UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue

Crop conditions

Growing conditions have improved from last week with sunny days, higher temperatures and a small amount of rainfall. A nice long steady rain is needed in most locations especially the north-eastern part of the state. Cool nights have slowed things down some as well. Fruiting crops are in the ground for the most part, including peppers, tomatoes, eggplants and melons. Asparagus harvest is going strong and selling well along with radishes, greens and other cool season crops. The warm weather this past Memorial Day weekend accounted for big sales of bedding plants and vegetable starts for greenhouse growers. Expect to see the beginning of insect activity in the next few days as average daily temperatures are forecasted to stay at or above 60 degrees for most regions in the state. The first pest alerts are, as usual, flea beetles and cabbage root maggot fly on brassica crops. Keep an eye on susceptible plants.

Corn plants have grown slightly with the increased temperatures but growers are still waiting for some warm nights before they can really take off. Most growers have removed plastic and row cover by now in expectation of higher temperatures. Corn remaining under row cover is protected from the first corn borer flight. Small flights of European corn borer moths have been caught in a few locations throughout the state but nothing to worry about (yet). We expect flight to begin in cooler areas next week. Earliest corn is the most attractive for moths laying eggs. If you want to know what's happening with ECB flight on your farm, the best way is to set up pheromone traps. Use two Scentry net traps, placed in weeds at the edge of the field, with a lure for the two races of ECB (known as Iowa-Z-I and NY-E-II). Traps and lures can be obtained from Great Lakes IPM (517-268-5693). For more information on setting up a sweet corn scouting program on your farm visit our website www.umassvegetable.org or contact Amanda Brown at 413-577-3976.

-A. Brown, UMass Extension

Managing striped cucumber beetle in vine crops

Striped cucumber beetle is our most serious early-season pest in vine crops. These beetles spend the winter in plant debris in field edges, and with the onset of warm days and emergence of cucurbit crops, move rapidly into the field. Densities can be very high, especially in non-rotated fields or close to last year's cucurbit crops. Adult feeding on cotyledons and young leaves can cause stand reduction and delayed plant growth. More importantly, the striped cucumber beetle vectors *Erwinia tracheiphila*, the causal agent of bacterial wilt.

Avoid early season infection with wilt. Cucurbit plants at the cotyledon and first 1-2 leaf stage are more susceptible to infection with bacterial wilt than older plants, and disease transmission is lower after about the 4-leaf stage. The higher beetle density during early plant growth, the more severe the incidence of wilt. Male beetles that discover a host plant will release an aggregation pheromone that calls others to their spot. Groups of beetles feeding, wounding and defecating on a single plant are more likely to transmit disease, and to acquire the pathogen and transmit it to other plants.

Cultural Controls: 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, it is 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.

Cultural Controls: 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.

Striped Cucumber Beetle

Cultural Controls: Row Cover. 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 warmth and solves the problem of weed management under the covers.

Thresholds and foliar controls. Beetle numbers should be kept low, especially before the 5-leaf stage. Scout frequently (at least twice per week for two weeks after crop emergence) and treat after beetles colonize the field. The threshold depends on the crop. To prevent bacterial wilt in highly susceptible crops, we recommend that beetles should not be allowed to exceed one beetle for every 2 plants. Less wilt-susceptible crops (butternut, most pumpkins) will tolerate 1 or two beetles per plant without yield losses. Spray within 24 hours after the threshold is reached. Proper timing is key. There are a number of broad spectrum insecticides which can be used for foliar control (including Capture 2EC, Decis 1.5EC, Thoinex 50W, Asana, and Sevin). See 2006-2007 New England Vegetable Management Guide for more details.

Organic insecticides. OMRI-list insecticides available for use in organic cucurbits include kaolin clay (Surround WP), pyrethrin (Py¬ganic Crop Spray 5.0 EC), and spinosad (Entrust). Pyrethrin is a short-lived contact toxin that has shown poor results on SCB in trials. Spinosad acts both as a contact and a stomach poison and has shown reasonably good results in recent trials. See last week's issue for more details. Surround WP should be applied before beetles arrive because it acts as a repellent and protectant - beetles do not "recognize" the plant and so do not feed - not a contact poison. 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.

Perimeter trap cropping. This strategy saves time and money – and it works! See the May 15 VegNotes article for more details on ptc, available at http://www.umassvegetable.org/newsletters/documents/May15_2008_newsletter-email.pdf.

Systemic controls. Two systemic neo-nicotinoid products, imidacloprid (Admire) and thiamethoxam (Plati¬num), are registered for use in cucurbits. In New England, Platinum is labeled for use specifically for striped cucumber beetle only in MA and CT. These are systemic insecticides that may be used as an in-furrow, banded, drench, or drip irrigation application to the seed/seedling root zone during or after planting/transplanting operations. DO NOT apply as a foliar spray. Note that imidacloprid is being sold in different formulations that differ in concentration. Admire 2F (21.4% active ingredient) is half as concentrated as Admire Pro (42.8% active ingredient) and generic products are also available. Label rates change according to concentration.

Because of the systemic activity when applied to soil or seed, these products are taken up through the roots and transported into new leaf tissue where they persist through the critical early plant stages. They can be applied in the furrow or as a surface band at planting, which simplifies control efforts especially in fields where a sizable invasion of cucumber

beetles is likely. They may also be applied through drip irrigation, which allows application to be timed shortly in advance of the expected arrival of the pest, and is suited to crops grown on plastic. They can be applied as a transplant drench prior to setting out in the field. Also, they are very well suited to a perimeter trap crop system – which dramatically reduces the cost per acre for pest control.

Using systemics in direct seeded crops. It is important to get the insecticide into the soil to avoid photochemical breakdown; placing it in the furrow or irrigating it in can accomplish this. One of the most efficient systems for an in-furrow treatment is to attach an injector to the planter for placement at the seed level after the furrow is opened and before the seed drops. This has the advantage of one trip through the field and very precise targeting of material. Where it is applied to the soil surface, it should be watered in with irrigation (or rainfall) to move it to root depth for seedlings. For growers who plant by hand on a two-way grid for cross-cultivation, apply in a twelve-inch band at the time that fertilizer is incorporated.

Striped Cucumber Beetle Damage

Platinum rates are recommended at 5 to 8 oz per acre. The label provides a chart of recommended rates per 1000 feet of row at various row spacings. For example, at 3 foot spacing, the recommended range is 0.34 to 0.55 oz/1000 liner feet, while at 7 foot spacing, the rates range from 0.8 to 1.29 oz/1000 feet. It may be possible to use a similar ap¬proach as for Admire by calculating rates per row feet. In a trial conducted at the UMass Crop Research and Education Center in 2005, both high and low rates gave comparable levels of control compared to imidacloprid.

The Admire Pro label gives a range of 7.0 to 10.5 fl. oz per acre. Replicated studies and field experience has shown that a rate equivalent to 0.5 oz Admire Pro per 1,000 feet of row is sufficient for controlling cucumber beetle in the critical early weeks. Given the wide range in row spacing with these crops and the fact that this is a banded application, we have suggested that growers calculate rates based on the number of row feet to be treated per acre or per block. For example, at 6 ft spacing, one acre has 7,260 linear row ft (43,560 sq feet divided by 5 ft between rows).

Using systemics on transplants. This method of application is, obviously, less expensive than a furrow drench. Note that rates are based not on application to the furrow (including where the plant is PLUS the area between plants) but only to the plant itself. The best time to treat is about 1 day prior to planting in the field. We see effective results with a rate of 0.02 ml/Admire 2F (equivalent to 0.01 ml Admire Pro) per plant. Slightly higher rates may not be phytotoxic, but caution should be used because phytoxicity can occur at higher rates. For example, don't concentrate the full amount that would be used in furrow applications on the plant. Note: there are 29.6 milliliters (ml) in one fluid oz.

Another way to apply imidacloprid to transplants is through a water wheel planter. Use the same rate per plant as you would for a transplant drench and the rate of water per plant that fits your planter (e.g. 8 oz). Multiply by the number of plants and mix the total insecticide needed with the total water needed in the tank. Make sure your workers wear protective gloves and allow time for uptake (1+ days) into leaves Note that the highest rate of uptake will be into new growth.

Drip application. A drip system can be used for Admire or Platinum applications to either direct seeded or transplanted crops. Know your system well enough to know how long it will take to inject a given amount of concentrated solution (eg one bucketful) and to soak the area between emitters. Apply early enough to allow the plant roots and leaves to take up the material before beetles arrive. The system should be primed with water first, and the insecticide injected slowly for even distribution. Make sure to use enough water to soak the area between emitters. More emitters provide more even distribution of product.

Calculate the total needed based on the rate per 100 or 1000 ft of row and the number of row feet of line that will be treated. Place the total amount in the bucket with enough water for 20-30 minutes of injection. Charge the system with water first to get the soil wet. Turn on the Venturi or other injector, to inject slowly for even distribution (20 or 30 minutes). Then flush lines with clear water and to move product out and down.

Non-target effects. Bees are very susceptible to imidacloprid and thiamethoxam and could be affected by its presence in pollen if it is still at high levels in the plants at the time of flowering. Bees intoxicated by Admire or Platinum, like beetles,

show unusual behaviors such as tremors, staggering, and falling over before dying. This could happen with bees at excessively high rates of these insecticides. We have not observed it at the rates suggested in this article. The foliar formulation of imidacloprid (Provado)is not labeled for cucurbits, and the foliar formulation of thiamethoxam (Actara) has a label for cucurbits but may not be sprayed during bloom. Carbamates such as Sevin and synthetic pyrethroids should not be used during bloom to avoid killing bees. Given the high losses of hives to hive collapse syndrome, protecting bees is an especially important concern.

Resistance from overuse: The down side of systemic products might be that they are 'too easy'. That's not necessarily a bad thing for growers who are always too busy! However if these are overused on a routine basis, these products may well be lost to resistance in a fairly short time. Furthermore, they are not cheap. For a truly IPM approach, combine or alternate these materials with crop rotation, perimeter trap cropping, and field scouting followed by foliar sprays with other classes of insecticides to reduce the likelihood of resistance and keep use rates low. Perimeter trap cropping provides a large, untreated refuge which can delay resistance.

-Ruth Hazzard, University of Massachusetts

MANAGEMENT TACTICS FOR CUCURBIT VIRUSES

Cucurbits are susceptible to five major virus diseases: Cucumber Mosaic Virus (CMV), Watermelon Mosaic Virus (WMV), Papaya Ringspot Virus (PRSV), Zucchini Yellow Mosaic Virus (ZYMV), and Squash Mosaic Virus (SqMV). ZYMV and SqMV seldom occur in the Northeast. The most susceptible cucurbits are summer squash (yellow, zucchini, and scallop types), pumpkin, and winter squash (acorn, delicate, and spaghetti types). Winter squashes such as Butternut, Hubbard, Buttercup, and Kabocha are not severely affected by viruses, though their foliage may show symptoms. Cucumber is resistant to CMV and not seriously affected by the other viruses. Severity of infection is determined by the timing of infection; the earlier infection occurs, the greater the impact on plant growth, fruit symptoms, and fruit set. Delaying the onset of infection by several weeks can have a dramatic effect on the amount of damage. Virus diseases are not usually seedborne and migrant aphids (winged forms) are therefore responsible for the introduction of all but SqMV which is vectored by cucumber beetles. The viruses are transmitted in a non-persistent manner; there is just enough virus on the stylet to infect one or two plants. Aphids can infect a plant quickly; insecticides DO NOT act quickly enough to prevent infection or control disease spread.

Management Tactics:

- Do not transplant virus infected plants into fields.
- Do not grow ornamental plants and vegetable transplants in the same greenhouse.
- Plant resistant varieties. Currently, virus resistance exists only in summer squash varieties, but resistance can slow the spread of virus diseases in squash and nearby pumpkin fields.
- Cover the crop with floating row covers in the spring to prevent the early influx of virus carrying aphids. Be careful with this tactic, as aphid populations can develop quickly under row cover if there are aphids present when the crop is covered. Make sure plants are not already infested before you apply row cover.
- Reflective mulches can repel aphids, but the absence of reliable sunshine reduces the effectiveness of this approach.
- Eliminate weed host reservoirs such as Shepherds purse, field bindweed, dandelion, purple deadnettle, and Canadian goldenrod.

-Source of information: Dr. Thomas Zitter, Cornell University; adapted by M. Bess Dicklow

POWDERY MILDEW RESISTANT CUCURBIT VARIETY TRIALS – 2006 & 2007

(Note: This is a brief summary of a more detailed report. If you'd like the complete report, including yield, appearance and photos of the varieties, go to http://vegetablemdonline.ppath.cornell.edu/ and click on 'Resistant Variety'. ed. C. R. MacNeil, CCE, CVP)

Powdery mildew is an annual production problem for all cucurbit crops throughout the US reducing yield potential and fruit quality when not controlled. Effective control with fungicides alone has been challenged by development of fungicide resistance to key chemistries. There are now varieties of several cucurbits with resistance [not immunity] to this disease.

All varieties of yellow summer squash tested exhibited control of powdery mildew relative to the susceptible check Multipik. Varieties tested included: HMX 5712, General Patton, Patriot II, Success PM, Sunray and Sunglo.

All varieties of zucchini tested that are marketed with claims for resistance to powdery mildew exhibited excellent control relative to the susceptible check Zucchini Elite in 2006. In sharp contrast, only Romulus PM and Amatista exhibited control of powdery mildew on both upper and lower leaf surfaces on Aug. 9, 2007. Payroll was also significantly less severely affected on lower surfaces. Lynx did not exhibit resistance in this study. Zucchini varieties tested included: Envy, Felix, HMX 7729, Judgment III, Justice III, Payroll, Romulus PM, Paycheck (RSQ6004), RXQ6006, Wildcat, Sebring Premium, Amatista and Topazio.

All of the melon varieties tested with powdery mildew resistance exhibited at least 48% suppression of mildew on upper leaf surfaces. The honeydew Crème de Menthe was the only variety not significantly less severely affected by powdery mildew than the susceptible check Superstar on lower leaf surfaces. The specialty melons, most of which are not advertised as having resistance to both races 1 and 2, exhibited less suppression of powdery mildew than the muskmelons, which all have resistance to both races.

The melon varieties tested included: Goddess (PM 1,2), Strike (PM 1,2), Wrangler (PM 1,2), Maverick (PM 1,2) Lil' Loupe (PM 1,2), Athena (PM 1,2), Bolero (PM), Dorado (PM 1,2), Vicar (PM 1) and Crème de Menthe (PM).

-Margaret Tuttle McGrath, Cornell and Sandra Menasha, CCE, Suffolk County

GREENHOUSE APHID IDENTIFICATION AND BIOCONTROL

(adapted from Ontario Ministry of Agriculture fact sheet 06-081 www.omafra.gov.on.ca/english/crops/facts/06-081.htm)

Part two of a two part series.

Biological controls are readily available for aphids. These include the parasitic wasps Aphidius (various species) and *Aphelinus abdominalis*; the predatory midge *Aphidoletes aphidimyza*; and ladybeetles (*Hippodamia convergens, Harmonia axyridis*). Lacewings are more generalist predators available for aphid control. Aphidoletes and ladybeetles are usually used to supplement the activity of Aphidius and for reducing aphid populations in 'hot spot' areas.

Parasitic wasps: Aphidius species do not go dormant and are usually more effective during winter, early spring, and fall. Optimum conditions for Aphidius are 65-77 degrees F and 80% RH. Aphidius completes its development from egg to adult in about 10 days at 77 degrees, and 14 days at 70 degrees. Three species of Aphidius are commercially available. One is *Aphidius matricariae*, which can parasitize about 40 aphid species including the green peach aphid. *Aphidius matricariae* has been largely replaced by *Aphidius colemani*, which is effective against both the green peach aphid and cotton aphid. *Aphidius ervi* is a larger species used against potato and foxglove aphids. Aphidius wasps lay their eggs inside the aphid. As the wasp develops, the aphid changes colour and appearance, becoming swollen with a bronze colour and a papery texture. This parasitized aphid is known as a mummy. The new adult wasp emerges from the mummy.

Aphid mummy

Aphidius species are best used when aphid numbers are very low. To facilitate continuous release of low numbers of these species, many growers use "banker plants" that essentially consist of seedlings of a cereal species like rye. These seedlings are host to cereal aphid species that do not attack non-cereal crops, and the cereal aphids in turn are hosts or food for the parasitic wasps. Research indicates that for optimum results, evenly distribute banker plants throughout the greenhouse, with a distance of between each banker plant ideally not greater than 130 feet.

Aphelinus abdominalis primarily attacks potato and foxglove aphids. This wasp prefers to parasitize the 2nd and 3rd nymphal stages while the 1st and small 2nd nymphal stages are used for host-feeding (i.e. as food by adults). To feed on an aphid, the wasp first pierces the aphid with its stinger or egg-laying body part, and then feeds on the aphid's body fluid through the tiny opening(s).

In contrast to *A. colemani*, egg laying activity is low during the first few days of this wasp's life. And then by the 4th day after emergence, an adult female can lay 10-15 eggs per day for the rest of its life of 15-27 days. During this time, an adult female may parasitize more than 200 aphids and kill about 40 by host-feeding. Because adults prefer to walk or hop rather than fly over the crop, they tend to remain localized. Studies have shown that dispersal by this wasp is poor in the greenhouse, and that most remain close to their points of release. This means these wasps should be released as close as possible to aphid infestations for best results. Note that aphids parasitized by *A. abdominalis* appear black while those parasitized by Aphidius species are bronze.

Aphidius colemani

Predatory midge: *Aphidoletes aphidimyza* adults resemble small mosquitoes whose larvae are the predatory stage. Females lay eggs close to aphid colonies so that upon hatching, the orange-colored larvae have a readily available food source. Eggs usually hatch after 2-3 days, the larval stage lasts 5-7 days after which they drop to the floor to pupate. The pupal stage usually lasts about 8-10 days. Adult *A. aphidimyza* feed on honeydew and are non-predatory. The larvae can kill between 10-100 aphids in total. A particularly positive characteristic of Aphidoletes is that unlike parasitoids, it causes little disturbance in colonies. Because of its furtive behavior, it triggers little defensive reaction by aphids. This means aphids attacked by Aphidoletes are less likely to disperse, escape predation, and start new colonies. When aphids are attacked by parasitoids, they defend themselves by kicking and producing alarm pheromones (chemicals used for communication within a species), resulting in their own escape, as well as many other members of their colony.

Under natural daylengths, *A. aphidimyza* enters reproductive diapause between September and March because the larvae require at least 15.5 hours of light to prevent the pupae from diapausing. However, there is some evidence to suggest that regular preventative releases of Aphidoletes can be made throughout the winter to control aphids. The Aphidoletes adults lay eggs and the larvae feed on aphids, however there is no second generation of midges produced. If lighting can be supplemented, even low light intensities, such as from incandescent bulbs, are sufficient to prevent diapause.

Adults are nocturnal and require a period of darkness for mating and egg-laying. Therefore, continuous lighting from a bright source will prevent reproduction. Likewise, lighting that eliminates dusk can also interrupt mating. It is also important to note that larvae drop to the ground and use grains of sand and possibly soil debris to form cocoons. If the larvae fall on plastic or concrete that is dry and free of debris, mortality of this predator will be high. Repeated or continuous release using banker plants is necessary under such situations to achieve acceptable suppression of aphids.

Other Biocontrols: Ladybeetles are also used for control of aphids. *Harmonia axyridis*, also known as the multi-coloured Asian ladybeetle, is an introduced species that can provide excellent control. However, it has developed a bad reputation because it has developed huge populations in the outdoor environment, become a pest on some crops such as grapes, and it has displaced native ladybird beetle populations. Some biocontrol producers have stopped supplying this species. The second species, *Hippodamia convergens* is a native North American species collected in the wild in California.

Both adult and larval ladybeetles feed on aphids. When daylengths are suitable, ladybeetles must feed on aphids to maintain egg production. Eggs are torpedo-shaped, orange-colored, laid in circular clusters on the underside of leaves, and hatch in 2-5 days. The larval stage lasts for about three weeks after which they pupate. Adults emerge from pupal cases after 3-5 days. To increase the percentage of ladybeetles remaining in the greenhouse, make releases late in the evening, and sprinkle a sweet liquid (diluted soda pop) over the beetles. This provides an immediate energy and water source.

Lacewings also feed on a variety of prey including aphids, thrips, spider mites, young caterpillars and moth eggs, mealybugs, scales, and whitefly larvae and pupae. However, they do have a preference for aphids over thrips, and then spider mites. Older larvae (3rd instar) are particularly voracious, and can eat unhatched eggs, other larvae, and even adults if food is scarce. A larva can consume 300-400 aphids and are usually best suited for high aphid populations. The adults feed only on honeydew, nectar and pollen.

Other Control Strategies: Remove weeds from within, and immediately outside, the greenhouse. If possible, empty the

greenhouse of all plant matter for a period of several weeks each year, leaving it shut to bake at high temperatures, or open to freeze during the winter. Aphids can develop on many different species of weeds. Remove plants in isolated areas of infestation which are detected early, to prevent aphids spreading to the rest of the greenhouse. Consider the use of insect screening to eliminate the movement of aphids from outside into the greenhouse. There are a number of registered pesticides for control of aphids in both vegetables and ornamental greenhouses, and some of these are compatible with biological control. Be aware of potential phytoxicity in some products. See also Vegetable Bedding Plants and Greenhouse Tomatoes sections of the 2008-2009 New England Vegetable Management Guide (also at www.nevegtable.org).

Suppliers of biological controls in the Northeast include The Greenspot Litd, 603-942-8925 (www.greenmethods.com), IPM Laboratories 315-497-3129, (www.ipmlabs.com). Another source in CA is Beneficial Instectary, 800-477-3715 www.insectary.com.

-From Vermont Vegetable and Berry News – March 26, 2008, compiled by Vern Grubinger, University of Vermont Extension,(802) 257-7967 ext.13, vernon.grubinger@uvm.edu www.uvm.edu/vtvegandberry

ORGANIC RIDGE TILL VEGETABLES

The Organic Cropping Systems Project at Cornell is testing several different organic management systems, including a ridge till system. The other systems use tillage methods more typical of organic agriculture but varying in the intensity of weed management, the amount of cover crops, and soil inputs used. These field trials provide a unique opportunity to explore how ridge tillage compares to other organic management methods. Few vegetable growers have experimented with ridge tillage, but this approach shows promise for vegetable production in this experiment. For a detailed look at how ridge tillage works and how this method has been adapted for this vegetable experiment, please see the fact sheet at: http://www.umassvegetable.org/newsletters/documents/Ridgetillsystems.pdf

- adapted from Krista Isaacs, Brian Caldwell, Charles L. Mohler

NEW DECISION TOOL AVAILABLE TO MAKE CHOOSING A COVER CROP FAST.

Vegetable growers have a new tool available to make it easy to select a cover crop. It's challenging to keep track of which cover crops are good for various situations. Even growers who want to try a new cover crop find they don't have time to research them when the opportunity to use one arises. The new decision tool will speed that process. If a grower has an idea of why they need a cover crop and a particular window in the rotation, they should be able to enter those goals and come away with growing instructions in less than five minutes.

This decision making tool was developed by Dr. Thomas Bjorkman at Cornell University. It is tailored specifically to New York, though it should be useful to growers in many parts of MA as well as southern Vermont and Northern PA.

Not every combination of management goal and time results in a hit. The cover crops included in the tool are only those that are readily available and relatively inexpensive. Nevertheless, there are cover crops available for any time of the year. There are those that are best raised for a year or so, to those that are done in a bit over a month. A substantial number of management goals are included. Some, such as increasing organic matter, can be met by many cover crops, others, like suppressing verticillium, are met only by one cover crop. The tool will be expanded as current research projects yield more results.

The online decision tool can be accessed at http://miniurl.org/nyccctool. This is a shortcut to the relevant page on the Cornell vegetable cover crop site.

- adapted from Thomas Björkman, Horticultural Sciences Department. Cornell University

VEGETABLE DIAGNOSTICS SAMPLE SUBMISSION

Contact M. Bess Dicklow at (413)545-3209 to determine if sending a specimen is necessary or to inform her that one is being sent. . Microscopic and laboratory identification of fungi, bacteria, viruses, and nematodes are routinely carried out. Samples can be hand-delivered (if possible) or sent overnight mail, UPS, or Fed Ex. Along with your sample, please include a completed case history form. Be complete as possible; accurate diagnosis depends on sufficient information

about cultural practices and environmental conditions. Collect specimens that show a range of symptoms, avoiding rotted or decayed specimens. Please avoid Friday samples; these will not be examined until the next Monday. Upon reaching a conclusion, the lab will send or e-mail a report on the diagnosis including complete management guidelines emphasizing cultural and biorational controls, as well as chemical control options.

Please submit samples according to the following guidelines, based on the symptoms present:

Leaf Spots and Blights. Leaf spots and blights of vegetable crops are often caused by fungi or bacteria. Certain pesticides, or environmental or nutritional factors can also cause spotting. Select leaves which show a range of symptom development. Specimens that are dead or dry are of little diagnostic value. Place leaves between sheets of paper or inside of a magazine. Place the package in a plastic bag, and then into the envelope for mailing. Never wrap leaves in wet paper towels.

Fruit Rots. Select early stages of disease rather than badly rotted tissue. With large fruit such as a pumpkin, cut the affected area out with a knife and submit. Wrap fruit or fruit sections in newspaper, and put into a plastic bag for mailing.

Stem Cankers. When a canker occurs on a large plant, cut a section of the stem with the symptoms, wrap in newspaper and place in a plastic bag for mailing. If the plants are small (1 foot or less), shake the soil from the roots, wrap in newspaper and put into a plastic bag for mailing.

Wilt, Crown Rot or Root Rot. If the plants are 1 foot or less, include the entire plant. Dig the plant including a good handful of the root system. Leave the soil on the roots. Place the root/soil ball into a plastic bag and tie off at the crown to prevent soil from spilling out. Wrap in newspaper and put into a plastic bag for mailing. If the plants are large, send a portion of the plant that includes the infected tissue. For wilt diseases, we must have lower stem tissue and roots.

Scorch, Defoliation or Poor Growth. These symptoms are usually caused by nutritional or environmental factors. They may also be the result of root rot or vascular disease. Collect a specimen as for Wilt (above), be sure to submit a soil sample to the soil testing laboratory. A tissue analysis may also be advisable. Call the soils lab at (413) 545-2311 before sending the sample.

- M. Bess Dicklow, UMass Plant Disease Diagnostics Lab

CORRECTION FROM LAST WEEKS HERBICIDE UPDATE

Last week we included a new material called Laudis in our herbicide update. We've been informed that the that Laudis registration in MA was delayed because of a staff shortage. It should be registered by July, and perhaps sooner. In addition, product supply has all gone to the Midwest, where acerage is the greatest. We'll have to wait for this one.

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.