UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue

Crop conditions

Crops are growing well, harvest of summer vegetables continues, and markets are strong. The eastern half of the state finally got rain. In fact, nearly everyone has had more than enough rain this week. Storms with damaging hail and wind have hit some counties, often with very localized damage as winds tore through some sections of town and left trees uprooted or broken. Some vegetable fields were lost or damaged. Continuous leaf wetness for several days along with soil saturation and puddling in low areas of many fields will certainly foster vegetable diseases. *Phytophthora capsici* is showing up. Sanitation within and between fields is hard during picking season, but worth the effort.

Garlic harvest, curing and storage

Garlic production has gained a strong foothold on diversified vegetable farms in New England for sale through CSA's, farmstands, farmer's markets and occasionally for wholesale. Mid to late July is harvest season, and it's important not to wait too long for harvest. The ideal timing attains maximum bulb size (bulb size doubles in the last stage of growth) but does not allow the cloves to begin to separate. Separated bulbs sell and store poorly. Harvest when leaves begin to turn yellow, but when about 60% are still green. Check bulbs to determine when they are ready.

Use hand tools to loosen soil under the bulbs or a mechanical harvester to undercut the bed. Pulling bulbs out when they are tight in the ground can open wounds at the stem/ bulb junction and allow infection. Treat the bulbs like eggs or apples: they bruise easily! Don't knock off dirt by banging bulbs against boots, shovels, or buckets – shake or rub gently, and leave the rest to dry out during curing. Fresh bulbs are fragile. Bruises will encourage infection.

Most growers will store their garlic for a period of weeks or months before selling. Curing is important for successful storage. Curing in the field runs the risk of sunscald, while poorly ventilated barns can result in loss from disease. Avoid high temperatures (over 90 F) and bright sunlight. A hoophouse covered with a sunshade cloth, with sides and ends open, with bulbs placed roots-up on 1" wire mesh, and maybe even a fan running, will provide for rapid curing. A well-ventilated barn will also work, but be sure that bulbs are hung with adequate air circulation, or on open racks up off the floor. Curing takes 10-14 days. Stems may be cut before or after curing. Curing is complete when the outer skins are dry and crispy, the neck is constricted and the center of the cut stem is hard.

Optimum storage temperature for garlic for seed is 50 F with a humidity of 65-70%. Garlic cloves sprout most rapidly between 40 to 50 F, hence prolonged storage at this temperature range should be avoided. Storage of planting stock at temperatures below 40 F results in rough bulbs, side-shoot sprouting (witches-brooming) and early maturity, while storage above 65 F results in delayed sprouting and late maturity.

Store other garlic just above freezing (32 - 35 F) and 60 to 70 % relative humidity. If in good condition, and well cured when stored, garlic should keep for 6 to 7 months at 32 F. Relative humidity should be lower than for most vegetables because high humidity causes root and mold growth; on the other hand, if it is too dry the bulbs will dehydrate. Storage

at higher temperatures (60 °F) may be adequate for the short term, but it is important to select a place with proper relative humidity and good air flow.

-R Hazzard. Resources: New England Vegetable Mgt Guide, Oregon State, ATTRA, Wishingstone Farm, Pratt Farm.

CUCURBIT DISEASE UPDATE

Downy Mildew: The NCSU downy mildew forecast reports that all of New England was at high risk over the past weekend and western MA was at high risk on Wednesday of this week, and we've had an unconfirmed report of Downy Mildew in North Grafton, MA. This makes it very likely that downy will be showing up in your fields soon, especially cucumber fields. We would recommend spraying fields with a protectant fungicide (such as Bravo or Maneb) at this point (this will also protect against powdery mildew and Plectosporium), and switching to a material that is specific for downy mildew as soon as it's confirmed in your field. This is a time when it is CRITICAL that you scout your fields to catch the disease as soon as it appears. Protectants will help, but the most effective way to control this disease is to apply your most effective material immediately after the disease appears in your field and then follow a recommended spray schedule (consult the NE Vegetable Management Guide or see June 26 2008 VegNotes at http://www.umassvegetable.org/newsletters/documents/June262008_000.pdf for spray recomendations).

Powdery Mildew: We have started to see powdery mildew in summer squash and pumpkin crops. Conditions are ripe for the development of this disease. See powdery mildew article for more information. Many of the fungicides recommended for powdery mildew will also be effective against Plectosporium and black rot, consult the NE Vegetable Management Guide for details.

Angular and Bacterial Leaf Spot: The hot and wet weather in some parts of the state through most of July have led to an outbreak of these diseases in some areas. Applications of copper compounds during early fruit set can reduce the risk to fruit in some vine crops.

Phytophthora: The heavy rains experienced in many parts of the state, combined with warm temperatures, are ideal for the development of this disease. We've seen Phtophthora blight in a number of places already this summer. This is a destructive disease that can be very difficult to manage. The most effective management technique for this disease is to avoid standing water in the field. Anything you can do to reduce ponding and pooling of rain or irrigation water will help to reduce the spread of this disease. Removing infected material, along with a border of healthy-looking plants, may slow its spread. Be careful of moving soil from infected fields to healthy fields on boots or equipment.

As always, make sure you check the label before mixing fungicides.

- A. Cavanagh, UMass Extension

ORGANIC CONTROL FOR CORN EARWORM IN SWEET CORN.

Corn earworm numbers will be escalating soon, and without control measures ears will soon be infested with earworms in the tip. While foliar sprays of Bt or Entrust will be effective for control of European corn borer, additional measures may be needed for control of corn earworm. Foliar sprays of Entrust can control CEW when the pressure is light, using the same type of equipment and spray schedules as with non-organic insecticides. Good coverage of the silk and ear zone is critical. For growers without specialized spray equipment or with smaller plantings, direct silk applications of vegetable oil mixed with a pesticide provide an effective alternative. These applications will reduce corn earworm and corn borer damage to ears by coating the silk channel and the kernels in the tip where CEW (and also some ECB and fall armyworm) larvae feed. This method may be used alone or in combination with foliar sprays. Certified organic growers must be careful to select approved materials. A handheld oil applicator (the Zealater™) designed to make this hand-application method economical and comfortable, is available from Johnny's Selected Seeds (877-564-6697). The UMass Extension Vegetable program has an eight-page publication, Organic Insect Management in Sweet Corn: Scouting, Thresholds and Management Methods for Key Caterpillar Pests in Sweet Corn, describing the pests, monitoring methods, materials, tools, timing, and how to integrate oil applications with other methods. Contact the Extension Bookstore (413-545-2717) or the Vegetable Program office (413-545-3696) to obtain a copy, or find it online at the UMass Vegetable website sweet corn section (http://www.umassvegetable.org/soil_crop_pest_mgt/crops/corn_sweet.html.

Success with the direct oil method takes attention to detail and timing. Here is a summary of some key points:

Using the Zealater

Timing. Corn should be treated with 0.5 ml (not 5.0ml!) of oil, once during early silk stage. Action should be taken when >2 corn earworm moths are found per week in a trap in your area. The best time to apply oil is generally 5-8 days after silk growth starts, or 3-4 days after silk is full grown. At this time, the tips of the silks have just begun to wilt and turn brown and pollination is nearly complete.

A good way to check the timing is to carefully husk a couple of representative ears and examine the kernels. The ideal time to treat is when the silk is still attached to the top 1" or less of the kernels. The rest of the silks should have detached from the kernels, indicating that pollination is complete.

Applications made too early after silk do not give better control, but may result in a higher rate of "cone" tips. This occurs when oil interferes with silk pollination resulting in unfilled kernels in the tip. While partially filled tips are a relatively common occurrence in sweet corn, cone tips caused by oil can be more pronounced.

Oil applied too late after silk initiation can result in more feeding damage to the kernels caused by caterpillars that entered the ear prior to the oil. There is a window, somewhere between 5 and 8 days after silk initiation, that provides the best combination of corn earworm control and ear fill.

Materials. We recommend using corn oil or soy oil with added spinosad (Entrust). Bt may also be used in the oil; our studies showed it to be slightly less effective than spinosad. Non-organic corn or soy oil is ok to use on certified organic corn in Massachusetts and many other states, but certifiers do differ on this point so check to be sure. Organically certified growers will need to use a dry formulation of pesticide and can add an emulsifier to the oil to keep the pesticide suspended in the oil. We have had luck with liquid lecithin (available from health food stores). Add 5% volume of liquid lecithin to the oil before adding the dry material that has been suspended in water. Liquid lecithin is the consistency of molasses: we strongly recommend that you add it directly to the oil instead of measuring into a separate container first. Lecithin will mix more readily with oil than water, making cleanup difficult: be careful not to spill the lecithin. Use the labeled rate of pesticide per acre in corn. Add this to the approximately 2 gallons of oil it takes to treat 1 acre (assuming 16,000 ears/acre). For the Bt product that we have used in our trials (Dipel DF) this translated to approximately 3 tablespoons of Bt per liter of oil for an application rate of 1/2 lb Bt per acre. For 2 oz per acre of Entrust, use 0.25 oz per liter of oil, which is approximately 4 tsp per liter of oil.

If you have any questions please contact Ruth Hazzard at rhazzard@umext.umass.edu or 413-545-3696.

NEW SWEET CORN SCOUTING GUIDE FROM UMASS EXTENSION

The UMass Extension Vegetable Program is pleased to announce the newest addition to our list of publications. With funding and assistance from the Massachusetts Department of Agricultural Resources and the USDA Natural Resource Conservation Service, the Vegetable Program has put together a farmer-friendly guide for using IPM in sweet corn. Using **IPM in the Field: Sweet Corn Insect Management Field Scouting Guide** provides quick and easy instructions with plenty of color photographs for recognizing pests and damage, setting up traps, scouting, deciding when to spray, and using the latest control methods. Bound with the Guide, a **Record Keeping Book** is designed to help growers keep scouting records and trap counts for the season in one easy-to-use compact spiral-bound booklet. The Record Keeping Book is also available separately. We are providing these books free of charge to those who are interested and are also posting the documents as downloads on our website www.umassvegetable.org. If you would like a copy please contact Courtney Huffman at 413-577-3976 or umassvegetable@umext.umass.edu with your name, address, and email or phone number.

SWEET CORN REPORT

European corn borer: The second generation of European corn borer has showed up in a few locations this week. Trap counts were variable ranging from 0 in the eastern part of the state, up to 51 in the Connecticut Valley. Traps counts are very inconsistent throughout the Connecticut Valley; this may be due to crop history in the surrounding fields and whether host crops have been grown or wild hosts are plentiful; they may be due to moisture and temperature (ECB seems to do well in areas with wetlands and fallow fields) but it is hard to pinpoint the exact reason for high or low counts in a given

Location	Z1	EII	Total	CEW	FAW
Bershires/Champlain Valley					
Sheffield	0	0	0	0	-
CT Valley					
South Deerfield	1	4	5	-	-
Sunderland (1)	11	1	12	11	0
Sunderland (2)	1	50	51	3.5	0
Whatley	1	4	5	2	0
Hadley (1)	0	14	14	0.5	0
Hadley (2)	1	17	18	4.5	0
Amherst (1)	1	0	1	0.5	0
Amherst (2)	0	1	1	2.5	0
Granby	1	2	3	1	0
Easthampton	0	0	0	0.5	0
Central & Eastern MA					
Still River	0	1	1	3.5	0
Concord	0	0	0	3	0
Leicester/Spencer	0	0	0	3	0
Northbridge	0	0	0	18	0
Tyngsboro	0	0	0	7	0
Lancaster	0	0	0	9	0
NH					
Litchfield, NH	0	0	0	9	-
Hollis, NH	0	1	1	12	-
Mason, NH	0	0	0	10	-

field. One thing we can be sure of is the importance of trapping on your own farm to get an accurate picture of what is happening there. Trap counts do reflect the moth pressure in a particular field. In the absence of other moths, ECB should be controlled with 6-7 day spray intervals on silk. We have seen small larvae in pretassel corn, though numbers are still low.

When flight begins on your farm you can expect egg lying to start and hatch to begin about a week later. Inspect tassels for feeding damage and live caterpillars. Spray tassels if 15% or more of your field is infested. The action threshold for ECB during silking is 12 moths per week. If your flight is at 12 moths per week or greater, a weekly spray is warranted unless corn is within a week of harvest. Sprays should target the ear zone with the use of drop nozzles if possible. High pressure and low speeds are also effective at targeting the ears where small borers can hide and tunnel into the sides of developing ears. Keep checking your traps weekly to decide whether or not you need to be concerned about your silking corn and when you should start scouting your pre-tassel and tasseling corn.

Corn earworm: Trap counts for corn earworm were above threshold at 12 out of 15 of our trapping locations. We see a noticeable difference between traps placed in blocks of corn with fresh silk and those where silk is dry and corn is close to harvest. Fresh silk is very attractive to corn earworm – and the place where moths lay the most eggs. Moving trap into fresh silk will give the best indication of how high the population is in the corn that is most at risk. If you are trapping, be sure to keep at least one trap in a block of fresh silk. This requires moving a trap at least every week. With the storms coming from the southern part of the country this week it may be wise to check your traps twice a week to make sure that you are catching the beginning of the flight and taking preventative control measures. See table below for CEW thresholds in silking corn.

Corn Earworm Threshold		
Moths/Night	Moths/Week	Spray Interval
0-0.2	0-1.4	no spray
0.3-0.5	1.5-3.5	every 6 days
0.6-1	3.6-7	every 5 days
1.1-13.0	7.1-91	every 4 days
Over 13	Over 91	every 3 days

The high temperatures we have been experiencing mean faster egg hatch for corn earworm eggs. The single, globe-shaped eggs are typically laid on fresh silk. Larvae hatch and move within an hour or two into the silk channel where they are protected from feeding. Good control depends on having a residual insecticide on the silk when eggs hatch. Products which also have ovicidal activity kill eggs directly. For organic growers, see this week's article on the Zea-later for control options.

Fall armyworm: Although no flight has been caught this week, FAW damage has been seen in the field. Infestation levels were at 13% in Sunderland and 9% in Tyngsboro even though the flight is at zero in both locations. It is very important to scout your late blocks of whorl corn. Walk throughout the field because fall armyworm can be very patchy and can hit one end or one section of the block while the rest is clean. Heavily damaged corn may be delayed or fail to mature. Look for ragged feeding on leaves and in the center of the whorl. Inside the whorl, look for a smooth, tan, green or brown caterpillar with a dark head that has a light marking of an inverted Y. FAW caterpillars reach 1 ¾ inches long, then drop to soil to pupate. Growers have reported mixed success with standard synthetic pyrethroids on heavy fall armyworm infes-

tations. Those who tested indoxycarb (Avaunt) last year reported very successful control but noted that it was best if the treatment was timed to hit armyworms before they were full grown. This year may be a good time to test this product.

--Thanks to our scouting network: R.Hazzard,, A.Brown, C. Huffman, D.Rose, J.Golonka, S.Pepin, G.Hamilton, P.Willard, J.Mussoni, C.Leich, B. Howden, J. Bartlett, S. Algeria

Pepper report

Pepper growers should be on a regular spray schedule for ECB if they are catching more than 7 moths per week. Insecticide applications should begin one week after trap counts reach 7 per week (or one per night). This week delay provides an ample time margin for mating, egg-laying and egg hatch to occur before the larvae can enter the fruit. During the period when ECB moths are active, a regular schedule of insecticide applications should be maintained. This flight period usually lasts through August. At the end of the flight, when trap captures drop below 20 per week, insecticides should no longer be needed.

Location	Z1	EII	Total ECB
CT Valley			
Granby	1	2	3
Holyoke	0	1	1
Sunderland	3	5	8
Amherst	0	0	0
Hadley	1	2	3

Summer meeting dates – mark your calendar!

Massachusetts: The 34th Annual NOFA Summer Conference, August 8 - 10, 2008, University of Massachusetts, Amherst, MA. After many years at Hampshire College, this year's event will be held down the road at the University of Massachusetts. Three days of workshops, keynote speakers, exhibits, local food. Register for one day or the full conference. Call 860-684-0551 or 978-355-2853 for information or online at

http://www.nofamass.org/conferences/ s2008/index.php

Rhode Island: Vegetable Twilight Meeting. August 18, 4:30 to 7:30. URI Agronomy Farm, Kingston, RI. For more information contact Kristen Dame (401) 874-2967 or (401) 935-7308 or kdame@mail.uri.edu. Participants will receive a sit-down supper as well as 2 hours of pesticide credits. Cost: $15 per person at the door. Make checks payable to URI. PLEASE RSVP to Kristen Dame by August 11th: (401) 874-2967 or (401) 935-7308 or kdame@mail.uri.edu to ensure we have enough food for everyone.

UMass Vegetable Twilight meetings: Augst 19 and September 24.

Verrill Farm Twilight Meeting, 11 Wheeler Rd., Concord MA. Tuesday, August 19, 4-7 pm. Sponsored by UMass Extension, the New England Vegetable and Berry Growers Association, and by Crop Production Services and Fieldworks. Highlights: how to identify cucurbit diseases and what to do about them; cover crops for weed suppression including white clover between plastic and sudangrass before corn; heirloom tomato varieties (25 named varieties in the stand every day!); farmstand marketing highlights such as multicolored and heirloom varieties, email newsletter, and special festivals; energy conservation practices in the farmstand. (978) 369-1069.

Directions: If you are traveling East on Rt 2, turn RIGHT at Emerson Hospital, then RIGHT at the next stop sign. Stand will be approximately 2+ miles on your right.

If you are traveling West on Rt 2, turn LEFT at the intersection AFTER Rte. 126. That is Sudbury Rd. Stand will be approximately 2+ miles on your right

Bonanno Farm (Pleasant Valley Gardens) Twilight Meeting, 255 Merrimack St., Methuen, MA, Wednesday, September 24, 4-7 pm. Sponsored by UMass Extension and New England Vegetable and Berry Growers Association and by Crop Production Services and Fieldworks. Highlights: cultural practices for growing susceptible crops in a Phytophthora-infected field; identifying and controlling cucurbit diseases; irrigating 6 acres with trickle irrigation using a sand filter for river water; growing lettuce all season through heat and cold; marketing packaged romaine hearts and baby lettuce.

Directions: From I-495, take exit 46 toward Pleasant Valley. Turn left off the ramp at Merrimack St/RT-110. After three-quarters of a mile, turn into the farm driveway after Messina Ave., park near greenhouses. If questions, call 978-361-5650.

MASSACHUSETTS TOMATO CONTEST TO BE HELD AUGUST 18TH

The 24th Annual Massachusetts Tomato Contest will be held at Boston's City Hall Plaza Farmers' Market on Monday, August 18th in conjunction with the City Hall Plaza Farmers' Market and the start of Massachusetts Farmers' Market Week. Tomatoes will be judged by a panel of experts on flavor, firmness/slicing quality, exterior color and shape. Always a lively and fun event, the day is designed to increase awareness of locally grown produce.

Farmers who want to submit entries can bring tomatoes to the City Hall Plaza Farmers' Market by 10:15 am on August 18th or drop their entries off with the corresponding registration form to one of several locations around the state on August 16th or 17th. These tomatoes will be brought in to Boston on Monday. For the complete details, including contest criteria and a registration form, go to: http://www.mass.gov/agr/markets/tomato_contest.htm

The 24th Annual Tomato Contest is sponsored by the New England Vegetable and Berry Growers Association and Massachusetts Department of Agricultural Resources in cooperation with the Federation of Massachusetts Farmers' Markets.

WINTER SPROUTING BROCCOLI: A CROP TO CONSIDER?

(reprinted from NH Vegetable, Berry, & Tree Fruit Newsletter, http://extension.unh.edu/Agric/Docs/July2008.pdf)

In England, sprouting broccoli is a traditional heirloom crop that has shown a recent rise in popularity. The crop is sometimes referred to as 'asparagus broccoli', due to the tender long sweet shoots produced in very early spring. Sprouting broccoli is unlike the broccoli typically grown in the U.S. because it produces many small shoots, rather than a single head. In addition, many varieties require a cold treatment, or vernalization, before making sprouts. In England, sprouting broccoli is planted in late summer, and plants grow very slowly during the fall and winter months. When temperatures start climbing in February, they start to grow again and produce prolific amounts of small purple or white florets on long bright green leafy stems. The shoots are harvested from March to May, when other fresh local vegetables are in short supply and high demand. Unlike broccoli rabe or rapini, the shoots are mild-flavored, even sweeter than typical broccoli.

Harvesting Sprouts. Photo: Becky Grube

Growing in High Tunnels: New England winters are more severe than those in England. However, to cope with a short growing season, many farmers and gardeners have already created warmer climate zones by constructing low-cost, unheated greenhouses (called high tunnels) or cold frames. We have shown in Durham, NH that sprouting broccoli can survive the winter in high tunnels to produce early spring crops. In New England, many high tunnels are used to produce tomato crops during the summer growing season. Winter sprouting broccoli can be used to provide a source of income from these tunnels when they would otherwise be unoccupied and when little other local produce is available. It would also serve as a rotation crop that could help reduce soilborne diseases in the next tomato crop.

Sprouting Broccoli Variety 'Claret'. Photo: Becky Grube

Varieties, Availability & Yields: Most sprouting broccoli varieties are purple (see the photo of 'Claret'), but some are green or white, like cauliflower (see 'Nine Star'). Currently, seeds of these varieties are available from only a handful of companies (Thompson & Morgan, Bountiful Gardens, and Territorial Seeds, to name a few), but that will likely change if growers ask for them. Red Arrow, Bordeaux, and Nine Star each produced an average of over 0.25 lbs of sprouts per plant. There were no significant differences in yield per plant between most of the

varieties. However, Claret had the lowest yield, which at 0.15 lbs/plant was significantly lower than the highest yielding variety, NineStar. In our 30x60 tunnel, we harvested 136 lbs over the season. However, our experimental layout did not use space most efficiently. At our spacing (2.25 square feet per plant), a 30x60 tunnel could theoretically house 800 plants, yielding up to 200 pounds. Higher yields may be possible with optimized spacing, timing and rowcover use.

Marketing: This crop will not be familiar to consumers, and it will require education about the crop and how to prepare it. It can be used in any way that broccoli or asparagus is used. It may be helpful to refer to it as 'asparagus broccoli' or another creative name for marketing purposes. Our experience has been that trial consumers and chefs have been ecstatic about the crop once it is introduced to them and they then seek it out. Specialty restaurants or markets may be the best market for the crop since the harvest season is before most stands and farmers' markets open for the season.

Production Information: In 2006 and 2007, several varieties of winter sprouting broccoli were seeded in late summer/ early fall and transplanted into an unheated tunnel in Durham, NH. Within the tunnel, some plants were covered with spunbonded polyester rowcover in December, and the rest were left uncovered. After establishment, the plants were not watered, fertilized, or otherwise managed during the winter months. Winter temperatures were below zero Farenheit for several days.

FERTILITY: Compost and aged manure was added at a rate corresponding to approximately 50 lbs N/acre prior to planting. During the harvest season, plants were fertigated twice with calcium nitrate (15.5-0-0) at a rate of 5 lbs N/acre each time.

PLANTING DATE: We tested three planting dates: seed 8/10 (transplant 9/14), seed 8/26 (transplant 9/26), and seed 9/12 (transplant 10/10). The last planting matured earlier and produced over a longer period of time than the earlier plantings. It was also easier to manage, since the smaller plant size made them easier to cover with rowcover. Overall yield was similar for all three plantings. Earlier plantings might do better in years with short cool autumn season. In our experiment, all seedlings were grown in a greenhouse and transplanted into the high tunnel. Because direct seeding may result in a sturdier and hardier plant, we plan to test this method in the future.

SPACING: We used raised beds with 3' between row-centers. Plants were planted in staggered double rows, with 1' between each plant in a row. This corresponded to 2.25 square feet per plant. More trials are needed to determine the optimum spacing.

HARVEST PERIOD: Nearly all plants survived the winter. In early March, rowcovers were removed from covered plants. The first harvest was on March 20, and the last harvest was on May 15. For most varieties, the harvest period lasted for 3-5 weeks.

ROWCOVERS: Rowcovers were helpful. Compared with uncovered plots, plots with rowcovers mature significantly earlier, produced yields for a significantly longer harvest period, and produced significantly higher total yields (0.29 vs. 0.17 lbs per plant).

Pests: Because the crop is grown outside the main production season, common broccoli pests (cabbage loopers, imported cabbageworm, etc.) are not present during harvest. In 2007, our plants became infested with aphids during harvest (March-April). Despite heavy infestation, aphids remained on lower leaves and did not affect the sprouts. We managed the aphids by removing the heavily infested outer leaves and introducing ladybugs (Hippodamina convergens) to reduce aphid populations.

With additional questions about this crop and/or our results, please contact Becky Grube at becky.grube@unh.edu or 603-862-3203.

- Beck Grube, NH

POWDERY MILDEW OF CUCURBITS: 2008 UPDATE

Powdery mildew is a major production problem in cucurbit crops in all parts of the world. All cucurbits are susceptible, but the disease is less common on cucumber and melon due to the prevalence of resistant cultivars. Yields are reduced by a reduction in the number and/or size of fruit. Fruit quality can also be adversely affected by sunscald (due to defoliation), incomplete ripening, reduced storability (winter squash), and poor rind quality or discolored handles (pumpkins). In addition, infection by Powdery mildew may predispose plants to other diseases (Gummy stem blight).

Symptoms occur on leaf surfaces, stems, and petioles as white, powdery fungal growth. Symptoms develop first on older leaves, shaded lower leaves, lower leaf surfaces, and on older, fruit bearing plants. Infected leaves shrivel and die; plants

may senesce prematurely. The pathogens are obligate parasites and cannot survive in the absence of living hosts; initial inoculum for the Northeast is most likely airborne spores originating in southern states. Other possible sources include greenhouse grown cucumbers and alternate hosts. Under favorable conditions, Powdery mildew develops rapidly; the time between infection and symptom expression can be as short as 3 days and many spores are produced. Conditions favoring infection include a dense plant canopy, low intensity light, high nitrogen fertilization, and high relative humidity (although infection can occur at relative humidity of less than 50%). Optimum temperatures for disease development are 68-80˚ F; infection can occur between 50-90˚ F. Temperatures of 100˚ F or above stop Powdery mildew development.

Plant resistant varieties where available. Separate successive cucurbit plantings physically to prevent older plants from serving as an inoculum source for main crop. Scout fields regularly (particularly lower leaf surfaces) and apply fungicides early in disease development. Powdery mildew cannot be effectively controlled by fungicide applications after the disease is established. Powdery mildew develops best on the lower leaf surfaces; thus a successful fungicide program requires controlling the pathogen on both leaf surfaces.

An important component of fungicide programs are materials which can move to the lower surface (systemic or translaminar). Systemic fungicides, due to their single site mode of action, are prone to resistance development and the powdery mildew fungi have demonstrated the ability to develop resistance to this type of fungicide: (benzimidazoles (Topsin M) and strobilurins (Flint, Cabrio, Amistar). Managing resistance is an important consideration when selecting a fungicide program. Current recommendations for managing resistance consist of an alteration of effective high-risk materials of two or more chemical classes at 10 day intervals, with a protectant fungicide included in every application. Systemic materials should only be applied once per season, and always mixed with a protectant. A protectant fungicide has multi-site activity, low resistance risk, and will control strains resistant to the systemic chemical.

At this point, we are recommending application of a protectant fungicide alone until powdery mildew is seen in the field, at which time we recommend switching to Pristine mixed with a protectant, followed 7-10 days later by an application of Nova or Procure mixed with a protectant, and finishing the season with protectants alone. See the NE Vegetable Management guide for more recommendations (available online at www.nevegetable.org), and for a more detailed discussion on choosing a spray program see the june 26 2008 issue of Vegetable Notes, available online at http://www.umassvegetable.org/newsletters/documents/June262008_000.pdf.

- adapted from McGrath, M.T.

Vegetable Notes. Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author and photographer is R. Hazzard if none is cited.