Vegetable Crops Hotline

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

Liz Maynard, Editor
600 Vale Park Road
Valparaiso, IN 46383
(219) 531-4200
emaynard@purdue.edu

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IN THIS ISSUE

Drought Monitor Report - *(Liz Maynard)* - As of June 19, conditions in Indiana ranged from 'abnormally dry' in the southeast and northwest to 'extreme drought' in the southwest, according to the U.S. Drought Monitor from the National Climate Data Center (Figure 1). As of June 16 the long term Palmer Drought Severity Index was moderate to extreme in all except Southeastern Indiana **http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif**. For up-to-date information on drought conditions across the state and region, visit the Indiana State Climate office site at **http://iclimate.org**, and the Midwest Climate Watch drought page at **http://mrcc.isws.illinois.edu/cliwatch/drought/drought.jsp**.

Together with the unusually warm temperatures, these conditions will influence crop development and time of maturity and quality. Some crops will be ready early. Others including peppers, snap beans, pumpkins, and tomatoes may have delayed or missed fruit set due to heat and/or drought stress. Depending on the timing, this may delay a first harvest, or leave an unexpected gap in the harvest season. Crop quality may be reduced, for example, higher incidence of blossom end rot in tomatoes and peppers; smaller size of tomatoes, melons and pumpkins; and uneven shape in cucumbers and summer squash. On the bright side, melons and tomatoes are likely to have higher sugar content in the edible portion, giving them better flavor.

Taking time to communicate with your customers about the availability and quality of your crop is always important, but especially so in an unusual year like this one.

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.14	99.86	78.24	36.31	5.20	0.00
Last Week (6/12 map)	11.60	88.40	39.44	5.16	0.00	0.00
3 months ago (3/30 map)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Cal. Year (12/27/11 map)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year (9/27/11 map)	55.11	0.00	0.00	0.00	0.00	0.00
One Year Ago (6/14/11 map)	100.00	0.00	0.00	0.00	0.00	0.00

D0 Abnormally Dry · D1 Drought - Moderate · D2 - Drought - Severe · D4 - Drought - Exceptional · D3 - Drought - Extreme

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See text summary at Drought Monitor site for forecast statements. ***http://droughtmonitor.unl.edu***

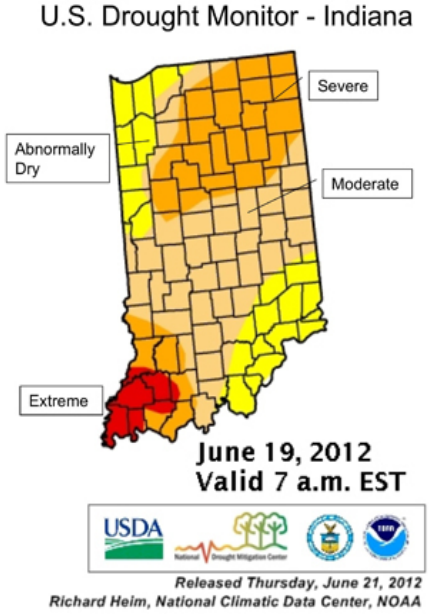

Figure 1: June 19 U.S. Drought Monitor Map for Indiana. The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See text summary at Drought Monitor site for forecast statements. Source: **http://droughtmonitor.unl.edu/pics/in_dm.png**.

Common Scab of Potato - (Dan Egel) - Although the above ground portions of the potato plant may appear healthy, it is possible that the potato tubers may be diseased. Common scab of potato is one such disease that affects the underground tuber.

The symptoms of scab can vary. The surface of the potato may appear raised, corky or pitted (Figure 2). The potato can still be eaten, but the appearance may make the tuber unmarketable.

Scab of potato is caused by a bacterium that is both common and survives well in soil. The pathogen can spread with water, infected tubers or farm equipment. A few other crops can also be occasionally affected by scab, including radish, beet and carrot.

Soil temperatures of 68 to 72 F are optimum for potato scab to form, but scab formation is possible from 50 to 88 F. The pathogen primarily invades potatoes through natural opening (lenticels), but may also invade the tuber via wounds.

Control of potato scab:

- Irrigation–dry conditions during tuber formation can increase the severity of scab. Maintain soil moisture at field capacity during weeks 2 through 6 following tuberization. The recent dry weather may have contributed to the scab of potato seen in Figure 2.
- Soils with a pH over 5.5 favor scab symptom development. So, one management option is to keep soils under pH 5.5.
- Light textured soils and soils with high levels of organic matter favor scab development.
- Although the scab pathogen survives well on organic matter in the soil, crop rotation with small grains or alfalfa helps reduce scab severity.
- Host resistance is perhaps the best means of managing potato scab. Select varieties that have some resistance to scab.

Growers with questions about common scab of potato should contact Dan Egel at (812) 886-0198 or **egel@purdue.edu**.

Figure 2: Common scab of potato causes a variety of different symptoms including a corky appearance on the surface of potatoes. *(Photo by Dan Egel)*

Critical Periods for Irrigation - *(Liz Maynard)* - Extended dry periods like we're having make it difficult to get enough water to all crops, even with an irrigation system. Keep in mind that certain crops and crop stages are more sensitive to water stress. A lack of water at a critical period will reduce marketable yield much more than lack of water at another time.

Seed germination and seedling establishment is a critical period for all crops. If there is moisture in the soil, plant deep enough so that seeds are in moist soil, but not so deep that they can't emerge. If soil is dry, irrigate after planting with enough water to keep soil moist through emergence and establishment. With the current high temperatures seeds should germinate in a few days.

Transplant establishment is also a critical period. Harden plants off for a few days before transplanting. Water seedlings well before taking them to the field, and keep them watered as needed during transplanting. Water well at planting. If a starter fertilizer is used in transplant water, be sure not to mix it too strong: as the water evaporates the fertilizer will concentrate and seedling roots may be burned. If irrigation is not available and rain is unlikely, it may be best not to use any fertilizer in the transplant water. If windy conditions persist, a windbreak may be helpful. It may be feasible to erect snow fence or plastic fencing as a windbreak.

Once the crop is established, critical periods for fruiting crops and cucurbits including tomato, pepper, melon, cucumber, squash, and pumpkin are flowering, fruit set, and fruit sizing. For sweet corn, the critical periods are tasselling, silking and ear development. For beans, flowering and pod set are critical periods. For cabbage, broccoli, and cauliflower, head formation and enlargement are critical periods. For root crops like carrots, beets, and radishes, the critical period is root enlargement. For onions, bulbing and bulb enlargement are critical periods. The critical periods for potatoes are tuber formation and enlargement.

Weed Management in Established Crops - *(Liz Maynard)* - While dry conditions are reducing weed emergence in many fields, weeds that do emerge will compete with the crop for water so control remains important. If pre-emergent herbicides did not get moved into the germination zone by rain or mechanical incorporation, they will not be as effective. This article discusses options for weed management in established vegetable crops, and is adapted from an article published in issue 539 of this newsletter.

If mechanical control, including cultivation, hoeing, and handweeding are the methods of choice, the equipment and operators will make a big difference in success of the effort. Be sure that all cutting surfaces are sharp and adjusted properly. If possible, cultivate when weeds are small, even before they emerge, so that a shallow cultivation will be effective. Shallow cultivation will also help to conserve soil moisture. Avoid deeper cultivation that will expose buried weed seeds to conditions that will stimulate them to germinate. If larger weeds require deeper cultivation for control, be prepared to manage the next flush of weeds. Be careful not to cut through crop roots with deeper cultivations. Take the time to sharpen hand tools. Train employees how to use tools effectively, if they don't already know. If the weeds have 'taken over,' removing weeds near the crop row should be a priority because they have the biggest negative effect on the crop. Mowing weeds between rows is also an option to reduce competition and make it easier to manage the crop.

If herbicides are part of your toolbox, choose carefully to match herbicides permitted on your crop with weeds that are present or expected. If grasses are in a crop, consider using one of the postemergence grass herbicides sethoxydim (e.g. Poast®) or clethodim (e.g. Select®). These can be applied over the top of broadleaf crops for which they are labeled without injuring the crop. Check the *Midwest Vegetable Production Guide* and product labels for crops they can be used on. Be aware that these grass herbicides do not control nutsedge. These materials work best when the grass is actively growing and not under moisture stress. Hot, dry conditions also reduce the herbicide effectiveness because the leaf surface is less permeable thus less herbicide is absorbed by the grass. If possible, schedule applications of these materials after a rain or irrigation when weeds are less stressed. Use adjuvants recommended on the herbicide label to improve uptake of the herbicide by the grass.

Herbicides that control emerged broadleaves and may be applied over the top of a vegetable crop are few. Matching the material to the weeds present as well as the crop becomes especially important. For instance, Sandea®, which is labeled postemergence on some of cucurbits, is not effective against emerged lambsquarters but will control pigweeds. The table on page 39 of the 2012 *Midwest Vegetable Production Guide* indicates effectiveness of postemergence herbicides against various weeds. The herbicide label provides additional information. To identify unknown weeds, consult one of the online weed identification guides linked on the Purdue Fruit and Vegetable Connection weed management page at **http://www.hort.purdue.edu/fruitveg/veg/weed_management.shtml**. County Extension offices may also provide assistance with weed identification, or contact me.

Some postemergent herbicides are available for use between rows of the crop as a directed spray, or applied with a shielded or hooded sprayer. Glyphosate products may be used between rows for most vegetables if applied with a hooded or shielded sprayer, or for some crops a wiper applicator. It is important to avoid any contact of glyphosate with the crop. For crops on plastic mulch, avoid spraying glyphosate on the mulch because if a crop leaf contacts the mulch it may absorb the herbicide. Preharvest intervals apply for some crops. The advantage of glyphosate is that it will control both grasses and broadleaves and thorough coverage of weeds is not essential because it is systemic. The disadvantage is the potential for systemic crop injury if the spray contacts the crop. Also, in fields with a long history of reliance on glyphosate there may be populations of weeds that are not well controlled.

Aim® (carfentrazone) is also labeled on many vegetables for application in row middles with a hooded sprayer. Aim® controls many emerged broadleaf weeds. It is a contact herbicide so thorough coverage of weeds is important. It will work best on small weeds.

Weed Pharm® (acetic acid) is a nonselective contact herbicide that may be used between crop rows with a hooded or shielded sprayer. It will kill many small weeds when applied properly. Thorough coverage of leaves is essential for good control. Weed Pharm® has been approved for use in certified organic production; check with your certifier to determine whether it is acceptable to them.

For full season crops, application of a preemergent herbicide between rows after emerged weeds are controlled may be warranted. This will reduce the population of later emerging weeds, possibly eliminating need for additional cultivation. It will also make it easier to prevent weed seed production. For example, in cucurbits, tomatoes, and peppers, Sandea® and trifluralin products may be used in this manner; Curbit® may be used on cucurbits only. Dual Magnum® may be used between rows in pumpkins. If you plan to establish cover crops, be aware that the herbicides may reduce cover crop germination or establishment. An article in the June 3, 2011, Purdue Pest and Crop Newsletter addressed this issue for herbicides used on corn and soybeans and may be found at **http://extension.entm.purdue.edu/pestcrop/2011/issue9/index.html#cover**.

Weed control may not be the most urgent task on your list, but investment in effective weed control now will help to conserve soil moisture, and will pay off in crop yield and quality this year and in reduced weed pressure in future years.

Black Walnut Wilt of Tomato - *(Dan Egel)* - Black walnut trees are native to Indiana and are common in woods as well as in landscapes. Occasionally tomato plants in proximity to black walnuts are observed to wilt. This article describes black walnut toxicity, also known as black walnut wilt of tomato.

Symptoms of walnut wilt include chlorosis (yellowing) of leaves, wilt and possible death of plants (Figure 3). Note that other diseases such as Fusarium wilt, Verticillium wilt and bacterial canker may also cause tomato plants to wilt. Samples can be sent to the Purdue Pest and Plant Diagnostic Laboratory to determine the cause of the tomato wilt.

Figure 3: Tomato plants in the row closest to the walnut trees have wilted due to toxicity from walnut roots. *(Photo by Dan Egel)*

The compound in black walnut roots that may cause wilt is known as "juglone". The largest concentrations of juglone occur in buds, nut hulls and roots. Leaves and stems contain smaller quantities. Plants that are very sensitive to juglone may show symptoms of wilt anywhere that black walnut roots occur. The phenomenon of one plant affecting the growth of another is known as "allelopathy".

Other vegetable plants that may be sensitive to black walnut wilt include asparagus, cabbage, eggplant, pepper, potato and rhubarb.

The most obvious solution to black walnut wilt is to plant tomatoes well away from black walnut trees. Avoid using any portion of the black walnut tree as mulch. Toxicity from black walnuts seems to decrease in well-drained soils.

More information can be found in the publication Black Walnut Toxicity, HO-193-W **http://www.hort.purdue.edu/ext/HO-193.pdf**.

Resource: Construction Tutorial for Mid-Sized Tunnels - (*Liz Maynard*) - Anyone thinking ahead to protecting low-growing cool season crops next fall and winter? A pictorial tutorial on mid-sized tunnels shows how to make a 3.75-ft. high, 4-ft. wide tunnel using half-inch metal conduit and a conduit bender. Find it at **http://hcs.osu.edu/vpslab/sites/drupal-hcs-vpslab.web/files/mid-tunnel-prep-install-tutorial-final.pdf**. Thanks to Matt Kleinhenz at The Ohio State University – OARDC for this guide. Learn more about his work at the Vegetable Production Systems Laboratory at **http://www.facebook.com/osuvpslab**.

Upcoming Events

Southwest Indiana Twilight Tour, Southwest Purdue Agricultural Center (SWPAC), Vincennes, IN. July 12, 4:30 to 9 p.m. EDT. Contact Valerie Clingerman, Knox County Extension Educator at 812-882-3509 to register or for more information. Flyer available at **http://www3.ag.purdue.edu/counties/knox/Hot%20Topic%20Images/twilighttourpub_final.pdf.**

Figure 4: One of the features on the Twilight Tour will be SWPAC's high tunnel tomato production. *(Photo by Shubin Saha)*