Vegetable Crop Update

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

No. 21 – August 16, 2012

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Calendar of Events

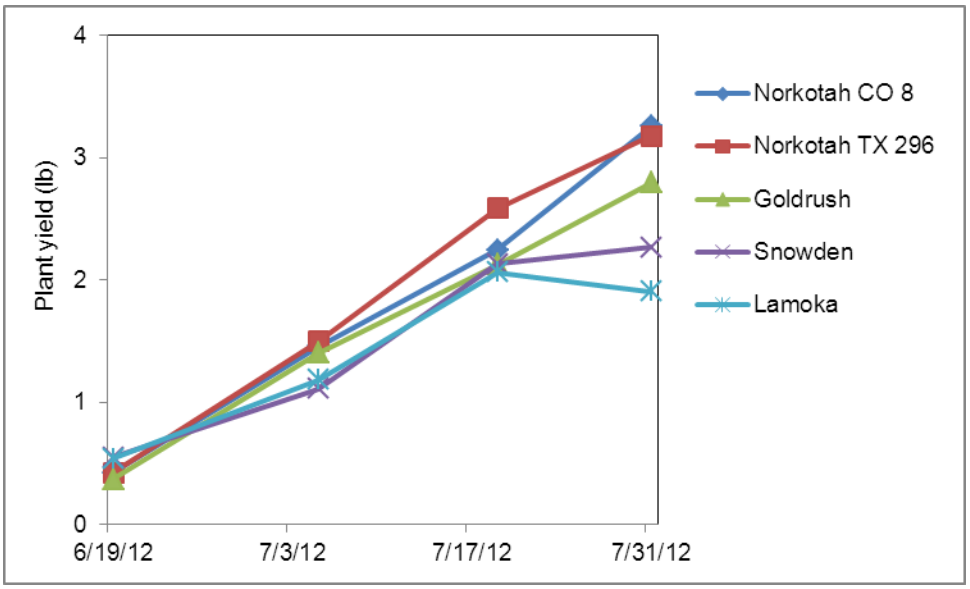
August 23 – UW-Langlade County Ag Res Station Field Day Antigo, 10:00AM – NEW DATE & TIME
October 24&25 – Hancock ARS-Storage Research Facility, Potato Variety Harvest Expo, 8AM-4:30PM

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 (nearly the center of the state from North to South), day length will be less than 14 hours per day by the end of the month. This has dramatic consequences for a number of crops as this will mean we no longer have light saturation for growth of many crops and plants. For example, tomato growth is maximized when day length is at least 14 hours long and as photosynthesis begins to decline longer time periods are required for crops to mature. For crops like potato and onion, the decrease in growth will result in decline of tops and vines and preparation for harvest as well.

Potatoes: Harvest season has begun for many growers harvesting chipping and processing potatoes, and of course fresh potatoes of all types direct to the processing plants or packing sheds. Yields appear to be quite good across the state, but there are some quality issues that have begun to raise concerns. Determinate crops, including Norkotah, are beginning to mature, but early samples suggest the yields are good and this in naturally occurring in many fields.

We have started larger scale bulking plots this summer to provide us with better yield and quality estimates. This experiment was planted during the last full week of April so please keep this in mind when making your own crop projections. Russet Norkotah CO8 total yield was 321 and 448 cwt/a on July 25 and August 6, respectively. Snowden total yield was 407 and 529 cwt/a over the same dates. Potatoes appear to continue bulking in a linear fashion at a rate of approximately 10 cwt/day. This is consistent with bulking of potatoes in small plots at the Hancock Ag Research Station.



Potato bulking has been in the linear growth phase since at least June 19. If we project 10 cwt/a/day growth current yields would suggest late bulking initiated approximately 45 d prior to August 6 or somewhere around June 15 to 20. Bulking graph above for Norkotah CO8 and TX 296, Goldrush, Snowden, and Lamoka would support that claim. It would appear that individual plants are increasing per plant tuber yield by 0.75 to 1 oz per day over the month of July.

Specific gravity of the CO8 was 1.067 and 1.072 on July 25 and August 6, respectively. These are reasonable specific gravities for Russet Norkotah and this is quite encouraging given the heat of the summer and potential impact this might have had on lowering specific gravity. The Snowden specific gravity was 1.075 to 10.76 over the same time span. The Snowden are still quite immature and solid content and thus specific gravity should increase as the crop matures.

Tuber set is quite high with about 9 to 10 harvested tubers per plant for CO8 an 9 to 11 harvested tubers per plant for Snowden. Tuber size distribution indicates the crop is still quite small with about 75% of CO8 tubers still less than 6 oz in size and 50% of Snowden less than 2" in diameter as of August 6. Average tubers size appears to be 4.5 to 5 oz. The tubers appear to be growing at about 0.1 oz/day based on a 10 cwt/a increase in yield per day. This year's crop needs about 15 to 20 good bulking days from August 6 to improve size distribution and value of the crop.

The crop canopies have begun to senesce in many regions of the state. Some of this is attributable to the natural maturation process and senescence of the crop especially in the case of the Goldrush and Norkotah line selections. There is some early dying that is also evident by the 'flagging' appearance of stems or necrosis or death of the leaflets on one side of the petiole in contrast to the other.

That said, daily water use is beginning to decline even in the indeterminate crops such as Russet Burbank, Bannock Russet, and Silverton indicated that the crops are fast approaching the last days of late bulking and will soon begin to mature. Even though canopies are green and lush, adjusted ET appears less than potential ET. This is evident by evaluating soil moisture prior to irrigation. Soils that should be near the critical point based on reported potential ET still have soil moisture as evident by staining of the hands from the clay and silt particles when forming a

ball. Again, some of this is due to early dying while in other cases this is simply the natural senescence of the crop.

Crop quality concerns do exist across the state and we have a long way to go to harvest conditions for storage. Warm temperatures may have triggered heat necrosis back when tubers were less than 1.5 cm in diameter. Hot soils with declining vines might dramatically increase respiration rates in the hills causing black heart. Furthermore, insect damage has been seen (wire worm) that is also triggering defects. Finally, specific gravity appears to be in decent shape, but continued bulking will be necessary to optimize gravity for processing and chip potatoes.

Processing crops: Cooler conditions during the later parts of July and first part of August has improved the quality of snap beans. There were issues with split set even under irrigated conditions a couple of weeks ago that seems to have disappeared. Yields are much more respectable for sweet corn and snap beans as well under irrigation.

Non-irrigated snap beans have begun to grow again. The lack of rain led to poor pollination and few pods for many snap beans planted during June. That said, recent rains in some regions have facilitated pollination and pod formation and potential for some yield. This is all dependent on the emergence of the crop, rainfall received, and continued favorable weather.

Fresh market crops: Many quality issues have continued to persist across different parts of the state. Many of these are linked to inadequate moisture through the pollination or fruit development phases of growth. Again, recent rains have dramatically improved harvest. Be aware, that the rains have caused many defects on fruit including:

Blossom end rot
Growth cracks
-subsequent infection by pathogenic bacteria or fungi
Grey wall in tomato
Sun burn in numerous fruiting crops.

Even watering is absolutely essential for avoiding these quality concerns in fresh vegetables. Recent rains likely promoted rapid growth that led to these and other defects.

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/

Potato Early Blight: Over the past 2 weeks, early blight has rapidly progressed in central and southern Wisconsin potato crops. Unmanaged early blight can prematurely defoliate the crop impacting yield and quality. Symptoms may vary as our survey has indicated presence of both classic, bull's eye dark brown early blight lesions in lower potato canopies (early blight), as well as smaller fleck lesions with slight bull's eye patterning on upper canopies (brown spot).

Potato and Tomato Late Blight: While we had a couple of days of warmer temperatures and dry weather, much of the state is entering a period of rainy weather with cool nights and moderate summer days. This cooler, wet weather is favorable for late blight. Be mindful of upcoming rain

when timing necessary protectant fungicide applications. 7-day programs are recommended for most of the state, with tightened 5-day programs for counties with infected fields. I am aware of no new reports of late blight in WI since the last newsletter was sent on 11 Aug 2012.

This past week there were several new late blight reports from CT (tomato), ME (tomato and potato), NY (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, and WI. 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. All we need to know is the county of sample origin, we do not need to have specific field or grower information associated with the sample. Identification of genotype at the county level would be very helpful. 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.***

Location	Planted	50% Emergence	P-Day Cumulative	DSV Cumulative	Calculation Date
Antigo Area	Early 5/1	5/30	527	46	8/11
	Mid 5/10	6/6	489	46	8/11
	Late 6/1	6/16	423	46	8/11
Grand Marsh Area	Early 4/3	5/8	647	48	8/11
	Mid 4/15	5/16	600	48	8/11
	Late 4/30	NA	545	47	8/11
Hancock Area	Early 4/1	5/1	723	28	8/11
	Mid 4/15	5/10	666	22	8/11
	Late 5/1	5/17	622	22	8/11
Plover Area	Early 4/3	5/17	651	42	8/11
	Mid 4/19	5/18	586	42	8/11
	Late 5/1	5/27	523	38	8/11

***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, CT, DE, FL, GA, IN, KY, LA, MD, MI, NC, NJ, NY, OH, PA, SC, VA, and Ontario Canada. **The newest reports within the**

past 7 days have been on cucumber, cantaloupe, winter squash, and Jack-o-lantern pumpkin with closest detects in northwestern IN (LaPorte Co.) on cucumber.

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 from the lower Lakes region into central sections of NY and PA; and in eastern KY / western WV / southwest OH. Moderate risk along the Gulf Coast and into the Southeast, through the southern Appalachians and mid-Atlantic states through eastern NY. Low risk for coastal SC / NC / VA, southern New England, and a few scattered areas in the Ohio Valley and South. Minimal risk to cucurbits in 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

Colorado potato beetle (CPB) – Persistence of the 2nd generation of Colorado potato beetle (CPB) can still be observed at several locations in central and northern Wisconsin. Most of the summer adults have emerged from the soil at this time and middle to later stage larvae can be found feeding in areas of the field where insecticide skips have occurred. Control of this second generation remains critical as many of these insects will become the parents for next year's 1st generation. Concentrations of adult and later instar larvae can be effectively controlled with insecticides containing the following active ingredients; chlorantraniliprole (e.g. Voliam Xpress), phosmet (Imidan), rynaxypyr (Coragen), spinetoram (Radiant).

Fall armyworm / Beet armyworm / Corn earworm – The appearance of young larvae of each of these 3 caterpillar pests signifies some risk for susceptible sweet corn. Armyworms are typically middle to late-summer pests in this crop as the insect normally overwinters successfully southern Florida and south Texas. The fall armyworm is a strong flier, and disperses long distances annually during the summer months until it finally reaches the upper Midwest. The life cycle is usually completed in about 30 days during the summer and the number of generations occurring in an area varies with the appearance of the dispersing adults. In Wisconsin, adults appeared in traps relatively early this season on strong, south-westerly breezes. In Wisconsin, where fall armyworm moths do not appear until early August, there may have been 1-2 generations this season. In corn, they sometimes burrow into the ear, feeding on kernels in a similar manner as European corn borer (ECB). Fall armyworm may also enter sweet corn by burrowing through the husk on the side of the ear, similar to ECB. The beet armyworm has a

wide host range, occurring as a serious pest of many vegetable, field, and ornamental crops. Among susceptible vegetable crops are asparagus, snap bean, beet, broccoli, cabbage, cauliflower, celery, sweet corn, eggplant, lettuce, onion, pea, pepper, potato, sweet potato, and tomato. Field crops damaged include alfalfa, corn, sorghum, soybean, and sugarbeet. Several weeds also are suitable for larval development. Continued flights of the corn earworm have been observed from the Wisconsin DATCP's, Pest Bulletin (http://datcpservices.wisconsin.gov/pb/), with adult moth captures registered in many locations throughout southern and central portions of the state. Recall that trap captures exceeding 10 or more moths for two consecutive nights indicates the need for protective treatment of silking sweet corn fields.

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Matt Ruark, and co-authors: Kevin Shelley, UW-NPM Program, Jim Stute, Rock County Extension, Francisco Arriaga, UW-Extension Specialist

Considerations for cover crops in 2012: With a growing season like we are having in 2012, it is likely that residual nitrate concentrations in the soil will be high, especially if corn was harvested early as silage or if yields are well below expected. One benefit of planting cover crops after corn silage, small grain, or a processing vegetable crop, or after a manure application is that the cover crop can take up residual nitrate and reduce the risk of nitrate leaching between harvest and planting. Other benefits of cover crops include reduction in soil erosion and weed suppression. This article focuses on using cover crops for nutrient conservation benefits rather than growing cover crops for forage. For tips on growing cover crops for forage see Winnebago County Agricultural Agent Nick Schneider's article on Emergency Forage Cover Crop Tips (http://go.wisc.edu/xvmh3a).

Government program and insurance considerations:

- The USDA-NRCS has announced additional funding through Environmental Quality Incentive Program (EQIP) to provide financial assistance to establish cover crops. The sign up for this program runs to August 24. It is important to note that this program does not allow for harvesting of biomass as forage (http://goo.gl/EvrQN). Another program, the Conservation Stewardship Program (CSP), has cover cropping as part of the program, but sign up was required at the beginning of the year.
- If deciding to grow a cover crop for forage, and mechanically harvest, you will not be eligible for some government programs and you may not be able to insure the subsequent crop.

Cover crops to trap nitrate. The ideal cover crops for a nitrate trap crop are grass crops that establish quickly, such as cereal rye (aka winter rye), oat, barley, annual ryegrass (aka Italian ryegrass), and sorghum-sudangrass. These cover crops also have a fibrous root system. Brassicas (e.g. radish, turnip, mustard) and legumes (clover, hairy vetch) will also take up residual nitrate, but do not establish as quickly. Radish has been popular cover crop in no-till systems and, if

planted early enough, radish can take up as much or more N compared to grass cover crops during the winter, but grass cover crops can scavenge N deeper into the soil profile. The radish will winterkill, while rye will continue to grow (and take up N) in the spring. Oats, barley, sorghum-sudangrass, and annual ryegrass will typically winterkill during Wisconsin winters. However, growers have noted that annual ryegrass can be difficult to control if it survives the winter and is not completely killed with tillage.

The planting timing and seeding density of these cover crops is very important for establishment. Our recommendations for seeding rates (drilled) are 90-112 lb/ac for rye, 15-20 lb/ac for annual ryegrass, and 80-110 for oat, 60-90 lb/ac for barley, and 35-40 lb/ac for sorghum-sudangrass. Apply toward the higher end of the range with later plantings (especially after Sept. 15th), in weedy fields, or if broadcast seeded. Grass cover crops are more likely to establish during the fall months, while legumes and brassicas need to be planted in summer months to ensure a quality stand. The NRCS Wisconsin Agronomy Technical Note provides some general, statewide recommendations for seeding rate and planting time for cover crop species (http://goo.gl/hXxMO).

Legume cover crops (i.e. green manure crops) will also take up residual N; high residual nitrate environments will cause nodulation to be delayed. However, if the goal is to trap N or grow a cover crop to provide soil conservation benefits, we would not recommend planting legumes. If the goal is to supply N to the subsequent crop, then legumes would be recommended. The N contribution from a green manure crop is called "nitrogen credits". This N credit means that when you terminate the legume prior to planting, you can reduce your N fertilizer by the value of the credit. The total amount of N in the biomass will be greater than the "credit", as not all of this organic N will be mineralized for the subsequent crop. The credit is based on field research, comparing optimum N rates when using green manures to optimum N rates when not using green manures. Late plantings of legumes are not ideal, as at least 6" of growth is needed to produce a predictable N credit.

Do we get the "trapped" N back? The N taken up by a cover crop is cycled back into the soil during the decomposition of the plant biomass. The release of N into the soil is, in-part, a function of the carbon to nitrogen (C:N) ratio of the plant material. In general, the decay of plant material with a C:N ratio between 20 to 30 results in no net contribution to, nor consumption of, plant available N. Plant material with a C:N ratio less than 20 can result in a net excess of N after microbial decomposition. As the microbes breakdown the material, N is produced in excess of what the microbes need to function, and thus, this N is available for plant uptake. As a result, the termination of a cover crop like red clover, which typically has a C:N ratio of 15, is equivalent to an application of 40 to 80 lb/ac of N fertilizer depending on plant height (Fig. 1). However, grasses and brassicas have a C:N ratio of 20 or greater, resulting in no net effect to available N. If the C:N ratio of the plant material is greater than 30:1, net immobilization can occur, meaning that N from the soil is consumed (i.e. immobilized) by microbes during the decomposition process, resulting in a decrease in plant available N. Grasses tend to increase in C:N ratio as they grow. For this reason, we recommend killing rye cover crops as early as possible in the spring to minimize any effect of immobilization.

The low C:N ratio materials (e.g. red clover) also breakdown much more rapidly compared to grasses and brassicas. This results in greater synchrony of N release with periods of high N uptake by the corn crop. Release of N from the grass crops does occur, but often occurs later in

the growing season, after peak N uptake rate for corn has occurred. Thus, we do not recommend taking an N credit for grass cover crops. However, the slow breakdown of grass crops, along with their higher C:N ratio, can lead to a greater contribution of organic material to the soil, which can increase the soil organic carbon and soil organic nitrogen content over time. The extensive root system also can lead to an increase in soil organic carbon in the subsurface soil, which can be beneficial for fertility and water retention. These types of soil building benefits will not be realized after only one year of cover cropping, but instead, is a long term effect of using cover crops as part of the cropping system.

There are tremendous benefits to water quality with growing a cover crop after manure application in the late summer or fall. It has been clearly shown that fall cover crops reduce nitrate leaching losses, especially on tile drained land (http://www.agry.purdue.edu/drainage/AY-04-01.pdf). While this trapped N will not likely become plant available the following year, as previously mentioned, there are other long-term benefits of trapping the manure nitrate in plant biomass and incorporating this biomass into the soil. If concerned about the amount of time required for application of both manure and cover crops, slurry seeding of cover crops has been shown to be a viable method (http://www.mccc.msu.edu/slurryseeding.html). The slurry seeding method creates a one-pass system where cover crop seeds are tank mixed with the manure. If interested, check out the link, especially the YouTube® videos.

Table 9.5. Green manure nitrogen credits.

Crop	< 6" growth	> 6" growth
	———— lb N/a to credit ————	
Alfalfa	40	60–100 [a]
Clover, red	40	50–80 [a]
Clover, sweet	40	80–120 [a]
Vetch	40	40–90 [a,b]

[a] Use the upper end of the range for spring seeded green manures that are plowed under the following spring. Use the lower end of the range for fall seedings.

[b] If top growth is more than 12 inches before tillage credit 110–160 lb N/a.

Figure 1. Green manure nitrogen credits for commonly used legumes in WI (Table 9.5 in A2809).

Figure 2. Corn field in Columbia Co. where rye was grown for forage and harvested 10 May (left) compared to a corn field where rye was not grown (right). Corn was planted on the same date. Picture taken on 29 June 2012.

There is also little, if any,WI-based data to support taking an N credit following radish. We do know that radish can take up a lot of N, but are less certain how available that N becomes the following year. Current research trials in Sheboygan, Washington, Rock, and Jefferson counties are being conducted to evaluate if the benefits of growing radish in WI.

What about water use? Another reason to kill the rye as early as possible in the spring is to minimize water uptake. In a year like 2012, severe yield losses on corn are expected on fields where rye was harvested as a forage crop in May (following a previous crop of corn silage). The deep, fibrous root system consumed too much subsurface water and with the drought conditions, this subsurface water was not replenished, thus creating a worse-case scenario for this type of double forage-cropping system (e.g. Fig. 2).

Popular options for cover crop use:
If interested in scavenging excess N, plant rye, oats, or ryegrass to get quick establishment and soil coverage. Of these three crops, only rye will survive the winter. Make sure you kill the rye as early as you can in the spring.
If interested in supplying N, grow a legume. An option that would be recommended through August 15th is planting berseem clover with a companion crop of oats. The oats will establish first and take up some of the excess N in the root zone, and if planted early enough, the berseem clover will establish nicely, outgrow the oats, and provide an N credit for the following crop. Oats/berseem can be planted in August, but good growth will depend on adequate moisture. A recommended seeding rate would be 8 to 10 lb/ac for berseem clover and 40 to 55 lb/ac for oats. Both the oats and berseem clover will winterkill.
If interested in experimenting, try radish or a combination of radish and winter pea. This will have the greatest benefit on no-till land. The addition of a legume to the mix increases the potential for an N credit, but, it should be noted that there is no data to indicate what an N credit would be from this cover crop mixture.

Antigo Potato Research Field Day Announcement

Alex Crockford, UW Seed Potato Certification Program

We welcome the public again to the Langlade County Research Station Field Day on Thursday, August 23rd at 9:30 a.m. The experimental station is operated by UW Extension with funding and support from the Wisconsin potato industry at the Langlade County Airport (corners of Hwy 64 and Hwy 52 just east of Antigo).

A seed potato grower industry portrait will be taken first to commemorate 100 years of seed potato certification in Wisconsin in 2013. All current and former seed potato growers are encouraged to attend. Following the picture, the tour will highlight potato research now on-going at the research farm.

UW faculty and local Extension staff have been working on several novel research projects. We continue to study the use of light oils to discourage aphid feeding, a main vector of a troublesome virus disease in potato (PVY). In addition to using these oils, this year's management trial includes treatments evaluating new insecticides, and studying the effects of using no systemic insecticides. Reducing the impact of this virus is of great importance to the local seed potato industry.

We are also evaluating dozens of new products across three trials that address other industry concerns. Products that we hope may improve vine killing, or reduce the severity of common scab, a new trial this year evaluates products with promise to reduce potato early dying complex. New potato varieties will be appearing in the Wisconsin Potato Variety & Advanced Selection Evaluation Trial.
Other topics at the tour will include a discussion on Colorado Potato Beetle insecticide resistance by Dr. Russ Groves, current season disease update from Dr. Amanda Gevens, and a weed and herbicide update from Dr. Jed Colquhoun.

Following the tour and program (complete agenda below) we will meet at the City Park shelter. Questions can be directed to Alex Crockford at 715-527-8939 or abcrockford@wisc.edu.

2012 Antigo Field Day, August 23rd

9:30 Group photograph for UW Seed Potato Certification 100th Year Anniversary (2013)

9:45 Load Wagons

10:00 Program begins in field

Vegetable Pathology Update
. The effect of tillage practices on Fall bed fumigation with Pic Plus
Dr. Amanda Gevens, UW-Plant Pathology and Alex Crockford, UW Seed Potato Certification.
. Potato Early Dying product efficacy trial, Dr. Amanda Gevens

Breeding Program Update
. Wisconsin Variety and Advanced Breeding Line Trial
Bryan Bowen and Mary Lemere, UW Ag Research Stations
. Grower/Industry Variety Evaluation Day (October 2012)

Vegetable Entomology Update
. PVY symptom plot, Dr. Amy Charkowski, A. Crockford, R. Hafner, UW Seed Potato Certification
. Best management practices to limit PVY using combinations of foliar protectants
Dr. Russ Groves, UW -Entomology and Alex Crockford, UW Seed Potato Certification
Weed and Herbicide Update
. The evaluation of potato vine dessicants
Dr. Jed Colquhoun and Dan Heider, UW-Horticulture

Potato Production and Storage Update
. Evaluation of fresh market russet and red-skinned varieties
Dr. A.J. Bussan, UW-Horticulture

Common Scab Work
. Potato Common Scab Fungicide Efficacy Trial
Bryan Webster, Amanda Gevens, UW-Plant Pathology & A. Crockford, WSPCP
. Breeding for Resistance to Common Scab in Potato
Sarah Braun, Ph.D. Candidate, Jansky