# Vegetable Crop Update

***A newsletter for commercial potato and vegetable growers prepared by the University of Wisconsin-Madison vegetable research and extension specialists***

**No. 23 – August 30, 2012**


**In This Issue**



**Calendar of Events**

October 24&25 – Hancock ARS-Storage Research Facility, Potato Variety Harvest Expo, 8AM-4:30PM


**Vegetable Crop Update – A.J. Bussan, Professor, Department of Horticulture, UW-Madison, Phone: 608-225-6842, E-mail: ajbussan@wisc.edu.**


In Stevens Point, Wisconsin, daylength is certainly less than 14 hours per day. Forecasted heat will likely mature crops such as potato, onion, pumpkin, and winter squash, and other crops. Indeterminate crops such as tomato and pepper will ripen remaining fruit, but growth and productivity will be limited by remaining day length.

**Potatoes.** Many potato fields have been desiccated. In part, this is due to maturation of a number of different fields and varieties. Furthermore, we are fast approaching three weeks to initial harvest for long-term storage so crops are being desiccated to promote vine-kill. Potatoes continued to bulk from August 6 to August 16, but most varieties at a reduced rate (< 10 cwt/a/d). In part, this was due to diminishing canopy, while shorter day length also contributed to reduced bulking rates.

Russet Norkotah line selection CO8 increased from 440 to 480 cwt/a with continued yield increase of ~4 cwt/a/d from August 6 to the 16$^{th}$. B size tubers (< 1 7/8") comprised only 4% of the harvested yield with 50% of US No. 1 tubers under 6 oz and the balance over 6 oz. The proportion of potatoes < 6 oz in size has decreased from 70 to 50% of tubers over the 10 d prior to August 16. While bulking has decreased, continued growth was critical for improving the tuber size profile.

Snowden bulked better than CO 8 in no small part to better canopy health. Yields of Snowden increase to just over 600 cwt/a on 8/16 from 525 cw/a on 8/16. B sized tubers was lowered from 6 to 3% and more importantly the proportion of tubers < 4 oz (< 2" diameter decreased from 40 to 26% while tubers > 4" in diameter remained less than 10% of all tubers.

The growth from August 6 to 16 was important for increasing tuber size profile and thus crop value. While vines continued to decline, data suggests this bulking continued over the last 10 days which will be important for optimizing potato crop value.

However, bulking is likely continuing to decline as the crop canopy continued to decline. Extreme heat over the coming couple of days could also cause further decline of the potato crop canopy.

With the risk of late blight, the decision must be made on whether the crop should be vine-killed or not. With limited bulking potential remaining in some crops, the question should be asked as to whether the added value to the crop by delaying bulking is worth the risk of potential substantial storage losses should the field, and more importantly, the tubers be infected by late blight.

Varieties such as Gold Rush, Norkotah, Burbank, Atlantic, and even Snowden have limited bulking left for this season based on current crop yields, size distribution, and quality. In many cases, it may be advisable to vine-kill the crop in areas of high late blight potential. Long season varieties such as Bannock, Nicolet, should not be vine-killed especially if the crop canopy is still relatively healthy with potential for continued tuber growth is present.

**Vegetable Disease Update – Amanda J. Gevens, Assistant Professor & Extension Vegetable Plant Pathologist, UW-Madison, Dept. of Plant Pathology, 608-890-3072 (office), Email: gevens@wisc.edu.**

**Vegetable Pathology Webpage: http://www.plantpath.wisc.edu/wivegdis/**

**Late blight updates and considerations for late season and post-harvest management:** As of the time of this report, late blight has been confirmed in 8 WI counties, as listed in table below. Over the past month, late blight confirmations have come from potato and tomato, with all samples indicating the US-23 clonal lineage of the *Phytophthora infestans* pathogen.

| County | Crop | Date of Detection | Clonal Lineage of the Late Blight Pathogen |
|---|---|---|---|
| Barron | Potato/Tomato | 31 July 2012 | US-23 |
| Adams | Potato/Tomato | 31 July 2012 | US-23 |
| Portage | Potato/Tomato | 2 August 2012 | US-23 |
| Oneida | Potato | 4 August 2012 | US-23 |
| Waushara | Potato/Tomato | 20 August 2012 | US-23 |
| Marathon | Potato/Tomato | 22 August 2012 | In process |
| Rusk | Tomato | 23 August 2012 | In process |
| Sheboygan | Tomato | 24 August 2012 | In process |

Late blight has been found on commercial farms, as well as home gardens in both conventional and organic systems. All growers of tomatoes and potatoes should be carefully scouting plants several times each week for earliest symptoms of late blight. From initial infection, lesions can develop in as few as 4 days under ideal weather conditions, as we observed in a small tomato plot in Hancock this past week.

**Tomato late blight symptoms** are easy to see given the green and lush foliage on most tomato plants. Two commonly seen foliar diseases, Septoria and Early blight, may be on tomatoes at this time and are shown below.

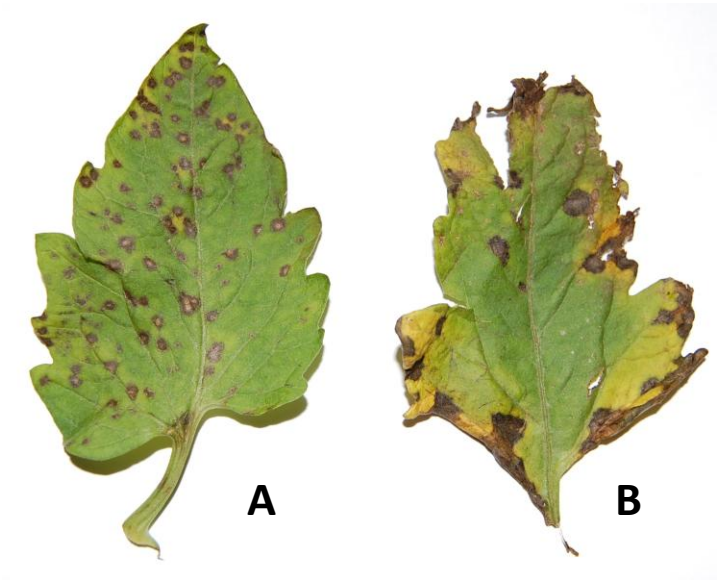
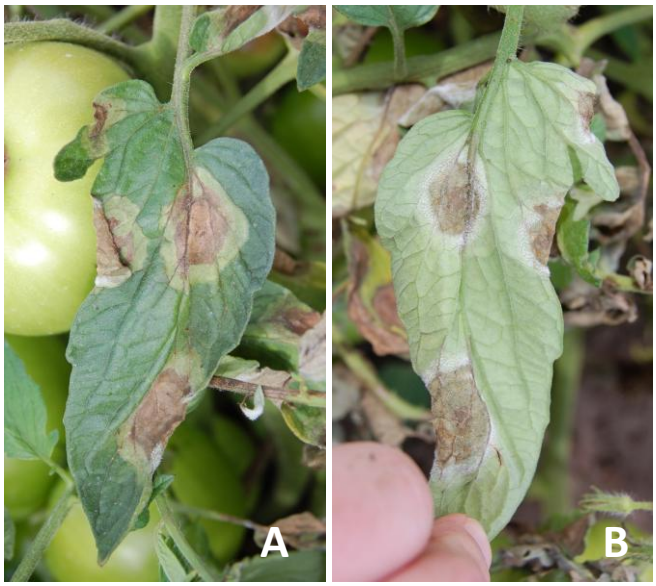



**Figure 1. Septoria** lesions (A) are typified by small, nearly circular, dark brown to black (sometimes purple) lesions with pale brown to tan centers. Under high moisture conditions, the centers of the lesions may bear conidia which look like black pepper. **Early blight** lesions (B) are often vein constrained giving them an angular edge, are dark brown to black in color, and have rings or a 'bull's eye' appearance. Both diseases may occur together on plants.

**Figure 2.** In contrast, **late blight** lesions (on right) typically have a pale green or olive-colored halo around a brown, necrotic lesion (A). On leaf undersides, or areas protected from direct sunlight, the pathogen may produce sporangia or spores – seen as fuzzy white growth surrounding lesions (B). When conditions are very moist, lesions may take on a dark brown, wet, or greasy appearance.




**Potato late blight symptoms** are harder to identify in the field at this time given the senescence of the foliage and possibly advanced early blight infection. While it is hard to remove the 'background noise' of late season vine conditions to visualize late blight, the disease should continue to be scouted for as long as there is some green tissue remaining in the field. Identification of late blight in the crop at this stage is useful in considering your harvest and post-harvest management options. Pre-harvest checks for late blight in shallow tubers can further inform your management of a field. Wash tubers prior to checking for symptoms as early infections may be hard to see through even a thin layer of soil. (Tuber blight pics in Fig. 3)

**Late season and post-harvest management of late blight**: Many WI growers have decided to vine kill early this season with the advanced status and size of the crop and risk of late blight. While most of vines will die following the first kill treatment, lower stems may remain green especially in instances where potato vines were very hearty and green at time of vine kill. It is still important to continue to scout fields of this status and maintain fungicide programs on a 5 to 7-day schedule.

If late blight has been present in a field, be sure that vines are killed well prior to digging (waiting 2-3 weeks after last vine kill treatment). This will limit potential risk of active late blight pathogen coming in contact with tubers. Take care to limit damage to tubers through the harvest and post-harvest processes. While the late blight pathogen does not need wound sites, they are an easy and ready entry point for late blight and other pathogens.

**Late-season potato late blight disease management practices should include the following:**

1) Continue to scout fields regularly. Scouting should be concentrated in low-lying areas, field edges along creeks or ponds, near the center of center-pivot irrigation structures, and in areas that are shaded and protected from wind. Any areas where it is difficult to apply fungicides should be carefully scouted.
2) Avoid excess irrigation and nitrogen. If foliage is infected with late blight, spores can be washed down through the soil and infect tubers. Green vines can continue to be infected and produce spores even at harvest. Additionally, green and vigorous vines are hard to kill and skin may not be well-set at digging resulting in higher risk of post-harvest infection by late blight and other diseases.
3) Allow 2-3 weeks between complete vine kill and harvest. Fungicide applications should be continued until harvest. When foliage dies, spores of the late blight pathogen that remain on the foliage also die. This practice will prevent infection of tubers during harvest and development of late blight in storage. In many WI fields, even 3 desiccation treatments have not completely killed vines. As such, the continuation of fungicide use to protect tubers is critical.
4) Do not produce cull piles of late blight infected tubers. Such piles are a significant source of spores and centers of large piles may not experience freezing/killing winter temperatures which serve to kill tuber tissue and the pathogen. Culls should be spread on fields not intended for potato production the following year in time that they will freeze completely and be destroyed during the winter. Potato culls can also be destroyed in some other way such as chopping, burial, burning or feeding to livestock.
5) Keep tubers dry and cool in storage. Air temperature and humidity should be managed so as to avoid producing condensation on tubers. Temperatures $\leq$45°F limit activity of the late blight pathogen, but are not ideal for curing during pre-conditioning. Condensation and warmer temperatures can promote spore production of the late blight pathogen in storage. Application of fungicidal materials, such as phosphorous acids (ie: Phostrol) on tubers entering storage can limit progress of late blight. Carrier volume of fungicides should be no more than 0.5 gal water/ton of tubers.

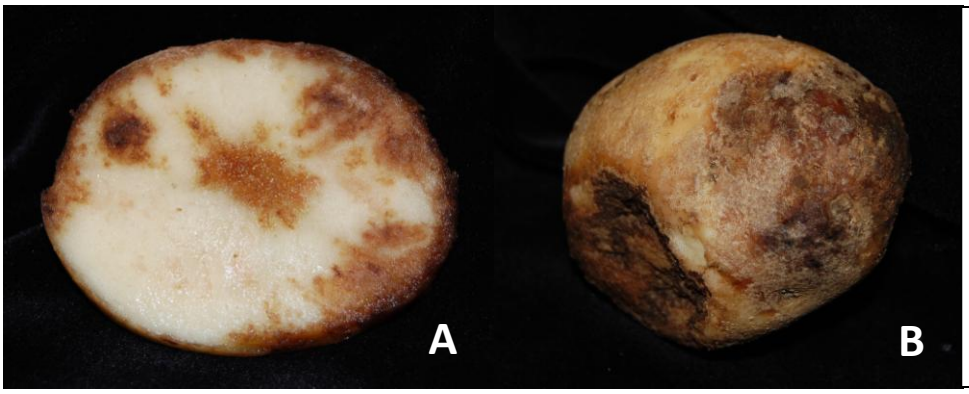



**Figure 3.** Symptoms of late blight infected potato tubers. Note brown, corky internal tissue (A) and sunken, dark external symptoms (B).

Nationally, new late blight reports in the past week have come from CT (tomato), NH (tomato), NY (potato and tomato), OH (tomato), and PA (tomato). To date this production year, late blight has been reported in CA, CT, FL, MA, ME, NC, NH, NJ, NY, OH, PA, VA, VT, WI, and Ontario Canada. The website: http://www.usablight.org/ indicates location of positive reports of late blight in the U.S. and provides further information on disease characteristics and management.

In order to help better understand the epidemic at hand, please submit samples to my lab or work through your county agent and request that they send to me for genotyping. We are also offering free diagnostic services for potential late blight samples (along with the UW-Plant Disease Diagnostic Clinic). All we need to know is the county of sample origin. Lab address: Amanda Gevens, 1630 Linden Dr, Room 689, Plant Pathology Dept., University of Wisconsin, Madison, WI 53706. Please send infected leaves in a slightly inflated ziplock bag with no paper towel. Overnight shipping is best.

**Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations.** ***Thresholds for both diseases have been met. Accumulations will continue to be provided until the end of potato production season. Thank you to Vaughan James for his efforts in this reporting.***

| Location | Planted | 50% Emergence | P-Day Cumulative | DSV Cumulative | Calculation Date |
|---|---|---|---|---|---|
| **Antigo Area** | Early 5/1 | 5/30 | 643 | 52 | 8/29 |
| | Mid 5/10 | 6/6 | 605 | 52 | 8/29 |
| | Late 6/1 | 6/16 | 538 | 52 | 8/29 |
| **Grand Marsh Area** | Early 4/3 | 5/8 | 780 | 57 | 8/29 |
| | Mid 4/15 | 5/16 | 733 | 57 | 8/29 |
| | Late 4/30 | NA | 678 | 56 | 8/29 |
| **Hancock Area** | Early 4/1 | 5/1 | 860 | 36 | 8/29 |
| | Mid 4/15 | 5/10 | 802 | 30 | 8/29 |
| | Late 5/1 | 5/17 | 759 | 30 | 8/29 |
| **Plover Area** | Early 4/3 | 5/17 | 779 | 48 | 8/29 |

| | | | | | |
|---|---|---|---|---|---|
| | Mid 4/19 | 5/18 | 713 | 48 | 8/29 |
| | Late 5/1 | 5/27 | 650 | 44 | 8/29 |

***Cucurbit Downy Mildew*:** has not been identified in Wisconsin at this time in commercial fields, home gardens, or our sentinel monitoring plots. Several states have reported cucurbit downy mildew this season across a wide range of cucurbit hosts in AL, IN, KY, MA, MD, MI, NC, NY, OH, and WV. **The newest reports within the past 7 days have primarily been on cucumber with closest new detects in southwestern IN.**

No forecasted risk of movement of spores from states reporting detects to Wisconsin at this time. Disease forecaster, Tom Keever of North Carolina State University reports, "high risk for cucurbits in LA / MS and almost all of the southeast. Low to moderate risk for west-central NC / southern Appalachians, central and western TN, southern MO, and AR. Minimal risk to cucurbits most other areas." The website: http://cdm.ipmpipe.org/ offers up to date reports of cucurbit downy mildew and disease forecasting information. Early detection and management of this disease is critical. If you suspect downy mildew, please contact your county agent, me, or submit a sample for confirmation.

For further information on any fungicides that may be mentioned in this newsletter, please see the 2012 Commercial Vegetable Production in Wisconsin Guide A3422. An online pdf can be found at the link below or a hard copy can be ordered through the UWEX Learning Store.
**http://learningstore.uwex.edu/assets/pdfs/A3422.PDF**

**Vegetable Insect Update – Russell L. Groves, Associate Professor and Applied Insect Ecologist, UW-Madison, Department of Entomology, 608-262-3229 (office), (608) 698-2434 (cell), or e-mail: groves@entomology.wisc.edu.**

**Vegetable Entomology Webpage: http://www.entomology.wisc.edu/vegento/index.html**

**Spotted Wing Drosophila (SWD) –** Spotted Wing Drosophila (SWD) fruit fly has recently been detected in Wisconsin in 2012. Specifically, the DATCP documented the infestation in SW Wisconsin near Readstown in blackberry. This year marks the second report of SWD in Wisconsin and infested counties to date reportedly include Crawford, Dane, Racine, and Vernon Counties, although the SWD is probably much more widespread in the state. During field visits earlier this week in Monroe County, additional finds were recorded and crops infested included raspberry, blackberry, and strawberry (**Fig. 1**). The Minnesota Department of Agriculture has also recently confirmed several infestations on blackberries and raspberries in their state in August. To date, Minnesota detections originated from Hennepin County (a back yard raspberry patch) and from Ramsey County (a patch of wild blackberry in the middle of a woods area). Both infestations were reported by the public, and in each case, an abundance of maggots were found in the fruits collected by the people who had picked them.

The insect was first detected in Michigan in 2010 and active pest management programs have been in place for the insect. In addition to Minnesota, Michigan researchers (e.g. Dr. Rufus Isaac's) have compiled an excellent list of resources for monitoring and management of SWD.

These resources can be obtained from the Michigan site at: http://www.ipm.msu.edu/swd.htm, and also from the Minnesota site at http://www.vegedge.umn.edu/SWD/SWD.html.

The SWD is a vinegar fly of East Asian origin that can cause damage to many fruit crops. This small insect has been in Hawaii since the 1980s, was detected in California in 2008, spread through the West Coast in 2009, and was detected in Florida, Utah, the Carolinas, Wisconsin and Michigan for the first time in 2010. Because the flies are only a few millimeters long and cannot fly very far, natural dispersion between states is unlikely. Human-assisted transportation is a more likely cause of the recent rapid spread. It appears that this insect has become widely established through North America. SWD has been detected in traps located near berry crops, grapes, cherries and other tree fruits and the flies have a preference for softer-fleshed fruit.

As outlined by the MI site, summer and fall ripening berries must be protected from first color until harvest if SWD is active in the area and on your farm. The most effective SWD materials are the organophosphates Imidan and malathion, the synthetic pyrethroids including Asana, Brigade, Bifenture, Danitol and Mustang Max, the carbamate Lannate, and the spinosyn insecticides Entrust and Delegate. The neonicotinoid insecticides such as Actara, Assail or Provado are not effective against SWD and should not be used for this pest.

Due to the zero tolerance for fruit infestation in the food industry and the increasing captures of SWD being detected in monitoring traps, if ripe fruit are present and SWD is active in your immediate area, we recommend fruit protection at this time. Maintaining fruit protection will require reapplication based on the product used previously and its expected longevity, the weather conditions and the harvest schedule.

While these recommendations provide guidance for management in-season, they provide little information on what to do once harvest ends. There have been increasing questions about the effectiveness of post-harvest sprays to reduce the population of SWD for next year, but there is no research-based information yet that has measured whether post-harvest spraying reduces pest pressure next year. Because of this, we do not make any recommendations about the effectiveness of this approach. As noted by the Isaac's lab in MI, it seems that the short-term emphasis needs to be on protecting fruit from first fly activity until they are harvested, and not trying to control every SWD until they stop flying. While the desire to control SWD after harvest is understandable given the threat, there are some issues with post-harvest spraying for SWD that should be considered.

1. Repeated applications of insecticides against pest populations increase the chance for resistance development. This is even more likely in a pest that has a short generation time like a vinegar fly, and this group of insects has been shown previously to have the capacity for developing resistance. If resistance develops, having a period without sprays would allow time for recovery of susceptibility so that insecticides will still work.
2. Biological control of SWD is less likely to become established in fields if they are being sprayed.
3. SWD is active through fall until the first severe frost. In Michigan in 2011, adult flies were trapped until late December and early January, which would be a very long time to try and achieve control.

4. The money spent on this spraying might be better saved until 2013 for doing an excellent job of protecting next year's crop against this pest.
5. SWD will experience very high winter mortality in our climate.
6. This pest is increasingly becoming well-established in our natural areas with many widespread host plants such as autumn olive, blackberry, pokeweed, honeysuckle, etc., and eradicating that background population seems like a very challenging task.

There are many unanswered questions related to SWD management that need to be resolved, and research entomologists in neighboring states and Europe are actively pursuing some of the highest priority questions to aid growers in their management of SWD.

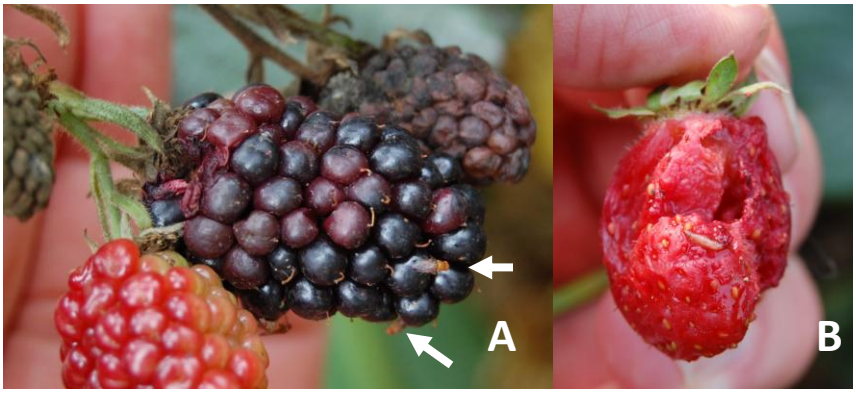



**Figure 1**. A. Adult SWD flies ovipositing upon blackberry (indicated with arrows). B. Larval flies (maggots) infesting strawberry fruit.

**UW-Plant Pathology & WI Seed Potato Certification Program, Alex Crockford, UW Seed Potato Certification Program Director, Phone: (715) 527-8939, E-mail: abcrockford@wisc.edu.**

The Lelah Starks Elite Foundation Seed Potato Farm began vine-killing early this year with good progress in bulking already in July. After yield sampling showed target yield and profiles, we began vine-killing August 2nd. In the days that followed we continued to vine-kill earlier than most years. Due to the increasing risk of late blight in Wisconsin, we did a thorough walk-thru with all inspectors to look for late blight lesions, but found none. As crop scouting and UW reports continued to indicate increased risks, we decided to kill the remaining 10 acres early. This will affect the size and yield of only a limited amount of grower seed. The entire crop is now fully desiccated and has received multiple applications of fungicides, a program that included protectants Bravo Zn and Manzate Prostick as well as the late blight specific materials Revus Top and Tanos. Forum and Stylet oil applications are being made on the crop as it awaits harvest, which is scheduled to start on Sept. 4th. We are very satisfied with how the crop looks and will provide data to seed growers on yields as we bring in the crop. All the greenhouses are now harvested and the minitubers are stored under refrigeration. The fall NFT production is in full swing. We will be sending out a seed report card with both fall and spring shipments of seed. Please take this opportunity to give us feedback or talk to Alex or Keith directly about your seed. Harvest has started on some commercial production in the Antigo area. Many growers will begin harvest following the upcoming holiday weekend.