UNIVERSITY OF CONNECTICUT COOPERATIVE EXTENSION SYSTEM AND DEPARTMENT OF PLANT SCIENCE

CROP TALK

COMMERCIAL VEGETABLE AND FRUIT CROPS NEWSLETTER

VOLUME 2, NUMBER 1 — MAY 2006

IN THIS ISSUE

Rotating Vegetables After Corn Treated with Callisto

Doug Doohan, Ohio State University
Reprinted from VegNet, May 11, 2006

Syngenta has relaxed the Callisto label restriction on rotational crops. Label language under the heading Rotational Crops now reads, "Planting unspecified rotational crops, or those rotational crops that are specified, at shorter than recommended intervals may result in injury to the rotational crop." This means in essence that if you do it, you're on your own and assume all risks.

Several years ago we evaluated the effect of various rates of Callisto applied the previous year on carrot, snap bean, tomato, cabbage, cucumber and pepper. Trials were conducted at Fremont and at Wooster. Callisto was applied to field corn in mid-June at the POST rates of 3, 6 and 12 oz/A (corresponding to 1, 2 and 3X the recommended rate of 3 oz/A). With each crop, injury was greater at Fremont than at Wooster, and this location effect has been noted in previous rotational crop experiments with other herbicides. Soil chemistry was relatively similar at both sites but soils varied greatly in physical traits. The Fremont soil was 75% sand, while the Wooster soil was only 11% sand. At the recommended 1X rate of 3 oz/A, slight chlorosis (10% or less) was noted on most crops soon after emergence/transplanting, but did not persist. Cucumbers at the Fremont site displayed more chlorosis (15%), and snap bean was severely injured at both sites at the 3 oz rate. Cabbage, pepper and tomato injury did not increase appreciably in plots treated with the 6 oz/A rate, suggesting a relatively high level of safety. Carrot was not injured at either site, regardless of rate. Despite early chlorosis, statistically significant yield reductions were not detected, except for snap bean, and then only at 6 and 12 oz/A at the Fremont site.

These studies were conducted with Callisto alone—no atrazine was used [editor's note: you may not need any atrazine mixed with your Callisto and grass herbicide]. Aatrex at 0.5 to 1 pt/A on its own should not carry over in sufficient quantity to injure vegetable crops. However, we cannot discount the possibility of synergism between the two herbicides increasing the likelihood of crop injury. Bear in mind that the Aatrex label still reads "(1) Do not rotate to any crop except corn or sorghum until the following year, or injury may occur" and "(6) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains, or small-seeded legumes and grasses the year following application, or injury may occur." Likewise, environmental conditions during the year following Callisto/Aatrex use, herbicide uptake by crops and weeds, and the time of application (late in the season vs. early spring applications) may impact persistence. In Ontario, Canada an atrazine rate of 1 lb active ingredient per acre or greater is considered as unsafe for growers planning to rotate to vegetables the following year. This guideline has been published in the Ontario Guide to Weed Control (Publication 75) for more than 20 years.

Upcoming Events

CT Pomological Society Twilight Meetings—Belltown Orchards and Norton Brothers Fruit Farm

May 24, 5:30 pm at Belltown Orchards at 475 Matson Hill Road in South Glastonbury. June 14, 5:00 pm at Norton Brothers Fruit Farm at 466 Academy Road in Cheshire. Both meetings include orchard tours and discussions, followed by refreshments.

Vegetable Twilight Meeting—Fair Weather Acres

July 14, 6:00 pm at the Collins family farm at 1146 Cromwell Avenue in Rocky Hill. The Collins wholesale 600 acres of snap beans. Take exit 23 off of Route 91, go south on Route 3 for 1.5 miles. The group will meet at the farm stand on the left.

New England Greenhouse Conference

November 1-3, 2006, at the DCU Centre (formerly the Centrum Center) in Worcester, MA (see article on page 8).

A New Pest Concern in New England: Winter Moth

Donna Ellis, University of Connecticut

We recently received notification from a laboratory at the University of Massachusetts that winter moth (*Operophtera brumata*), a new pest of concern in New England, has been confirmed in several towns in New London County, Connecticut. Adult winter moths were captured in pheromone wing traps placed on host trees in December 2005 as part of a survey conducted by the USDA APHIS Cooperative Agricultural Pest Survey (CAPS) program in Connecticut. This exotic insect is of great concern in our state due to its propensity for causing significant feeding damage to a number of fruit crops, trees, shrubs, and perennials. Since 2003, winter moth has moved from coastal areas of Massachusetts to several inland towns and has also been found causing extensive damage in all counties of Rhode Island. Winter moth has also recently been confirmed in New Hampshire and Maine.

Winter moth is a harmful plant pest in Europe that was introduced into Nova Scotia in the 1950s. The exotic moth is regarded as a major pest of agricultural crops. It is a generalist feeder with the potential for causing destructive injury on a wide range of host plants. The immature moths, called larvae, inchworms, or loopers, attack many types of fruit, including apples, blueberries, cherries, and a number of trees and shrubs such as maple, oak, ash, birch, elm, linden, and crabapple. Additionally, winter moths have been observed on *Viburnum* shrubs, roses, and other perennial crops that are a vital component of Connecticut agriculture and natural areas. Winter moth has become well acclimated to conditions in New England, and has adapted to Massachusetts and Rhode Island coastal and some inland climates. It has been found to produce high numbers of offspring, which has allowed its rapid establishment there. Young larvae feed in and cause severe damage to developing buds on host plants, while older larvae become free feeders on plant foliage, which may cause complete defoliation.

Winter moth larvae are similar in appearance to the larvae of Bruce spanworm (*Operophtera bruceata*), a common species in forests and woodlands in Connecticut and New England. Larvae are pale green caterpillars with a white stripe running down each side of the body. They have two pairs of prolegs, which are located at the back end of their body. They grow to a length of about 1 inch. Larvae are expected to be feeding on foliage within the next 2-3 weeks. A fact sheet on winter moth can be found at the following University of Massachusetts website: http://www.massnrc.org/pests/pestFAQsheets/winter%20moth.html.

The University of Connecticut and The Connecticut Agricultural Experiment Station will be conducting visual surveys for winter moth larvae in Connecticut during May and June 2006 to learn more about the distribution of this new pest. Please contact donna.ellis@uconn.edu (860-486-6448) if you suspect you have this pest on ornamental plantings, or lorraine.los@uconn.edu (860-486-6449) for larvae found on apples, blueberries or other fruit.

Figure 1. Winter Moth Larval Damage on Mountain Ash

(Photo: Hannes Lemme, www.forestryimages.org, UGA1220054)

Figure 2. Winter Moth Larva

(Photo: Louis-Michel Nageleisen, Dépt. de la Santé des Forêts - France, www.forestryimages.org, UGA1190032)

Figure 3. Winter Moth Adult

(Photo: Louis-Michel Nageleisen, Département de la Santé des Forêts - France, www.forestryimages.org, UGA2102009)

Figure 4. Winter Moth Adult

(Photo: Daniel Adam, Office National des Forêts - France, www.forestryimages.org; UGA2102008)

Updated New England Fruit Pest Management Guides

The latest edition of the New England Small Fruit Pest Management Guide was recently updated and edited by Sonia Schloemann from the University of Massachusetts. To purchase a copy call the UConn Communications and Information Technology office at (860) 486-3336, send an email to Lori.Barlow@uconn.edu, or send $14 (includes shipping and handling) to UConn / Communications and Information Technology; U-4035 / 1376 Storrs Road / Storrs, CT 06269.

We have not fully updated the New England Apple Pest Management Guide since 2003. We recommend that New England growers use the Cornell 2006 Pest Management Guidelines for Commercial Tree Fruit Production. The only caution is that there may be a few pesticide uses registered in New York that may not be registered in Connecticut (or vice versa). Your agrichemical salesperson should be aware of these differences. Please contact Lorraine Los at (860)486-6449 or Lorraine.Los@uconn.edu if you have any questions regarding a pesticide registration for a fruit crop in Connecticut.

The Cornell guide is available online at www.nysaes.cornell.edu/ent/treefruit. You can also order a hard copy online at http://store.cce.cornell.edu/index.html or by calling Cornell at (607)255-2080.

Resistance Management: Mix or Rotate Between Insecticides?

Jude Boucher, University of Connecticut

The answer to the question "should you mix insecticides together in the same tank or rotate between insecticides to slow the development of resistance" often has two different answers depending upon who you ask. In truth, the answer is controversial and the science behind the scene is incomplete. Therefore, to find the most logical answer, I like to start with a much simpler question: "what is the best possible resistant management program?" The answer to that is clear: don't use insecticides at all.

In fact, most of the standard resistant management methods involve methods that minimize insecticide use and/or pest population exposure, especially repeat exposures to the same type of product. If you can't give up insecticides all together, then the next best thing is to integrate chemical controls with effective cultural, biological, mechanical, physical or genetic controls to minimize insecticide use. In short, use IPM! That includes scouting, monitoring and using action thresholds to assure that applications are necessary before they are made. Other IPM methods like spot treatments, perimeter trap cropping and using a refuge planting help assure that some susceptible individuals survive to reproduce. Otherwise, repeat applications can remove all susceptible individuals from a farm leaving only those with special survival traits (or genes) to reproduce and produce resistant populations.

Now let's think about the theory behind mixing. By applying two or more insecticides at the same time you should be able to extend the useful life of products longer than if you used one until it became ineffective, and then the next (etc.), until they were all useless. The mixing theory is based on the fact that it is unlikely for individual pests to posses the genes that would allow them to survive multiple types of poison. The problem with the mixing theory is that it is unlikely to hold up in the field. Getting extended use from insecticides by mixing assumes that: 1) some susceptible individuals from the pest population are spared, 2) each pesticide in the mix has a different mode of action, 3) each has the same length of effectiveness, 4) resistant individuals are rare, and 5) resistance is passed on to offspring by a single recessive gene.

The mixing theory should work well if two or more insecticides with different methods of killing the pests (modes of action) came onto the market at the same time and were always used together. In practice, however, we expect an expensive new insecticide to control the pest all by itself. In reality, few people would like to bear the expense of always using multiple products in their tank. So we seldom start mixing products before we begin to have pest control failure problems with the first product. According to the theory, it is too late to start mixing at this point because resistant individuals would no longer be rare (assumption #4). This would accelerate the development of resistance rather than retard it because of the strong selection pressure for the survival of resistant individuals that could withstand the chemical barrage.

It is also unlikely that products with different modes of action would have a similar residual period of activity. For instance, there are several insecticides with different modes of action registered to control European corn borer on peppers and most have different residual periods: Javelin (3-4 days), Ambush (5-10 days), SpinTor (7 days), Intrepid (7-14 days), and Orthene (10-14 days). The only two that were registered at approximately the same time were Spintor and Intrepid, which have different lengths of effectiveness, so assumption #3 will rarely if ever be met. That means there will be times when pests will be exposed to a single insecticide rather than a mix, and so the mixing theory breaks down again. Finally, if there is no immigration of susceptible individuals from outside of the field, or if multiple genes are involved in the inheritance of resistance, then mixing insecticides can actually hasten the development of resistance instead of delaying it. There are also many hidden costs and risks that such an intensive insecticide program might contain, such as environmental pollution problems, applicator safety, killing off beneficial organisms, secondary pest outbreaks, multiple re-entry intervals and different day-to-harvest restrictions.

On the other hand, rotating between insecticides with different modes of action, and only using one material at a time, fits right into the IPM and resistance management philosophy of trying to minimize pesticide use. Using one insecticide at a time, instead of two or more in each application, lowers the related expenses, costs and risks associated with chemical pest control. Rotation, especially with selective insecticides that only kill the pest species, also makes it more likely that you will spare beneficials that help prevent secondary pest problems and prevent additional pesticide use and expense. Rotation is the only logical choice in resistance management for farmers with an eye on a sustainable future.

UConn's Sweet Corn IPM Program

Jude Boucher, University of Connecticut

Over the past 20 years, 133 different growers have participated in UConn's Sweet Corn IPM Program. These growers have learned how to improve their crop quality, yields and profit margin, while simultaneously reducing chemical use. Here is how the program works. At the beginning of the program, growers participate in a survey about their crop production and pest management practices, so that I can help them assess where improvements can be made. They are supplied with a copy of the *Northeast Sweet Corn Production and IPM Manual*, *UConn's Sweet Corn IPM Action Thresholds,* and an updated version of the *New England Vegetable Management Guide*. We then meet in their fields on a weekly basis throughout the season. At our weekly meetings we discuss weed control and herbicide options, scout for European corn borer and fall armyworms in whorl and pre-tassel stage corn, and monitor for corn earworm moths with pheromone traps in silking sweet corn. The participating growers learn about the life cycle of each pest, and, usually for the first time, begin to fully understand how and why different blocks of corn experience such varied pest pressure. They also learn to determine exactly when they should treat each block to minimize the damage to their corn. Through the course of the season, we discuss everything from nutrient management, pesticide selection, and effective pesticide application, to natural enemies, marketing, environmental concerns and minor crop pests.

(Continued on page 9)

Pesticide Label Changes for Fruit Crops

Lorraine Los, University of Connecticut

Changes to Existing Labels

- **Imidan (phosmet):** The restricted entry interval (REI) for Imidan 70-W (Gowan) has changed for a number of fruit crops. The REI on the old label was 24 hours for all crops. The following REI changes for fruit crops are on the new label: There is now a 3 day REI for apples, apricots, cherries, nectarines, peaches, pears, plums and prunes. The REI for high-bush blueberries remains at 24 hours; however it is 3 days for low-bush blueberries. On grapes, the REI has changed to 14 days. Both labels will probably be in the field in 2006, and product with the 24 hour REI label can be used as such. Watch for the new labels as they appear on the market.

- **Guthion, etc. (azinphosmethyl):** The registration of azinphosmethyl products (including Guthion and generic products) has changed for the following crops: caneberries, cotton, cranberries, peaches, nectarines, and potatoes. Distribution or sale of product with these crops listed was allowed through March 31, 2006. The use of azinphosmethyl on these crops is allowed only through September 30, 2006. The registration status for apples and other crops has not changed at this time.

New Products or New Formulations of Existing Products

- **Lorsban (chlorpyrifos):** A new formulation, Lorsban 75WG (water dispersible granule) from Gowan, will replace Lorsban 50W, which is being phased out. It is described as an encapsulated "dry EC" and is a low-odor material. The original label indicates usage on apples during the dormant/ delayed dormant period only. However, two new supplemental labels have been added. The first supplemental label is for post-bloom application to apple tree trunks for borer control. The second supplemental label is a clarification of the early-season window for the use of 75WG on apples. This label indicates that Lorsban 75WG can be used "as a dormant or delayed dormant spray through petal fall". This clarification applies ONLY to the 75WG formulation. This product CANNOT be applied after petal fall as a foliar spray. No more than two applications or 2.67 lb of Lorsban 75WG can be applied per acre per season. You will need copies of the supplemental labels in your possession for these uses. The REI is 4 days and the pre-harvest interval is 28 days.

  Note: The Lorsban 4E (Dow AgroSciences) label is only for use in dormant/delayed dormant period. It DOES NOT have the supplemental label for foliar use through petal fall. It DOES have the supplemental label for post-bloom application to trunks for borer control.

- **Proclaim (emamectin benzoate):** Proclaim insecticide (Syngenta) is now registered on pome fruits for control of leafrollers, leafminers and fruitworms; and suppression of Oriental fruit moth, codling moth, pear psylla and spider mites.

- **Abba & Farmsaver Abba (abamectin):** Abba 0.15EC and Farmsaver Abba 0.15EC, both from Makhteshim–Agan of North America, are new formulations of abamectin. They are registered on apples, pears, strawberries, grapes, and other crops. They have similar usage and crops as Agri-Mek.

- **Assail (acetamiprid):** Assail is now also available as a 30SG formulation. Cerexagri will be phasing out 70WP eventually.

- **Couraze (imidacloprid):** Couraze 1.6F (Cheminova, Inc.) is another product containing imidacloprid as the active ingredient. It is registered on pome fruit, stone fruit, bushberries and strawberries. The pests controlled are similar to those on Provado label.

Phase-Outs/Cancellations

- **Kelthane (dicofol):** Dow AgoSciences has initiated a voluntary phase-out of Kelthane miticide. They will stop the manufacture of Kelthane in June 2006 and plan to sell out their entire inventory into channels of distribution during 2006. Kelthane can be distributed, sold and applied legally until all supplies are exhausted.

- **Mitac (amitraz):** Mitac insecticide has been voluntarily cancelled by the manufacturer effective May 3, 2006. This insecticide was an old standard for pear psylla. However, I doubt if much has been used in recent years, particularly due to the 28 day REI. Mitac can continue to be distributed for a period of 18 months after the cancellation date.

- **Dimethoate, Digon, Dimate (dimethoate):** These products have been voluntarily withdrawn from use on several crops including apples and grapes. Sale of dimethoate with apple and grapes on the label is allowed until July 20, 2006. Growers can use existing stock with apples and grapes on the label until supply is exhausted. Pears are still a registered use.

- **Funginex (triflorine):** The tolerances for Funginex were revoked effective October, 2004. It is no longer legal to use Funginex on blueberries or any other previously labeled crops. Several growers had inquired about this product with regard to mummy berry control.

Section 18 Emergency Exemption Label

- **Indar (fenbuconazole):** Connecticut has a Section 18 label for Indar 75WSP on blueberries for control of mummy berry disease. This specific exemption is effective through June 30, 2006. This label was pursued by Dr. Wade Elmer from the CT Agricultural experiment Station. The Section 18 label must be in the possession of the user at time of application. It should be available from the manufacturer and can be found at http://www.cdms.net.

Section 24(c) (Special Local Need) Label

- **Captan (captan):** Connecticut still has a 24(c) label for MicroFlo Captan 50 Wettable Powder for disease control on raspberries and blackberries. This is the only brand and formulation of Captan with this special label. This label is effective through 12/31/06.

Note: If you have difficulty finding the supplemental or special use labels, please contact Lorraine Los at (860)486-6449 or Lorraine.Los@uconn.edu.

New Vegetable Crop Insecticides, Miticides and Molluscicides

Jude Boucher, University of Connecticut

Miticides/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 cannot 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, brassicas, leafy greens, potatoes and sweet potatoes. 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 crops and many root crops. It is more toxic than most pyrethroids. Decis has an oral LD50 of 43 mg/kg and carries a "danger" 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, solanaceous crops, cucurbits, 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 lambda-cyhalothrin, the active ingredient in 'Warrior.' The gamma isomer is reported to be approximately twice as potent as the lambda isomer; therefore, 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 beetles, flea beetles, potato leafhoppers and wireworms on potatoes; seedcorn maggots, flea beetles, white grubs, cutworms and wireworms on sweet corn; and aphids, Mexican bean beetles, potato leafhoppers, seedcorn maggots and wireworms on beans 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) pre-mixed with a dithiocarbamate fungicide to help control *Fusarium*. With only 1.25% imidacloprid, it is registered to aid in the control of aphids, Colorado potato beetles, flea beetles, potato leafhoppers 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 beetles, potato leafhoppers 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 insect cuticle formation during molting. It should be used on immature insects only. Rimon is registered for Colorado potato beetles, European corn borers, cabbage loopers, 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 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.

New Vegetable Crop Herbicides

Adapted from information provided by Rich Bonanno, UMass

Callisto 4EC (mesotrione): A broadleaf herbicide for sweet corn in resistance group 28 that can be applied both preemergence and postemergence. Callisto provides excellent control of many problem broadleaf species such as velvetleaf and triazine-resistant lambsquarters. On cool soils in the spring, Callisto may be a better option than using Prowl to control these two weed species. Callisto has a 45 day-to-harvest restriction and a 12h restricted entry interval.

Preemergence - Applied after seeding to the soil surface. A grass herbicide must also be used. Callisto does not provide preemergence control of yellow nutsedge. If this weed is problematic, it is important to continue to use Atrazine. A preplant-incorporated application of either Eradicane or Sutan+ will also have activity on yellow nutsedge.

Postemergence - Applied postemergence to corn up to 30" tall when weeds are no more than 3" tall. Callisto provides only partial control of yellow nutsedge and no control of ragweed when applied postemergence. Use other options if these weeds are present.

Aim 40 WG (carfentrazone): A broadleaf postemergence herbicide for sweet corn in resistance group 14. Apply before corn reaches 8" in height to control seedling broadleaf weeds including pigweed, common lambsquarters, eastern black nightshade, and velvetleaf. Tank mix with atrazine at reduced rates or another broadleaf herbicide to increase the spectrum of weeds controlled. Expect to see speckling of the crop foliage after application. Initially, the injury appears to be substantial, but it is not systemic and the corn outgrows the injury rapidly. Cultivar sensitivity may vary with Aim; use caution when treating new cultivars. Weather conditions may also affect the degree of injury observed: injury may be more severe during periods of warm, cloudy weather with high humidity and plentiful soil moisture when corn growth is rapid and soft.

Fungicide Resistance Management and New Vegetable Crop Fungicides

Adapted from article by M. Bess Dicklow, UMass Extension

Fungicide resistance management

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 (FRAC) has categorized each class of fungicide based upon their mode of action in killing pathogens or interfering with pathogen life cycles. Two general rules apply:

- Fungicides with a single site of action (i.e. which attack a single biochemical pathway in fungi) are assigned group numbers; All fungicides with the same group number have the same site of action.
- Fungicides with multiple sites of action are assigned to group M (subgroups 1-9) and typically have a lower risk for causing resistance than fungicides with a single site of action.

Often fungi that have developed resistance to one chemical within a group will also be resistant to the other group members (this is termed 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 in groups M1-M9, which 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.

New strobilurin fungicides

The strobilurin or QoI fungicides (in Group 11) 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, Group 11): 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.

Cabrio (pyraclostrobin, Group 11): A broad-spectrum fungicide registered for cucurbits, tomatoes, eggplants, peppers, carrots, radishes, beets and bulb vegetables.

Gem (trifloxystrobin): Registered on potatoes against both early and late blight.

Headline (pyraclostrobin, Group 11): Controls downy mildew and late blight, as well as anthracnose, rust and powdery mildew on potatoes, sweet potatoes, and dry beans.

Pristine (pyraclostrobin, Group 11 + boscalid, Group 7): A premix of two fungicides with different modes of action, which is registered on bulb vegetables, carrots, and cucurbits. Its spectrum of control includes leaf spots, anthracnose, and powdery and downy mildews.

Quilt (azoxystrobin, Group 11 + propiconazole, Group 3): Manages the *Cochiolobolus (*formerly *Helminthosporium)* blights, other leaf spots, and rusts on both field and sweet corn.

Tanos (famoxadone, Group 11 + cymoxanil, Group 27): 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.

New chemistries for managing downy mildew & Phytophthora

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). In addition to the strobilurin fungicides listed above, several new chemistries are available for the management of these diseases, including the following:

ProPhyt, Phostrol, Fosphite (phosphites, Group 33):

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 (cymoxanil, Group 27): Registered for cucurbit crops, potatoes, and tomatoes for downy mildews and late blight and should always be tank mixed with a protectant fungicide.

Gavel 75 DF (zoxamide, Group 22 + maneb, Group M3): A combination material that is effective against leaf spots, *Botrytis*, *Phytophthora*, and downy mildews on potatoes, tomatoes, and cucurbit crops.

Previcur Flex (propamocarb, Group 28): Same active ingredient as Acrobat. A fungicide for oomycetes. Previcur should be mixed with Bravo, Maneb or Mancozeb to prevent development of resistance.

Other new fungicides:

Nova (myclobutanil, Group 3): Registered for use on asparagus, bean, tomatoes, and cucurbit crops for powdery mildews and rusts.

Endura (boscalid, Group 7): Can be used to control *Alternaria, Botrytis, and Sclerotinia* on beans, bulb vegetables, carrots, lettuce, and solanaceous crops.

Apogee® for Growth Control and Fireblight Prevention in Apple Production

Win Cowgill, Agricultural Agent, Rutgers University

Adapted from article in Plant and Pest Advisory Fruit Ed., March 2006

One of the main reasons for using Apogee® (BASF Corp.) is for the prevention of the shoot blight phase of Fireblight on high value apple cultivars. Consider Apogee use on high value fireblight susceptible cultivars. The following is a summary of some thoughts on Apogee use for 2006.

The Basics: Apogee is a unique production management tool labeled for use on apples. Apogee is a Plant Growth Regulator used for fireblight suppression and vegetative growth control of apples. Apogee does not have direct antibiotic activity against the fire blight bacteria (*Erwinia amylovora*), but it can decrease host susceptibility by reducing vegetative growth and allowing a balance between canopy development and fruit production. The chemical ingredient, prohexadione calcium, blocks the synthesis of active gibberellins, the plant hormone that in part regulates shoot growth. Controlling vegetative growth with Apogee will reduce the incidence and severity of fireblight infection (*Erwinia amylovora*) of shoots and leaves. Apogee applications are not, however, effective for suppression of blossom blight. Vegetative growth suppression with Apogee typically lasts for 2-5 weeks per application during the current growing season and does not affect vegetative growth the following year. Apogee reduces the susceptibility of apple shoot tips to fireblight and should be used as one component of a comprehensive IPM strategy for control of fireblight. Apogee provides many beneficial effects, including:

- Vegetative growth control
- Reduced need for summer and dormant pruning
- Improved light penetration into the tree canopy
- Improved color of red varieties because of better light penetration into the canopy
- Reduced incidence and severity of fireblight of shoots (shoot blight). This decrease in susceptibility will not become effective until about 10 days after application.

Timing and Rates: These are important considerations with Apogee application (as with any other pesticide or plant growth regulator!). First, you need to consider the amount of vigor in your orchard – high vigor will require higher rates to do the job. For timing, the most important application is the first – it must be made when terminals are 1-3 inches long, no later. Subsequent applications are made at 10- to 14-day intervals depending on the vigor of the orchard. For moderate vigor orchards, 3 or 4 more applications are sufficient, whereas in high vigor or 'crop loss' orchards, up to 6 or 7 more applications may be necessary to adequately control growth. Apogee may be an effective tool to help you reduce production costs IF you can reduce pruning bills and increase packout via better color and pest control. But you must get effective vegetative growth control to realize these benefits. For maximum reduction in fireblight susceptibility, Apogee should be applied at least ten days before the occurrence of weather condition favorable for shoot and leaf infections. This decrease in susceptibility will not become effective until about ten days after application. Use a standard nonionic spray adjuvant to improve leaf coverage and performance consistency. Follow the manufacturer's rate recommendations.

Number of Sprays: In New Jersey you will need to make at least three applications at the low rate to achieve season-long growth control. Make sure to consult the label for additional information on rates, precautions and mixing instructions.

NJ Experience with Apogee: I have used Apogee at the Rutgers Snyder Farm on selected blocks for the past 5 years. I have had good growth control and minimal fire blight outbreaks. Dr. Jim Schupp and I did collaborative research on Apogee in 2001 at both the Rutgers Snyder Farm and at the Cornell Highland Station in New York. Our work focused on the use of water conditioners and the effects on Apogee. Dr. Schupp did a tremendous job outlining his work in the first two issues of the NY Scaffolds newsletter in 2002. You should review both of these if you plan to use Apogee this season. These articles can be found at http://www.nysaes.cornell.edu/ent/scaffolds/2002.

Use a Water Conditioner: Mixing Apogee in hard water reduces its effectiveness. Adding either ammonium sulfate (AMS) or Choice as a water conditioner to hard water before mixing the Apogee resulted in better growth control than when Apogee was mixed with soft water. This result is important to growers who wish to use lower rates of Apogee to reduce undesirable effects on fruit set, or simply to save money. In addition to conditioning hard water, AMS previously has been shown to increase the uptake of some chemicals, and this may explain why it improved the performance of Apogee in our study. In either case, our results suggest growers will get a better result by adding a water conditioner to the spray tank before mixing Apogee, even if the water source is soft. The loss of effectiveness caused by hard water is due to the calcium it contains. It follows that one should not add calcium fertilizer to the spray tank when applying Apogee. Re-

(Continued on page 8)

Apogee for Growth Control… *(Continued from page 7)*

search conducted by Ross Byers in Virginia shows that tank-mixing boron with Apogee causes a similar loss of effectiveness. To clear up any confusion, hard water does not mean the same thing as high pH water. Dr. Byers' research shows no benefit from adjusting the pH of the spray tank before applying Apogee. It's the calcium in the calcium carbonate that creates a problem with Apogee, not the carbonate.

You should consider having their water tested for hardness (calcium carbonate) prior to the spraying season. If your water is high in calcium carbonate and needs to be conditioned, add one pound of ammonium sulfate (AMS) for every pound of Apogee. Use high quality, spray-grade AMS to avoid plugging nozzles. Research at the Rutgers Snyder Farm in 2000 also indicated the water conditioning products Quest and Choice could be used to modify the water hardness and improve the efficacy of Apogee. In our trial at the Snyder Farm the addition of water conditioners AMS, Choice and Quest significantly enhanced the effectiveness of Apogee in reducing total shoot growth. The efficacy of Apogee can be greatly enhanced with the addition of water conditioning agents in high calcium hardness conditions.

Important Notes:

- ***Do not use Apogee on Empire apples* —** Apogee can cause fruit corking and cracking when applied to Empire. The occurrence of this injury is sporadic, and the circumstances that lead to expression of the injury are not known. However, it has occurred across several years in Michigan, New York, Ohio, and Pennsylvania and New Jersey. Apogee has been applied to many commercially important varieties, but Empire is the only variety identified as being sensitive to Apogee thus far.
- ***Tree row volume* —** Using Apogee as part of a management program significantly reduces the tree row volume. Spray guides typically recommend using the tree row volume to determine the correct pesticide application rates.
- ***Gibberellic acid may reduce efficacy*** — When gibberellic acid sprays, such as Accel Plant Growth Regulator or ProVide Plant Growth Regulator, are applied in the same season as Apogee to thin, reduce cracking, reduce russet or to increase typiness, a loss in efficacy may occur in the Apogee and/or the gibberellin spray.

New England Vegetable Management Guide for 2006-2007

The New England Vegetable Management Guide has been updated for 2006-2007. The 2006-2007 Edition has many new features, including:

- New crops have been added, including basil, mesclun, sweet potato, and okra
- New pest management products have been added, including many biorational disease control materials. To assist organic growers in selecting approved pesticides, all materials which are approved for use in organic production are identified as "OMRI listed."
- Resistance group designations have been added for all pesticides to help growers slow the development of resistance by selecting products from different resistance groups.

To purchase a printed copy call the UConn Communications and Information Technology office at (860) 486-3336 or send $15.00 (includes shipping and handling) to University of Connecticut / Communications and Information Technology; U-4035 / 1376 Storrs Road / Storrs, CT 06269. You can also view the guide online at the website http://www.nevegetable.org.

New England Greenhouse Conference

Mark your calendar for the New England Greenhouse Conference, which will be held this year from November 1-3 at the DCU Centre (formerly the Centrum Center) in Worcester, MA. The first day, Monday, November 1, will feature six pre-conference workshops and short courses on such topics as plant growth regulators, disease diagnostics, greenhouse pest management, perennial production, plant nutrition and retail garden center marketing. The trade show will kick off on the second day with over 170 exhibitors of exciting new plants and hard goods. One attendee at last year's conference stated, *"I look forward to the trade show at every New England Greenhouse Conference."*

The second and third days will feature several consecutive tracks of educational programs and a trade show, all to help your business grow and prosper. Educational sessions focusing on greenhouse production, pest management, retail garden centers and business management, and energy will be featured on Tuesday, November 2. You won't want to miss the popular "Garden Center Idea Exchange" in the evening that will be moderated by Bill Calkins, Managing Editor of "Green Profit" magazine. Greenhouse management, pest management, alternative crops (including cut flower production and organic greenhouse production), marketing, and perennials will be featured on Friday, November 3. There will be over 40 educational workshops from which to choose, featuring respected industry speakers over this three-day educational conference. A few of our welcomed speakers include:

- Jim Barrett, University of Florida, and Peter Konjoian, Konjoian's Floriculture Education Services on *Using Growth Regulators - Beginner and Advanced Workshops*
- Bill Agro, Blackmore Co, on *Understanding pH and Nutritional Management for Container Grown Crops*
- Robert Hendrickson, Garden Center Group on *Retail Garden Center Merchandizing*
- Stephanie Cohen on *Cutting Edge Perennials*
- Raymond Cloyd, University of Illinois, *on Insect and Mite Identification and Management, Pesticide Resistance Management*
- John Erwin, University of Minnesota on *Crop Production Tips*
- Eliot Coleman, Four Season Farm on *Getting Returns Growing Greens Using Minimum Heat Structures*

For more information, contact Cindy Delaney, the show coordinator, by email at info@delaneymeetingevent.com, phone at (802) 655-7769, fax at (802) 655-6098, or mail at 1 Main Street, No. 36 / Winooski, VT 05404. You can also find additional information on our website at http://www.negreenhouse.org.

UConn's Sweet Corn IPM Program *(Continued from page 3)*

In 2005, I worked with 13 growers with 303 acres of sweet corn, scattered across Connecticut from Bridgewater near the New York border to Sterling near the Rhode Island line. Some growers learned how to control problem weeds such as horse nettle, jimson weed and resistant lambsquarter. Other growers tried new, safer, environmentally-friendly herbicides (i.e. Callisto) and insecticides (e.g. SpinTor or Avaunt) for the first time, and found them equally as effective or more effective on problem pests. A few growers purchased new boom sprayers (e.g. Zimmerman or Penn's Creek sprayers) to improve insecticide coverage and control. All growers learned how to time applications better and improved their sweet corn quality.

On post-season surveys, the 13 program participants said that they culled an average of 14% of their sweet corn prior to participating in the program and less than 2% in 2005. Collectively, they made an additional $141,000 or $466 per acre by reducing pest damage. Most of the growers in the program reported perfectly clean corn with no caterpillar damage at all. At the same time they reduced their pesticide use by 31% or by almost 400 pounds of active ingredient. All of the growers rated the Sweet Corn IPM Program as "excellent" and said they would recommend it to others as being worthwhile.

Blueberry Fertilization

Gary C. Pavlis, Atlantic County Agricultural Agent
Reprinted from the NJ Blueberry Bulletin, April 10, 2006

Research conducted in the past two years in Michigan and New Jersey have radically changed my thinking regarding the fertilization of highbush blueberries. I summarized some of this work in my articles in this newsletter last year. However, new findings this winter have resulted in further changes in my recommendations. In the past, New Jersey blueberry growers would have been advised to make their first fertilizer application around this time. In fact, one blueberry grower told me that Good Friday was the traditional day for the first application. Well, things have changed! Research out of Michigan from Dr. Eric Hansen's lab, has shown that there must be leaf emergence and growth before you have uptake of fertilizer by the blueberry plant. So, if you are applying fertilizer now [in April], you are wasting your money. This is because only 10% of what you put on now [in April] will end up in the plant. The correct timing for the first N-P-K application is during bloom or shortly thereafter. The second application should be made in late June. So, timing is the first change we have made.

Secondly, after taking many leaf and soil samples this past year I have realized one very important thing. Fertilizer recommendations which are based on soil analysis are nearly worthless. Leaf and soil samples which had been taken from the same plant never agree, and the leaf analysis show what is actually getting into the plant. So, what do we do about this? I believe the only important thing that we learn from soil analysis is pH. Yes, pH is critical. Many growers have heard me say that the three most important things you must know to grow blueberries are pH, pH, and pH. This is especially true for growers who have plantings that are not on soils that are naturally 4.5 to 4.8. The pH of the soil must be known because leaf analysis results assumes that the pH is within the correct range. If it is not within that range, I would not rely on the leaf analysis recommendations.

So, what should growers do about fertilizing their blueberries? First, every blueberry grower should have their blueberry soils tested for pH. If soil pH is not within the 4.5-4.8 range, this should be adjusted immediately. If the pH is higher, sulfur is added. If the pH is lower, lime is added. The amount of sulfur or lime depends on your pH and I would have the pH tested in the spring and fall until the proper range is attained. Thereafter, fall pH tests are best because adjustments can be made then and the pH will be correct by bud break in the spring. Second, this year's N-P-K application should be made according to the timing above, but realize that the amount, 600 lb/A of 10-10-10 on a mature planting is largely a guess until we take leaf samples in July. After that we can make recommendations based upon the leaf analysis. Note: this can only happen if the soil pH is correct or we must continue to guess on the recommendations. Lastly, these changes are needed because even though the samples we took last year were from growers who are some of the best blueberry growers in the world, 70% of the plants were deficient in nitrogen and 97% were deficient in one of the micronutrients. Nutrient deficiencies cause decreased yield, lower fruit quality, increased disease problems and plant mortality. We need to make these changes as soon as possible.

Regional Pest Messages Can Help Keep You Prepared

The New England Greenhouse Update is now available by email or fax!—Receive timely reports about what's happening in MA, CT and RI with pests, nutrition, greenhouse engineering, marketing and other issues that affect your greenhouse business. University Extension specialists contribute information to the New England Greenhouse Update website from our visits and conversations with growers. As new information is added, an email sends a reminder and provides a direct link to the website (www.negreenhouseupdate.info). Our fax-alert message sends the same text message that is on the website to growers who do not use email. To sign up, please contact Leanne Pundt by email at leanne.pundt@uconn.edu or by calling (860) 626-6240.

UConn Update for Greenhouse Growers—Updated weekly during seasons of high pest pressure and biweekly during seasons of low pest pressure throughout the year. To receive Greenhouse Updates by email contact Leanne Pundt at (860) 626-6240 or Leanne.Pundt@uconn.edu. They are available online at www.hort.uconn.edu/ipm.

UConn Weekly Vegetable Pest Message—Updated every Friday afternoon from June to September. They are available online at www.hort.uconn.edu/ipm or by calling the recorded message at (860) 870-6954.

UConn Fruit Pest Message—Updated throughout the fruit growing season. To receive Fruit Messages by email contact Lorraine Los at (860) 486-6449 or Lorraine.Los@uconn.edu. They are also available online at www.hort.uconn.edu/ipm.

Note: These pest messages are prepared for commercial growers. Recommendations may not be practical or legal for homeowners

Connecticut General Assembly Approves Funds for State IPM Program

Ana Legrand, IPM Program Coordinator, University of Connecticut

On May 3rd 2006 the Connecticut General Assembly approved a one year appropriation of $300,000 for the Integrated Pest Management Program. These funds were obtained because farmers in Connecticut had expressed a need for more IPM services. Back in December 2005, Senator Donald Williams hosted a legislative forum on Connecticut's Farm Economy. It was then that farmers highlighted the benefits of IPM and the need for the IPM program. Senator Williams took action on those requests and introduced a bill to fund several IPM program activities. Senator Williams worked vigorously to ensure that farmers obtained the support they had requested for IPM. State Representative Denise Merrill was also instrumental in making sure that the farmers' request was met. We understand that many growers and farmers, particularly members of Connecticut Farm Bureau, were very active in contacting their legislators. Many members of the public were also speaking on behalf of our program.

Thus, the IPM Program team thanks all the farmers, growers and community members that placed their trust in us and took time to communicate with their legislators. The financial support obtained was highly needed. We are confident that the work of the IPM team, on behalf of Connecticut's residents, will stand out when this appropriation is up for renewal.

University of Connecticut
Cooperative Extension System
24 Hyde Avenue
Vernon, CT 06066