UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 16, Number 5 June 2, 2005

CROP CONDITIONS

From the NASS New England Crop Weather for May 29:

Cooler than normal conditions forced greenhouse producers to continue to heat their facilities to keep temperature above 70 degrees. Greenhouse growers were struggling with fungal diseases such as botrytis mold caused from the cool, wet conditions. Vegetable growers started to plant warm weather transplants, tomatoes, and beans. Producers reported that earlier planted vegetables were not germinating due to cool soil temperatures. Farmers harvested asparagus, spinach, and rhubarb. Producers prepared fields for planting as weather permitted.

For the week ending May 29, temperatures in Massachusetts averaged 7 to 9 degrees below normal (the 30 year average). Accumulated growing degree days (starting March 1, with a base temperature 50°F) were lower than the 30 year average at all locations reported in Massachusetts, with the exception of Otis on Cape Cod. The GDD as of May 29 ranged from 97 (Worthington) to 237 (Chicopee) and the amount lower than normal ranged from 21 GDD to 126 GDD. The greatest lags in GDD occurred at both ends of the state (New Bedford and Greenfield).

Cumulative rainfall for the previous 4 weeks ranged from 10.5 to 17.5 inches, which exceeded normal levels by more than 5 inches at some locations. The heaviest rainfall occurred in the eastern part of the state.

Added comments:

Growers are reporting corn growth behind last year by 7-9 days; however, they've been keeping up with planting and corn is finally germinating on schedule. Some farmers held off planting vine crops until soils warmed late last week and over the weekend; others with earlier planted field have waited while seed sat far longer than usual and are concerned about losses from seed decay. Conditions are finally improving for planting warm weather crops.

Flower and bedding plant sales finally picked up over the long weekend, a welcome change after a drastically slow spring season thus far. Many Community Supported Agriculture farms will open for their first share distributions in the next week.

Damage from cabbage root maggot seems heavier than normal, where treatments were late or plants were unprotected. A few cucumber beetles have been spotted, waiting in the wings so to speak, feeding on dandelions and wild cucumber. This week we continue our series on Cucurbit Diseases with an article by Jude Boucher on Plectosporium blight, a new and serious disease of pumpkin and summer squash.

--R. Hazzard

PLECTOSPORIUM BLIGHT AND NEW SPRAY RECOMMENDATIONS FOR 2005

Plectosporium blight, caused by the fungus *Plectosporium tabacinum* (formerly known as *Microdochium tabacinum*), is a new destructive disease of cucurbits in New England. This disease was found in Tennessee in 1988 and has since spread rapidly throughout the eastern United States. It occurred on a single farm in Massachusetts in 2000 and on at least a dozen farms in Connecticut and Massachusetts in 2003. In the fall of 2004, after two seasons of rainy weather, it was present in every field I visited from Long Island Sound to Burlington, Vermont.

Plectosporium blight is known to cause damage to a wide variety of cucurbit crops in Europe and Asia, but the strain present in the U.S. seems to primarily damage pumpkins, summer squash, zucchini and a few varieties of gourds. In wet years, which favor disease development and spread, crop losses in no-spray and low-spray fields can range from 50 to 100%. Fortunately, this disease is easily recognized and can be effectively managed.

Description and Management

Plectosporium blight is favored by cool, rainy weather. The fungus can overwinter on crop residue and can persist in the soil for several years. Plectosporium has not been reported to be seed-borne. Tiny, one or two-celled, sickle-shaped spores are formed in lesions on vines, stems, fruit, leaves and leaf petioles. Spores are dispersed by wind over long distances. Lesions are small (<1/4 inch) and white. On vines, petioles and leaf veins, the lesions tend to be diamond to lens-shaped; on fruit and leaves lesions are usually round (Fig. 1, 2 & 3). The lesions increase in number and coalesce until most of the vines and leaf petioles turn white and the foliage dies. Severely infected pumpkin vines

become brittle and will shatter if stepped on (Fig. 4). Early in the infection cycle, foliage tends to collapse in a circular pattern before damage becomes more universal throughout the field. These circular patterns can be easily detected when viewing an infected field from a distance. Numerous fruit lesions produce a white russeting on the surface and stems that render the fruit unmarketable (Fig. 5). Fruit lesions also allow for entry of soft rot pathogens that hasten the destruction of the crop (Fig. 6).

Fig. 1. White, diamond-shaped lesions on vine

Fig. 2. Lesions on leaf petiole

Fig.3. Round fruit lesions on pumpkin

Fig. 4. Severely infected vines become brittle

Fig. 5. Lesions produce white russeting on fruit

Fig. 6. Lesions allow soft rot pathogens in.

Disease management recommendations include:

- a three-year crop rotation
- planting in sites with good air circulation to encourage rapid drying of the foliage
- switching to trickle irrigation
- scouting fields to confirm the presence of Plectosporium, applying fungicides, and plowing under crop residue after harvest

No pumpkin or summer squash varieties are known to be resistant to the disease, although differences in susceptibility do occur. The pumpkin varieties Sorcerer, Gold Standard and sugar pumpkins seem to be less susceptible than other varieties grown in the same fields. When scouting, look for a few white, elongated, diamond-shaped lesions on lower vines and leaf petioles.

Understanding fungicide recommendations

Chlorothalonil (i.e. Bravo) and strobilurin fungicides (Pristine, Cabrio, Flint, Amistar = Quadris) are the most effective at controlling Plectosporium blight. However there are several other important factors that must be considered when designing spray recommendations such as control of other important cucurbit diseases, resistance management, and spray coverage.

Selection of fungicides for summer squash is straightforward since this crop has a relatively short season. In most cases, two or three applications of a fungicide such as chlorothalonil (Bravo), beginning at fruit set, will control Plectosporium blight, scab, and most other important diseases of summer squash. In some years, you

may need to add a material to your spray mix to improve control of powdery mildew or downy mildew late in the season.

Fungicide selection is more challenging and expensive when it comes to choosing the most effective materials for a long-season crop such as pumpkins. As well as Plectosporium blight, it is crucial to manage powdery mildew, black rot (gummy stem blight), scab, and possibly Alternaria and downy mildew.

To successfully manage this pest complex with adverse weather conditions, you will need to make regular applications of a fungicide mix, with at least 40 gallons of water per acre for good plant coverage, while alternating systemic products to help prevent resistance.

Fungicide Group & (action)	Trade Name	Common Name
Strobilurin (systemic)	Amistar = Quadris	azoxystrobin
	Cabrio	pyraclostrobin
	Flint	trifloxystrobin
Anilide (systemic) + Strobilurin	Pristine	boscalid + pyraclostrobin
Demethylation inhibitor (DMI)	Nova	myclobutanil
	Procure	triflumizole
Dithiocarbamate (contact)	Maneb (etc.)	maneb
Chloronitrile (contact)	Bravo (or other brands)	chlorothalonil
Inorganics (contact)	Microthiol Dispress (etc.)	sulfur
	Kocide, Champ (etc.)	copper hydroxide

Systemic fungicides provide the best control of powdery mildew because they provide protection to both the upper and lower leaf surfaces where mildew infections begin. However, systemics have one mode of action per fungicide group and tend to have more problems with resistance than contact fungicides, which provide multi-site activity against diseases. Systemic fungicide resistance can occur in a single season if the product is overused. Once a disease organism develops resistance to a systemic material, the pathogen may quickly become resistant to other products in the same fungicide group (i.e. stobilurins). As a result, newer materials that have not been exposed to disease organisms as long, usually tend to work better than older products, but not for long. In contrast, many contact fungicides have been used for decades without experiencing resistance problems. Although stobilurin fungicides have been some of the most effective materials available in recent years for most pumpkin diseases (including Plectosporium), powdery mildew and black rot have already developed resistance to stoblilurins in some states, and resistance for downy mildew has occurred outside the U.S.

The best resistance management strategy to help preserve the useful life of the systemics is to make a single application from each effective fungicide group (anilide, stobilurin and DMIs) in a given season beginning when powdery mildew is first detected. In addition, pathologists are now recommending that all systemic materials be applied with a contact fungicide to help slow resistance development.

Chlorothalonil (i.e. Bravo) is effective at controlling Plectosporium blight on pumpkins but does not work as well as many systemic fungicides on powdery mildew. It can be mixed with systemics, such as the DMIs, myclobutanil and triflumizole (Nova or Procure), or protectants like sulfur (i.e. Microthiol Dispress) which work well on powdery mildew but do not control Plectosporium blight or other important cucurbit diseases.

Contact fungicides such as copper hydroxide and maneb may aid in the control of Plectosporium blight and possibly other diseases, but they don't have the efficacy to provide sufficient protection when used alone. So, fungicides must be mixed or alternated to produce a combination that will provide a full range of disease protection. Systemics must be alternated with fungicides outside of their group to prevent the build up of resistance.

Recommended Pumpkin Spray Schedules for 2005

Scout pumpkin and summer squash plantings weekly for symptoms of both Plectosporium and powdery mildew. Examine the lower surface of 50 leaves for small (1/4"), white powdery mildew colonies and all plant parts for Plectosporium lesions. If powdery mildew is detected first, follow the first spray schedule (example 1). Pristine contains boscalid, a new effective systemic material for powdery mildew control, and pyraclostrobin, the same active ingredient found in Cabrio (Anilide + Strobilurin groups). Procure is a new DMI in the same fungicide group as Nova. Applications should be applied 7-10 days apart, and should be limited to a single application per season for each fungicide group. Many Connecticut growers used a 10-day schedule during the wet 2004 season, and had no problems with Plectosporium blight, powdery mildew, black rot (GSB) and scab.

All systemic sprays should be applied with a contact fungicide (e.g. chlorothalonil, copper or maneb). Sulfur (i.e. Microthiol Dispress) and chlorothalonil (i.e. Bravo) can be used for late-season sprays to rest the systemic materials and still provide effective control of Plectosporium blight, powdery mildew, black rot (GSB) and scab. If downy mildew is found in Connecticut prior to September, other systemics (i.e. Ridomil/Bravo) may be needed with sulfur late in the season. There is no need to control downy mil-

dew on pumpkins during September, because this disease only affects leaves and not fruit.

If Plectosporium blight is detected before powdery mildew, apply chlorothalonil (i.e. Bravo) on a weekly basis until powdery mildew is found (see spray schedule example 2).

Caution: do not apply sulfur if temperatures exceed 90°F, before/with/after oil applications, or to melons due to phytotoxicity problems.

Spray schedule example 1:

		Spray #		
	(PM detected) 1	2	3	4
Fungicides	Pristine + copper	Procure + Bravo	sulfur + Bravo	sulfur + Bravo repeat if necessary

In unusually wet weather, in unrotated fields, or if Plectosporium is detected before powdery mildew, start your spray program as soon as the disease is detected or at fruit set. Scout your fields weekly for symptoms of Plectosporium blight and powdery mildew. Apply chlorothalonil (i.e. Bravo) every 7-10 days until powdery mildew is found during weekly scouting trips. Then add a systemic material or sulfur to the spray mix for mildew control, taking care to alternate between fungicide groups to help prevent resistance. Copper or maneb can be used with the Pristine application to rest Bravo. Crop rotation is an essential component of this management program.

Spray schedule example 2:

		Spray #			
	(fruit set) 1-3?	(PM detected) 4?	5?	6?	7?
Fungicides	Bravo	Pristine + copper	Procure + Bravo	sulfur + Bravo	repeat if necessary (sulfur + Bravo)

(Reminder: Thorough coverage of the foliage and fruit with 40+ gallons of water per acre is recommended).

--T. Jude Boucher, University of Connecticut, Cooperative Extension System

Special thanks to the following plant pathologists for their comments and suggestions in preparing these recommendations: R. Wick, S. Douglas, M. McGrath, T. Zitter, M. Babadoost, and K. Everts.

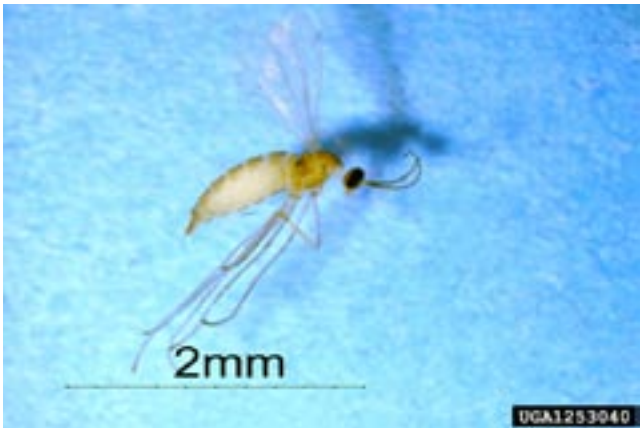
SWEDE MIDGE FOUND IN NEW YORK

What is a swede midge and what is Massachusetts doing?

The swede midge, a pest of brassica crops and native to Europe, was found for the first time in the United States in Ontario County, New York in September of 2004. The swede midge was first identified in North America in 2000 in Ontario, Canada. The damage Canadian growers had noted on crucifers since 1996 was mistakenly attributed to nutrient deficiency. Currently swede midge has been found in 11 counties in Ontario and 4 counties in Quebec. This year New York, Massachusetts and other states will be surveying for this pest. Here in Massachusetts, the Massachusetts Department of Agricultural Resources in partner with the USDA, APHIS Cooperative Agricultural Pest Survey will be setting up swede midge pheromone traps in 12 locations. Our hope is to determine that this pest is not present in the state. If swede midge is found, early detection will allow growers to be proactive in protecting their crops from this pest.

Hosts

While swede midge will attack any member of the brassica family including cruciferous weeds, the highest levels of damage have been seen on broccoli and Asian greens.



adult swede midge
Courtesy of Susan Ellis

Symptoms

Symptoms that indicate swede midge damage include brown corky scarring especially along petioles, distorted and twisted leaf stalks, and death of the growing point resulting in a blind head, crinkled and crumpled heart leaves, deformed and asymmetrical heads, and multi-headed or multi-stemmed plants resulting from destruction of growing tip. This damage can be mistaken for common physiological or nutritional problems so swede midge needs to be found to confirm the diagnosis. If you suspect swede midge larvae are present in a plant, drop the suspect

Leaf curling due to swede midge damage
©Queen's Printer for Ontario, 2003

part of the plant in a vial of alcohol or place it in a plastic bag in the sun to force the larvae to exit from the plant tissue.

Management

Swede midge is difficult to control and cultural practices are a big part of the management strategy. The following management practices have been suggested by the Ontario Ministry of Agriculture and Food:

1) Begin the season with clean transplant material.

2) Crop rotation out of crucifer crops for 2-3 years. Swede midge was probably in low levels in western New York due to the practice of most growers rotating fields out of crucifer production for 3-4 years.

3) Monitoring for the presence of swede midge.

4) Field sanitation and residue management. Controlling cruciferous weeds eliminates an alternative host for swede midge.

5) Selection of less susceptible cultivars. For example the broccoli variety Paragon is highly susceptible to the swede midge while the varieties Everest and Triathalon have proven less susceptible.

swede midge damage on brassica stem
©Queen's Printer for Ontario, 2003

6) Field selection. Swede midge damage is most often found in areas sheltered from the wind such as field edges and buildings because the swede midge is a poor flier and prefers areas of low wind movement.

7) Preventative insecticide applications. Canadian growers have been using acetamiprid on greenhouse transplants and lamda-cyhalothrin and acetamiprid in the field.

If you have any questions about swede midge or suspect you have swede midge damage, please contact **Julie Callahan** at *julie.callahan@state.ma.us* or 413.577.0809.

-Julie Callahan, Massachusetts Department of Agricultural Resources

FIELD DAY AND TWILIGHT MEETINGS FOR SUMMER AND FALL '05

Mark your calendar for the following series of twilight meetings coming up this summer! You will be getting more details on each of these events in future newsletters.

--**July 12** (Tues.)– Field Day at UMass Research Farm in South Deerfield
--**August 25** (Thurs.)– Twilight Meeting, Verrill Farm, Concord
--**September 28** (Wed.)– Twilight Meeting, Marini Farm, Ipswich
--**October 19** (Wed.) -- Twilight Meeting, Appleton Farm, Ipswich
--(**Date TBA**) – Twilight Meeting, Hibbard Farm, Hadley

At the UMass Research Farm we have been busy preparing a wide range of research experiments for this season -- plowing down rye, disking, staking plots, applying treatments, planting or getting ready to plant. There will be lots to see at the Field Day on July 12!

Here is an additional list of twilight meetings that are taking place in June in other states:

--**Tuesday**, **June 7** Management of Sweet Corn Insects &Vertebrate Pests Brentwood, NH. Contact: Nada Haddad (603) 679-5616

--**Wednesday**, **June 8**, Vermont Biodiesel Spring Workshop Biodiesel And How It Will Play A Role In Vermont's Energy Future. Where: **Vermont Law School, S. Royalton, Vermont**

The purpose of this one-day workshop is to help build commercial demand for biodiesel and to assist suppliers and potential users by providing practical information and education as well as a focused networking opportunity for all participants.

Although the workshop is designed primarily for commercial users, suppliers and distributors, the information presented will also be of interest to non-commercial users, small-scale produc-

ers, legislators and members of the agricultural community.

The workshop is being hosted by Vermont Law School and promises to be a key event this year in bringing together the participants in the emerging biodiesel sector.

The Vermont Biodiesel Project is sponsoring the workshop, with support from the Vermont Department of Public Service, the Vermont Biofuels Association, the Vermont Sustainable Jobs Fund, and the U.S. Department of Energy.

The cost to register is $40.00.. Fee includes session materials, continental breakfast and buffet lunch.

On-line registration is encouraged (see *https://secure.bock.com/scripts/delaney/vt_biodiesel.html*). You can pay either online with your Visa or MasterCard or by sending a check to the address below.

Make checks payable to:

Vermont Biodiesel Spring Workshop (VBSW)
c/o Delaney Meeting & Event Management
One Main Street, #36
Winooski, VT 05404

For more information call: (802) 665-6098, or contact: *info@delaneymeetingevent.com*

--**Thursday**, **June 16**, Stoneridge Farm Twilight Meeting, Bradford, NH. Contact: Sadie Puglisi (603) 225-5505

SOYBEAN RUST AND SOYBEAN APHID: NEW INTRODUCTIONS TO THE CONTINENTAL UNITED STATES

Soybean rust can be caused by two fungal pathogens, *Phakopsora pachyrhizi* and *P. meibomiae*. *P. pachyrhizi* is the more aggressive of the two pathogens and is found in Asia, Australia, Africa, Hawaii and South America. In November 2004 *P. pachyrhizi* arrived in the continental United States from South America on the winds of a hurricane. Nine southern states reported soybean rust in 2004. While the rust is not expected to survive cold winters, it is expected to survive long-term on legumes in frost-free areas in the southern United States. Windborne spores of soybean rust could reach the Northeast during the growing season causing periodic epidemics.

Hosts:

In addition to soybean (*Glycine max*) there are 30 species of legumes in 17 genera reported to be hosts in a natural environment. Sixty additional legume species have been successfully inoculated under laboratory conditions. Common hosts include snap beans and dry beans (*Phaseolus vulgaris*), lima and butter bean (Phaseolus lunatus), cowpea (*Vigna unguiculata*), vetch (*Vicia dasycarpa*), yellow sweet clover (*Melilotus officinalis*), medic (*Medicago arborea*), and lupine (*Lupinus hirsutus*). In the southern United States the widespread invasive plant kudzu (*Pueraria montana var. lobata*) could serve as a reservoir for soybean rust. Four counties in Florida have reported soybean rust on kudzu this year. These different hosts show varying degrees of susceptibility to both species of soybean rust.

soybean rust developing on leaf
Photo: Reid Frederick, USDA ARS

Symptoms:

Spores can infect a plant at any stage of development. Infection is encouraged by leaf wetness, temperatures between 42 and 82°F, and high relative humidity (75-80%). Symptoms appear 5-10 days after infection. Symptoms are first seen on the underside of lower leaves as small lesions that increase in size and change from gray to tan or reddish brown. Tiny bumps (uredinia) develop within the lesions and will eventually release tan colored spores. Lesions can be confused with Septoria brown spot, bacterial pustules, and other diseases. Soybean rust can lead to premature defoliation and yield decreases of 10-80%.

Control:

Since most of the varieties of soybeans currently grown in the United States are susceptible to soybean rust, fungicide is the current control option. Research is being done on developing resistant varieties of soybeans but this will take several years.

For more information on soybean rust visit the USDA, APHIS Soybean Rust Information Site *http://www.usda.gov/soybeanrust*.

Another new pest of note for soybean growers in Massachusetts is the soybean aphid (*Aphis glycines*), was seen for the first time in Massachusetts last year. It was found by a scout on farms in Franklin and Hampshire counties. Since the discovery of soybean aphid in the Midwestern United States in 2000, soybean aphid has been found in 23 states including New York, Connecticut, and Maine. The soybean aphid, a native of China, requires two hosts to complete its life cycle. The soybean aphid lays eggs on buckthorn species in the fall where they will overwinter. In the spring the aphid undergoes two wingless generations before winged

soybean aphid nymph
Photo:David W. Ragsdale,
University of Minnesota

females seek out soybean plants. The soybean aphid is a pale yellow aphid with black cornicles (the "tailpipes" sticking out of the rear end of the insect). Although the soybean aphid is similar in appearance to the melon aphid (*Aphis gossypii*), it has a much narrower host range attacking buckthorn (*Rhamnus spp.*), soybean, and a few clovers. Soybean aphid is the only aphid in North America capable of developing large colonies on soybean. The soybean aphid can vector viruses such as soybean mosaic and bean yellow mosaic. You can read more about this aphid and management strategies on the Plant Health Initiative soybean aphid web page at *http://www.planthealth.info/aphids_basics.htm.*

-Julie Callahan, Massachusetts Department of Agricultural Resources, julie.callahan@state.ma.us

CULTURAL AND ORGANIC METHODS FOR STRIPED CUCUMBER BEETLE CONTROL

Managing cucumber beetles is best accomplished by using a combination of cultural practices, with insecticides used in ways that minimize cost and environmental impact. Last week (Vegetable Notes, Vol 16:4, May 25, 2005), we wrote about managing striped cucumber beetle with conventional insecticides using foliar sprays or soil-applied systemics. This week we will discuss transplants, which are becoming more widely used by many growers, row covers, and information for organic growers on Perimeter Trap Cropping and on organic insecticides or deterrents.

Crop rotation. Because beetles spend the winter in field borders close to last year's crop, planting into the same field encourages rapid invasion by high numbers of beetles. Rotating to a field at a distance from last year's cucurbits reduces beetle numbers significantly. Of course, crop rotation has many other benefits as well – in vine crops, its critical for disease management. Any barriers between the fields – woods, buildings, fallow fields or other crops, roadways and waterways – help delay the arrival of beetles.

Using Transplants. Several studies in the Northeast have shown that three-week-old transplants, set out in the field at the same time as a direct-seeded crop, will produce not only earlier but higher yields. These studies were done with both summer and winter squashes. Transplants have multiple benefits. Germination of untreated seeds in cool soils can be spotty, while transplanting ensures a good stand. Transplants provide a jump on the weeds. Plants are bigger when cucumber beetles arrive so that they are less vulnerable to both feeding damage and to wilt. An insecticide or repellent can be applied to flats before plants are set out, making it less costly. Planting dates are more flexible – for some crops, it may be possible to delay planting until late June and avoid the worst of the beetles. Plants can be held inside to avoid late frost or wait until fields are dry (or wet) enough to plant. Of course, it is not advisable to hold transplants too long. If they are already flowering or have been stressed when they are set out, they tend to develop into small plants with early but small fruit. Standard seedling production methods work well for vine crops, but large cell sizes (72, 36 or 24) or peat pots are recommended as roots should not be disturbed when transplanting.

Row Covers

Floating or spun-bonded row covers are very effective barriers that keep beetles off the crop during the critical early growth stage. They have the added benefit of enhancing growth and reducing wind damage in the early season, for an earlier yield. Studies have also shown an increase in yield with row covers. Covers must be removed at flowering to allow for pollination. Wire hoops are very helpful, to prevent damage from abrasion; these are usually used on single rows, but can also be used under wide sheets of 15 or 25 or 50 feet. Black plastic adds to the warmth and helps to solve the problem of weed management under the covers.

Perimeter Trap Cropping (PTC) A technique that is gaining popularity in the Northeast is planting trap crops around the border of the field. See April, 2005 issue for more details. Cucurbit crops that are being planted or transplanted in June (pumpkin, butternut, summer squash, cucumber) can benefit from using a perimeter trap crop, most likely Blue Hubbard Squash . The following suggestions for managing the border apply to organic and conventional growers, except that the choice of insecticides is much broader for conventional growers:

- Scout the trap crop at least twice weekly and spray the border with an insecticide (e.g., Pyganic) as soon as beetles are found. Don't wait for beetles to build up in the borders or chew them down. It is important to maintain healthy border plants. Scout again to determine if repeat sprays are needed in the border. 1 to 3 sprays may be needed as beetles continue to colonize.

- An alternative organic control, for those who don't want to use sprays, is suction. A reverse leaf blower can be used (at least twice weekly) to suction beetles off the border plants. One grower who tried this last year was pleased with the results and noted that the blower chopped up the beetles nicely and though it did some damage to the border plants it kept beetles out of the main crop.

- For diversified growers who don't have large acreage of any single cucurbit crop, it is possible to grow a mix of crops inside the border. However, watch out for relatively attractive crop that might need additional sprays. For example, zucchini is more attractive than summer squash and may need to be sprayed even if it is inside a blue hubbard perimeter.

• Where heavy infestations might be expected, such as borders along woods where beetles may have overwintered, use a wider perimeter of 2-3 rows.

• If you the amount of Blue hubbard needed for the border is far more than you need, consider using other *C. maxima* crops, such as buttercup, Red Kuri, Prizewinner, or Cinderella Pumpkin to create the perimeter border. A mixed border has worked well where growers have tried this approach.

Organic insecticides. Insecticides available for organic growers include kaolin clay (Surround WP), pyrethrin (Pyganic Crop Spray 5.0 EC), and spinosad (Entrust). Pyrethrin is primarily a contact toxin, while spinosad acts both as a contact and a stomach poison. None of these provides a highly effective 'knockdown" of beetle populations. No rotenone products are approved under the National Organic Program.

Surround WP should be applied before beetles arrive because it acts as is a repellent and protectant -- beetles do not "recognize" the plant and so do not feed -- not a contact poison. It can be tricky to mix and use. One approach is to mix a slurry in a bucket and then add the slurry to the tank, as the dry powder can cake if added directly to the tank mix. Another approach is to add the powder to water and allow it to settle slowly. Once the powder is fully wet, agitate gently. Regular agitation is needed during spraying. With direct-seeded crops, apply as soon as seedlings emerge if beetles are active. Transplants can be sprayed before setting out in the field. Surround can also be used on the main crop of a PTC system, creating a "push-pull" dynamic. Ensure good coverage of the foliage (it will look like it was sprayed with white latex paint), including, if possible, the undersides of leaves (not easy when cotyledons are close to the ground). Reapply after a heavy rain and on new growth. And, wear a respirator or mask when mixing and spraying. Although kaolin is very safe in terms of skin exposure or ingestion, handlers should take precautions to avoid breathing the powder.

--Ruth Hazzard

ONLINE ACCESS– WITH UPDATES – TO THE *New England Vegetable Management Guide*

The 2004-2005 edition of the New England Vegetable Management Guide is now sold out at most sources in New England, including state Extension publications offices and the New England Vegetable and Berry Growers Association. If you have one, hang on to it!

However, you can access all of the information in the Guide at the new Guide website, http://www.nevegetable.org/. In fact, the updates that will be available in the 2006-2007 edition will be made available on the website this summer. There are many new products as well as added or changed product uses that are being posted on the website over the next month. The next printed edition (2006-2007 **New England Vegetable Management Guide**) is currently in production and is expected to be ready in time for the 2005 New England Vegetable and Fruit Conference in Manchester NH, December 2005. You can have access to the updated information this season online.

Wondering what insect or disease or weed you are looking at? Get yourself a copy of the **Pest Identification Supplement** to the Guide, which has vivid color photographs of all the insects, diseases and weeds that are listed in the New England Vegetable Management Guide. There are still copies available at $5.00 per copy.

To order by phone or request a catalogue, please call

1-877-UMASSXT (within Massachusetts) or 413.545.2717. You can also mail your order with a check made out to the University of Massachusetts to the UMass Extension Bookstore, Draper Hall, 40 Campus Center Way, Amherst, MA 01003-9244. All orders are shipped USPS Media Rate, charged at a standardized rate of $5.00 for the first item ordered, and $1.00 for each additional item per order. Allow 7-10 business days for delivery. To order online, visit the UMass Extension online bookstore:

http://www.umassextension.org/Merchant2/merchant.mv?Screen=CTGY&Category_Code=FVP.

Vegetable Notes, Ruth Hazzard, editor and Ben Hunsdorfer, Assistant Editor. 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 is R. Hazzard if none is cited.

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