UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue...

This issue features updates on the new insecticides, fungicides and herbicides that are included in the 2006-2007 New England Vegetable Management Guide. This new edition also has other new features, including:

- •New crops have been added, including basil, mesclun, sweet potato, and okra.
- •The irrigation section has been updated and expanded.
- •Many new pest management products have been added, including biorational disease control materials. Check the 'Biorationals' tables as well as the disease and insect management section for each crop.
- •Because pesticide resistance management is a serious concern, we have added the resistance group designations for insecticides, herbicides and fungicides/bactericides. This will help you select products from different resistance groups.
- •To assist organic growers in selecting approved pesticides, all materials which are approved for use in organic production are identified as "OMRI listed."

The Pest Identification Supplement, published separately, provides color photographs of all the weeds, insects, diseases and non-pathogenic disorders that are mentioned in this Guide. We hope that growers will use these two publications together for identification and management of pests.

If you do not already have a copy of the new Guide, you can order one through the UMass Outreach Bookstore (reached easily from www.umassvegetable.org or at 413-577-2717) or your state Extension office. Guides are $15.00, ID supplements $5.00.

Also in this issue….Dr. Rob Wick, who is on sabbatical in Bangladesh, reports on his experiences with vegetable farmers there. If you have wondered about the new compounds that encourage plant resistance, read Dr. Christine Smart's report on her research in controlling tomato bacterial speck with these materials. Two excellent upcoming programs are Consider Farmers Markets (April 4), and the Mass Aggie Seminars, especially the "Vegetable, Fish and Fruit Day" (March 25).

Fungicide Update 2006

-UMass Extension Plant Diagnostic Clinic

The single, most serious issue of chemical disease management in 2006 is the capacity of the major pathogens of vegetable crops to develop resistance to the very best materials available. To achieve effective control and prolong the useful life of new chemistries, it is imperative that fungicide applications be guided by the principles and practices of resistance management. To this end, the Fungicide Resistance Action Committee has assigned group numbers to each class of fungicide based upon their mode of action in killing pathogens or interfering with their life cycles (FRAC codes). These numbers appear in Table 19 and in the text of the specific crop recommendations. Two general rules apply: 1) fungicides with the same FRAC code have the same or similar mode of action (that is, attack the same biochemical pathway in fungi) and 2) fungicides with a single site of action have the greatest risk for resistance development. Often fungi that have developed resistance to one chemical within a group will also be resistant to the other group members (cross resistance). Systemic or penetrant fungicides that enter and move within plant tissues have the greatest risk of resistance development. Unfortunately, it is these very same chemicals that give the best control. Fungicides with a M# code have a multi-site mode of action, work as protectants, and have a low to medium risk of resistance development. To prevent resistance development in pathogen populations, sequential applications of fungicides within the same chemical group should be avoided. Alternate applications of systemic chemicals with protectant chemicals, use combination products, or tank mix fungicides according to label directions. Know the active ingredients and FRAC group of your materials, rotate applications, choose fungicides with a low risk, and integrate cultural practices that reduce disease pressure into your management programs.

The strobilurin, Group 11, QoI fungicides are systemic and have a broad range of activity, as well as a propensity for resistance development. To preserve their useful life, these chemicals MUST be alternated with fungicides with a different mode of action. New strobilurin fungicides include **Amistar** (azoxystrobin), **Headline**

and **Cabrio** (pyraclostrobin), **Gem** (trifloxystrobin), and **Tanos** (famoxadone). **Amistar** controls leaf spots, downy mildews, powdery mildews, and *Phytophthora* in a wide variety of crops. It is one of the few fungicides registered for use on herbs. **Headline** also controls the "lower fungi" (downy mildew, Late blight) as well as anthracnose, rust and powdery mildew on potatoes, sweet potatoes, and dry bean. **Gem** is registered on potatoes against both Early and Late blight.

Two of the most intractable pathogens that cause severe damage year after year on many vegetable crops are "lower fungi"- downy mildew and Phytophthora (Late blight of solanaceous crops and *P.capsici* of cucurbits, peppers, tomatoes, and eggplant). Several new chemistries are available for the management of these diseases including the phosphites or phosphonates (**ProPhyt, Phostrol, Fosphite**), cymoxanil (**Curzate 60 DF**), pyraclostrobin plus boscalid (**Pristine**), famoxadone plus cymoxanil (**Tanos**), zoxamide plus maneb (**Gavel 75 DF**), and propamocarb (**Previcur Flex**). The phosphites are considered to be biorational (less damaging to the environment and beneficial organisms), have systemic action, and are registered for **Pythium**, *Phytophthora*, and Downy mildews on brassicas, cucurbits, leafy vegetables, and solanaceous crops. **Curzate 60 DF** is registered on cucurbit crops, potatoes, and tomatoes for Downy mildews and Late Blight and should always be tank mixed with a protectant fungicide. **Pristine**, a premix of two fungicides with different modes of action is registered on bulb vegetables, carrots, and cucurbits. Its spectrum of control includes leaf spots, anthracnose, Powdery and Downy mildews. Another premixed fungicide, **Tanos**, is effective against Downy mildews, Early blight, and the fruit and/or foliar phase of *Phytophthora capsici*. It is registered for use on cucurbits, head lettuce, potatoes, tomatoes, and peppers and must be tank mixed with a contact fungicide such as maneb or chlorothalonil. **Gavel 75DF** is effective against leaf spots, Botrytis, Phytophthora, and Downy mildews on potatoes, tomatoes, and cucurbit crops and is also a combination material.

Other fungicides that are new to the *Vegetable Management Guide* are **Nova** (myclobutanil), **Endura** (boscalid), and Quilt (azoxystrobin plus propiconazole). **Nova** is registered for use on asparagus, bean, tomatoes, and cucurbit crops on Powdery mildews and rusts. Endura can be used to control *Alternaria*, *Botrytis*, and *Sclerotinia* on beans, bulb vegetables, carrots, lettuce, and solanaceous crops. Quilt manages the *Cochiolobolus* (formerly *Helminthosporium*) blights, other leaf spots, and rusts on both field and sweet corn.

Finally, to accommodate the growing number of organic growers and farmers interested in reducing toxic chemical use, the section on biorational and biofungicides has been expanded t•o reflect the many new products available in these categories. Materials that are OMRI (Organic Materials Review Institute) approved are noted. Biorational fungicides fall into six classes: activators of plant defense mechanisms (**Actigard**), copper compounds (**Kocide**, **Champ**, **Nu-Cop 3L**, **Nordox 75WG**) hydrogen dioxides (**ZeroTol**, **OxiDate**, **TerraClean**) phosphites, sulfur compounds (**MicroSulf**, **SulfDispers**), and plant extracts (garlic juice, neem oil, rosemary oil, sesame oil, sesame seed meal). These materials have broad crop clearance and are effective against a wide spectrum of diseases. Biological controls (biofungicides) are also listed and too have broad crop clearances and broad spectrums of activity, although controlled research trials of these materials has failed to demonstrate consistent, effective control of plant diseases.

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WEED MANAGEMENT UPDATE 2006

WPS Changes

NEVMG information is different and refers you to the new "How to Comply" manual changes in the WPS worker training requirement that requires untrained workers to be provided basic pesticide information before entering pesticide-treated areas reduction in the number of days decontamination supplies must be available to workers after application of low-risk pesticides, and the supplies are to be located together modification in the language requirements for treated-area warning signs.

WPS Changes Modification in the size requirements for treated-area warning signs; Early-entry exception for irrigation tasks and for limited contact tasks; Optional use of separable glove liners beneath chemical-resistant gloves; Exemption for certified or licensed crop advisors and persons under their direct supervision.

EPA also offers a CD-ROM version of the revised WPS HTC Manual which contains several additional compliance assistance tools not available with the printed version. The CD version of the HTC Manual which is available in English and Spanish also contains:

-EPA's WPS Worker Training Handbook

-EPA's WPS Handler Training Handbooks;

-13 additional fact sheets; EPA's Recognition and Management of Pesticide Poisonings handbook

The 2005 revised HTC Manual is available on the Web at: *http://www.epa.gov/ne/eco/pest/index.html*

Resistance Management

Numbers are included for each herbicide to indicate similar modes of action If possible, rotate herbicides so that the same class is not used in successive years Herbicide resistance does not occur as quickly as fungicide or insecticide resistance but it does occur
(ex. triazine resistant lambsquarters)

New Crops: Basil, Okra, Sweet Potato

•**Basil**
Stale Bed
Roundup, Scythe, flaming
Plasticulture combined with stale bed

•**Okra**
Stale Bed:
Roundup, Scythe, flaming
Soil Applied:
Treflan preplant incorporated
Bare ground systems
Plasticulture combined with stale bed

•**Sweet Potato**
Stale Bed:
Roundup, Scythe, flaming
Soil Applied:
Command ME, Dacthal, Devrinol
Postemergence Grass Control:
Poast, Select

New Herbicides/Label Changes

•**Stinger 3S**
Crops: Beets, Turnips, Spinach
Postemergence control of many weeds (Galinsoga, Ragweed, Pineappleweed, Clover, Vetch Canada Thistle, Glodenrod, Aster, Chrysanthemum)
Asparagus is no longer on label

•**Sandea 75WSG**
Crops Postemergence
Beans, Sweet Corn
Permit will be discontinued in New England

•**Command 3ME**
Replaces Command EC
Crops: Beans, Cabbage, Cucumbers, Melons, Peas, Peppers, Squash, Sweet Potato
Not registered in pumpkin
Low/No Volatile compared to the EC formulation
Surface applied

•**Other Label Changes**
Add Solicam 80DF (norflurazon) to asparagus
After cutting season
Grasses, many broadleafs, nutsedge
Add Goal 2XL (oxyfluorfen) to garlic
After transplanting one application
After seeding with 3 leaves
Note precautions: no surfactant, no tank mix, sunny weather prior to application

What's New in Sweet Corn: Callisto and Aim

•**Callisto (mesotrione)**
Supplement to atrazine and a grass herbicide
Allows reduced rate of atrazine
Controls triazine-resistant Lambsquarters
Preemergence & Postemergence control

•**Callisto Preemergence**
Preemergence at 6-7.7 ounces per acre alone
Preemergence at 5-6 oz/acre with atrazine
Can reduce atrazine rate from 1.5 qt/acre to 0.5 to 1 pint/acre
Controls velvetleaf and triazine-resistant lambsquarters
May get some corn injury in cold soils

•**Callisto Postemergence**
Early Postemergence at 3 oz/acre alone or combined with 0.5 pint of atrazine
Weeds should be less than 3 inches for best results
Add NIS at 0.25%
Controls velvetleaf and triazine-resistant Lambsquarters
Aim (carfentrazone)
Postemergence control of annual broadleafs
Pigweed, lambsquarters, eastern black nightshade, velvetleaf
0.33 to 0.67 lb/acre
Add a non-ionic surfactant at 1 qt/100 gal
Corn less than 8" high or use drops
Some speckling of corn foliage may occur

Tank Mixing Order

1) Wettable Powders (WP)
2) Dry Flowables (DF) or Water-dispersible Granules (WDG)
3) Water-dispersable liquids (AS)
4) Emulsifiable Concentrates (EC)
5) Water-soluble Liquids (S)
6) Surfactants

Oats as a Living/Dead Mulch in Strawberry Matted Row System

Plant mid-late August
100 lb/acre broadcast or banded between the rows
Preemergence herbicides will kill oats so band herbicides such as **Dacthal**, **Devrinol**, and **Sinbar** only in the row
May still need a fall herbicide applications after establishment
Look for oats to grow 18+ inches
Oat will winter kill and provide mulch

•**Pesticide Safety**
ALL GROWERS regardless of conventional/organic orientation:
Read and follow all label directions

Follow the Worker Protection Standards
REI and PHI
Record keeping
Personal Protective Equipment (PPE)
Keep yourself, your family, and your employees safe.

--A. Richard Bonanno
UMass Extension Weed Specialist

NEW VEGETABLE CROP INSECTICIDE/ MITICIDES/MOLLUSCIDES

Miticide/Insecticides for greenhouse and field crops

Abba 0.15EC (abamectin): A selective insecticide/miticide for Colorado potato beetle on tomato and potato or mites and leafminers on cucurbits, tomatoes, peppers and celery. Also for leafminers on head lettuce. It has a 3 to 14 day-to-harvest (dh) restriction and a 12 hour re-entry interval (REI). Abba is in insecticide group #6 (avermectins) and was derived from a metabolite of a soil bacterium, Streptomyces avermitilis.

Acramite 50WS (bifenazate): A selective miticide for use on cucurbit and fruiting vegetable crops. An important new tool to help control mites on eggplant. It has a quick knockdown and long residual period of activity (up to 28 days). Acramite is a member of insecticide group # 28 (carbazates) and has a 3 dh restriction and a 12 h REI. It can not be used on grape tomatoes (< 1 inch in diameter).

Floramite SC (bifenazate): A selective miticide for use on greenhouse tomato varieties greater than 1 inch in diameter when mature. A long-residual (28 days) nerve poison in insecticide group #28 (carbazates) with a 3 dh restriction and a 12 h REI.

Oberon 2SC (spiromesifen): A selective insecticide/miticide primarily for the egg and nymphal stages of mites and whiteflies on cucurbits, solanaceous crops, Brassica, leafy greens, potato and sweet potato. Another important new tool to help control mites on eggplant. Oberon is a member of insecticide group #23 (tetronic acid derivatives), and has a 7 dh restriction and 12 h REI.

Pylon (chlorfenspar): A selective miticide/insecticide that functions as both a contact and stomach poison for mites, thrips and various caterpillars on greenhouse solanaceous crops. It is a member of insecticide group #13 (pyrroles) and has a 0 dh restriction and a 12 h REI.

New broad-spectrum synthetic pyrethroids

Decis 1.5 EC (deltamethrin): A restricted-use, broad-spectrum, synthetic pyrethroid (insecticide group 3A) registered for caterpillar and beetle pests on sweet corn, cucurbits, solanaceous, and many root crops. It is more toxic than most pyrethroids. Decis has an oral LD50 of 43 mg/kg and carries a Adanger@ skull and cross-bones warning on the label. It has a 1 to 3 dh restriction and a 12 h REI.

Fanfare 2EC (bifenthrin): Similar formulation to the insecticide >Capture.= A restricted-use, broad-spectrum synthetic pyrethroid (insecticide group 3A) registered for most major caterpillar and beetle pests on sweet corn, beans, Brassicas, cucurbits, solanaceous crops, head lettuce and spinach. Like Capture, use is prohibited on sweet corn in all coastal counties. Fanfare has a 40 dh restriction on spinach, but a 1 to 7 dh limit on other crops, and a 12 h REI.

Proaxis 0.5EC (gamma-cyhalothrin): A restricted-use, broad-spectrum, synthetic pyrethroid (insecticide group 3A) registered for most major caterpillar and beetle pests on sweet corn, beans, Brassicas, solanaceous crops, and lettuce. It is also registered for thrips and cutworms on onions. Gamma-cyhalothrin is a mirror isomer of lammbda-cyhalothrin, the active ingredient in >Warrior.= The gamma isomer is reported to be approximately twice as potent as the lambda isomer, therefor, Poaxis is formulated with half the amount of active ingredient and applied at similar rates per acre as Warrior. It has a 21 dh and a 14 dh restriction on dry beans and onions/garlic, respectively, and 1 to 7 dh restriction on other crops, with a 12 h REI.

Seed treatments

Cruiser 5FS (thiamethoxam): A systemic seed treatment in the neonicotinoid class (insecticide group #4). It is registered for Colorado potato beetle, flea beetle, potato leafhopper and wireworms on potato; seedcorn maggots, flea beetles, white grubs, cutworms and wireworms on sweet corn; and aphids, Mexican bean beetles, potato leaf hoppers, seedcorn maggot and wireworms on bean and peas. Rates are based on row spacing. Do not use subsequent applications of neonicotinoids following seed treatments.

Gaucho 480F (imidacloprid): A systemic seed treatment in the neonicotinoid class (insecticide group #4). Treated seed must be purchased. It is registered for flea beetles, seedcorn maggots and wireworms on sweet corn, and for wireworm and aphids on beans. Do not use subsequent applications of neonicotinoids following seed treatments.

Gaucho MZ (imidacloprid + mancozeb): A systemic seed treatment in the neonicotinoid class (insecticide group #4) premixed with a dithiocarbamate fungicide to help control Fusarium. With only 1.25% imidicloprid, it is registered to aid in the control of aphids, Colorado potato beetle, flea beetle, potato leaf hopper and wireworms on potatoes. Do not use subsequent applications of neonicotinoids following seed treatments.

Genesis 2F (imidacloprid): A systemic seed treatment

in the neonicotinoid class (insecticide group #4). With 21.4% imidacloprid, it is registered to control aphids, Colorado potato beetles, flea beetle, potato leafhopper and wireworms on potatoes. Do not use subsequent applications of neonicotinoids following seed treatments.

Insect growth regulators

Rimon 0.83EC (novaluron): This insect growth regulator (insecticide group #15) disrupts the insect cuticle formation during molting. It should be used on immature insects only. Rimon is registered for Colorado potato beetle, European corn borer, cabbage looper, cutworms, and whiteflies on potatoes and sweet potatoes. It has a 14 dh restriction and a 12 h REI.

Talus (buprofezin): This insect growth regulator (insecticide group #16) disrupts the insect cuticle formation during molting. Mortality may take 3 to 7 days. It has a long residual period of activity (up to 28 days). Talus is registered for whiteflies, mealybugs and leafhoppers on greenhouse tomatoes. It has a 7 dh restriction and a 12 h REI.

Molluscicide

Sluggo Snail & Slug Bait (iron phosphate): Iron phosphate disrupts feeding immediately (chemical group 9B) and produces mortality in 3 to 6 days. This is a low-risk material exempt from tolerances on food commodities and has a 0 h REI. It can be applied around any vegetable in the field or greenhouse. Apply in the evening when the soil is moist.

The information in this article is for educational purposes. The recommendations contained are based on the best available knowledge at the time of printing. Any reference to commercial products, trade or brand names is for information only, and no endorsement or approval is intended. The Cooperative Extension system does not guarantee or warrant any product referenced or imply approval of the product to the exclusion of others that also may be available. All agrochemicals/pesticides listed are registered for suggested uses in accordance with federal and state laws and regulations as of the date of printing. If the information does not agree with current labeling, follow the label instructions. The label is the law. Warning! Agrochemicals/pesticides are dangerous. Read and follow all instructions and safety precautions on labels. Carefully handle and store agrochemicals/pesticides in originally labeled containers in a safe place. Contact the Massachusetts Department of Agricultural Resources for current regulations. The user of this information assumes all risks for personal injury or property damage.

--Jude Boucher,
University of Connecticut Cooperative Extension System

PLANT PATHOLOGIST IN BANGLADESH

I am well into my second of five months here in Mymensingh, Bangladesh and feel like I belong here. The people are great, the food is great and the weather has been very nice. Temperatures are beginning to climb but it will only get about as bad as August in Amherst; about 100 F and high relative humidity. March is still dry and it

has been dry for months. I stay in a guest house on the Old Brahmaputra River so when I have time I can sit and watch the boats go by.

In addition to rice, they grow all of the vegetables we grow in Massachusetts but many kinds of cucurbits and eggplants. They have *Phytophthora capsici* on peppers and eggplant, downy mildew on teasel gourd, Bipolaris on wheat, black rot on bottle gourd, Cercospora leaf spot on peppers, root-knot nematodes on many crops and bacterial wilt on tomato and eggplant. They also have the fungus Sclerotium rolfsii, which like bacterial wilt is a big problem in several different crops.

My favorite activity is to walk through farmer's fields and villages with my Bangladeshi hosts. Farmers are always interested in talking to us and cooperating as much as they can. I am teaching diagnostic plant pathology to 63 graduate students; 3 two-hour labs and 1 two-hour lecture per week. I also help in several English classes. As expected, the facilities here are not very good and the labs have very little equipment and supplies. I developed a workbook for them before I came, and brought a lot of books and supplies with me. My goal is to develop a lab course in diagnostic plant pathology that the younger faculty can mold to suit their own needs. I don't have enough room to say much in this column but if you are interested in my on-line journal go to: http://people.umass.edu/wick/fulbright/index.html

--Robert L. Wick

CONTROLLING BACTERIAL DISEASES WITH PLANT ACTIVATORS

Inducing plants to protect themselves from pathogens is a very attractive method of disease control. Thus, it is not surprising that such products have been identified and commercially developed. Products that can activate plants natural defense systems are known collectively as plant activators. Unfortunately, these products have not been widely used by growers primarily because they are not consistently effective in the field. In addition to disease control, some plant activators have been shown to increase yield while others can decrease yield. In order to determine the utility of plant activators in the Northeast, we have studied the ability of several activators to both control disease and enhance yield. The names, rates and manufacturers of the products used in this study are listed in Table 1.

Many products that are said to enhance yield and/or control disease can be incorporated into the planting mix. These products contain living organisms (either bacteria or fungi) that survive on or near the roots of plants. These organisms are thought to increase yield by increasing the level of nutrients and minerals available for uptake by the plant. We have begun a study to evaluate two products for use on vegetable transplants. We have tested BioYield, which contains two species of the Bacillus bacterium, and also RootShield, which contains the fungus Trichoderma.

A second type of plant activator is not added to the planting mix, but rather applied as a foliar spray multiple times over the course of the season. The compound we tested was Actigard (active ingredient acibenzolar-S-methyl), a synthetic analog of the natural plant product salicylic acid. Actigard has been shown to effectively control bacterial diseases of tomato but can have a detrimental impact on yield. We looked at the influence of these biological and biorational compounds on yield as well as their ability to control the disease bacterial speck of tomato.

Table 1. Products used in this study.

Product	Rate	Manufacturer
Actigard 50 WG	0.75 oz/Acre	Syngenta
BioYield Concentrate standard rate	2 lb/cu yd planting mix	Gustafson (Bayer)
BioYield Concentrate high rate (this rate was only used in 2005)	4 lb/cu yd planting mix	Gustafson (Bayer)
Cuprofix 40 (replaced Cuprofix Disperss in 2005)	2.5 lb/Acre	Cerexagri
Cuprofix Disperss (used only in 2004)	5 lb/Acre	Cerexagri
Cuprofix MZ Disperss	5 lb/Acre	Cerexagri
RootShield Granular	1.2 lb/cu yd planting mix	Bioworks

The study has been done in two consecutive years (2004 and 2005) in Geneva, NY. Weather conditions were remarkably different between the two years with 2004 being cool and wet, while 2005 was hot and dry. Tomatoes, cultivar Sunchief VF, were planted in 20 plant plots on black plastic covered beds. Each treatment was replicated three times. For treatments containing BioYield or RootShield, the product was mixed into the planting mix prior to sowing the seed. Actigard was sprayed on as a foliar application every 7 days for 8 weeks starting 2 weeks prior to inoculation with the bacterial speck pathogen (*Pseudomonas syringae pv. tomato*). Copper-based compounds (Cuprofix 40, Cuprofix Disperss, and Cuprofix MZ Disperss with mancozeb) are a standard bacterial speck control strategy and were included for comparison. The copper-based compounds were on the same spray schedule as Actigard.

Results from 2004 show that both BioYield and RootShield had a larger average yield (in terms of both fruit number and weight) compared to untreated control plants. However, only the BioYield treatment was statistically significant (Table 2). Neither compound (when incorporated into the original planting mix) was able to control bacterial speck. The cool and wet weather of 2004 was favorable for pathogen development and treatments containing Actigard had very low disease severity.

Table 2. Disease severity (based on lesion number) and average yield (fruit number and weight) from a 2004 tomato trial in New York.

Treatment	Lesion no[1]	Fruit no[2]	Fruit wt (lb)[3]
Control	34.0 bc[n]	103.33 c	34.10 c
RootShield	64.0 a	124.33 abc	41.45 abc
BioYield + RootShield	44.33 b	120.33 abc	41.86 abc
BioYield Standard Rate	41.33 b	145.33 a	48.70 a
Cuprofix MZ Disperss	20.67 cd	134.33 ab	44.41 ab
Cuprofix Disperss	4.33 de	111.33 bc	39.27 bc
Actigard 50 WG	2.67 e	103.00 c	35.95 bc
BioYield + Actigard	0.33 e	105.67 c	39.67 bc

[1]Mean number of lesions counted on 20 leaflets per plot
[2]Mean number of fruit on 5 plants per plot
[3]Mean fruit weight from 5 plants per plot
[n]Numbers followed by different letters are significantly different (P=0.05) based on Fisher's LSD.

Results from 2005 were quite different from those of 2004. Yields, as determined by both total fruit weight and number of fruit on 5 plants per plot, were much larger than 2004 due to excellent growing conditions. Surprisingly the control plants, which were not treated with any products to control bacterial diseases, had the largest yield although not statistically significant (Table 3). The hot and dry weather of 2005 was not favorable for pathogen development and there was very little disease in any plots. All treatments

were significantly better than the control plot, and those containing Actigard had the lowest disease severity (based on the number of lesions, Table 3).

Table 3. Disease severity (based on lesion number) and average yield (fruit number and weight) from a 2005 tomato trial in New York.

Treatment	Lesion no[1]	Fruit no[2]	Fruit wt (lb)[3]
Control	15.87 a[n]	88.89 a	60.34 a
BioYield High rate	7.80 b	82.78 ab	58.73 ab
BioYield Standard rate	5.93 bc	73.00 b	50.30 b
Cuprofix 40	3.77 cd	76.89 ab	52.54 ab
Cuprofix MZ Disperss	3.60 cd	77.56 ab	56.99 ab
Actigard 50 WG	4.28 cd	84.11 ab	59.10 ab
Bioyield + Actigard	2.07 d	73.89 ab	50.86 b

[1]Mean number of lesions counted on 20 leaflets per plot
[2]Mean number of fruit on 5 plants per plot
[3]Mean fruit weight from 5 plants per plot
[n]Numbers followed by different letters are significantly different (P=0.05) based on Fisher's LSD.

Results from the two years of this study were quite different. Our hypothesis is that when plants are under stress, such as during the cool and wet summer of 2004, activators that colonize the rhizosphere of the plant such as BioYield and RootShield will be more effective for yield enhancement. We also hypothesize that because disease pressure was very light in 2005, all control strategies were successful. Additionally, because plants had optimal growth conditions in 2005 the effect of rhizosphere colonizing BioYield was not significant. In contrast, the foliar-applied activator Actigard was effective in disease control in both 2004 and 2005. As additional data are collected regarding plant activators, it will be possible to identify the optimal field conditions for successful use of these products.

--Christine D. Smart, Maryann A. Borsick and Holly W. Lange, Assistant Professor, Graduate Research Assistant and Research Technician, Department of Plant Pathology
Cornell University, NY State Agricultural Experiment Station, Geneva, NY 14456; Reprinted from Proceedings of 2005 New England Vegetable and Fruit Conference with permission of the author

UMASS SMALL FARM AND GARDEN DAYS

Waltham, MA
Presented by the UMass Extension Agriculture and Landscape Program

The University of Massachusetts Extension Agriculture and Landscape Program will once again sponsor a seminar series for back yard gardeners and beginning or part-time farmers and landscapers. In the tradition of the Mass Aggie Seminars, the 2006 UMass Small Farm and Garden days will feature UMass Extension Educators and UMass Amherst faculty. Instruction will emphasize how to produce food and manage landscapes and small farms in a sustainable manner. A broad and diverse range of topics will be presented, covering specifics within several areas including livestock, tree fruit, berries, vegetables, flowers, landscape plants, and turf.

Proceeds from these programs will partially support the research and outreach efforts conducted by UMass Extension for farmers and agribusinesses in Massachusetts

- **Growing/Pruning Stone Fruit** Saturday, April 8, 2006
- **Pruning Blueberries & Raspberries** Saturday, March 18, 2006
- **Vegetable, Fish, and Fruit Day** Saturday, March 25, 2006
- **Lawn & Landscape Day** Saturday, April 1, 2006
- **Horses, Livestock & Heritage Breeds Day; with Pesticide Safety & Equipment** Saturday, April 22, 2006

March 25

•Vegetable, Fish and Fruit Day
Location: 240 Beaver St., Waltham, MA

8:30 - 10:00 (Concurrent sessions - choose one)
•Introduction to Farm Pond Aquaculture
--Craig Hollingsworth and Reed Baldwin, UMass Extension Aquaculture Specialists

•Healthy Soils for Vegetable Crops
--Frank Mangan and Masoud Hashemi, UMass Extension Vegetable Specialists

10:15 - 11:45 (Concurrent sessions - choose one)
•Selecting, Planting, and Caring for Young Fruit Trees
--Dr. Wes Autio, Professor of Pomology, University of Massachusetts

•How to Beat the Weeds and Extend Your Vegetable Harvest Season
--Rich Bonanno and Ruth Hazzard, UMass Extension Vegetable Specialists

12:30 - 2:00 (Concurrent sessions - choose one)
•What's Bugging You in the Backyard Orchard?
--Jon Clements, UMass Extension Fruit Specialist

Healthy Vegetables from Seed to Harvest
--Ruth Hazzard, UMass Extension Vegetable Specialist, and M. Bess Dicklow, UMass Extension Plant Pathologist

2:15 - 3:45 (Concurrent sessions - choose one)
Growing Grapes for Small scale Wine Production
--Dr. Duane Greene, Professor of Pomology, University of Massachusetts

The Tried and True or the Wild and New: Good varieties and exciting new crops for gardens and markets
--Eric Toensmeir, Nuestras Raices, Holyoke MA.

See **www.MassAggieSeminars.org** for more information. Or, call **(413) 545-0895** or e-mail *info@massaggieseminars.org*
Please note that pre-registration is required to attend any of the seminars.

FARMERS' MARKETS WORKSHOP TO BE HELD APRIL 4TH IN NORTH GRAFTON

Tuesday, April 4th 2006
Brigham Hill Community Farm, 37 Wheeler Rd,
North Grafton, MA
9:00 A.M - 3:30 P.M.

A workshop for farmers who are thinking about selling at farmers' markets will be held Tuesday, April 4th at Brigham Hill Community Farm in North Grafton, MA. Topics will include developing a farmers' market plan, risk management, making the transition from wholesale to retail and more. Speakers will include both experienced and new farmers who currently participate in Massachusetts Farmers' Markets. A complete agenda is included below.

"The workshop provides farmers with an opportunity to learn firsthand from other producers who attend farmers' markets and learn from their experiences," says Douglas Gillespie, Massachusetts Department of Agricultural Resources Commissioner. "Many Massachusetts communities are looking to start a farmers' market and are seeking all types of farm vendors."

The workshop is free, however limited space is available. Attendees must register by calling **617-626-1754** or **david.webber@state.ma.us** by Tuesday, March 28.

-9:00 - 9:15 Welcome

-9:15 - 9:45 Making the Transition from Wholesale to Retail- Things to Consider

-9:45 - 10:30 Developing Your Farmers' Market Plan: Preparing for Success

-10:30 - 11:00 Risk Management and Insurance

-11:00 - 11:30 Advice from the Market Manager

-11:30 - 12:00 Food Safety and Licensing Issues

-12:00 - 1:00 Lunch (will be provided)

-1:00 - 1:30 Beyond Fruits and Vegetables: Finding Success

-1:30 - 2:00 Developing Customer Loyalty

-2:00 - 2:30 Perspectives from "Newer" Farmers' Market Vendors

-2:30 - 3:00 State and Local Resources

-3:00 - 3:30: Open Discussion and Wrap-Up

-3:30: Adjourn

For additional question or directions, contact:
david.webber@state.ma.us

POSITION AVAILABLE

Field Crew Manager wanted for organic farm in Deerfield. Full-time, April-November. 2 years experience required. Call **413-695-2728** or email *gideon@atlasfarm.com*. Seasonal field crew worker positions also available.

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 and photographer is R. Hazzard if none is cited.