Phytophthora Blight Thrives in Wet Soils  
by Robert Hadad and Julie Kikkert

Phytophthora blight is caused by the water mold Phytophthora capsici. The spores are most often carried by water, but as sporulation occurs on foliage and fruit, aerial distribution also occurs. Soil moisture is important for initiation of the disease. Spore-forming structures called sporangia can form within 24 hours when the soil is at field capacity and then release zoospores (swimming spores) within 5 to 6 hours when the soil is saturated (under controlled conditions). Thus, soil water management is crucial in the battle against this disease. Growers and researchers both note that it is critically important to avoid standing water in production fields, including driveways, following rain or irrigation.

SUSCEPTIBLE PLANTS include:
- All cucurbits (melon, cucumber, pumpkin, squash)
- Most solanaceae (bell and hot pepper, tomato, eggplant)
- Legumes (snap beans and lima beans)
- Weeds (nightshades, purslane, Carolina geranium)

Phytophthora blight (aka Phytophthora fruit and stem or crown rot) is a challenge to manage, especially in a wet year. Symptoms include crown rot, tip blight, leaf spots, and fruit rot. Characteristic white yeast-like growth of spores develops under humid conditions. Management focuses on preventing the pathogen from being moved into a new field and managing soil moisture to avoid saturated conditions that favor disease onset. The new Phytophthora blight website at Cornell University contains a lot of useful information to aid in disease identification and management. [http://phytophthora.pppmb.cals.cornell.edu/](http://phytophthora.pppmb.cals.cornell.edu/)

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**PREVENTION** is very important because the disease is difficult to control once it starts, and after it has occurred on a farm it is challenging to continue growing susceptible crops. The pathogen moves into new fields through contamination of infected produce brought in from other farms, by water, and soil adhering to equipment, boots, and trucks. Never dump culled fruit or plants into production fields! Pumpkins and other produce purchased from infested farms is one of the most common ways of spreading this pathogen. Clean vehicles and equipment or dedicate certain equipment for fields that are known to be contaminated.

**CULTURAL PRACTICES** include subsoiling between rows to break up compaction zones and improve drainage. This is also critically important for sprayer alleys and drive roads within the field. Spores will actually move through water in the soil or on the underside of plastic and swim toward susceptible plants. If symptoms appear in small sections of the field, tear out and get rid of infected plants in a sanitary landfill or by burying them. Cut out sections of black plastic to restrict movement of the pathogen or remove all plastic during really wet times to let soil dry out. Raised beds can be used to reduce moisture levels around plants. Grass strips between fields or down-hill from contaminated fields can help reduce runoff into uncontaminated fields. Also check for varieties that are tolerant and watch for other crop families that are susceptible when you are creating a rotation plan (refer to Cornell website above).

**FUNGICIDES** are a valuable component of a Phytophthora blight management program and fortunately several products are registered with targeted activity for this pathogen group (oomycetes) and mobility in plants. Having said that, it is important to realize that none of the fungicides and experimental materials tested to date in university efficacy studies work sufficiently well that they could be relied on as the sole management practice for this disease. For crops such as snap and lima beans, no fungicides are registered in NY at this time. The fungicide program implemented for Phytophthora blight should be used with cultural management practices, started before disease onset, and consist of an alternation amongst oomycete fungicides tank-mixed with protectant fungicides for managing fungicide resistance. Pathogen strains with resistance to mefenoxam have been detected in NY and to cyazofamid in SC. FRAC, or the Fungicide Resistance Action Committee, was developed to help provide resistance management guidelines for fungicide use. Importantly, fungicides with similar chemistries and mode of actions (MOA) that belong to the same FRAC code may also be prone to cross-resistance, where a fungus that develops resistance to one fungicide in the FRAC group may also develop resistance to other fungicides in the group, even if those other fungicides haven’t been used. Alternate among fungicides in different FRAC Groups and tank-mix with a copper or chlorothalonil fungicide. This needs to be done beginning the first year of use because the main goal of resistance management is to delay its development, rather than manage resistant strains, and furthermore these strategies usually are specified on the label, which is a legal document. Select specific fungicides to use based on whether other oomycete pathogens are also present and what crops will be grown in the field next year. Most oomycete fungicides, but not all, are effective for both Phytophthora blight and cucumber downy mildew. They are not effective for powdery mildew, another important disease in cucurbits. Some fungicides have a sufficiently long rotational interval (18 months) that only labeled crops are allowed to be planted the following year.

**FUNGICIDES WITH ACTIVITY AGAINST PHYTOPHTHORA CAPSICI (PHY):**

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>FRAC Group</th>
<th>Pre-Harvest Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranman 400SC</td>
<td>2(ee)</td>
<td>48 hr.</td>
</tr>
<tr>
<td>Forum 4.18 SC</td>
<td>40</td>
<td>48 hr.</td>
</tr>
<tr>
<td>Gavel 75DF</td>
<td>11</td>
<td>48 hr.</td>
</tr>
</tbody>
</table>

**Y** is the FRAC code, **X** is the pre-harvest interval. For use on all cucurbits at 8 oz/A for a max of 4 applications. Must be tank-mixed with another fungicide and applied no more than twice before alternating with another fungicide.

**Ranman** 400SC (EPA Reg. No. 71512-3)(cyazofamid)(ISK Biosciences Corp). For use on tomatoes and cucurbit crops. Limited systemic activity. Apply with an organosilicone surfactant such as Silwet L-77. For PHY, apply Ranman at 2.75 fl oz/A beginning before symptoms for a maximum of 6 applications. The minimum interval is 7 d.

**Forum** 4.18 SC (EPA Reg. No. 352-604)(dimethomorph)(BASF). Labeled for pepper, eggplant, and all cucurbit crops at 6 oz/A every 5 to 10 d, depending on disease pressure, beginning when plants are 4-6 inches tall for a max of 30 oz or 5 applications. Must be tank-mixed with another fungicide and applied no more than twice before alternating with another fungicide.

**Gavel** 75DF (EPA Reg. No. 62719-441)(mancozeb and zoxyamide) (Gowan). Can be used on cucumber, melon, summer squash, and watermelon but not on pumpkin. Also registered for Buckeye fruit rot in tomato. Labeled for use at 1.5-2.0 lb/A every 7 to 10 d or when conditions are favorable for disease for a max of 8 applications. REI is 48 hr.

Gavel and Tanos are available for use in NY for Phytophthora blight under FIGRA 2(ee) Recommendation, a copy of which must be in the applicators’ possession when either of these are used in NY. This is needed because the label does not specify the pathogen. A copy can be obtained at [http://pmep.cce.cornell.edu/regulation/2ee/unlabeled_pest/vegetables/cucurbits/fungicides/index.htm](http://pmep.cce.cornell.edu/regulation/2ee/unlabeled_pest/vegetables/cucurbits/fungicides/index.htm)
New 33 phosphorous acid fungicides (inc. ProPhyt, Phostrol, FungiPhite, Fospite, Agri-Fos, Kphite,7LP and Rampart)are more effective than Aliette. Can be applied to all cucurbits at 2-6 pt/A on a 7-14 d interval up to 6-7 times/crop. Phosphate ion, the active ingredient for these fungicides, effects fungal pathogens directly and promotes the plant’s defense system. In addition to foliar applications, some formulations are labeled for use as a drench treatment to transplants before transplanting or as an in-furrow drench at planting. Can be tank-mixed with Admire. Some are also labeled for use on eggplant, pepper, and tomato.

11Reason 500SC 14 (EPA Reg. No. 254-695) (fenamidone) (Bayer CropScience). Suppression of PHY only in eggplant, pepper, and tomato. Apply at 8.2 fl oz/A, on a 5-10 d interval, with no consecutive applications, for a maximum of 24.6 fl oz/A. It is labeled for other diseases in cucurbits. Cannot be used in Nassau or Suffolk Co.

4 Ridomil Gold SL 7 (EPA Reg. No. 100-695) (mefenoxam) (Syngenta). Labeled for PHY in eggplant and pepper, and fruit rot in tomato. Apply at 1 pt/A. Labeled for use preplant or at planting as a soil spray, through drip irrigation, and as a banded spray or shank application following transplanting.

**MANAGING PHYTOPHTHORA AND DOWNY MILDEW IN CUCURBITS:**

If Phytophthora blight has previously occurred on your farm and forecasts exist for Downy Mildew airborne from Michigan, Ontario, Pennsylvania or New Jersey -- then Downy Mildew (DM)/Phytophthora (PHY) sprays should include the following, used preventively:

- 43 Presidio 2 (DM, PHY) + protectant
- 28Previcur Flex 2 (DM, PHY) + protectant
- 22Ranman 0 (DM, PHY)
- 11+22Tanos 3 (DM, PHY, suppression only) + protectant
- 22Curzate 30R (DM) + protectant
- 22+M3 Gavel 3 (not Pump or W. Squash)(DM, PHY)

Alternate with 40Forum (DM,PHY) or 11Reason 14 (DM) or 22Ranman 2 (DM) 33Phosphoric acids 3 Agri-Fos, Fospite, Fungi-Phite, ProPhyt, Kphite, Phostrol, Rampart (DM, Phytophthora, Pythium) or 4+M3 Ridomil Gold Bravo 0 (Resistance issue of mefenoxam for *DM*), M1 copper 3, 40Revs 0 (suppression for both)

Some of the preceding information was obtained from Drs. Margaret McGrath and Thomas Zitter, Department of Plant Pathology and Plant Microbe Biology, Cornell University. We thank them for reviewing this article.

**Cole Crops: Precautions for Tank Mixes with Goal Tender**

*C. Hoepting, CVP:* Goal Tender has proven to be an excellent new addition to the herbicide roster as a POST emergent weed control option that may be applied over-the-top to cabbage and other cole crops. It provides broad spectrum broadleaf weed control including control of black nightshade, common groundsil and Shepherd’s purse. Apply Goal Tender to direct seeded crops when the crop has a minimum of 4 true leaves and to transplanted crops after a minimum of 2 weeks after planting. The combination of pre-plant and post-transplant treatments must not exceed 16 fl oz per acre per season. Avoid application if heavy rainfall is predicted to occur within 24 hours after planned application.

The label also states, “Do not add any adjuvant, liquid fertilizer or pesticides to the spray mixture”. Cornell research by Robin Bellinder showed that tank mixes of Goal Tender + crop oil concentrate and Goal Tender + Select Max can cause extensive injury in the growing point of cabbage. In 2010 trials, 9 pesticides were evaluated in tank mixes with Goal Tender. None of them resulted in significant reductions in yield, although stunting was observed 6 and 31 days after treatment. It is important to note that tank mixes with pesticides that have emulsifiable concentrates (EC) in their formulations caused the most crop injury.

Growers are encouraged to try tank mixes (including herbicides and insecticides) with Goal Tender on a limited basis, before treating significant acreage. Be especially cautious of tank mixes of Goal Tender with ECs.

**Tank mixes with Goal Tender in order of highest to lowest injury post application (R. Bellinder, 2010)**

<table>
<thead>
<tr>
<th>Goal Tender + Type</th>
<th>% Stunting (No. days post treatment)</th>
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<tbody>
<tr>
<td></td>
<td>6 days</td>
</tr>
<tr>
<td>By itself Herbicide</td>
<td>27</td>
</tr>
<tr>
<td>Select Max EC* Herbicide</td>
<td>45</td>
</tr>
<tr>
<td>Poast EC* Herbicide</td>
<td>45</td>
</tr>
<tr>
<td>Assure II EC* Herbicide</td>
<td>40</td>
</tr>
<tr>
<td>Stinger Herbicide</td>
<td>30</td>
</tr>
<tr>
<td>Quadris Fungicide</td>
<td>27</td>
</tr>
<tr>
<td>Warrior II Insecticide</td>
<td>27</td>
</tr>
<tr>
<td>Radiant Insecticide</td>
<td>25</td>
</tr>
<tr>
<td>Coragen Insecticide</td>
<td>25</td>
</tr>
<tr>
<td>Bravo Ultrex Fungicide</td>
<td>22</td>
</tr>
</tbody>
</table>
Expect & Prepare for Downy Mildew in Basil

From Meg McGrath, Cornell

Unfortunately this destructive new disease of basil is expected to occur again in the northeastern US during 2011. Field-grown crops as well as basil in greenhouses and home gardens have been affected every year by downy mildew since first occurrence in 2008. The pathogen (*Peronospora belbahrii*) produces an abundance of spores easily dispersed by wind, which are considered the main source of inoculum. The pathogen can survive over winter in southern Florida. From there the pathogen is thought to move up the eastern coast during the production season. Infested seed is another possible source. Seed could be the source for some outbreaks that have occurred in greenhouses, especially during the winter to spring period before field production is underway.

The primary management practices for downy mildew are using seed not infested with the pathogen, selecting a less susceptible variety, and applying fungicides. A seed testing procedure is being developed. Spice and other exotic basils types as well as ornamental basils were found to be less susceptible to downy mildew than sweet basil varieties, which were all found to be similar in susceptibility through evaluations conducted in NJ and NY. Minimizing leaf wetness and reducing humidity to obtain conditions unfavorable for downy mildew development may contribute to control, especially in greenhouses, where humidity can be lowered by using circulating fans and lights, and by increasing temperature. Outdoors, plant where there is full sunlight and good air movement with rows parallel to the prevailing wind direction, maximizing plant spacing, and using drip irrigation.

A monitoring program started in 2009 can provide information on occurrence useful for assessing risk of downy mildew in a crop. Each year a spreadsheet accessible by anyone has been set-up in Google Docs. A link to the page for 2011 is at [http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html](http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html) Success of the monitoring program depends on reports from anyone growing basil; therefore, everyone is encouraged to enter observations at the monitoring page or via e-mail to mtm3@cornell.edu.

Applying fungicides frequently and starting before first symptoms are considered necessary to control downy mildew effectively. Few fungicides are currently labeled for this new disease. Actinovate AG, Trilogy, and OxiDate are OMRI-listed fungicides labeled for use on herbs and for suppressing foliar diseases including downy mildew. OxiDate is labeled for use outdoors and in greenhouses. The Actinovate and Trilogy labels do not have a statement prohibiting use in greenhouses. OxiDate has limited residual activity and thus if used should be combined with or followed by another product. There are three phosphorous acid fungicides that have downy mildew under herbs on the current label: ProPhyt, Fosphite and K Phite. This chemistry was documented to be effective in fungicide evaluation experiments. Greenhouse use is not prohibited. Quadris is labeled for use on basil but not specifically for downy mildew; it also has been shown to be effective for this downy mildew. In states like NY where the target disease is required to be specified on the label, Quadris cannot be used without an approved FIFRA 2(ee) recommendation, which the applicator must possess when using (the one for NY can be downloaded at [http://magritte.psur.cornell.edu/pims/current/](http://magritte.psur.cornell.edu/pims/current/)). Greenhouse use is not permitted with Quadris.

Basil crops should be disked under or otherwise destroyed as soon as possible after last harvest, or when abandoned because of disease, to eliminate this source of inoculum for other plantings. A sunny day is the best time to physically destroy an affected crop because the disturbed spores will be killed by UV radiation.

Photographs of symptoms and additional information about this disease and its management are posted on the web at [http://www.longislandhort.cornell.edu/vegpath/photos/downymildew_basil.htm](http://www.longislandhort.cornell.edu/vegpath/photos/downymildew_basil.htm).

Please Note: The specific directions on fungicide labels must be adhered to - they supersede these recommendations, if there is a conflict. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.
CROPS  Tidbits & Insights

Wet field conditions still prevail with a number of tractors and equipment getting stuck. Patience is a virtue when getting behind in the vegetable business. More problems usually occur when we get out into a field that is still too wet to work. Crusting, compaction, and deep ruts will only lead to other issues when waiting a couple more days for things to really dry out.

CABBAGE AND OTHER COLE CROPS

Flea beetles remain the most common pest of cole crops. Newly hatched imported cabbage worm (ICW) larvae were also found this week. Sprays are not needed until larvae start to feed on 20% of the plants. Look for tiny larvae feeding on the undersides of the leaves where they hatched. ICW larvae are sluggish when prodded, unlike diamondback moth larvae, which wriggle and hang from a silk thread. Look for ICW eggs, which are bullet-shaped, stand on end and go from off-white when newly laid to dark yellow when they are ready to hatch. They are laid singly mostly on the undersides of leaves, especially on plants along field edges. If you see the yellow cabbage butterfly ICW adults flying about, you should check your plants for eggs and larvae.

LETTUCE

Young leaf hoppers have been seen in some plantings. This problem could worsen if surrounding farms cut alfalfa plantings any time soon. Admire, Warrior, and Lannate are some of the products available though follow label directions for application days prior to harvest.

ONIONS

Uncooperative wet weather of the past week finally put an end to onions that were direct seeded during the second week of May – they never did come up. Several acres of onions in Elba will be disked under. Early transplants are at the 6-7 leaf stage and early direct seeded onions are at the 3 leaf stage. Transplanted onions are doing very well.

The big news of the week is that Botrytis leaf blight (BLB) is over the spray threshold of 1 lesion per leaf in most transplanted fields with 6 or more leaves. BLB was also detected below threshold in direct seeded fields with 1.5 leaves or more, and in small-scale isolated onion production. **We recommend that all transplanted onions at the 6 leaf stage or larger be sprayed for BLB this week, and to scout direct seeded fields and isolated small-scale production for BLB.** Fields above the spray threshold should get a high rate of a good BLB fungicide, such as 3 pts Bravo (typically applied with 3 lbs mancozeb), 9 fl oz Scala + 1.5 pts Bravo, or 1.5 pt Rovral (1 pt if tank mixed with another fungicide). If direct seeded onions reach threshold, use the lower 1.5 pts of Bravo.

With wet conditions, pre emergent herbicide applications did not always get on in a timely manner, and even if they did, this is the time of year when we start to see weed escapes in onions. Post emergent broadleaf herbicides are labeled starting at the 2 and 3 leaf stages. They include Goal 2XL, Goal Tender, Chateau and Buctril and they all provide broad spectrum broadleaf weed control. All of these herbicides have contact activity and can result in necrotic lesions and leaf burning, especially when applied after cool cloudy wet weather and onion leaves do not have a thick waxy cuticle. The hotter and drier the weather, the less risk for injury and higher rates can be used. Goal 2XL is by far the most commonly used and several applications may be made per season. It is weaker on mustards and smartweed. Goal Tender performs similarly to Goal 2XL, but is safer on the onions and in tank mixes. Buctril tends to be better at controlling smartweed, common groundsil, ragweed and some mustards, while it is weak on pigweed. It can only be applied between the 3 and 5 leaf stage. Chateau tends to be better at controlling some species of mustards, chickweed, purslane, smartweed and pigweed. Chateau can only be applied to transplanted onions at the 2 to 6 leaf stage and to direct seeded onions at the 3 to 6 leaf stage. No more than 2 apps can be made per season and they must be 14 days apart. Chateau cannot be tank mixed with anything. Except, research in Michigan shows that Chateau is safe on onions when tank mixed with Goal Tender and Prowl H2O. Know what your problem weeds are and make post apps accordingly. For example, if mustards are your number one problem, you may want to try Chateau. Tank mixes are also an option, especially with Goal Tender.

SWEET CORN

Sweet corn flea beetles have been a minor problem on newly emerged bare ground corn. Insecticides like Warrior are available. Row cover with edges buried has helped in keeping these pests off of crops.

ECB are being trapped in low numbers at most locations, along with a few stray (and very early) corn earworm and fall armyworm (see table). If you have corn in or approaching the tassel emergence stage during the first generation, see the accompanying article by Abby Seaman.

VINE CROPS

Cucumber beetles have shown up in large numbers in the last few days on uncovered summer squash plantings. Reapplication of Admire or other registered chemicals might be necessary for plantings that have been grown for a while under cover. Row cover and trap cropping can aid in reducing beetles from feeding on the squash or cucumbers. Covers must be removed when female flowers form on the plants.
Dry Bean Planting Reminders

C. MacNeil, CVP: Dry bean planting will begin soon. To ensure that you end up with a minimum stand of 4 plants/ft of row consider the seed count (number of seeds per pound), % germination, when the germination test was done, and the soil conditions. Lower plant populations result in a loss of yield right up front. For commonly grown light red kidney varieties of typical seed count and 90% germination, assuming good planting conditions, about 95 lbs/acre of seed should be planted. Dark red kidney seed is usually a little smaller and the target stand can be reached with about 85 lbs/acre. For average size black turtle soup beans about 45 lbs/acre of seed is needed. Note that where germination is below 85% vigor is often much reduced. In this case we see in bare ground corn that is close to tassel emergence it is good to expect egg masses in, the most advanced corn, especially fields that we see in bare ground corn that is in the whorl stage during the flight. For tassel emergence scouting is critical. Growers have had good results when pheromone trap catches or scouting for egg masses to determine when sprays are needed. Growers waited until there was a significant increase in the ECB trap catches in their area and then timed sprays to coincide with egg hatch. ECB eggs require 100 degree days (base 50) from oviposition to hatch. Two to three applications bracketing the peak moth flight are generally effective.

Managing ECB in Plastic, Row Cover, or Transplanted Sweet Corn

Abby Seaman, NYS IPM Program

The usual scouting and threshold recommendations do not apply for row cover, plastic, or transplanted sweet corn that is close to tassel emergence during the first generation flight of European corn borer (ECB). In these early plantings, larvae don’t feed in the whorl and emerge in the tassel as they do in bare ground corn. Below are suggestions for timing sprays in season extension corn.

Moths will be most attracted to, and deposit the most egg masses in, the most advanced corn, especially fields started under plastic or row cover. Corn that is in late whorl to tassel emergence stage when egg masses are being laid does not show the typical larval feeding in the emerging tassel that we see in bare ground corn that is in the whorl stage during the flight. For that reason, tassel emergence scouting and thresholds have not been successful in plastic and row cover corn. Target newly hatching larvae using the moth trap catches or scouting for egg masses to determine when sprays are needed.

Herbicide Cautions: Note that herbicides that can be pre-emergence surface applied such as Dual Magnum, Permit, Outlook, Sonalan, MicroTech can cause bean injury, especially on coarser soil if heavy rain occurs shortly after application and while beans are emerging. This is especially true for black beans. The safest action is to apply these herbicides within a day of planting. Or use Dual or Outlook pre-plant incorporated (PPI) for better nitsedge control, though annual weed control suffers if its incorporated too deeply. Reflex can be applied pre-emergence for residual weed control. It should be applied to the soil surface before beans emerge – do not incorporate! Pre-emergence it is good to excellent against ragweed, redroot pigweed, Galinsoga, mustard and Eastern black nightshade; fair to good against lambsquarters. Combine with another herbicide to catch velvetleaf, annual grasses and nitsedge (only fair control at snap/dry bean rates).

Be sure to refer to “Herbicides for Snap & Dry Bean Weed Control” updated for the 2011 April Veg Edge, or go to: http://blogs.cce.cornell.edu/cvp/veg-edge-newsletter when planning your herbicide program to manage your common and problem weeds. Be sure to read all the footnotes to avoid injuring your beans or missing control of an important weed.
Scout for Weeds in Peas, Now!

**J. Kikkert, CVP:** I saw some nice fields of peas last week that have several nodes of growth on them. I know everyone is busy trying to finish up planting of all crops, but scouting for weed escapes is critical during the next month. Your best chance of weed control is when the weeds are young. Apply post-emergence herbicides based on the dominant weed species present and the growth stage of your peas. You can get a copy of the chart on relative effectiveness of herbicides available for peas in NY from our website http://blogs.cce.cornell.edu/cvp/ or from Julie jrk2@cornell.edu. There are no changes in herbicides for peas in NY in 2011 as of this date.

Basagran and Thistrol don’t have any soil residual, so the best time to spray is when the majority of weeds have emerged. Ideally, the first flush of weeds would have one or two leaves and the next flush would be in the cotyledon stage. Keep in mind that rain will stimulate new flushes of weeds. If you have nightshades, pigweed or mustard in your field, a better choice may be Raptor or Pursuit. Basagran will only control hairy nightshade, whereas Raptor and Pursuit will control both hairy and eastern black nightshade. Post, Assure II/Targa and Select Max all provide good to excellent control of the most prevalent annual grasses in NY.

Although Basagran is labeled for yellow nutseed, the rate we use in peas (1.0 – 2.0 pt/A) is too low to kill nutsedge, however, you may see suppression of weed growth. That is why on the pea herbicide chart that Robin Bellinder and I prepared Basagran is given a “poor” rating on yellow nutsedge. In the future, make note that Dual Magnum applied pre-emergence is very effective against nutsedge. Better yet, control nutsedge in fallow fields or rotational crops as a long-range plan for a particular field.

If you have Canada thistle in your fields, you may either hand-pull if there are small patches or apply a spray of Thistrol when the thistle is 4 to 10 inches tall. Use a rate of 3 to 4 pints/acre. This will prevent the thistle from forming flower buds that can contaminate the pea product, but will not kill the thistle. Remember that Thistrol cannot be applied to peas that are later than 3 nodes before flowering. In early peas, those at nodes 9-11, the timing of this postemergence application is critical. Late applications in early peas cause nonuniform flowering, resulting in uneven maturity. Canada thistle management is best done in rotational crops or in the fall. Stinger is the most effective herbicide, because it moves to the roots. Note that there is an 18 month restriction before you can plant peas in a field where Stinger has been applied. Stinger is labeled for field corn, sweet corn, cabbage, beets and spinach, and pasture/forage crops. The optimal time for application is in April and May before the thistle buds open. Later in the season, you can use 2,4-D in labeled crops (not peas). In the fall, Roundup + Banvel can be used.

---

**Late Blight Severity Value Accumulations**

**Late Blight Severity Value Accumulation 5/31/11**

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*Accumulations start 5/05/11
**Airport stations, with RH increased to estimate field conditions

**C. MacNeil, CVP:** Destroy all potato culls and volunteers immediately! If you have tomatoes or potatoes within a mile or more of sprouted potato culls or volunteers scout your crops carefully and often. If tomatoes originated off the farm scout them carefully and often. According to the Blitcast late blight (LB) forecast program: All potatoes 4+ inches tall should be sprayed with a fungicide shortly after 18 LB severity values (SV) have accumulated your general area. After the first spray potatoes should be sprayed on a 7 day interval if about 3 – 5 SVs accumulated in the past week; on a 5 day interval if 6+ SVs. Tomatoes should be sprayed according to TomCast (see Crops, Tomatoes at http://newa.cornell.edu/ ) until LB has been detected in the county or an adjacent county, after which time the Blitcast schedule is followed. An alternative is the Late Blight Decision Support System, under Potatoes on the website, which takes into account not just past weather but future weather on your farm as well, and accounts for varietal susceptibility, fungicide weathering, and other factors. For information on this new, more precise forecast contact Carol MacNeil at 585-313-8796 or crm6@cornell.edu.

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**Identification, Management & Updates in Forecasting Tomato/Potato Late Blight**

June 27, 2011
6:30 – 8:30 pm
CCE - Monroe Co, 249 Highland Ave, Rochester

No fee but pre-registration required. A light supper will be served. DEC pesticide credits available. Contact Carol MacNeil at crm6@cornell.edu or 585-313-8796.
Botrytis on Greenhouse Tomatoes (and Cukes)

J. Reid, CVP: Gray mold, caused by the fungus *Botrytis cinerea*, can rot tomato fruit and foliage. This disease is common in 2011 as it is favored by cool, cloudy weather. Lack of ventilation in the greenhouse also contributes to the problem. Greenhouses that are growing flowers above vegetables are prone to gray mold, as the decaying cast blooms from hanging baskets are often the initial points of infection (see Figure 1). The fuzzy mass of spores from these infections can cause fruit to also rot (see Figure 2).

**Keys to controlling gray mold:**
- Regular ventilation via fans or roll-up curtains, even in cool cloudy weather
- Removal of dead plant tissue including cast flowers (such as from petunia)
- Regular pruning of suckers and lower leaves of tomatoes

In addition to the above steps there are multiple fungicides labeled for the control of gray mold on greenhouse tomatoes. These include:
- Decree 50 WDG (1 day PHI)
- Scala (1 day PHI)
- Serenade Max (1 day PHI) OMRI Approved!
- Oxidate (0 day PHI) OMRI Approved!

**Figure 1:** Decaying cast blooms from hanging baskets are often the initial points of infection of gray mold (*Botrytis*) in greenhouses

**Figure 2:** Very small tomato with sepals infected with gray mold (*Botrytis*)

Ant Damage to High Tunnel Tomatoes

J. Reid, CVP: Each spring a number of high tunnel and soil-based greenhouse growers suffer losses to ants. The warm dry soil in these environments is attractive to ants, while outside it is still wet and cool. Having no other food, ants of various species will girdle tomatoes plants at the soil level. Affected plants will wilt and may show some nutrient deficiency symptoms such as yellow leaves. The feeding of the ants creates a firm, narrow lesion at the crown (see photo). This is often confused for soil-borne pathogens such as Pythium or Rhizoctonia.

We are reluctant to advocate the use of pesticides for a creature generally regarded as beneficial, or at worst benign. However, if left uncontrolled ants could cause several thousand dollars in lost yields in a single bay structure. A scan of common tomato insecticides did not produce a label for ant control. However, entering the word ‘ant’ into the search function of Adobe Acrobat on a pesticide label will produce hits such as adjuvant, amaranth, currant, transplant and cantaloupe. Contact Judson or Katie if you think you might have ant damage on your tomatoes.
Colorado Potato Beetle (CPB) Update on Potatoes

C. MacNeil, CVP: Colorado potato beetle (CPB) are emerging in large numbers in some fields. Monitor field edges, especially adjacent to hedge-rows and where potatoes or tomatoes grew last year. CPB resistance to imidacloprid seed, in-furrow and foliar treatments (contained in Admire, Advise, Alias, Macho, Montana, Widow, Gaucho; Provado, Couraze, Impulse, Nuprid, Pasada, Prey) has been increasing on some farms. Unfortunately, all the recommended planting time materials are Chloronicotinyl insecticides, within Insect Resistance Class 4. (See Managing Colorado Potato Beetle - A-Planting Insecticides and Cultural Practices, in the April Veg Edge at: http://blogs.cce.cornell.edu/cvp/veg-edge-newsletter ) The first indication of this was when the insecticide’s control began wearing off earlier and earlier a few years ago. Now over-wintering CPB adults are escaping the control of the materials in some cases. Similar situations have occurred on Long Island and are now reported in southern Maine. If you have this problem please contact Carol at 585-313-8796 orcrm6@cornell.edu. Note that research has shown that emerging/small potato plants can sustain up to 25% defoliation without an effect on yield, though with the late season that estimate may be high.

See the May Veg Edge article Colorado Potato Beetle Resistance Management (with foliar insecticides). If pyrethroids + PBO still work against adult CPBs for you, or if you haven’t used them in several years, you might try them for a spray or two. This is backed up by research at a number of universities. Foliar sprays of Assail, Actara or Endigo ZC may work against emerging adults though they, or some of their components, are related to imidacloprid. Leverage may work since it’s a combination of imidacloprid with a pyrethroid. If all else fails then Altacor or Vomil Xpress may be your only choice against high populations of emerging CPB adults, but crop rotation is then very strongly advised.

There are many choices for control of hatching and small CPB larvae. See the article in the May Veg Edge mentioned above. Entrust (OMRI), Radiant, B. Bassiana (OMRI), Avaunt; and Pyganic (OMRI), Agri-Mek/Abba, Novodor, Trigard, Cryolite and Ecozin (OMRI), are effective against small CPB larvae, but the latter group works best if sprays begin at egg hatch. Note that in very hot weather a 5 day spray interval may be too long for good control, as the insects are growing so rapidly. If good control of small larvae is achieved, later CPB pressure should be much reduced.

From Sandy Menasha, CCE-Suffolk Co. - It is recommended that the organic products be applied at the highest labeled rate and it is important to achieve good coverage. Entrust is the most effective material available to organic growers although many growers are reporting reduced efficacy due to possible resistance. Ecozin is not as effective as Entrust but may provide some control, especially where there may be possible resistance to Entrust. Apply when temperatures are warm. Beauveria bassiana is another option but only 2 out of 7 University trials reported fair to good control, perhaps due to spores being readily killed by solar radiation. Applications are most effective on cloudy days in cool to moderate temperatures. Above products do not persist long on the plant so multiple applications are usually necessary.

Dates to Remember...

June 14 - Farm IT: How to Use Web Soil Survey to Know Your Soils Better
7-9pm, Cornell Food & Agricultural Technology Park, 500 Technology Farm Dr., Geneva.
Learn how to use the power of Web Soil Survey, a genuinely useful and free database & map set. We will use real examples of ways to view a complete map of soils on your property, how to interpret the symbols and colors, calculate acreages of various fields, and make plans to develop your country property. We will also look at a few other free on-line sources of property images, data, and maps and learn how to navigate them.
Cost: $10 per person, space limited. To REGISTER: Call Nancy Anderson at 585-394-3977 x427 or send name, address and phone number to nea8@cornell.edu

June 27 - ID, Mgmt & Updates in Forecasting Tomato/Potato Late Blight
See page 7 for details

June 27 - Farm IT: Online Relationship Marketing of Your Farm
7-9pm, Cornell Food & Agricultural Technology Park, Geneva. Keeping in touch with farm customers using popular social networking tools takes time and effort, so is it worth it? We will dig into the practical side of on-line social media like Twitter, ConstantContact, and Facebook. The objective is to help you decide which, if any, can be a benefit to your farm. See examples of how social media should and should not be used as part of your farm marketing plan. Cost: $10 per person, space limited. To REGISTER: Call Nancy Anderson at 585-394-3977 x427 or send name, address and phone number to nea8@cornell.edu

July 13 - 2011 Cornell University Vegetable Weed Science Field Day
H.C. Thompson Research Farm, Freeville, NY (10 miles Northeast of Ithaca, Fall Creek Rd, Rt. 366 Extension, 8:00 am Registration, 8:30 am – 11:30 am Vegetable Crop Weed Control (with Dr. Robin Bellinder). $8 per person. Pre-Register by July 11th by contacting Maxine Welcome, 607-255-4549 or mw45@cornell.edu
It’s disappointing to discover that your high-value early spinach and chard leaves are showing ugly feeding mines just as they are ready for harvest. Spinach leaf miner, typically an early-season pest, is likely to be active now and may cause damage to early greens. It attacks crops and weeds in the plant family Chenopodiaceae which includes the crops chard, beets, and spinach as well as weeds like lamb’s quarters and pigweed. Leafminer is a fly larva that burrows between the layers of a leaf eating everything but the epidermis. Early damage is a slender, winding ‘mine’ or tunnel, but later these expand and become blotches on the leaves. Inside the mine is a pale, white maggot.

The fly overwinters as pupae in the soil and hatches in late April and May. The adult fly then lays eggs on the leaves and the resulting larvae begin their dam-age. The oblong white eggs, less than 1 mm long, are laid in neat clusters on the un-derside of the leaves. They are easy to spot if you scout by looking under the leaves. The maggots may migrate from leaf to leaf down a row. They become fully grown in just a few weeks and drop into the soil to pupate. The entire life cycle is 30-40 days. There are three to four generations per season. Typically mid-late May, late June and mid-August are peak activity peri-ods.

In most seasons the damage is minimal and the plants will outgrow it leaving only early leaves with cos-metic damage. In other years, or other fields in the same year, the damage may be great and if the plants are hit early and growth is slow be-cause of weather condi-tions, the loss may be great. Treat when eggs or first tiny mines are noticed. See the New England Vegetable Management Guide for products [http://www.nevegetable.org/index.php/crops] (Note from J. Kikkert: NY growers should also refer to the Cornell Vegetable Guidelines [http://www.nysaes.cals.cornell.edu/recommends/]). There are both con-ventional and organic products available. An adjuvant is recom-mended to improve efficacy. Some soil-applied systemic neonicoti-noids are registered, but be sure to observe the long days to harvest restrictions. Most of the products labeled are for foliar applications.

Because the spinach leaf miner feeds on one crop family and also on many weeds including chickweed, lamb’s quarters and nightshade, weed control and crop rota-tion are the first line of defense. Row covers can also be used to ex-clude flies if placed over the crop before flies are active or immedi-ately after planting. “Spinach” and “beet” leaf miners are very similar species in behavior, appearance, and damage and can’t be distin-guished in the field. ■

Damage due to spinach leaf miner
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**Weather Charts**

*J. Gibbons, CVP:*

**Weekly Weather Summary: 5/24 - 5/30**

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**Accumulated Growing Degree Days (AGDD)**

Base 50°F: Jan. 1 — May 30, 2011

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* *Airport stations
** Data from other station/airport sites is at: [http://newa.cornell.edu/](http://newa.cornell.edu/)
Weather Data, Daily Summary and Degree Days.
Veg Edge Weekly is a seasonal weekly publication of the Cornell Vegetable Program providing information about crop development, pest activity and management, pesticide updates, local weather conditions, meetings and resources.

Veg Edge is published 28 times annually, monthly from October-May and weekly from May-September. If you have any questions about this publication, contact Julie Kikkert at 585-394-3977 x404 or jrk2@cornell.edu. Visit the Cornell Vegetable Program website at http://cvp.cce.cornell.edu/ for information on our research, upcoming events and enrolling in our program.

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Cornell Vegetable Program Extension Specialists

Robert Hadad
585-739-4065 Cell  rgh26@cornell.edu

Christy Hoepting
585-721-6953 Cell  cah59@cornell.edu

Julie Kikkert
585-313-8160 Cell  jrk2@cornell.edu

Carol MacNeil
585-313-8796 Cell  crm6@cornell.edu

Judson Reid
585-313-8912 Cell  jer11@cornell.edu

CVP Assistants

John Gibbons,
716-474-5238 Cell
Katie Klotzbach
585-732-2545 Cell

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