Vegetable Crop Update

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

Division of Extension
University of Wisconsin-Madison

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Calendar of Events

December 3-5, 2019 – Midwest Food Producers Association Annual Convention/Processing Crops Conference, Wisconsin Dells, WI
January 26-28, 2020 – WI Fresh Fruit & Vegetable Growers Conference, Wisconsin Dells, WI
February 4-6, 2020 – UW-Madison Div. of Extension & WPVGA Grower Education Conference, Stevens Point, WI

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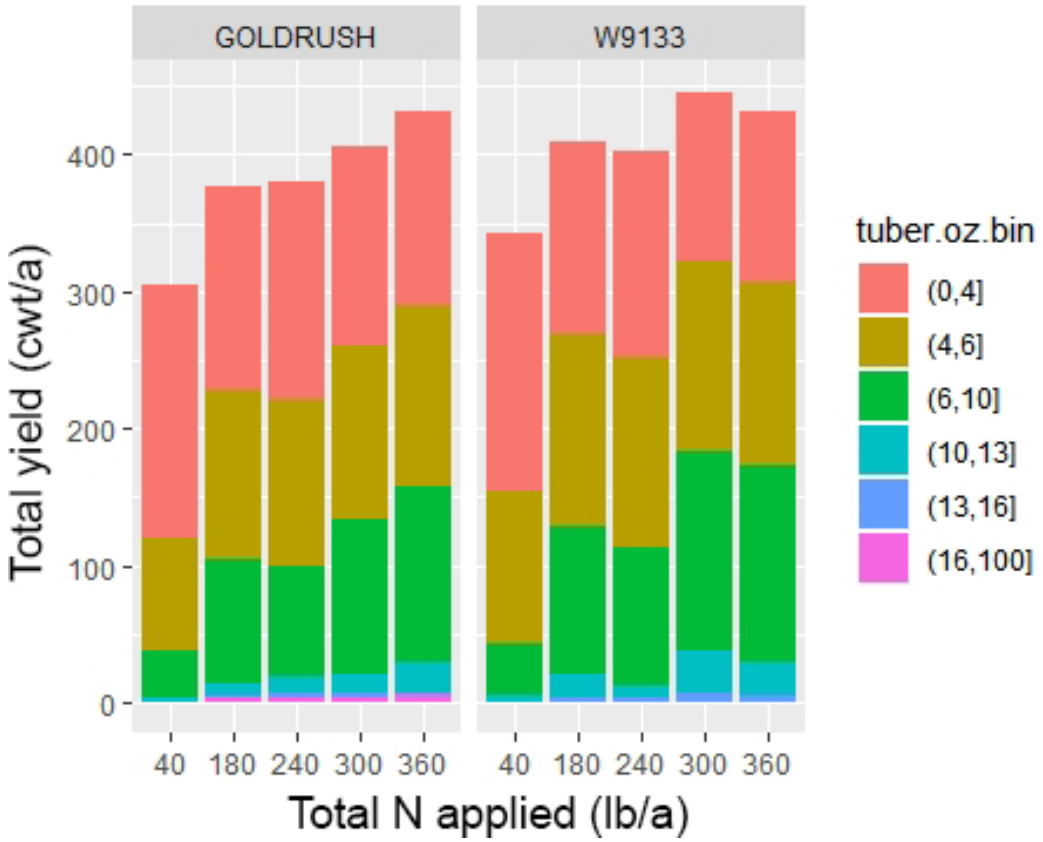
This week we harvested our early season russets (GoldRush and W9133-1rus) grown under different N treatments over the season. Seeds were put into ground on May 7th, emergence on May 25th, vine kill on August 12th, and final harvest on August 27th. The N treatments are shown below:

N rates (lb/A)	N application amounts and dates (lb N/A per application)
40	40 starter
180	40 starter + 80 hilling (May 29th) + 60 tuber initiation (June 13rd)
240	40 starter + 80 hilling (May 29th) + 120 tuber initiation (June 13rd)
300	40 starter + 80 hilling (May 29th) + 120 tuber initiation (June 13rd) + 60 early bulking (July 3rd)
360	40 starter + 80 hilling (May 29th) + 120 tuber initiation (June 13rd) + 60 early bulking (July 3rd) + 60 mid bulking (July 18th)

Graph below shows the total yield of the two varieties under different N rates:



Apparently, 40 lb N/a resulted in the lowest yield in both varieties, none of the tubers was larger than 10 oz, and most (at least 65%) were smaller than 4 oz. During grading we can easily identify tubers produced from this low N rate.

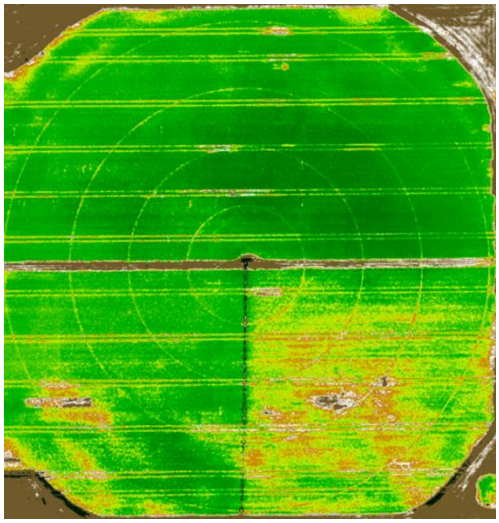
For GoldRush, we can see a yield response to higher N rates, 360 lb N/a led to the highest total yield (435 cwt/a) and the highest percentage of tubers ≥6 oz (36%). Interestingly, percentage of tubers ≥6 oz stayed between 30% and 36% across the four N rates 180, 240, 300, 360 lb N/a. Skin set was not ideal for neither N rates due to our short window between vine kill and final harvest.

For W9133-1rus, a yield response can also be observed, although in this case 300 lb N/a resulted in the highest yield (445 cwt/a) and percentage of tubers ≥6 oz (42%). Again no difference of skin set between the five N rates was noticed, none was perfect.

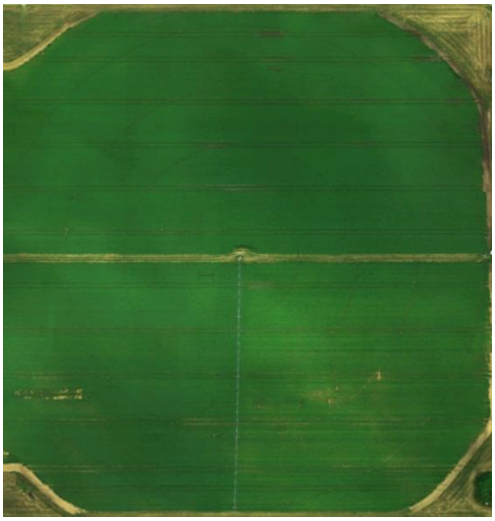
It is interesting to point out that average tuber set per plant was between 10 and 12 for both varieties across the five N rates. It seemed that lower N rate did not really affect the tuber set, instead it did not provide enough "energy" to the little tubers to bulk and turn into marketable size. Furthermore, we have not had a favorable season this year with the wet cloudy weather, which is another reason that we are getting overall poor marketable yield.

Graph below shows GoldRush vs. W9133-1rus produced under 360 lb N/a. We can see skinning on the tuber surface due to poor skin set. The light-colored russetting and blocky shape of W9133-1rus makes it another good candidate for the early season fresh market.

Another very exciting research study I would like to report here is our use of remote sensing in N management of commercial potato production. This summer we flew a UAV over a commercial potato field grown with two N rates. On August 8th, we can see that plants under 1/3 full rate shows stress-looking yellow color on the NDVI map (graph on left next page) compared to the green color of plants under full rate. NDVI directly indicates the N status of the crop canopy. In the conventional image of the field (graph on right), we cannot observe any difference between the two N treatments. The advantage of remote sensing is that it can cover the spatial variability of the field, and provide information that cannot be eyeballed. We are working on how to translate the remote sensing image into real-time yield map of the field.



NDVI map of the field



Conventional image

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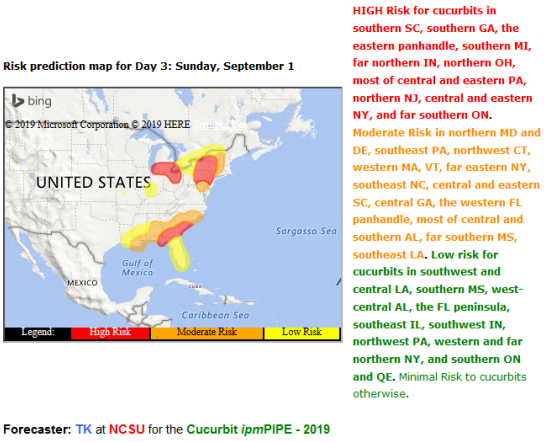
Cucurbit downy mildew: Vernon (cucumber; 8/20) and Dane County (butternut squash and pumpkin, 8/20) WI remain the only confirmed reports of downy mildew from over a week ago. No new WI samples have come through my lab or the Plant Disease Diagnostic Clinic. While downy mildew doesn't directly infect fruit, cucurbits that require several more weeks in the field could lose foliage, creating little/no sun protection for fruit resulting in sun scald. Additionally, plants infected with downy mildew often become more susceptible to other diseases esp. on fruit of late seasoning maturing hard winter squashes and pumpkins. Protection of cucurbits with use of effective fungicides is recommended at this time. **Visit our 2019 WI Commercial Vegetable Production Guide** for further information pertaining to the fungicides listed in this newsletter. https://learningstore.uwex.edu/Assets/pdfs/A3422.pdf The cucurbit downy mildew reporting and forecasting site http://cdm.ipmpipe.org/ indicated new confirmations of downy mildew in AR, CT, KY, MA, MD, MI, NY, OH, PA, SC, and VA this past week. In 2019 so far, the site has documented confirmations in AL, DE, FL, GA, IN, KY, MA, MD, MI, MO, NC, NJ, NY, OH, PA, RI, SC, TN, VA, and WI on various cucurbits.



The disease forecast, below, does not indicate risk of downy mildew movement within WI.

Potato & Tomato Late Blight Updates: Reports of late blight from both potato and tomato have been confirmed in a few additional counties this past week.

Date	County	Host Crop	Clonal Lineage
7/17/2019	Wood	Potato	US-23
8/2/2019	La Crosse	Tomato	US-23
8/6/2019 **8/15/2019** **8/22/2019**	Portage	Potato Potato Potato	US-23 US-23 US-23
8/13/2019	Monroe	Tomato	US-23
8/14/2019 **8/27/2019**	Adams	Potato Potato	US-23 US-23
8/14/2019 **8/15/2019** **8/19/2019**	Waushara	Potato Potato Tomato	US-23 US-23 US-23
8/14/2019	Vernon	Tomato	US-23
8/19/2019	Crawford	Potato	US-23
8/24/2019	Sauk	Potato	US-23
8/31/2019	Columbia	Tomato	To Be Determined

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 and around the counties of reports 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 NC (tomato US-23), NY (potato US-23), and PA (tomato) during this past week. In 2019, late blight had been confirmed in FL, NY, PA, TN, WA, and WI. 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

Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations - As potato fields are vine killed and harvested, our stations will be shut down for this season. Many thanks to Ben Bradford, UW-Madison Entomology; Stephen Jordan, John Hammel, & Samuel Meyer, UW-Madison Plant Pathology for maintaining stations and advancing data collection and processing in 2019. 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/

Location	***Planting Date***		**Emergence Date (50%)**	**Disease Severity Values (DSVs) 9/1/19**	**Potato Physiological Days (P-Days) 9/1/19**
Grand Marsh	Early	Apr 10	May 20	**129**	**751.51**
	Mid	May 1	June 1	**128**	**722.52**
	Late	May 20	June 9	**126**	**664.03**
Hancock	Early	Apr 10	May 22	**81**	**792.61**
	Mid	Apr 25	May 27	**80**	**756.71**
	Late	May 15	June 8	**78**	**667.19**
Plover	Early	Apr 22	May 27	**120**	**763.6**
	Mid	May 1	June 1	**120**	**729.2**
	Late	May 29	June 13	**118**	**638.98**
Antigo	Early	May 14	May 29	**67**	**652.65**
	Mid	May 24	June 8	**67**	**645.74**
	Late	Jun 1	June 20	**64**	**563.6**