Vegetable Crop Update #11
July 23, 2010

If you would like an electronic copy of the newsletter via email contact me at ajbussan@wisc.edu.

Events: Contact me for more information
July 27, Tuesday, Hancock Ag Research Station Field Day, 12:30 to 4:00 pm
July 28, Organic Vegetable Production Field Day, West Madison Ag Research Station, 1:00-4:00
August 10-11, Processing Snap Bean and Sweet Corn Demo, Hancock WI
August 12, Antigo Potato Field Day, Langlade County Airport Research Farm, Antigo, WI, 12:30-2:30

Hancock Agricultural Research Station Field Day Agenda12:30 – 2:00
Storage Research Facility Tour 12:30 – 12:45
12:30 – 12:45 Mary LeMere – Intro and current research update
12:45 – 1:00 A.J. Bussan – Sprout inhibition with new products
1:00 - 1:15 Paul Bethke – Sugar management in stored potatoes
1:15 - 1:30 Amanda Gevens – Disease management in stored potatoes
1:30 - 1:45 Russ Groves – Effects of biotic factors on stored potato quality
1:45 – 2:00 Jolyn Rasmussen – Ventilation effects on shrink in stored potatoes

Ground Water Tour – Welcome by Mary LeMere 2:00 – 4:00
2:00 – 2:05 Coordinated groundwater research – Jed Colquhoun, WISA Director
2:05 – 2:25 Groundwater, lake, and stream connections – George Kraft UWSP
2:25 – 2:45 Estimation of water usage in agricultural lands –Bill Bland and Sam Kung
2:50 – 3:10 Tracking and reducing agricultural impacts on water quality –Matt Ruark, Birl Lowery, and Russ Groves
3:10 – 3:30 Healthy Grown successes in IPM, reduced pesticide use and new directions -Deana Knuteson, Walt Stevenson, and Amanda Gevens
3:35 – 3:55 Water and irrigation management techniques – AJ Bussan, Alex Crockford and Mike Copas
4:00 – 4:10 Wrap up and future commitment - Molly Jahn, Nick George, and Duane Maatz,
4:10 – 4:45 Visit Demonstration Areas - New technologies for soil moisture monitoring; Understanding soil moisture data; New irrigation scheduling program; New energy and water conservation technologies on irrigation systems

4:45 – 5:30 Social Hour 5:30 Dinner

Vegetable Crop Update – A.J. Bussan, Department of Horticulture, UW-Madison, Tel. No. 608-225-6842, email: ajbussan@wisc.edu.

Rain and rain and rain. We are emerging from one of the wettest June and July’s on record. We saw some sunshine early this week, but rains continue to fall receiving between 2 to 6” more precipitation depending on where you are located. As a result, many crops are struggling due to poor root health and issues related to high humidity.

Potato. We certainly seem to have reached the late bulking period for a number of potato crops. Individual tubers of red and russet plants are quite variable with large potatoes (5 to 6 oz in size) occurring on the same plants with tubers around an inch in diameter. Vines have lodged and appear stressed in low spots and in wet fields. Early dying is beginning to appear in some locations, but we cannot be certain of the cause at this point. Unfortunately, some crops have simply drowned out in some areas.

Petiole numbers have dropped in response to high rainfall events requiring additions of supplemental nitrogen fertilizer in order to maintain crop health and promote continued bulking in long season potato crops. Recent rains will require continued monitoring of petiole nitrate levels and may require additional fertilizer. Recognize that we are fast approaching the time of year when supplemental N fertilizer will have little benefit on crop yield (45 d before vine killing).

Potato tuber size is fast approaching the correct size for timing MH30 applications. Apply MH30 during overcast conditions to minimize potential for crop damage. We have seen positive response in US No. 1 yields following MH in russet varieties such as Russet Burbank, Freedom Russet, and Gold Rush.

Seed growers need to watch tuber size on a number of varieties. The set and bulking have promoted the development of large potatoes under some varieties – especially round whites. Make sure to time vine desiccation in order to optimize tuber size distribution.

Processing crop. Pea harvest is wrapping up, but wet conditions provide challenges to harvest crews. Yield and quality is highly variable due to root rot pressure and warm conditions that rapidly promote over maturity. Snap beans are also being affected by wet conditions with root rot and white mold causing plant damage. Snaps should be cultivated to
promote adventitious root development. Pea and snap bean fields should be tilled after harvest to kill remaining plants and minimize the production of inoculum for future year’s crops.

**Cucumber, melons, and squash.** Several questions have arisen regarding the fruit set on the melon crops in particular. This seems to be most frequent on crops with lush vine growth. As you likely know, cucurbit crops are typically monoecious (separate male and female flowers) or andromonecious (male and perfect flowers). Some varieties have been developed that are gynoecious (female flowers only) especially in cucumber. High fertility, especially nitrogen, can promote excessive vegetative growth and promote the development of male flowers. This can lead to a delay in the development of female or perfect flowers and greatly delay pollination and fruit development.

We have also seen questions related to the health of the harvested crop. Cucumber, summer squash, zucchini and melon can be stored for up to 2 weeks with correct management. A key to healthy looking fruit after harvest is careful handling of the harvested crop. Any damage to the skin or rind of cucumber, summer squash, zucchini, or melon can lead to excessive moisture loss, disfiguration of the fruit, or infection by plant pathogenic fungi or bacteria that leads to rotten produce. Fruit should never be thrown or dropped during harvest or handling to minimize physical damage.

Storage management conditions to optimize cucurbit storage and harvest is listed below. Cantaloupe and summer squash should be cooled to 41 F within 12 hours of harvest and should be maintained at 95% relative humidity to prevent water loss and shrinkage and maximize storage time. Cucumbers can be stored at 50 F and also need to be stored at 95% relative humidity. Prevent accumulation of ethylene surrounding the fruit as this can lead to break down as well. Watermelon is the only crop that does not have to be cooled upon harvest and is not sensitive to ethylene.

<table>
<thead>
<tr>
<th></th>
<th>Temp (F)</th>
<th>% RH</th>
<th>Cooling Method</th>
<th>Storage (d)</th>
<th>Ethylene sensitive</th>
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</thead>
<tbody>
<tr>
<td>Cantaloupe</td>
<td>36–41</td>
<td>95</td>
<td>H,F</td>
<td>10–14</td>
<td>Y</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>50–55</td>
<td>95</td>
<td>F,H</td>
<td>10–14</td>
<td>Y</td>
</tr>
<tr>
<td>Summer squash</td>
<td>41–50</td>
<td>95</td>
<td>R,F</td>
<td>7–14</td>
<td>Y</td>
</tr>
<tr>
<td>Watermelon</td>
<td>50–60</td>
<td>90</td>
<td>N</td>
<td>14–21</td>
<td></td>
</tr>
</tbody>
</table>

F=forced–air cooling , H=hydrocooling, R=room cooling, N=no cooling needed

Sources: USDA Agricultural Marketing Service, Kansas State University Cooperative Extension Service

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**Reducing Potato Bruise Damage at Harvest - Ken Schroeder, Portage County Ag Agent, 715-346-1318, ken.schroeder@ces.uwex.edu**

As you gear up for the potato harvest, it is important to refresh in your minds all the important considerations related to bruising. The majority of the cost of producing the potato crop has already occurred by the time harvesting begins. Therefore, it is important to take that additional time and effort to ensure the crop goes into storage or processing in good condition. Mechanical damage and bruises caused by rough handling during harvest, trucking and piling into storage will increase storage rots, reduce quality and reduce the overall value of the crop.

The four main factors influencing the amount and severity of bruise are: soil conditions; tuber conditions; equipment maintenance, adjustment, operation, and modifications; and magnitude of impact. Maximizing the percentage of bruise-free potatoes involves harvesting under as nearly ideal temperature and soil moisture conditions as possible, as well as matching volume of material flowing through the harvester to its capacity. Soil needs to be moist, not too dry and not too wet. Tubers need to be mature with good skin set, properly hydrated for the temperature of tubers being harvested, and pulp temperatures should be between 45 and 60 °F. Minimum temperatures of 50 °F are important for varieties prone to shatter bruise.

**What about the harvester?** The most important factor influencing bruising is the ratio of **ground speed to conveyor speed**. Conveyors need to be kept full of potatoes or potatoes and other material (soil and vines). Harvester ground speed and conveyor speeds should be adjusted to be identical (this is also critical for windrowers). Proper **digger blade** angle and depth are important to ensure smooth flow of tubers and soil onto the primary conveyor and avoid slicing. Additionally, check individual **conveyor speeds** relative to preceding and following conveyors and adjust to maintain adequate loads without overloading and causing rollback. Be sure conveyor chain type and link pattern match soil type and operating conditions. **Deviner chains** need to be properly adjusted to prevent tubers from bouncing and tumbling upon entering the secondary conveyor. Bruising frequently occurs on harvesters and windrowers when tubers strike the
links of the deviner chain. Check *rear crossover chain* covering to be sure it is adequate and in good condition to reduce bruising. Due to the length and slope of the *side elevator*, tuber rollback and injury often occur. Flight intervals should be adjusted to minimize rollback. Use of hugger belts can also reduce tuber roll. Also check for tuber pinching along the edges. Reducing rollback on the *boom conveyor* can be accomplished by using hugger belts or installing flights with stiff ends every 12 to 16 inches.

Lastly, the harvester operator must keep the drop distance from the boom to the pile in the truck as short as possible without touching the pile. Use of electronic boom control devices will allow the operator to focus on other details that reduce bruising. Don’t forget, a significant amount of bruising injury can occur during truck unloading and piling.

For maximum bruise-free percentages, ALL people involved in growing, harvesting, packing, or shipping potatoes need to understand their role in minimizing bruising. For more detailed information on how to reduce bruising, see the University of Idaho Cooperative Extension bulletin 725 – Preventing Potato Bruise Damage.

**Vegetable Disease Update** – Amanda J. Gevens, Department of Plant Pathology, UW-Madison, Tel. No. 608-890-3072, Email: gevens@wisc.edu

**Potato Late blight:** Since the first reports of late blight in potato and tomato last week (July 14, 2010), there have been no additional confirmations in Wisconsin. While we anticipated additional finds in Marquette and Waukesha Counties, none have emerged likely due to high temperatures (>80°F) and average relative humidity of less than 70% in parts of southern and central WI until Wednesday evening. The late blight pathogen is favored by moderate air temperatures (60-80°F) and prolonged periods with relative humidity of ≥90%. Additionally, the use of preventative fungicides for disease control has greatly limited the occurrence of first and subsequent infections.

It is important to be vigilant in scouting for late blight. The best place to scout for potato late blight is in field corners and areas of fields that are sheltered by tree lines, or are often inaccessible to aerial pesticide application. It can be hard to find the earliest symptoms of late blight, especially when foliage is beginning to senesce and lesions are small and few in a large field.

In some areas, short season varieties may be nearing vine-kill. Allow 2-3 weeks between complete vine kill and harvest. Fungicide applications should be continued until vines are dead. When foliage dies, spores of the late blight fungus that remain on the foliage also die. This practice will prevent infection of tubers during harvest and development of late blight in storage.

The application of effective, preventative fungicides for late blight control is recommended on a 7 day interval. DSVs are over the threshold of 18 for all Wisconsin locations. Check [http://www.plantpath.wisc.edu/wivegdis/](http://www.plantpath.wisc.edu/wivegdis/) for information regarding fungicides or the University of Wisconsin Commercial Vegetable Production Guide A3422. The past several newsletters have included specific fungicides for application and can be located at the above website.

**Early blight:** Early blight pressure is great in some areas. The untreated susceptible checks in my trials at the Hancock Agriculture Research station are nearly defoliated as a result of early blight. As of July 19th, P-day values range from 291 (Antigo late emergence) to 520 (Hancock early emergence). Grand Marsh, Hancock, Plover, and Antigo have hit the 300 P-Day threshold for all but the late planting dates in Antigo and Plover. P-Days of 300 or greater indicate optimal temperature conditions for early blight activity. A list of commercial products and diseases they control can be found in the Commercial Vegetable Production in Wisconsin Guide A3422.

**Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Planted</th>
<th>Emergence</th>
<th>P-Day Cumulative</th>
<th>DSV Cumulative</th>
<th>Calculation Date</th>
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<tbody>
<tr>
<td><strong>Antigo Area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early 5/3</td>
<td>5/27</td>
<td>426</td>
<td>100</td>
<td>7/19</td>
<td></td>
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<tr>
<td>Mid 5/14</td>
<td>6/6</td>
<td>361</td>
<td>89</td>
<td>7/19</td>
<td></td>
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<tr>
<td>Late 5/26</td>
<td>6/16</td>
<td>291</td>
<td>61</td>
<td>7/19</td>
<td></td>
</tr>
<tr>
<td><strong>Grand Marsh Area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early 4/14</td>
<td>5/17</td>
<td>499</td>
<td>59</td>
<td>7/19</td>
<td></td>
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<tr>
<td>Late 5/5</td>
<td>5/23</td>
<td>458</td>
<td>53</td>
<td>7/19</td>
<td></td>
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<tr>
<td><strong>Hancock Area</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Early 4/18</td>
<td>5/7</td>
<td>520</td>
<td>65</td>
<td>7/19</td>
<td></td>
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<tr>
<td>Mid 4/28</td>
<td>5/15</td>
<td>507</td>
<td>56</td>
<td>7/19</td>
<td></td>
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<tr>
<td>Late 5/6</td>
<td>5/23</td>
<td>457</td>
<td>50</td>
<td>7/19</td>
<td></td>
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<tr>
<td><strong>Plover Area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Early 4/9</td>
<td>5/16</td>
<td>505</td>
<td>31</td>
<td>7/19</td>
<td></td>
</tr>
<tr>
<td>Mid 4/28</td>
<td>5/25</td>
<td>447</td>
<td>26</td>
<td>7/19</td>
<td></td>
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</table>

Late 5/28 0 0 10.98 144 61.-7.1(slantedc 85.38)4.4( )JJ/Cs6 cs 1 0 0 scn23.8743 0 TD.0027 Tc0 Tw{6171}
Visit our web site at [http://www.plantpath.wisc.edu/wivegdis/index.htm](http://www.plantpath.wisc.edu/wivegdis/index.htm) where you can find updated P-Day and Severity Value information throughout the growing season. Values in red indicate a value greater than the threshold (P-Day of 300 and DSV of 18).

**Tomato: Late blight:** Please see comments above in potato section for information on late blight occurrences in the state. To date, late blight has been identified on both potato (Marquette Co) and tomato (Waukesha Co) in Wisconsin. Appropriate fungicides can manage late blight, however, it is critical that fungicides are applied preventatively rather than after infection has been noted. Because field activities are many in tomato this time of the season, it is critical to observe the re-entry interval (REI) and pre-harvest interval (PHI) specifications on fungicide labels. A table summarizing these key intervals can be found at the “Late Blight” tab on the UW-Vegetable Pathology website: [http://www.plantpath.wisc.edu/wivegdis/](http://www.plantpath.wisc.edu/wivegdis/).

**Cucurbits: Downy mildew:** It has been over a week since the first reports of downy mildew on cucumber in Columbia and Dane Counties. No new reports have since emerged. There is moderate risk for the movement of spores to southern Wisconsin at this time. The website: [http://cdm.ipmpipe.org](http://cdm.ipmpipe.org) offers up to date reports of cucurbit downy mildew and disease forecasting information.

Because cucurbit downy mildew has been identified in WI and there is risk for spore movement, it is necessary to protect all cucumber, melon, and winter squash crops at this time. It is important to make selections of fungicides with known efficacy against cucurbit downy mildew. Downy mildew on cucumbers can quickly devastate a field, leaving foliage behind that resembles frost damage. Although downy mildew does not directly infect fruit, the loss of foliage results in exposed fruit that is susceptible to sunscald. Last week’s newsletter contained effective fungicide programs for cucurbit downy mildew and can be found in the archived newsletter at: [http://www.plantpath.wisc.edu/wivegdis/](http://www.plantpath.wisc.edu/wivegdis/). Effective fungicides for cucurbit downy mildew include: Gavel, Presidio, Previcur Flex, Ranman, Tanos alternated and tank-mixed with mancozeb or chlorothalonil. Further information on cucurbit downy mildew fungicides can be found in the Commercial Vegetable Production in Wisconsin Guide A3422 ([http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf](http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf)).

**Powdery mildew** on cucurbits is becoming problematic in some squash and pumpkin fields at this time. The progress of powdery mildew is about 3-4 weeks ahead of ‘normal’ schedule. With the advanced development of the crop and powdery mildew pathogen, controlling this disease is necessary to maintain fruit quality, quantity, and storability. While there is good varietal resistance in cucumber and watermelon, many pumpkin and squash varieties are susceptible to powdery mildew.

The timing of fungicide control measures is important, as some of the registered materials have reduced efficacy if applied after infection is well established. Among conventional fungicides labeled for squash and pumpkin powdery mildew, the following list includes those with good performance: Nova/Rally (myclobutanil), Procure (triflumizol), Pristine (pyraclostrobin + boscalid), Cabrio (pyraclostrobin), Topsis (thiophanate methyl), and Sovran (kresoxim methyl). It is recommended that the above-listed materials be tank-mixed and alternated with broad spectrum fungicides such as mancozeb or chlorothalonil to limit the development of pathogen resistance and to provide a fungicide program with a broad disease management scope. In organic production, there are products with some efficacy against powdery mildew: oils, bicarbonates, sulfur, and copper.

![Powdery mildew on cucurbit leaves (2 pictures on left) and spores of the powdery mildew pathogen (on right). Spores can be wind dispersed.](image)