Wisconsin Crop Manager

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New UWEX Pub – Western bean cutworm: A pest of field and sweet corn

Eileen Cullen, Field Crop Extension Entomologist

Western bean cutworm (WBC), traditionally a pest of the western Corn Belt, is an emerging pest in Wisconsin. As this pest will likely become established after arrival in a state, it is important that growers and agricultural professionals know how to identify and manage it. **UW Extension Publication A3856** ***Western bean cutworm: A pest of field and sweet corn*** explains WBC appearance, life cycle, corn scouting protocols, economic thresholds, and management options including: biological and natural controls, chemical control, and the importance of insect resistance management when using transgenic Bt corn hybrids for WBC management. This publication also provides links to the Western Bean Cutworm pheromone trapping network, maintained by Iowa State University, which includes Wisconsin real time data throughout the 2008 growing season.

To order print copies, or download a free PDF, please visit: UW Madison Entomology Department Field Crop Entomology website http://www.entomology.wisc.edu/cullenlab/site%20pages/extension/ext_pubs.html

Or UW Extension Publications Division

http://learningstore.uwex.edu/Western-Bean-Cutworm-A-Pest-of-Field-and-Sweet-Corn-P1270C252.aspx

Corn Rootworm Egg Hatch Update for Wisconsin

Eileen Cullen, Field Crop Extension Entomologist

With the relatively cool spring temperatures this year, insect development degree-days have been accumulating about 1-2 weeks slower than a typical spring. Figure 1 shows the current "hatch map" for western corn rootworm overwintered eggs in the soil. Corn planting is finishing up in Wisconsin, and growers and consultants will begin to ask about corn rootworm egg hatch and expected time frame of first through third larval instar corn rootworm feeding on corn roots.

Western and northern corn rootworms overwinter as eggs in the soil. Corn rootworm begins development at 44F and hatches from overwintered eggs in early to mid-June at 800 degree days. One generation occurs per year in Wisconsin and the North Central Region. Larvae pass through three instars as they feed on corn roots. Peak feeding occurs for several weeks after hatching (between 1300-1700 degree days) and pupation occurs in mid-July. Adults emerge 5-10 days after pupation. Emergence is observed from mid-July to mid-August between 1800-2200 degree days. Egg laying begins two weeks after adult emergence and adults remain active until the first killing frost. Western corn rootworm generally completes development 4-5 days before NCR.

This spring, ZedX, Inc. is providing our UW Madison Extension field crop entomology program with statewide soil temperature updates and estimated corn rootworm hatch and larval development progress. ZedX, Inc. provides data and decision support tools to the agricultural sector, specializing in weather data and crop pest phenology models http://www.zedxinc.com/index.php.

Figure 1. Western corn rootworm overwintered egg hatch map. May 22, 2008.

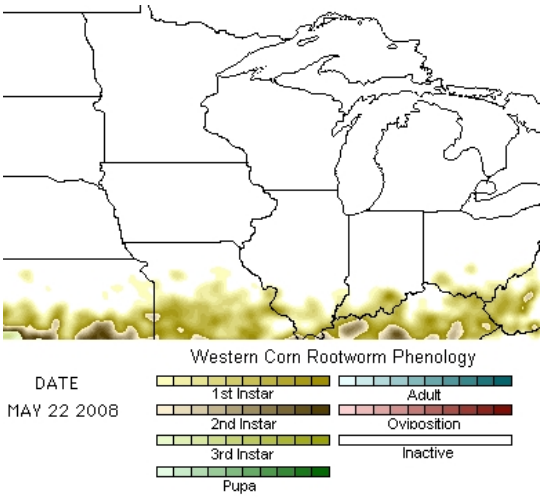

Figure 1, current through May 22nd shows western corn rootworm egg hatch has not yet begun in WI. Western corn rootworm is the predominant species in most of WI. While northern corn rootworms also occur in WI, the western corn rootworm hatch map can be used for a state estimate of corn rootworm overwintered egg hatch and larval development (western and northern). Southern states in the Corn Belt are starting to record 1st instar development as evidenced by the light brown coloration beginning to appear at the bottom of the regional map in Figure 1.

Variable Germination and Emergence in Soybean: Which Seeds Are Still Viable?

Shawn P. Conley, State Soybean and Wheat Extension Specialist

Many of us, including myself, have planted under less than ideal soil conditions this spring. Often the ground was worked a little on the wet side leading to clods and variable seeding depths for our soybean crop. Early reports of variable and delayed emergence in conventional (more common) and no-till soybean is raising replant and seed viability questions in several areas across the Midwest. If soybean was planted into dry soil and had not imbibed water (seed did not swell) then there is little to no concern for growers. Once a significant rainfall event occurs, the soybean will imbibe water, germinate, and should emerge normally. For yield estimates, we would assign the day it rained as the new planting date.

The more difficult question to answer is "How viable is the soybean seed once imbibition and/or germination has begun?" The critical seed moisture content for soybean germination is 20%. A soybean seed that has imbibed water, has a split seed coat, or has an emerged radicle will continue to germinate and grow as normal once the seed is re-hydrated if the seed (embryo) remains above 20% moisture (Senaratna and McKersie, 1983) (Image 1).

If the moisture content within a soybean seed falls to10% due to dry conditions after germination has started, then a dramatic difference exists among the different seed germination stages. If the seed has imbibed water for 6 hours (seed is swollen, but the seed coat has not broken), then the seed is dehydrated to 10% moisture, germination is not affected (Image 2). If the seed has imbibed water for 12 to 24 hours (seed coat broken, but prior to radicle emergence), then germination is reduced to 60 to 65% (Image 2). If the radicle has emerged and seed moisture levels drop to 10%, then no survivors can be expected (Image 2).

To test seed viability, growers can conduct a simple germination test. First excavate 100 soybean seeds and wrap them in a damp paper towel. Place these seeds in a warm location, and after 24 to 36 hours, count the number of seeds that have germinated (Image 3). Remember that typical soybean germination is 90%.

Literature Cited:

Senaratna, T. and B. D. McKersie. 1983. Dehydration Injury in Germinating Soybean (*Glycine max* L. Merr.) Seeds. Plant Physiology 72: 620-624.

Image 1: Stages of Soybean Germination.

Image 2: Seed Development Variability Based on Seedling Depth

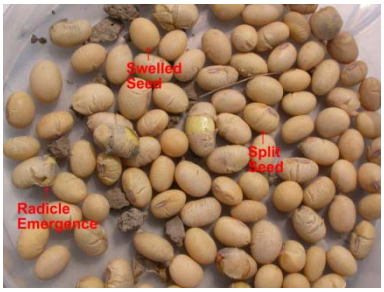

Image 3: Results of Soybean Germination Test:

Cleaning Herbicides from Sprayers

Chris Boerboom, Extension Weed Scientist

The potential for crop injury from herbicide contaminated sprayers is generally greatest with postemergence applications. Without proper clean out of sprayers, herbicide residues from one spray load can contaminate the next load and injury a sensitive crop. This is logical because the spray is making direct contact with the crops and is not being diluted with soil as with preemergence applications. Also, postemergence herbicides obviously have foliar activity, which may not be the case with all of the preemergence herbicides. The risk of contaminated sprayers is also a bit tricky considering the mix of herbicide-resistant crops in addition to the normal switching between spraying different crops. Therefore, as we approach the postemergence spray season, a reminder to properly clean spray tank is certainly in order.

The proper procedure to clean a sprayer after using a herbicide is specified in detail on many herbicide labels and should be followed to avoid problems. On some labels, the cleaning procedures will recommend that the cleaning solution stand in the sprayer for several hours to overnight. Cleaning a spray tank is not a job that should be rushed, especially with certain herbicides that are highly active on sensitive crops such as with dicamba-based products and soybeans or glyphosate on non glyphosate-resistant corn. The cleaning agents that are recommended on the herbicide labels in the table below are summarized as a reminder to check the label for cleaning instructions. The exact steps to clean spray tanks as described on the labels are not summarized or simplified here because the specific details differ among labels.

1. Flush the sprayer tank, lines, and booms thoroughly with clean water and apply the pesticide-contaminated rinsate to labeled sites.
2. Fill the sprayer to capacity with water, adding 1 cup of trisodium phosphate or household ammonia for each 10 gallons of water. If neither is available, use a strong detergent or soap. Hormone-type herbicides (e.g., 2,4-D, dicamba) are best removed with ammonia.
3. Wash the tank and pump parts thoroughly by running the sprayer for about 5 minutes with the flow to the nozzles turned off.
4. If possible, let the cleaning solution stand in the sprayer overnight. (Please note: household ammonia will corrode aluminum sprayer parts.)
5. Discharge the liquid from the tank, spraying some through the nozzles.
6. Drain the sprayer completely and remove nozzles, screens, and strainers.
7. Scrub all accessible parts with a stiff bristle brush.
8. Rinse the sprayer thoroughly with clean water and reassemble.

See Table on next page.

Potato and Vegetable Crop Update May 21, 2008 Issue #1

This is the first newsletter of the 2008 growing season. We'll try to update you weekly or as important information needs to be shared. We welcome your input and suggestions.

Important Dates:

Rhinelander Ag Research Station Field Day –
July 11, 2008, 10:00 am – 1 pm

Farm Technology Days, Brown County –
July 15-17, 2008

Central Wisconsin Potato Field Day, Hancock -
July 23, 9:00 am - 12:00 pm

Langlade County Potato Field Day, Antigo –
July 24, 1:00 pm – 3:00 pm

Potato and Vegetable Crop Update 6/28/07 –

Alvin J. Bussan, UW-Madison, Department of Horticulture

The longest winter in recent history combined with cool wet conditions through April and early May have made potato, carrot, onion, pea, and other spring crop plantings more than a little challenging. The cool conditions and seemingly endless cloud cover and rains have slowed early season crop development as well. Soil temperatures have been warm enough to promote emergence of many crops including potato, carrot, and pea, but many crops are growing slowly after emergence. On top of that we had record low temperatures in numerous regions in Central and Northern Wisconsin early this week with frosts occurring in low lying areas all the way to the Illinois border.

Potato. Snow was still piled in ditches and adjacent to farm yards when we finished planting potatoes at Hancock and many growers were still planting well into May in Central WI. Rains and delayed thawing of soils delayed planting by 5 to 10 days for most. Planting is still proceeding on muck and in Northern WI. The earliest planted potatoes emerged 5 to 7 days ago at Hancock, but shoots of slower growing potatoes such as Bannock Russet are still 1 to 2" from the surface of the hill. Stands appear uniform in plots to date suggesting minimal issues with seed piece decay or other soil pathogens, but many potato plants have dark and purple hues because of exposure to frost. Emerged potatoes have received the first side dress fertilizer applications and have been hilled for the first time.

Processing vegetables. One of my biggest concerns about processing crop fields this spring is working soil that is too wet. Due to wet soils from heavy snows and frequent rains, pushing tillage to allow for early planting could cause subsoil compaction, side wall compaction, or damage to surface soil texture in medium or heavier textured fields planted to pea, carrot, or early corn. Peas and carrots have emerged in response to warm soil temperatures, but growth has been slow due to cool air temperatures. Sweet corn hybrids planted May 6 - 8 have begun emerging at Hancock, but it is still too early to determine stand of different germplasm. Most early processing crops appear to have survived the frost from earlier in the week. GDD accumulation has been slow across much of the region causing delays in planting schedules.

Accent	ammonia or tank cleaner
Aim	ammonia
Assure II	ammonia or tank cleaner
Atrazine	detergent
Authority MTZ	ammonia
AuthorityFirst	ammonia or detergent
Autumn	ammonia
Banvel	ammonia
Basagran	detergent or tank cleaner
Basis	ammonia or tank cleaner
Beacon	ammonia or tank cleaner
Bicep Lite II Magnum	water
Boundary	ammonia or tank cleaner
Buctril	none listed
Callisto	ammonia or tank cleaner
Camix	ammonia or tank cleaner
Canopy	ammonia or tank cleaner
Canopy EX	ammonia or tank cleaner
Clarity	detergent or tank cleaner
Classic	ammonia or tank cleaner
Cobra	none listed
Command	water
Distinct	detergent or tank cleaner
Dual II Magnum	water
Express	water
Extreme	water
FirstRate	ammonia
Flexstar	tank cleaner
FulTime	none listed
Fusilade DX	tank cleaner
Fusion	tank cleaner
Gangster	ammonia or tank cleaner
G-Max Lite	detergent or tank cleaner
Gramoxone Inteon	none listed
Halex GT	ammonia
Harmony Extra	water
Harmony SG	water
Harness	water
Harness Xtra	water
Hornet	water
Impact	detergent or tank cleaner
Intrro	water
Keystone LA	none listed
Liberty	tank cleaner
Lightning	water
Lorox	water
Lumax	ammonia or tank cleaner
Marksman	tank cleaner
NorthStar	ammonia or tank cleaner
Option	ammonia
Outlook	detergent or tank cleaner
Permit	ammonia
Phoenix	none listed
Poast Plus	detergent or tank cleaner
Prefix	detergent or tank cleaner
Princep	detergent
Priority	ammonia
Prowl H2O	detergent or tank cleaner
Pursuit	water
Pursuit Plus	water
Python	water
Raptor	water
Reflex	tank cleaner
Require Q	ammonia or tank cleaner
Resolve Q	ammonia or tank cleaner
Resource	none listed
Roundup PowerMAX	water
Select Max	none listed
Sencor	detergent
Sequence	tank cleaner
Shotgun	detergent
Sonic	ammonia or detergent
Spartan	ammonia or detergent
Status	detergent or tank cleaner
Steadfast	ammonia or tank cleaner
Stinger	ammonia
Stout	ammonia or tank cleaner
SureStart	ammonia or tank cleaner
Surpass	none listed
Synchrony XP	ammonia or tank cleaner
Touchdown Total	tank cleaner
Treflan	none listed
Ultra Blazer	detergent or tank cleaner
Valor SX	ammonia or tank cleaner
Valor XLT	ammonia or tank cleaner
Yukon	detergent and ammonia

Fresh market vegetables. Cool season crops should have survived the frost fine in Southern, WI. Reports of low temperatures well below 20 F could have caused some crop damage in Northern parts of the state. Asparagus harvest began in earnest early last week in South Central WI. Bedding plants in greenhouses or high tunnels may show symptoms of cold damage over the course of the next few days. Newly emerged leaves on damaged plants will show leaf deformations or uneven color and growing points may have died on severely affected plants. Cold damage can be differentiated from disease or insect pests if every plant within an area shows symptoms.

Cool conditions are not conducive to planting summer annual crops. Season extension techniques will be tested and current conditions provide a good opportunity to evaluate the effectiveness of row covers, low tunnels, and other practices. Leaves touching row covers etc… will likely show frost damage if planted before this last weekend. However, plants should recover as long as the growing point is protected. With current conditions, cold hardening of transplants will be absolutely essential for successful crop establishment.

Any Volunteers? –

Jed Colquhoun, Department of Horticulture, UW-Madison

Unfortunately, I have seen volunteer potatoes rearing their ugly sprouts in the past few days. Despite several nostril-freezing days this winter, much of the potato production area was insulated with snow from just after Thanksgiving through at least late March, thus increasing the chances of seeing last year's crop this spring. Volunteer potatoes can not only significantly reduce rotational crop yield, but more importantly can serve as untreated hosts for pests that threaten this year's nearby potato crop, such as late blight, early blight, and several insect species. Volunteer potatoes are most common when winter soil temperatures at the tuber depth remain above 28 F in moist soils or 25 F in dry soils.

Volunteer potato control in Wisconsin rotation crops can be extremely difficult given the lack of effective herbicides in specialty crops. Three management goals should be kept in mind when dealing with volunteer potatoes:

1. Minimize untreated host foliage or tubers for potato pests,
2. Reduce competition with current rotational crop, and
3. Minimize viable daughter tuber formation that will impact subsequent rotational crops.

Successful management will require an integrated approach given the large carbohydrate reserves in the tuber and the ability of potatoes to re-sprout after treatment. If the rotational crop has not yet been planted and there is flexibility in moving crops among fields, the choice of rotational crop is by far the most important decision where volunteer potatoes could be severe. Volunteer potato control in less competitive specialty crops with limited herbicide options, such as carrot or onion, is extremely difficult. Volunteer potato control is probably most feasible in sweet and field corn. Registered herbicides containing the active ingredient mesotrione, such as Callisto, are very effective in not only reducing potato foliage but also daughter tuber production. Postemergence applications of mesotrione are most effective. In research in Washington State, Callisto was more effective than other corn herbicides in reducing daughter tuber formation. Keep in mind that the rotational restrictions for mesotrione can be lengthy for some crops. We are currently evaluating volunteer potato control with new herbicides that have a similar chemistry to mesotrione but with shorter restrictions for rotation to some crops.

Several other herbicides can reduce volunteer potato growth and tuber weight, such as fluroxypyr (Starane), atrazine (several trade names; check prohibited zones), imazamox (Raptor), dicamba (Banvel, Clarity), and glyphosate (Roundup and several other trade names). Contact herbicides such as oxyfluorfen (Goal) can also be moderately effective, particularly if repeated applications are allowed on the crop. Check the labels for registered crops and use rates for these options. In many cases, the effectiveness of these herbicides in reducing daughter tuber formation is improved when followed by cultivation after the herbicide has been adequately translocated throughout the potato plant.

In the processing row crops that are yet to be planted, such as snap bean and sweet corn, volunteer potato can be reduced by allowing the potato to sprout and removing the plants with tillage or glyphosate prior to rotational crop planting. Re-sprouting potatoes can be removed with cultivation and/or postemergence herbicides during the crop season.

Vegetable Insect Update –

Russell L. Groves, Vegetable Entomologist, Applied Insect Ecologist, UW-Madison

Onions - In 2007, onion growers experienced moderate to heavy populations of onion thrips depending on location. As was the case in 2005 and 2006, if hot and dry conditions during mid summer prevail then onion thrips populations can be expected to increase rapidly. Again in 2008, Wisconsin has received re-certification from the US EPA for a Section 18, Emergency Exemption for the use of Carzol SP against onion thrips. Product in Wisconsin will again be available through the following suppliers: Helena Chemical Co., Madison, WI, Dave Allen, (608) 577-7907: TH Agrichemicals, Plainfield, WI, Bob Zimple, (715) 335-6343: UAP, Plainfield, WI, Joe Kapral, (715) 335-4900: and, Wilbur-Ellis Co., Almond, WI, Tom Buchberger, (715) 366-2500.

Recall, yellow sticky traps can be used to monitor the early season colonization by adult onion thrips from over wintering sites. However, these counts are not reliable to base treatment decisions upon. Established thresholds (3 thrips / leaf) are reached only after thorough visual inspections of the plant by parting newly emerged leaves to reveal where immature thrips can be counted. Recall also that these thresholds are based upon counts of immature thrips; do not include adults in your scouting counts to determine if you are at or have exceeded threshold. Wisconsin Special Registrations for Carzol SP on dry-bulb onion can be found at the following website: (http://www.datcp.state.wi.us/arm/agriculture/pest-fert/pesticides/SpecialRegistrations. html). Note that the effective dates for the re-certification extend from 23 April to 15 September of 2008.

Seed Maggot(s) - With our prevailing cool and wet weather conditions this spring, the potential exists for increased damage to early season vegetable crops by infestations of seed maggots (*Delia* spp.). Bean seed maggot in snap and dry beans, onion and seed corn maggot in dry bulb onion, cabbage maggots in cole crops, and seed maggots in direct seeded and early transplant cucurbits are just a few of the species and crop combinations that we might expect to see this spring. In general, the early season transplants, and direct seeded crops that are slow to emerge and begin rapid growth can be most severely damaged. The adult maggots are often dusky gray, bristly, flies that resemble a housefly. The damaging larval stages are legless, white or opaque in color, and are typically around ⅓ to ½ inch in length with the body tapering slightly towards the head. Maggots can feed internally as well as on the root surfaces and these tunnels may provide an entry point for other plant pathogens such as soft rot. Affected plants appear stunted and stand emergence can be uneven. Direct seeded crops are often available with insecticide pretreatments on the coated seeds as a means of protecting against these early season pests. Incorporation of green manures or soil amendment with

animal manures should be done at least two weeks in advance of transplanting or seeding to reduce the potential for infestation by seed maggots. Specifically, adult flies are attracted to the volatile emissions of decomposing organic matter in the soil following the incorporation of green manures or organic amendments.

Potato – Overwintering Colorado potato beetle (CPB) adults have only just begun to emerge and become active during warmer afternoons in last 7-10 days. Typically, adult CPB will over winter in the soil along field margins near windbreaks and other wooded areas surrounding potato fields. A portion of the population will also attempt to over winter inside fields previously planted to potato. However, these populations often experience more harsh winter conditions including early and deeper frost set in the ground resulting in far greater mortality compared with CPB populations in the soil under protected areas just outside fields. This year, unfortunately, the snow pack arrived early and stayed late through the winter and may have protected many of the individuals attempting to over winter in the fields. In fact, many field locations in the Central Sands production areas experienced very little frost throughout the winter period and this may signal an above average year for populations of CPB.

As adults continue to emerge, they will feed for a short time and begin to mate and lay clusters on the undersides of developing potato leaves. Adult females can lay up to 350 or more eggs during their lives and this activity can last for 2-3 weeks in the early spring. No egg masses have yet been observed on any of the newly emerged plants in our experimental plots at either the Hancock Agricultural Experiment Station or the Arlington AES. Newly registered in 2008, potato growers have available the at-plant systemic neonicotinoid insecticides, Belay® 16 WSG and Venom® 70SG, in addition to the current seed piece and in-furrow registrations of imidacloprid (Tops-MZ-Gaucho® and AdmirePro®, respectively) and thiamethoxam (Cruiser® FS and Platinum®, respectively).

Vegetable Disease Update –

W. R. Stevenson, Department of Plant Pathology, UW-Madison

Update on coverage for potato and vegetable crop disease information for the growing season – The search for my replacement to cover vegetable diseases is being expanded at the Assistant/Associate Level with interviews to be conducted in early Fall. That leaves a gap that needs to be covered for the summer. So, good news for the trout, I'll be spending one day a week in the office and field to cover developing problems, disease management issues, field diagnosis, field days and the like. Tuesdays will be the best day to find me at the number above, but email is the best way to insure that requests receive quick attention.

Potatoes: Cold soils and adequate soil moisture seem to be the common situation for this early season. The early planted potato crop is just beginning to emerge so it's a bit early to get readings on seedpiece decay and emergence issues. For those who took the time to warm their seed to at least 50° F and allow time for wound healing before planting, I don't anticipate either decay or emergence problems. Cold and moist soils slow emergence and this often means an increase in Rhizoctonia stem infection affecting plant vigor and tuber quality. Seed or furrow treatment with a variety of fungicides helps to reduce the impact of poor environmental conditions on the incidence and severity of this disease. For those fields not yet planted, consider seedpiece treatment and avoid deep planting as this promotes more rapid emergence and helps to reduce stem infection.

We are now entering our sixth year without seeing late blight in our state. The last time we confronted the disease was mid-season 2002. I know that we all want this record to remain intact and if we all work together, this will happen. There are a few items that need immediate attention since it is possible that potatoes are already in the ground that came from areas of the U.S. last year which experienced late blight. In addition the snowy Wisconsin winter provided insulation to keep soils and last years' unharvested tubers from freezing thus creating a risk of volunteer potatoes in many 2007 production fields. 1) The deadline in the WI rule for removing cull piles is May 20. (Cull piles include those tubers removed during grading, cleanings from storage, chips and slivers left over from seed cutting.) 2) Watch for volunteer potatoes growing along windbreaks and in some cases whole fields where deep snow protected those tubers not harvested last year. While these won't be sources of late blight this year, the volunteer and unsprayed plants could provide suitable areas for multiplication of late blight if the pathogen came into the state on seed. 3) Scout your fields weekly and for that matter, if there are volunteers, scout those areas as well until the volunteers are completely removed or killed. 4) Calibrate your sprayers to insure accuracy in delivery of fungicides. (The June *Badger Common'Tater* has a full article on precautions for this coming summer.)

We plan on operating the late blight and early blight forecasting system this summer with weather systems at Hancock, Spooner, Antigo, Plover and Grand Marsh. Data will be collected continuously, processed every 2-3 days and the results posted on our web site (http://www.plantpath.wisc.edu/wivegdis/). Data will also be summarized at weekly intervals in this newsletter and we will post a notice regarding when we pass spray thresholds for late blight (18 severity values) and early blight (300 P-Days).

We have a new fungicide available for potato early and late blight control. Revus Top is the newest addition to the early and late blight arsenal. This product is a combination of two active ingredients, mandipropamid (FRAC Group 40) for late blight control and difenoconazole (FRAC Group 3) for early blight control. The product can be applied at a range of 5.5 – 7.0 fl oz/A and has a 14 postharvest interval along with a 12 hour reentry interval. Other details of use along with important rotational crop restrictions can be found on the label which should be carefully reviewed before use.

Other Vegetable Crops:

New Fungicides: Tomato – Revus Top fungicide is now registered for use on tomato for control of both early blight and late blight. The same information, use rates, etc. listed above for potato pertain to tomato as well.

Another fungicide – Revus – is newly labeled for use on brassica crops (broccoli, Brussels sprouts, cabbage, cauliflower, and several other crops in this group) for control of downy mildew, onion for control of downy mildew, cucurbits for

suppression of downy mildew and Phytophthora blight, leafy vegetables for control of downy mildew, and pepper for suppression of Phytophthora blight. This product contains the active ingredient mandipropamid (FRAC Group 40), can be applied at the rate of 8 fl oz/A and has a 12 hour reentry interval. The postharvest interval and seasonal limitations vary by crop. Consult the label for other important use instructions before applying this product.

As the season progresses, we'll include disease management information for the many fresh market and processing vegetable crops grown in Wisconsin. If you have specific needs for identification and control information, please do not hesitate in contacting us.