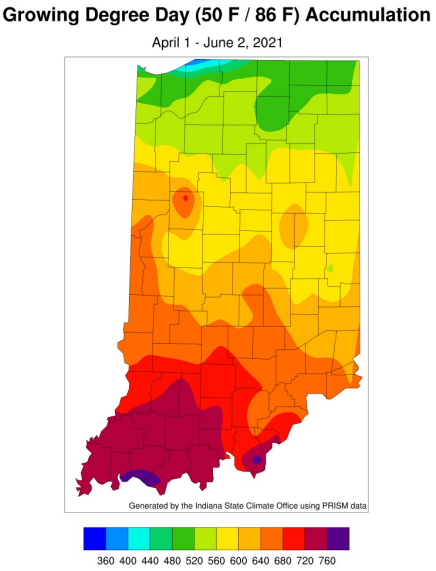

Figure 3. Modified growing degree day accumulation from April 1 to June 2, 2021.

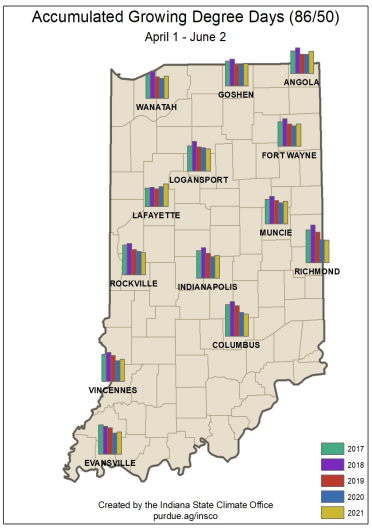

Figure 4. Comparison of 2021 modified growing degree day accumulations from average for April 1 – June 2 to the past four years.

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