This week we dug 10 plants per N rate/variety from our N trial for the third/last time before our scheduled vine killer application on 8/12.

In terms of total tuber set per 10 plants, for GoldRush, 40 lb N/acre led to the most tuber set but smallest average tuber weight, while 180 lb N/acre resulted in the highest set of tubers ≥6 oz. It is also noted that 300 and 360 lb N/acre also resulted in set of tubers ≥6 oz. For W9133-1rus, again 40 lb N/acre was
associated with higher tuber set but smaller tuber size, and 300 lb N/acre resulted in the highest set of tubers ≥6 oz.

For total yield, 180 lb N/acre led to the highest yield for GoldRush, followed by 300 lb N/acre; and 300 lb N/acre was associated with the highest yield for W9133-1rus, followed by 360 lb N/acre.

This week’s report wraps up our in-season digging for the 2019 potato early season variety trials (spacing trial and N trial). Please join me in thanking my outstanding group led by my lab manager Mack Naber for their hard work in the field, and instant data entry and analysis. The informative reports over the past six weeks would not be possible without their great effort.

From left to right: Jera Lopez, Evan Handowski, Trevor Crosby, Ophelia Tsai, Mack Naber, Guolong Liang, and me
Cucurbit downy mildew: No reports of downy mildew on cucurbits in Wisconsin at this time. The cucurbit downy mildew reporting and forecasting site [http://cdm.ipmpipe.org/](http://cdm.ipmpipe.org/) indicated new confirmations of downy mildew in MD, NC, PA, RI, SC, and VA during this past week. In 2019 so far, the site has documented confirmations in AL, FL, GA, MA, MD, MI, NC, NJ, SC, TN, and VA on various cucurbits. No apparent risk of movement of the pathogen to WI at this time. Please visit our [2019 WI Commercial Vegetable Production Guide](https://learningstore.uwex.edu/Assets/pdfs/A3422.pdf) for further information pertaining to the fungicides listed in this newsletter.

Phytophthora crown and fruit rot in cucurbits, tomatoes, and peppers. Phytophthora has been very aggressive and widespread this season in cucurbits (esp. cucumbers and yellow summer squash, but also evident in watermelon, winter squash, and pumpkins). Additionally, Phytophthora has been diagnosed in peppers as well as tomatoes and eggplant in a few locations. This disease is caused by the soilborne water mold (oomycete) pathogen *Phytophthora capsici*. You may recognize this pathogen genus as it is the same as the pathogen causing late blight in tomato and potato, however, it is a separate species. Phytophthora capsici has both of its mating types (A1 and A2) in all locations of presence and so produces soilborne, long term oospores in all sites. This condition makes this disease especially devastating due to its long term effects on farms, especially on varied vegetable farms which rely upon the income of high value specialty vegetables such as cucumbers, pumpkins, squash, watermelons, tomatoes, and peppers. Beans can also be a host to this pathogen, albeit a rather weak host and with infrequent field diagnoses. Due to its soilborne nature, this pathogen can readily spread from a ‘hot spot’ in a field to an entire field during flooding events such as those experienced in many parts of WI this past Fall 2018. The disease often is first noted in low lying, wet areas of a field with vine wilting and yellowing. Fruit typically show water soaking (darkened/wet areas) with prolific white pathogen sporulation when conditions are hot and humid with some free water below the foliar canopy.

If phenylamide fungicides (ie: mefenoxam, metalaxyl, such as Ridomil) have been used over the years on your farm, you may have resistance in the *Phytophthora capsici* population to this fungicide. My program tested several field locations back in 2010-2012 and we detected site specific resistance in a few locations of central WI. The pathogen doesn’t move far via its aerial spore structures (unlike late blight); field local populations are quite distinctive. Currently registered fungicides are listed in the A3422 Commercial Vegetable Production Guide for Wisconsin, organized by crop and Phytophthora crown and fruit rot. Cucumber is on page 98. [https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3422.pdf](https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3422.pdf)

Key fungicides for limiting Phytophthora crown and fruit rot for cucurbits include: Zampro, Ranman, Forum, Elumin, Tanos, Presidio, Aliette/Linebacker, Revus, Gavel, Orondis, Phostrol, Phosphite.

Once plants are infected, fungicides cannot reverse the disease. However, some fungicides have some curative/systemic activity that can limit sporulation and further spread of the pathogen within and between fields. It is important to till under infected/sporulating plants to limit inoculum development and further disease advancement. Non-host crop rotations, water management, and raised beds (with drip irrigation) can provide robust management along with preventative fungicides for subsequent years. In cases with high inoculum levels in soils and need to manage fields with less than 3 years of non-host crops, soil fumigation can provide substantial reduction in viable inoculum. Photos of symptoms/signs are included below.
To date, in Wisconsin we’ve diagnosed late blight on potato in Portage County (US-23 clonal lineage) on August 6, on tomato in LaCrosse County (US-23) on August 2, and on potato in Wood County (US-23) on July 17. US-23 has been the predominant strain type found in the US and WI in recent years. Most isolates of US-23 can be managed with phenylamide fungicides such as mefenoxam and metalaxyl. It is critical that susceptible potatoes and tomatoes in the Wood, La Crosse, and Portage County areas be treated with a combination of antisporulant and protectant fungicides to limit reproduction of the pathogen and new infections. **Antisporulants include: Orondis, Forum, Curzate, Tanos, Ariston, Previcur, Revus, and Ridomil.** Outside of WI, late blight was confirmed in TN, PA, and WA. In each of these three instances, the pathogen was of the US-23 clonal lineage. Late blight fungicides registered for use in Wisconsin are available at the UW-Potato & Vegetable Pathology website or at link: https://wivegdis.wiscweb.wisc.edu/wp-content/uploads/sites/210/2019/06/2019-Potato-Late-Blight-Fungicides.pdf The accumulation of DSVs this week ranged from 8 in Hancock and Antigo to 10 in Grand Marsh and 13 in Plover. The maximum number of DSVs per individual day is 4.

**P-Days are currently over 300 for all potato across locations and emergence dates.** Foliar fungicide applications are recommended to manage further spread and vine decline which can result in negative
tuber size and quality. Starting on page 219 in the A3422 Commercial Vegetable Production Guide for Wisconsin please find listing of registered fungicides for early blight caused by *Alternaria solani* and brown spot caused by *Alternaria alternata*.


**Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations** (Many thanks to Ben Bradford, UW-Madison Entomology; Stephen Jordan, John Hammel, & Samuel Meyer, UW-Madison Plant Pathology). A P-Day value of ≥300 indicates the threshold for early blight risk and triggers preventative fungicide application. A DSV of ≥18 indicates the threshold for late blight risk and triggers preventative fungicide application. Red text in table indicates threshold has been met/surpassed. Weather data used in these calculations comes from stations that are in potato fields. Data are available in graphical and raw data formats for each weather station at: [https://wivegdis.plantpath.wisc.edu/dsv/](https://wivegdis.plantpath.wisc.edu/dsv/)