



Vegetable Crop Update

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

No. 16 – July 11, 2012

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Calendar of Events

**July 13 – UW-
Rhineland Ag Research
Station, Potato Tour,
10AM-2PM**
July 24 – UW-Hancock Ag
Research Station, Field
Day, 12:30-4:00PM
August 2 – UW-Langlade
County Ag Res Station
Field Day Antigo, 1:00PM

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

Potatoes: The slight cooling should provide a large benefit to the potato crop, especially the lower night time temperatures. When low temperatures exceed 70°F we tend to see decreases in potato bulking rates that ultimately lead to reductions in the solid content, or specific gravity of the potatoes.

In addition, as we begin to accumulate days with high low temperatures in excess of 70°F, we tend to see changes in sugar content of potatoes as well. During early bulking we tend to see increases in sugar end defect in processing potatoes. If the warm temperatures occur during late tuber bulking we tend to see increases in stem end defect. Over the past 2 weeks we have accumulated more than 8 days with lows greater than 70°F. Continued warm conditions will increase the likelihood that stem end defect will be an issue in chipping potatoes.

There have been reports of heat necrosis in several potato varieties in Central Wisconsin as well. Heat necrosis occurs when cells in the cortical tissues die in response to heat stress. Tubers are especially sensitive to heat necrosis during tuber initiation or early bulking or when tubers are 1 to 3.5 cm in diameter. Heat stress is caused if soil temperatures exceed 50 to 60°F for 5 consecutive days. We definitely had soil temperatures in excess of 60°F as we had 10 days with low temperatures that were greater than 65°F from May 15 to June 15.

More specifically, Wisconsin experienced nightly low temperatures greater than 50°F every night from May 23 to May 29 and June 8 to June 11. Many fields initiated tubers by May 15 in Wisconsin. Depending on the potato variety, many fields likely had potato tubers 1 to 3.5 cm in

diameter at one or the other or both dates. Scout tubers to determine if heat necrosis is an issue to prepare for decisions with regard to marketing or sorting potatoes.

Fresh Market Vegetables: Most of Southern Wisconsin is in severe drought. At the Arlington Ag Research Station, total precipitation has been 0.58 inches since May 1 with no appreciable precipitation in 3 weeks. The lack of precipitation and drought conditions are most prevalent in the Southern half of Wisconsin. Limited precipitation has fallen south of an imaginary line running from near La Crosse to Green Bay, although this is variable across the state.



Combined with the lack of precipitation has been very warm temperatures. Daily high temperatures have exceeded 85°F with clear skies and low humidity every day for the past 3 weeks. Water use for the past month has been estimated at 7-10" with potential ET of 0.25 to 0.30" every day for the past 3 weeks. Vegetable crops with rooting depth of 2-3' including tomato, pepper, melon, summer squash will be under severe drought stress without irrigation. The result of this stress includes tapering of fruit from the stem to the bud as seen in the image on left. Symptoms on other crops include fewer fruit, smaller harvested crops, and cracked skins.

Many farmers are irrigating vegetable crops. Application of irrigation water after skins are cracked due to drought effects on vegetables will lead to rapid growth and rupturing of the fruit leading to visible growth cracks. Inconsistent irrigation and drought conditions can also limit the movement of calcium to the fruit. This ultimately leads to weakened cell walls that ultimately rupture and then can become infected by bacteria. This is commonly seen as blossom end rot. Many folks may treat crops with foliar calcium fertilizers to overcome this affect. The reality is, the best way to manage fruit cracking, blossom end rot, and tapered fruit is to irrigate evenly and adequately (see Matt Ruark's article on blossom end rot in this newsletter).

So how much water do the crops need? Right now, crops are using about 1" of water every 3 to 4 days depending on ET. Therefore, to meet crop needs growers need to apply 27,000 to 30,000 gallons of water every 4 days to meet crop water demands. What is the best way to recover? If your crops are on medium to fine textured soil (silt loam), apply an inch of water (27,000 gallons/acre) over the course of 1 to 2 days. After 48 hours, apply another inch of water within a 1 to 2 day period. Once soil moisture is recovered then apply 1" of water per acre every 4 days.

Many farms may have limited water pumping capacity. In the current season, irrigation will need to be prioritized to crops with the highest value and shallowest rooting depths first. **At this point, onion, tomato and pepper crops should be prioritized for irrigation. Melon, sweet corn, winter squash and pumpkin should follow in priority in order listed.**

Irrigated acres: Current crop prices are reflecting large potential shortages in grains and forage crops. Given the current growing season, soybean or field corn could be planted on early

harvested vegetable crops under irrigation or in areas of Northern Wisconsin with adequate moisture (although shorter growing seasons may limit productivity).

The University of Wisconsin - Team Grains have produced resources to guide mid to late summer planting of soybean and field corn.

Field Corn: Comments from Joe Lauer regarding double cropping field corn. 'Double-cropping corn under irrigation after wheat or peas could work well. In most years, I don't think we would have enough GDUs to grow corn to the point of regular silage. This year we might.

So the best option is to plant a long-season corn hybrid and try to maximize quality at flowering.

<http://corn.agronomy.wisc.edu/AA/pdfs/A042.pdf> (Figure 1)

<http://corn.agronomy.wisc.edu/AA/pdfs/A057.pdf>

<http://corn.agronomy.wisc.edu/Research/03DOP/Late2006.pdf>

<http://corn.agronomy.wisc.edu/Research/03DOP/Late2005.pdf>

Soybean: Shawn Conley felt soybeans planted under irrigation by mid July could produce 20+ bushels. He indicated seed might also be available for late planted crops making this a value proposition given current crop values. He provided the following link:

<http://soybean.uwex.edu/documents/DoubleCropSoybean.pdf>

Also recognize that crop residues, waste materials, or by-passed crops might have substantial feed value relative to many years. If crops have been by-passed and no pesticide residues are present on the crop that cannot be fed to livestock, contact local extension to facilitate potential harvest of crops for feed.

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Determinate vs. Indeterminate Varieties and Characteristics in Potato (written with A.J. Bussan, UW-Horticulture): Two weeks ago we provided an alternate nitrogen (N) management plan for indeterminate potato varieties based on petiole nitrate tests and potential harvest date. Questions have arisen related to how we are defining determinant and indeterminate growth for potato and which potato varieties are in each category. A common distinction is related to vine growth. For determinant varieties, vine growth ends at flowering, while indeterminate varieties have a slowing of vine growth. Supply of N to indeterminate varieties at flowering will promote additional vine growth and delays vine senescence. Adequate supply of N well into the growing season will benefit indeterminate varieties, as tuber bulking can continue to occur while vines are green. This is also why adequate N early in the season for determinant varieties is so important. Rescue applications of N are not as beneficial because the tuber yield has already been established at the time of flowering. Some potato varieties have indeterminate growth habit, but only bulk for a given period of time through the growing season and therefore behave like determinant potatoes. For example, Russet Norkotah will respond to supplemental

nitrogen fertilizer after flowering, but the vines typically senesce and the crop stops bulking prior to September.

Table 1. List of indeterminate and determinate potato varieties.

Indeterminate	Indeterminate, but behaves like a determinate [†]	Determinate
Russet Burbank	Russet Norkota	Yukon Gold
Snowden	Gold Rush	Norland
Bancroft Russet		Superior

[†] From a nitrogen management perspective, these varieties will respond to late-season N, as they are indeterminate, but bulking ends much earlier in the season.

Split-pivot trials comparing polymer coated urea and conventional fertilizer (written by Matt Ruark and Mack Naber, Associate Research Specialist: We are currently evaluating the performance of a controlled-release nitrogen (N) product on potato at the commercial field scale. Previous years' plot research has shown a potential benefit of using controlled-release products, but inconsistent results at the field level have been noted. In addition, there is evidence that petiole nitrate concentrations will need to be interpreted differently if using controlled-release N, or more specifically, polymer-coated urea (PCU). The PCU product being evaluated is ESN® (produced by Agrium Advanced Technologies).

A trial was conducted on Russet Burbank where half of a pivot received PCU as the primary N source and the other half received conventional applications. Both halves received 20 lb-N/ac in starter (April 13) and 77 lb-N/ac as 32% UAN (May 9). The PCU half also received 132 lb-N/ac as ESN® and 46 lb-N/ac as urea on May 9. The conventional fertilizer half pivot received 58 lb-N/ac on May 31 as a custom liquid (29% N).

Petiole samples were collected **30 days after emergence (DAE)** (June 7). At this point in time, the PCU half had received 275 lb-N/ac (all of the planned fertilizer) and the conventional had received 155 lb-N/ac. Petiole nitrate concentrations averaged **2.23% in the PCU half and 2.19% in the conventional half**. Both of half pivots were within the optimal range for 30 DAE (2.0 to 2.3%). At this point in the growing season, the ESN® appeared to be supplying N in a similar manner to the lower rate of conventional fertilizer.

Petiole samples were also collected **45 days after emergence** (June 22). The conventional half pivot received another 30 lb-N/ac on June 15 as a custom liquid (29% N); a total of 185 lb-N/ac was applied to the conventional half and 275 lb-N/ac was applied on the PCU half. The petiole nitrate concentrations for **PCU and conventional were both 1.5%**, which would still be in the optimum range (40 DAE: 1.7-2.2%, 50 DAE: 1.2-1.6%). So, by 45 DAE, the PCU has maintained a similar N supply to the potato as split applications of conventional fertilizer. Previous years' results have indicated that petiole nitrate concentrations may be lower than the optimum range when using PCU because of the low, yet consistent N supply by the product. However, with this year's growing conditions, it appears that the PCU has maintained petiole concentrations in the optimum range. It is important to note that previous studies have focused on using PCU as the sole N source, while the 2012 trial has only 50% of the N applied as ESN®. Petioles will continue to be monitored at 60 and 75 DAE to see if the trend continues. With the

high temperatures, we will want to know if the PCU is continuing its release rate at a desirable pace.

Blossom end rot in tomato and pepper (Matt Ruark): At a field day on Monday evening, growers brought several peppers that had blossom end rot. I asked the crowd how many of them were experiencing the same thing in their fields and about half of the audience raised their hand. Blossom end rot is a common physiological symptom that destroys fruit quality in tomato and pepper. A thorough description of symptoms in tomato can be found here:

<http://hort.uwex.edu/sites/default/files/Blossom%20End%20Rot.pdf>

Blossom end rot is associated with calcium (Ca) deficiency in the fruit. There are two mechanisms that will cause this, lack of Ca being taken up by the plant or lack of movement from Ca in leaf tissue to fruit. Lack of plant uptake can be caused by low soil test calcium in the soil, but this is unlikely for most soils in WI. Other things that can reduce Ca uptake are lack of root exploration in the soil (low root density) or lack of water movement to root (essentially anything that would prevent Ca from getting into the root. However, if using drip irrigation it will not likely be low Ca uptake from the soil. The blossom end rot occurring among fresh market growers in eastern WI is likely caused by Ca not moving from leaf tissue to the fruit.



Standard drip irrigation scheduling every other day, or even once a day, may not have been sufficient to prevent water stress during fruit development. Calcium is notoriously difficult to translocate in within the plant if water stress occurs. If the hot temperatures return without rainfall, it will be beneficial to supply water several times a day. But do not flood the soil, or to keep the soil saturated, but simply prevent the soil from drying out and causing water stress in the plant. The goal is not to over-irrigate, but to more efficiently irrigate.

On Left: Blossom End Rot of Pepper. Photo taken by M. D. Ruark, Pardeeville, 7/9/12.

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/>

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

Location	Planted	50% Emergence	P-Day Cumulative	DSV Cumulative	Calculation Date
Antigo Area	Early 5/1	5/30	276	14	7/9
	Mid 5/10	6/6	238	14	7/9
	Late 6/1	6/16	171	14	7/9
Grand Marsh Area	Early 4/3	5/8	419	13	7/9
	Mid 4/15	5/16	372	13	7/9
	Late 4/30	NA	316	12	7/9
Hancock Area	Early 4/1	5/1	476	15	7/9
	Mid 4/15	5/10	418	9	7/9
	Late 5/1	5/17	375	9	7/9
Plover Area	Early 4/3	5/17	433	17	7/9
	Mid 4/19	5/18	368	17	7/9
	Late 5/1	5/27	305	13	7/9

P-Days and Early Blight: All plantings of potatoes in Central WI have P-Day values exceeding the threshold of 300 of this time. Early and mid-plantings in the Antigo area are approaching the threshold of 300. Fungicides for early blight control should be applied in Southern and Central Wisconsin on all susceptible cultivars of potato at this time. An accumulation of 300 P-Day values indicates a time at which early blight is favored and first infection may occur.

While it has been dry and hot, *Alternaria* species can take advantage of moist microclimate effects of a closed potato canopy. Maintenance of irrigation and fertility for healthy plants further supports early blight control.

DSVs and Late Blight: We continue to have a slow and steady accumulation of DSVs at all sites. Earlier plantings in the Plover and Hancock areas are approaching 18 DSVs. An accumulated DSV of 18 indicates time to initiate fungicide applications for late blight control. While it has been hot and dry, overhead irrigation coupled with microclimate effects of a closed canopy and cooler nights may promote prolonged periods of leaf wetness, favoring the promotion of late blight if the pathogen is present.

There are no reports of late blight in Wisconsin at this time. This past week there were a few new late blight reports from MA (tomato), NC (tomato), and ME (tomato and potato, first report for 2012 production season). To date this production year, late blight has been reported in CA, CT, FL, MA, ME, NC, NJ, NY, PA, and VA. 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.

Cucurbits: Cucurbits have been relatively disease-free this season so far, with the greatest challenge to the crop being delivery of adequate irrigation. Denser plant canopies and cooler nights may begin to promote disease in cucurbits. Fields were experiencing bacterial wilt over the past few weeks.

Cucurbit Powdery mildew: Some reports of early symptoms of powdery mildew have come from the west side of the state, but I have not seen any in fields I have visited myself. In most years, cucurbits can tolerate some powdery mildew without need for fungicides. However, when powdery mildew comes early, some cucurbits, particularly pumpkins, may need protection from a fungicide. The use of fungicides for controlling this disease may be necessary to maintain fruit quality, quantity, and storability if disease level becomes high and you're raising a susceptible variety. 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), Topsin (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.

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, DE, FL, GA, MD, NC, NJ, OH, PA, SC, and VA. **The newest reports within the past 7 days have been primarily on cucumber with closest detects in MI and Ontario Canada.** I will be keeping tabs on disease reports in the region and will provide updates in this newsletter. No forecasted risk of movement of spores from southern and eastern states to Wisconsin at this time. Disease forecaster, Tom Keever of North Carolina State University reports, “there is low risk for cucurbits near the Michigan source.” The website: <http://cdm.ipmpipe.org/> offers up to date reports of cucurbit downy mildew and disease forecasting information.

Potato blackleg: is caused by *Pectobacterium carotovorum*, formerly *Erwinia carotovora*. Symptoms of blackleg were observed on several potato varieties throughout the state this past week. Infection of seed with blackleg can result in various symptoms including poor emergence, chlorosis, wilting, tuber and stem rot, and darkened or black slimy stems, and death. Blackleg inoculum can come from infected seed, infested soil, infested irrigation water, and by insects.



Blackleg is promoted by cool, wet conditions at planting and high temperatures after emergence. The blackleg pathogen is in the soil wherever potatoes are grown. Levels of infection are dependent upon seed-handling/cutting techniques, soil moisture and temperature at planting and emergence, cultivar susceptibility, severity of infection of seed, and potentially, amount of bacteria in irrigation water, cull piles, or other external sources. Sanitation and disinfesting of potato cutting equipment and proper handling reduces spread and aids in control of the pathogen. Treating seed to prevent seed piece decay by fungi can also contribute to blackleg control. Since the pathogen does well in cool, wet soils, avoid planting in overly wet soil. Crop rotation away from potato for 2-3 years will help control this disease as the bacterium causing blackleg does not survive well outside of the potato. While seedborne or vascular black leg cannot be reversed with applications of fungicides, spread of the bacterial pathogen from infected to healthy plants and aerial stem rot may be managed in the field with fungicide tank-mixes which contain copper. Most often, conditions which favor plant to plant spread include high winds and driving rains. While we have not had such rainy conditions, we have had wind and overhead irrigation which may promote this condition.

This year, almost all of the black leg I have seen appears to have come from the seed, as blackening of the vascular system is evident in the lowest of stem sections just below the soil line. In some cases, no blackening is evident externally, but wilted, necrotic plants exhibited blackened, slimy vascular systems when stems were cut open.

Field control of aerial stem rot is challenging. Copper containing fungicides such as Kocide can provide some control of aerial stem rot, and can aid in managing bacterial infection after the crop has suffered hail damage. However, note that results of these approaches have had varied success throughout the U.S. In recent work by Dr. Dennis Johnson of Washington State University, the famoxadone+cymoxanil (Tanos) plus mancozeb tank-mix alternated with

mancozeb+copper hydroxide (ie: Kocide) was an effective chemical tool in reducing aerial stem rot in potato. Irrigation management to reduce excess water also greatly enhanced control of aerial stem rot. Copper hydroxide applications alone did not have as effective of control as Tanos+copper hydroxide. As Tanos is also an excellent late blight control material, its use as we approach DSVs of 18 at this time offers an appropriate and effective program for control of both diseases.

Preparing for onion disease control: I have seen few diseases in onions so far this season. I have seen some thrips silvering, drought stress, and what seems to be heat damage or sunburn (bleaching/silvering). However, growers are planning ahead for what may come if weather trends should change. I have provided an overview here of common diseases and fungicides for Wisconsin onion. Common onion diseases include Botrytis leaf blight and Botrytis neck rot caused by *Botrytis squamosa* and *B. allii*, purple blotch caused by *Alternaria porri*, downy mildew caused by *Peronospora destructor*, and bacterial diseases such as Xanthomonas leaf blight (*Xanthomonas axonopodis* pv. *allii*) and soft rot (*Erwinia* or *Pectobacterium carotovora*) (Fig.1). Production techniques to avoid mechanical and insect damage in the onion crop contribute to disease management.

There are currently over 50 fungicides registered for use on onions in Wisconsin and selection of appropriate materials can be confusing (<http://www.plantpath.wisc.edu/wivegdis/> Go to: 'Slide Sets': 'Fungicides' and 'Fact Sheets' for more info). Broad spectrum protectant fungicides with good disease control are chlorothalonil (for Botrytis leaf blight, purple blotch) and mancozeb (for downy mildew). Disease control is enhanced when applications of protectants are alternated with applications of materials such as the strobilurins (ie: Quadris, Cabrio, Reason, Pristine), Scala, Rovral, Switch, and Omega (in work from Dr. Mary Hausbeck, Michigan State University). Weekly applications of mancozeb have been shown to provide protection against downy mildew when spray coverage is good and applications begin before disease appears. Pristine, Ridomil MZ, Quadris Top, and Inspire Super are also good downy mildew materials and can be used in alternation with mancozeb (Hausbeck). Copper-containing materials (ie: Kocide, Champ) are the only true bactericides for limiting diseases such as soft rot and Xanthomonas leaf blight. Coppers must be applied with good coverage and before disease appears to be most effective. Non-ionic surfactants can aid in improving coverage. Please note that Valent has removed onion from the Presidio (fluopicolide) label for this production season.



Figure 1. Symptoms and signs of common onion diseases in Wisconsin. Left, downy mildew, note gray pathogen sporulation; Right, bacterial soft rot, rot has spread from neck into onion bulb.

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>

Potato leafhopper – Potato leafhoppers populations continue to persist in many crops, especially those which have not received an at-plant neonicotinoid in-furrow or seed treatment. Untreated potato at the Arlington Agricultural Experiment Station have sweep net counts now exceeding 12.5 adults / sweep and at the Hancock Agricultural Experiment Station, populations are averaging 7 adults / sweep in our untreated control plots. The adult potato leafhoppers are small (1/8 inch) wedge-shaped, bright green insects that inject a toxic saliva that causes injury to many plants. Leafhopper feeding will cause leaf edges to curl and turn yellow, and leaves will eventually brown and die. This “hopperburn” is most serious on potatoes, dry beans, and snap beans.



Two potato leafhopper nymphs on the undersurface of a leaf

Fields must continue to be scouted on a weekly basis to monitor for this pest and decisions made to treat to avoid significant yield and quality losses. The potato leafhoppers are best sampled with a sweep net. For potatoes, take 25 sweeps with a sweep net per sample site, and carefully turn over 25 leaves per sample site. Select leaves from the middle portion of the plant. Use at least 10 sample sites per 100 acres. Control measures are recommended when a field averages one to two adult leafhoppers per sweep and there are more than 15 nymphs per 25 leaves, or if there are three or more adult leafhoppers per sweep and nymphs are present. For snap beans, take 25 sweeps per sample site with at least 10 sample sites per 100 acres scattered throughout the field. Nymphs are less mobile and are best scouted by leaf samples. Carefully turn over 25 leaves per sample site and count nymphs. Select leaves from the middle of the plant and use at least 10 sample sites per 100 acres. If counts exceed one leafhopper per sweep and one nymph per 10 leaves, then control measures are recommended. Consult the Vegetable Entomology webpage for more details on selected methods of insecticidal control to limit potato leafhopper (<http://labs.russell.wisc.edu/vegento/files/2012/05/A3422.pdf>).

Colorado Potato Beetle - Emergence of the 2nd generation of Colorado potato beetle (CPB) continues in central Wisconsin with egg deposition beginning and the appearance of early larvae will soon follow. We can expect to see adult emergence from the soil and egg laying for the next 10-14 days. In northern Wisconsin, the emergence of the 2nd will begin in another 10-12 days, depending upon prevailing weather conditions. Recall, it is necessary to avoid the consecutive use of a single product, or multiple products with these similar MoA's. The Insecticide Resistance Action Committee (IRAC) has developed and updates a Mode of Action (MoA) classification system with a guide to the selection of insecticides or acaricides (<http://www.irac-online.org>). As stated in past newsletters, do not reduce or increase rates from manufacturer recommendations as this can hasten resistance development. Use products at their full, recommended doses. Reduced (sub-lethal) doses quickly select populations with average levels of tolerance, whereas doses that are too high may impose excessive selection pressures. Depending upon the sequence of materials and associated chemical mode-of-action class used for early-season CPB control, adequate control of the 2nd generation can be achieved with the

newer registrations containing rynaxypyr (e.g. Coragen) and chlorantraniliprole (e.g. Voliam Xpress). If no Class 4A compounds (neonicotinoids) were used in early season CPB control, several foliar registrations offer excellent protection of the multiple lifestages of this insect.

Onion Thrips – Populations of onion thrips continue to increase at several locations given the lack of moisture and warm conditions. Weather over much of southern and central Wisconsin in the past 3 weeks, coupled with very warm nighttime temperatures, continue to increase the risk of rapid population growth. Thrips are very small, slender insects that are best seen with a hand lens. A very distinctive characteristic of thrips are two pairs of wings that are fringed with long hairs. Adults are pale yellow to light brown in color. The immature stages have the same body shape as adults but are lighter in color and are wingless. The onion thrips has a very extensive range of hosts, including cereals, selected broadleaved crops (e.g. cabbage), and onions. They also can be a problem on garlic and chive, but generally are not as serious a pest as they are on onion. The current high populations of thrips will directly reduce both yield and storage quality of onions. Thrips have a rasping-sucking mouthpart and feed by rasping the surface of the leaves and sucking up the plant fluid. They feed within the leaf neck in onions and in the protected inner leaves near the bulb. When population levels are high, thrips can also be found feeding on exposed leaf surfaces. Both adults and nymphs cause damage. When foliage is severely damaged, the entire field takes on a silvery appearance and the severe scarring also creates an entry point for foliar leaf diseases. As noted previously, success in managing season-long populations of onion thrips relies almost exclusively on the use of insecticides. Proposed sequences of insecticides used to manage onion thrips are in Table 1.

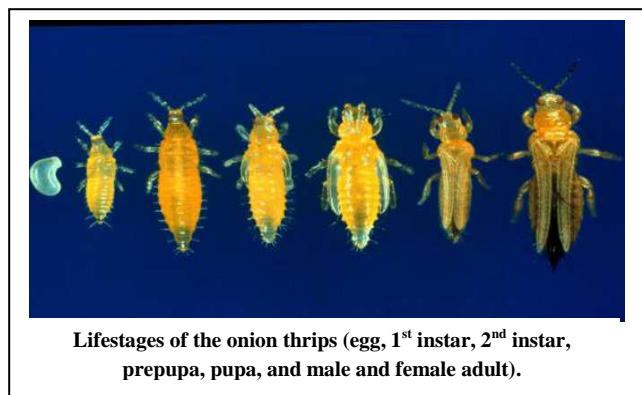


Table 1. Sequence of insecticides to apply for onion thrips control in Wisconsin onion fields. Two applications of each product should be considered and timing should be based on an appropriate action threshold.

Application #	Product	Action threshold/ Timing of spray to consider
1	Movento	1 thrips larvae per leaf
2	Movento	7 to 10 days after 1 st Movento spray ¹
3	Agri-Mek	1 thrips larvae per leaf
4	Agri-Mek	1 thrips larvae per leaf
5	Radiant	3 thrips larvae per leaf
6	Radiant	3 thrips larvae per leaf
7	Lannate	1 thrips larva per leaf
8	Lannate	1 thrips larva per leaf

¹ If the thrips population is reduced to a low level (e.g., below 1 thrips per leaf) after the first Movento spray and does not reach threshold again until 3 weeks later, consider avoiding another application of Movento. If this scenario occurs, the second application of Movento would likely be used against the next generation of thrips. Based on insecticide resistance management principles, such a case should be avoided if possible. The recommendation would be to continue the sequence with the next product, which would be Agri-Mek or Radiant.

Cole Crops – Populations of imported cabbageworm (ICW) and diamondback moth (DBM) have increased sharply over the past 2 weeks at many locations in central and southern Wisconsin. Larvae of the ICW feed on the first formed outer leaves of their host plants, which often appear riddled with irregularly shaped holes. As the caterpillars become mature, they feed in the center of the plant. The last instar larva does the most feeding damage. Initial damage from the DBM results in small incomplete holes caused by young larvae and larger complete holes caused by mature larvae. The entire plant may become riddled with holes under moderate to heavy populations. Larvae also feed in the developing heads of cabbage, causing deformed heads and encouraging soft rots. However, because of their small size, relative to the cabbage looper (CL) and ICW, it takes approximately 20 DBM larvae to defoliate as much cabbage as 1 looper, or 2 ICW larvae. Flights of the CL have been detected in southern portions of the state over the last 4 weeks of the summer with the warm weather.

Similarly, scouting for thrips in cabbage can be integrated with scouting for larvae (worms). A total of 40-50 plants should be examined weekly with a focus on the field perimeters where thrips infestations often first appear. Both adult and immature thrips are frequently observed on the undersides of leaves or within the developing head. They are often difficult to find, making it important to also look for signs of feeding which can appear as small tan or golden-colored blisters on infested leaves. During scouting, gently turn wrapper leaves over and examine the underside for mobile thrips stages; both adults and immatures.

Sweet Corn (WCR) – Populations of western corn rootworm (WCR) beetles have increased sharply over the past week as temperatures are conducive for flights at many locations in central and southern Wisconsin. The WCR historically has been a pest in later July when they emerge and attack susceptible corn. Over the past several days at the Arlington Agricultural Experiment Station, newly established, V-5 stage sweet corn plots have been significantly affected with rootworm beetles silvering many young plants. According to degree day (DD) model assessments for this insect, approximately 50% of the adult population could re-emerge in the south-central and southwestern counties. Adults resulting from the current emergence are looking for susceptible stages of corn in which to infest and then begin egg laying.

European Corn Borer (ECB) - As daytime high temperatures are anticipated to remain above average through the remainder of the upcoming week, second generation adult ECB is likely to be an emerging threat in portions of very western and southern portions of Wisconsin. The established thresholds for initiation of the 2nd generation flight occurred at 1,400 DD which has been surpassed in several southern locations of the state. Adult ECB's can be expected to appear in low to moderate numbers across this area of the state in black light traps. The peak of summer moth activity is projected for 1,733 DD. Here again, silking sweet corn, flowering to pin-pod snap beans, and peppers with early developing fruit should be closely monitored and black light trap results for these particular regions should be closely watched as well.

The UW-Agricultural Station in Rhinelander extends a Field Day invitation to all potato growers, allied partners and friends of our state potato industry.

The UW College of Ag. And Life Sciences has been working since the mid 1940's at our station, where potato breeding and variety selection has been the focus. Come and hear presentations about current developments: **Infrastructure**, *Breeding projects*, Variety and Advanced line progress, **Specialty potatoes**, National trialing and reports from Extension Specialists and Seed Certification.

We will have the distinct privilege of welcoming Kate Vandenbosch, the new Dean of the College of Ag. And Life Sciences, for her first visit to the Rhinelander Station.

This will be a relaxed day in the **Beauty of Northern Wisconsin**. Delegate your work, jump on your cycle or just plain get in the truck and show up.

We look forward to seeing you on the 13th!

Bryan Bowen and staff

Where: Rhinelander Agricultural Research Station (Breeding Station)

Directions at this link:

<http://ars.wisc.edu/rhinelander/directions.html>

When: Friday, July 13, 2012

Time: 9:45am Welcome

10:00am to 12:00 – field tour

Noon – lunch provided by Servco FS

2012

Rhineland Agricultural Research Station

Potato Field Day, Friday, July 13

Agenda: Breeding and Specialist presentations

9:45am, Welcome to station and review of recent infrastructure projects, CIH, Thanks and recognition of other venders - Bowen (presented in Willis Storage Bldg)

10:00 *load wagons*

		<u><i>Speaker</i></u>	<u><i>Location</i></u>
10:05	Breeding Program Overview	Palta	Greenhouses 5-8
10:20	Insect & Disease Update	Groves, Gevens	N9

(Travel to south fields)

10:40	Irrigation Water Expansion	Bowen	pond
10:45	Breeding Topics	Navarro	S9-10
10:55	Student Research Project	Kyle Rak	S9-10
11:05	Specialty Potatoes	Bowen	S9-10

(Travel to north fields)

11:20	NFPT and NCPT activities	Bussan	N1-3
11:30	Advanced Selection Multiplication And Maintenance		Navarro, Bowen N1-3
11:40	Seed Certification Topics	Charkowski	N1-3

(Travel to Buildings)

12:00pm- 1:15, Lunch	Servco-FS	Willis Building
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1:30-3:00 SPUDPRO meeting	Spudpro Committee	TBA
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