

CROP TALK



COMMERCIAL VEGETABLE AND FRUIT CROPS NEWSLETTER

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An Effective, Low-Rate, Post-Emergence Herbicide Program for Sweet Corn

Jude Boucher Extension Educator
Commercial Vegetable Crops

When the herbicide Callisto first appeared on the market a few years back Extension Specialists hoped that it would replace atrazine for broadleaf weed control in sweet corn. Atrazine is used at much higher rates tends to leach to groundwater and in recent years several weeds have developed resistance to it. It turns out that Callisto doesn't control quite as many different broadleaf weeds as atrazine (before resistance became a problem). As a result growers tend to use Callisto mixed with a half pint or pint of atrazine or purchase a pre mixed product that contains both Callisto and higher rates of atrazine (i.e. Lumax). These mixes provide pretty good weed control but don't allow growers to drop the atrazine.

Extension Specialists were also hopeful that Callisto would provide post emergence control of crabgrass in the event that the pre emergence grass herbicide (i.e. Dual) failed to activate due to dry weather. At the time this was a tool that was lacking in sweet corn production which would have proved very useful to save many a sweet corn field. As it turned out even though crabgrass was listed on the Callisto label post emergence control of crabgrass often proved "less than satisfactory" when the product was used by growers in the field. Often the seedling crabgrass plants would turn completely white and look like they were going to die only to recover a few weeks later and produce a smothering canopy of grass.

A couple of years ago a second product called Impact in the same herbicide family of chemistry (HPPD inhibitor inhibits carotenoid biosynthesis) as Callisto was registered for post emergence control of **most** broadleaf weeds and annual grasses in sweet corn. The list of weeds controlled or suppressed was so extensive that it seemed too good to be true. However the farmers who tried the product in 2007 found that it seemed to live up to the claims on the label. One grower tried a mix of several post emergence products which included Impact and atrazine to control all the weeds in multiple sweet corn plantings with a single application without any pre emergence herbicides. The mix worked so well that it was hard to find an annual weed in his field even at harvest time. The grower's results made me wonder just how effective Impact was when used alone with only the additives recommended on the label instead of being mixed with other herbicides. Note that Impact must be applied with the recommended additives (oil and N fertilizer) to be effective. An effective post emergence program with a low rate herbicide is a very attractive option from an IPM point of view. (continued on page 7)

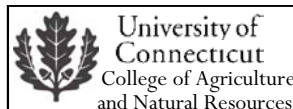
Calendar Of Events

Exploring Agriculture Marketing Opportunities Bus Tour
9 AM—3 PM Wed. May 13 2009
\$45 includes tour lunch & materials
For info or to register contact: Elsie Spoust 860 877 1608 or
elsie.spoust@uconn.edu

CT Pomological Society Twilight Meeting . June 10
5:30 PM Blue Hills Orchard Wallingford CT
Contact: Lorraine Los 860 486 6449
lorraine.los@uconn.edu

Farmers' Market at Tolland County 4 H Fair
3 PM—6 PM Sat. August 8 2009
Tolland County Extension Center Vernon CT
\$10 for a 10 foot spot
Contact: Kelly Trueb 860 490 8451

New England Vegetable & Fruit Conference
December 15—17 2009
Radisson Hotel Manchester NH
Invitations/Registration will be sent this fall
Contact: Jude Boucher 860 875 3331
jude.boucher@uconn.edu



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2009 Small Fruit Weed Management Update

A. Richard Bonanno, Ph.D. Weed Specialist,UMass Extension

This update contains label changes for herbicides in small fruits to supplement what has already been published in the New England Small Fruit Pest Management Guide. In all cases please obtain a copy of the complete label to obtain additional information on rates timing weed species controlled and precautions to improve both crop and applicator safety.

A brief summary of each of the herbicides that is mentioned below under individual crops:

Chateau (flumioxazin) provides preemergence and limited postemergence control of many broadleaf species. It is similar in activity to other residual broadleaf herbicides in small fruits such as Sinbar (terbacil) Princep (simazine) Karmex (diuron) Casoron (dichlobenil) and Velpar (hexazinone). It will not control grasses so a residual grass herbicide is still recommended.

Prowl H2O (pendimethlin) is a residual herbicide that controls many grass species and also has activity on a limited number of broadleaf species. It has similar activity to Dacthal (DCPA) Devrinol (napropamide) Surflan (oryzalin) and Solicam (norflurazon).

Rage (carfentrazone) provides postemergence burndown control of many weed species. It does not provide any residual activity. As a burndown it is similar in activity to Gramoxone (paraquat) and Scythe (pelargonic acid).

Callisto (mesotrione) provides preemergence and postemergence activity of many broadleaf species. The spectrum of weeds controlled is not as good as with some other residual broadleaf herbicides but its postemergence activity is excellent. There is limited control both preemergence and postemergence of some annual grasses. Use of a residual grass herbicide is still recommended.

Strawberries

Chateau (flumioxazin) is registered in strawberries. In DOR MANT strawberries the rate is 3 oz/acre. Chateau will provide preemergence control of many broadleaf weed species. If small broadleaf weeds are emerged also apply a crop oil concentrate at 1% or a non ionic surfactant at ¼% by volume. Chateau will control emerged chickweed field pansy and oxalis if sufficient contact is made with the weeds. 2 4 D may still be required to control other emerged weeds. A residual grass herbicide such as Devrinol (napropamide) or Dacthal (DCPA) is still needed. Chateau can also be applied with a hood or shield to row middles of non dormant strawberries prior to fruit set. This includes strawberries grown on both matted row and plasticulture systems. DO NOT allow Chateau to come into contact with the strawberry fruit or foliage.

Prowl H2O (pendimethalin) is registered in strawberries. Uniformly apply Prowl at a rate of 1.5 to 3 pints per acre to the soil surface PRE TRANSPLANT. Once the strawberries are established an application may be made up to 35 days prior to harvest BETWEEN crops row. DO NOT spray over strawberry plants. Application may cause stunting of daughter plants. Prowl provides excellent control of many annual grasses and several broadleaf species. See the label for a complete list of weeds.

Grapes

Chateau (flumioxazin) is registered in grapes. In grapes it is registered for both preemergence and postemergence control of weeds. If grapes are between 2 and 3 years old the rate is 6 oz/acre. If grapes are at least 3 years old the rate is 12 oz/application and 24 oz/year. It can be applied in the Spring as an alternative to either Sinbar (terbacil) or Princep (simazine). For postemergence control use a crop oil concentrate at 1% or a non ionic surfactant at ¼% by volume. A residual grass herbicide is still needed.

Rage (carfentrazone) is registered in grape. Apply at a rate of 12 to 40 ounces/acre to control emerged grass and broadleaf weeds. A non ionic surfactant or crop oil concentrate should be used to improve the activity of Rage. See the label for rate suggestions. Rage will not provide residual control of weeds. All applications in grapes must be made with a hooded sprayer to avoid crop contact.

Sufficient water must be used to provide complete coverage of weed foliage to obtain control. Contact with green bark foliage or fruit will cause crop injury and spotting. Rage can also be used at a rate of 3 to 4 oz/acre to suppress the vegetation growing in the row middles. This application must also be made with a hooded sprayer. Do not apply more than 40 oz/acre per application. Do not apply more than 242 oz/acre per season. Do not apply within 14 days of harvest. See the label for tank mix suggestions with other herbicides that will provide residual weed control.

Blueberry

Chateau (flumioxazin) is registered in highbush blueberry. In blueberry it is registered for both preemergence and postemergence control of weeds. For preemergence control apply to weed free soil at a rate of 6 to 12 oz/acre. Moisture is necessary after application to activate the herbicide. If emerged weeds are present the residual activity of Chateau will be reduced since weed foliage will intercept some of the herbicide. A residual grass herbicide is still needed. For postemergence control of certain weed species apply Chateau at 6 to 12 ounces per broadcast acre. For postemergence control use a crop oil concentrate at 1% by volume or a non ionic surfactant at ¼% by volume. For broader control of emerged weeds check the label for tank mix applications with glyphosate or paraquat.

Rage (carfentrazone) is registered in highbush and lowbush blueberry. The label also covers currant elderberry gooseberry and huckleberry. Apply at a rate of 20 to 40 ounces/acre to control emerged grass and broadleaf weeds. A non ionic surfactant or crop oil concentrate should be used to improve the activity of Rage. See the label for rate suggestions. Rage will not provide residual control of weeds. A dormant application can be made using a directed spray to the base of the crop. Once the crop breaks dormancy all applications must be made with a hooded sprayer to avoid crop contact. Sufficient water must be used to provide complete coverage of weed foliage to obtain control. Contact with green bark foliage or fruit will cause crop injury and spotting. Rage can also be used at a rate of 3 to 4 oz/acre to suppress the vegetation growing in the row middles. This application must also be made with a hooded sprayer. Do not apply more than 40 oz/acre per application. Do not apply more than 80 oz/acre per season using a hooded sprayer. The total of all applications per acre per season must not exceed 120 oz/acre. Do not apply within 14 days of harvest. See the label for tank mix suggestions with other herbicides that will provide residual weed control.

Callisto (mesotrione) is registered for use in highbush and lowbush blueberry. The label also covers lingonberry. In highbush blueberry and lingonberry apply as a directed spray to the base of the plants prior to bloom. In lowbush blueberry applications can only be made during the dormant year. Apply at a rate of either 3 or 6 oz/acre. If 3 oz is used a second application can be made no closer than 14 days apart. Use of a crop oil concentrate at 1% by volume will improve postemergence activity. Callisto will provide preemergence and postemergence control of many broadleaf weed species. See the label for a complete list.

Caneberry

Rage (carfentrazone) is registered in caneberries. The label covers but is not limited to blackberry boysenberry black raspberry and red raspberry. Apply at a rate of 10 to 32 ounces/acre to control emerged grass and broadleaf weeds.

A non ionic surfactant or crop oil concentrate should be used to improve the activity of Rage. See the label for rate suggestions. Rage will not provide residual control of weeds. Applications can be made either as a directed spray to the base of the crop or with a hooded sprayer to avoid crop contact. In all cases sufficient water must be used to provide complete coverage of weed foliage to obtain control. Contact with canes, foliage or fruit will cause crop injury and spotting. Rage can also be used at a rate of 3 to 4 oz/acre to suppress the vegetation growing in the row middles. This application must also be made with a hooded sprayer. Do not apply more than 40 oz/acre per application. The total of all applications per acre per season must not exceed 272 oz/acre. Do not apply within 14 days of harvest. See the label for tank mix suggestions with other herbicides that will provide residual weed control.

Pesticide Label Changes and New Pesticides for Fruit Crops

Lorraine Los University of Connecticut

Changes to Existing Pesticide Labels

Insecticides:

Guthion (azinphosmethyl)

The only remaining tree fruit uses include apples, pears and cherries which are supposed to remain on the label until 2012. The current Guthion Solupak 50% label includes maximum use rates for years 2008-2012. These rates change depending on year and crop. For 2009 the maximum use rate is 6.0 lbs. formulation per acre per year for apples; 4.0 lbs. formulation per acre per year for pears; and 3.0 lbs. formulation per acre per year for cherries. The REI is 14 days for apples and pears and 15 days for cherries. The preharvest interval (PHI) is 14 or 21 days for apples and pears (depending on rate) and 15 days for cherries. "Pick Your Own" harvesting is prohibited on pears and cherries if Guthion is used. On apples the REI for "Pick Your Own" varies from 33 to 44 days depending on rate used. There are also restrictions regarding spray drift and buffer zones for water bodies. Be sure to read this label very carefully!

Lorsban (chlorpyrifos)

There has been a lot of confusion regarding the use of Lorsban (chlorpyrifos) and the various generic chlorpyrifos products particularly for use on apples. **Lorsban 4E** (Dow) can be used on apples in one of 3 ways: as a single *foliar* spray dormant/delayed dormant OR as single *trunk* spray dormant/delayed dormant OR as a single *trunk* spray post bloom. No petal fall or post bloom *foliar* sprays are allowed. The post bloom trunk application of Lorsban 4E is now on the main label so you don't need a supplemental label for this formulation any more. **Only 1 application of Lorsban 4E is allowed on apples per year. Restricted Entry Interval (REI) = 4 days.** **Lorsban Advanced** (Dow) which is supposed to be a low odor formulation can be used on apples as a single *foliar* spray dormant/delayed dormant OR as single *trunk* spray dormant/delayed dormant. No petal fall or post bloom applications (*foliar* or *trunk*) are allowed. **Only 1 application of Lorsban Advanced is allowed on apples per year. Restricted Entry Interval (REI) = 4 days.**

Lorsban 75 WG (Gowan) can be used on apples as a single *foliar* spray dormant/delayed dormant OR at petal fall. One additional application of Gowan's Lorsban 75WG can be made on apples post bloom as a *trunk* spray. You are limited to a maximum *foliar* application of 2.67 lb. per acre of Gowan's Lorsban 75WG per year. However this seasonal limit does not include the *trunk* spray used at a rate of up to 2 lb. per 100 gal. of the Lorsban 75WG. **Two applications of Lorsban 75WG allowed on apples per year on the current label. Restricted Entry Interval (REI) = 4 days.**

Note: We expect more label changes for Lorsban 75 WG in the near future to become similar to the Dow Lorsban labels. Be sure to carefully read the label when you buy new product to see if the changes have been made.

Various generic chlorpyrifos products e.g. Whirlwind, Warhawk, Govern and Nufos. Each have their own requirements and restrictions including the number of applications that can be made. None of them allow post bloom trunk sprays on apples. You will need to consult those labels and follow carefully.

Last year some growers wondered if they could legally apply one Lorsban or generic chlorpyrifos formulation pre bloom and then follow later with another formulation for borer control. This is not legal! Whatever product you use for your first spray becomes the label you must stick with for the rest of the season. If you apply a Lorsban or generic chlorpyrifos formulation that allows only 1 spray per season you cannot legally follow it up with a foliar spray of another product or with a trunk spray of Gowan's Lorsban 75WG (which allows a second spray for apple trunks on its label). Lorsban and the chlorpyrifos generic products can also be used on other tree fruits. Check each label carefully for specific use restrictions for peach, nectarine, pear, plum, prune and cherry.

Thionex (endosulfan)

Thionex 50W and Thionex 3EC are now restricted use products with longer Restricted Entry Intervals (REI). The REI for Thionex 50W for apples, apricots, nectarines, peaches, cherries, pears, plums and prunes is now 4 days. The REI for Thionex 50W is 9 days for blueberries and 5 days for strawberries. The REI for Thionex 3EC for apples, apricots, nectarines, peaches, cherries, pears, plums and prunes is now 2 days. The REI for Thionex 3EC is 6 days for blueberries and 2 days for strawberries. Other changes include the requirement for a closed cab for airblast sprayer applications. For apples only there is an exception to the closed cab rule if not feasible; however, particular safety gear is required. In addition do not apply within 100 feet of rivers, natural ponds, lakes, streams, reservoirs, marshes, estuaries and commercial fish ponds. Seasonal maximum rates were also reduced. Be sure to read these new labels before using.

Fungicides:

Nova 40W is now called **Rally 40W**.

New Pesticide Labels

This year a number of new products, mostly insecticides, have been introduced. Some have already been added to the new 2009 New England Tree Fruit Management Guide. Others are new since the guide was printed.

Insecticides & Miticides:

Altacor 35 WG (chlorantraniliprole, rynaxypyr), DuPont, belongs to a new class of insecticides called anthranilic diamides. It is registered on pome fruits, stone fruits and grapes for control of a range of pests including leafrollers, codling moth, oriental fruit moth and grape berry moth. It is relatively safe on beneficials.

Beleaf 50 SG, (flonicamid), FMC, is labeled for aphids and plant bugs on pome fruit and stone fruit. Researchers have reported good efficacy against green peach aphid and tarnished plant bug on peaches. The label also lists apple aphid, black cherry aphid, rosy apple aphid, spirea aphid and woolly apple aphid.

Belt SC (flubendiamide), Bayer, belongs to the same new class of insecticides as Altacor. Belt is registered on pome fruits, stone fruits and grapes for control of a wide range of pests including leafrollers, codling moth, oriental fruit moth and grape berry moth.

Centaur WDG (buprofezin), Nichino America, is an Insect Growth Regulator (IGR) labeled for use on apples, pears and stone fruits for control of scale insects, mealybugs, leafhoppers and pear psylla. It is effective against the nymph stages by inhibiting chitin biosynthesis. It also suppresses oviposition of adults and reduces viability of eggs. Centaur is restricted to one application per year on apples; two applications per year on pears and stone fruits.

Delegate (spinetoram) Dow AgroSciences, is a new spinosyn insecticide related to spinosad (Spintor Entrust) but which has been chemically modified to be more active and effective against a broader range of insects. It is labeled for pome fruits stone fruits bushberries (blueberries currants gooseberry etc.) caneberries (blackberry raspberry etc.) and grapes. It has efficacy against internal feeding Lepidoptera such as codling moth and oriental fruit moth plus leafrollers and leafminers. It is also labeled for control of pear psylla thrips and cherry fruit fly and shows suppression of apple maggot and plum curculio.

Leverage (imidacloprid + cyfluthrin), Bayer, is a restricted use pesticide and is labeled for pome fruits stone fruits and grapes against a wide range of pests. It is a combined formulation of imidacloprid (the a.i. found in Provado) and cyfluthrin (the a.i. found in Baythroid). The pome fruit label includes internal worms and leafrollers aphids (except woolly apple aphid) apple maggot (when combined with a sticker) European apple sawfly plum curculio San Jose scale crawlers and plant bugs. The stone fruit label adds pests such as Japanese beetles American plum borer and cherry fruit fly among others. Do not apply pre bloom or during bloom or when bees are actively foraging. It has a high bee poisoning hazard.

Movento (spirotetramat), Bayer, is a new systemic foliar insecticide labeled for use on pome fruits stone fruits and grapes. The pests controlled include aphids mealy bugs pear psylla San Jose scale white peach scale and whiteflies. The product is active via ingestion against immature life stages and has shown effects on adult females by reducing survival of offspring. Do not apply until after petal fall in pome and stone fruits.

Onager (hexythiazox), Gowan, has the same active ingredient as Savey miticide and is used for control of mites such as European red mites and twospotted spider mites. They are both produced by Gowan Company but Onager is a 1EC liquid formulation and Savey is a 50 DF water dispersible granule formulation. Onager is labeled for pome fruits stone fruits and grapes. Savey is labeled for pome fruits stone fruits caneberries and strawberries.

Rimon 0.83EC (novaluron), Chemtura, is registered for use on apples. It is an insect growth regulator that interferes with the insect's ability to form chitin thus disrupting the molting process. It is effective against the immature stages of insects and will not kill adults. The route of entry is primarily through ingestion with some contact activity. The pests controlled include codling moth leafminers leafrollers and oriental fruit moth with suppression of white apple leafhopper and plant bugs.

Tourismo (flubendiamide and buprofezin), Nichino America, is labeled for use on pome fruits stone fruits and grapes. It is a combined formulation of flubendiamide (the a.i. found in Belt) and buprofezin (the a.i. found in Centaur). The long list of pests on the label includes most of those on the Belt and Centaur labels. Do not apply prior to petal fall of pome and stone fruits.

Voliam Flexi (thiamethoxan + chlorantraniliprole), Syngenta, is labeled for use on pome fruits stone fruits and grapes. It is a combined formulation of thiamethoxan (the a.i. found in Actara) and chlorantraniliprole (the a.i. found in Altacor). The long list of pests on the label includes most of those found on the Actara and Altacor labels. It is highly toxic to bees exposed to direct treatment or residues on blooming crops. After a Voliam Flexi application wait at least 5 days before placing beehives in the treated area.

Fungicides:

Adament 50 WG (tebuconazole + trifloxystrobin), Bayer, is labeled for use on peach nectarine cherry and grapes (except for Concord grapes). It is a combined formulation of tebuconazole (the a.i. found in Elite) and trifloxystrobin (the a.i. found in Gem). It is for management of a number of stone fruit diseases primarily brown rot and peach scab.

Inspire Super MP (difenoconazole), Syngenta, is labeled for use on pome fruits for apple scab sooty blotch flyspeck cedar apple rust and other diseases. It is packaged along with cyprodinil (the a.i. in Vanguard) which must be tank mixed and used together. Inspire Super MP is a sterol inhibitor (SI) fungicide in the same class as Rally Rubigan and Procure; however it is thought to be more effective on apple scab than these older SI products. Inspire has a 72 day Pre Harvest Interval (PHI).

Quash 50 WDG (metconazole), Valent, is a sterol inhibiting fungicide labeled for use on stone fruits; primarily for brown rot and peach scab. Do not make more than 3 applications per season.

Quintec (quinoxifen), Dow AgroSciences, is a fungicide labeled for cherries and grapes for control of powdery mildew.

Soil Fumigant:

Midas (iodomethane + chloropicrin), Arysta LifeScience, is a restricted use pesticide and pre plant fumigant of fields intended for commercial production of a number of crops including stone fruits strawberries and grapes. It is a broad spectrum product used for control of soil borne pests including weed seeds nematodes insects and diseases. There are a number of different formulations and fruit crops are not on all labels so be sure to check. Midas 33:67 and Midas 25:75 both include stone fruits grapes and strawberries on the label. **The label includes very specific information on how to apply this product.**

Note: Information on new products was derived from a number of sources including other state Extension newsletters pesticide manufacturer materials and pesticide labels. 4/28/09

UConn Pest Messages

UConn Vegetable Pest Message—Available from June to September online at www.hort.uconn.edu/ipm or by calling the recorded message at (860)870 6954.

UConn Fruit Pest Message—To receive 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.

UConn Greenhouse Update—To receive by email contact Leanne Pundt at (860)626 6240 or leanne.pundt@uconn.edu. They are also available online at www.hort.uconn.edu/ipm

Regional

The New England Greenhouse Update—Timely reports about what's happening in MA CT and RI with pests nutrition greenhouse engineering marketing and other issues. Available online at www.negreenhouseupdate.info or by email or fax by contacting Leanne Pundt at (860)626 6240 or leanne.pundt@uconn.edu.

Does Pruning Peppers and Eggplant Pay?

Jude Boucher Extension Educator
Commercial Vegetable Crops

At the January 2008 Connecticut Vegetable & Small Fruit Growers' Conference in Vernon CT Chuck Mohler from Illinois (a.k.a. Sweet Corn Charlie) described his method of pruning peppers of all lower leaves up to and including the lowest fruit which tends to get caught and misshaped between the lowest branches. Other growers have described how they prune eggplant of the lower "suckers" in a similar fashion which has become somewhat of a common practice in more southern regions and even on some farms here in CT. Sweet Corn Charlie's description of pruning and better yields interested me because that lowest misshapen fruit is often unmarketable anyway and it seemed to make sense to remove it so that the plant doesn't waste energy on fruit which don't produce profit. The first question of course even before we talk about the cost of labor for pruning would be: does pruning result in higher yields or better quality?

To answer this question last summer I decided to plant two pepper varieties ('Aristotle' and 'Red Knight') and three eggplant varieties ('Black Beauty', 'Epic' and 'Vittoria') at the Plant Science Research Farm in Storrs to compare yields. Each plot contained 2 treatments (pruned and unpruned plants) of 6 eggplants or 9 pepper plants arranged in 2 parallel rows. The plots were replicated 4 times in a randomized complete block design. Seedlings were transplanted into the field on 12 June. Eggplant were pruned on 10 July up to the fifth sucker (bud/"leaf tuft" that emerges at a 45° angle) or about 6-10 inches above the ground while pepper plants were pruned on 17 July of all leaves below the first branches and of the lowest single fruit. Harvest was conducted weekly between 31 July and 28 August. Fruit were harvested, counted and weighed and the number of fruit per plant and fruit weight per plant was calculated. Fruit were also rated for quality (scale of 1-4 unmarketable perfect) based on shape, scars, color and for peppers number of lobes (4 being the ideal).

Eggplant and pepper harvest results are shown in Tables 1 & 2. For eggplant average fruit weight and fruit quality were similar between pruned and unpruned plants for all three varieties. The number of fruit per plant for the two treatments was similar for Black Beauty but slightly lower in the pruned treatment for the Epic and slightly higher for Vittoria. The yield or fruit weight per plant was similar for the two treatments for Black Beauty and Vittoria but slightly lower in the pruned treatment for Epic due to the lower number of fruit harvested per plant.

For peppers again average fruit weight and quality for the pruned and unpruned plants were identical or nearly so. The number of fruit per plant was lower in the pruned treatment for both the Red Knight and the Aristotle as was the yield or fruit weight per plant. It appears from these preliminary results that there was no advantage to pruning either crop last summer. That means that all labor costs associated with pruning would simply lower net returns (profits). These results seem to match the results of similar studies in NH and PA. It seems that it would be wiser to use your labor for other chores that will benefit the bottom line on your farm.



Pruned and unpruned pepper plants



Pruned and unpruned eggplant

Table 1: Eggplant Pruning Results

Variety	Treat	Fruit wt	Ft wt/pl	# ft/pl	Quality
Epic	control	1.5 lb.	1.6 lb.	1.1	2.8
Epic	pruning	1.5 lb.	1.2 lb.	0.8	2.8
Vittoria	control	0.7 lb.	1.9 lb.	2.7	3.1
Vittoria	pruning	0.6 lb.	1.9 lb.	3.0	3.2
Black B	control	1.2 lb.	2.2 lb.	1.8	3.7
Black B	pruning	1.2 lb.	2.2 lb.	1.8	3.6

Table 2: Pepper Pruning Results

Variety	Treat	Ft wt	Ft wt/pl	# Ft/pl	Quality
Aristotle	control	0.4 lb.	2.0 lb.	4.6	3.2
Aristotle	pruning	0.4 lb.	1.8 lb.	4.2	3.1
Red Knt	control	0.4 lb.	1.9 lb.	4.3	3.3
Red Knt	pruning	0.4 lb.	1.7 lb.	3.8	3.3

Biological Control of ECB with *Trichogramma ostrinae* in Sweet Corn: Be ready for early releases!

Reprinted from Vegetable Notes Volume 20 Number 2 April 16 2009

Ruth Hazard Amanda Brown and Pamela Westgate Extension Vegetable Program University of Massachusetts

A tiny wasp – smaller than the dot at the end of the sentence – that will search out and kill the egg masses of one of our major sweet corn pest – can this really work? A number of sweet corn growers around the state have been testing *Trichogramma ostrinae* (pronounced ah STRIN ee ay) parasitic wasps over the past five years and have found that they do help to control European corn borer (ECB) in both corn and peppers. The use of these wasps in commercial sweet corn fields in Massachusetts has resulted in the reduction or elimination of foliar insecticide sprays saving time labor pesticides and fuel reducing soil compaction and maintaining or improving ear quality. This method is an ideal IPM practice because it prevents the emergence and feeding of caterpillars in the first place as opposed to rescuing the corn with sprays after the caterpillars have become a problem. Using *Trichogramma* to control ECB in early corn (corn to be harvested in July) is especially useful because timing sprays in the early corn can be tricky. Also most of the caterpillar damage in early sweet corn is from ECB thus wasp release control measures are not complicated by the need to control other major caterpillar pests. *Trichogramma* can also be used for second generation ECB which attacks both peppers and corn.

Biology. *Trichogramma* species are tiny parasitic wasps smaller than the period at the end of this sentence. Female wasps lay their eggs in the egg masses of host insects. *Trichogramma* larvae feed and pupate inside the egg killing the egg and preventing hatch. *Trichogramma ostrinae* lays its eggs in ECB egg masses. As they mature unparasitized ECB egg masses turn from a cream color to white to white with a black head mass in the center of each egg. When parasitized by *T. ostrinae* the entire egg turns black. *Trichogramma* have excellent dispersal and ability to search for egg masses in the field. They do not overwinter but they will reproduce and contribute to the control of ECB throughout the season.

Release timing. While some native species of *Trichogramma* persist in the wild *T. ostrinae* need to be reared at an insectary shipped to the farm and released each season. Since *Trichogramma* control ECB by parasitizing egg masses knowing when to release the wasps requires knowing when the ECB moths are laying eggs. Thus knowing when ECB flight begins reaches a peak and ends in a given field is key to the proper timing of *Trichogramma* releases. You can use regional information about flight activity; however to get the best coordination of timing on your farm we recommend that you monitor ECB flight in your own fields. ECB moths have two generations per growing season in Massachusetts; the first one emerges in late May or early June while the second generation begins to emerge in late July and early August. Time the first release of *T. ostrinae* to the beginning of ECB egg laying which will begin within a week after the first ECB moths are caught in traps. If the corn is less than 6 inches high you may want to wait a few days. For corn maturing in the middle of moth flight target releases to corn that is in the 4-6 leaf stage (12-16 inches tall). To help align the concentrated presence of *T. ostrinae* with ECB host egg laying we recommend two to three releases each approximately 7 days apart. Our current recommended release rates in early corn are 60,000 wasps per acre per release. Degree days (DD) can help with timing. Using a base temperature of 50 degrees F the first spring moths will emerge at 375 DD50 (when *Spiraea x vanhouttei* in full bloom) and the first eggs are laid at 450 DD50 (Pagoda dogwood late bloom). Eggs require 100 degree days to hatch. Releases should be made when eggs are in the field but before eggs hatch.

Handling *Trichogramma*. *Trichogramma* are shipped from the insectary as pupae inside protective cards. They are ready to emerge upon arrival although there will be a range of pupal age so they will emerge gradually over 1-7 days depending on temperature. It's best to put the cards out in the field the same day as they arrive. If you cannot release them upon their arrival keep the cards in their shipping box in a cool location at about 50°F – not in the refrigerator! The insects are alive: avoid exposing them to extreme temperatures (below 40°F or above 90°F) so they will still be alive and in good shape when you put them in the field.

Releasing *Trichogramma*. Place the proper number of cards to provide the desired release rate in the center of the field or at regular intervals through the field away from the field edges. *Trichogramma* wasps will disperse well throughout the field one to four release sites per acre is adequate. Tie cards securely to corn leaves or on a stake. Do not put them on the ground. Leave the packet stapled shut so that other insect predators do not consume them.

Scouting release fields. Where *Trichogramma* has been released you can scout as usual. Eggs that were parasitized and did not hatch will never reach the larval stage resulting in a lower rate of infestation with caterpillars. Use the standard ECB threshold (15% infestation in caterpillars or fresh damage) to decide whether to spray.

Spraying release fields. *T. ostrinae* will suppress ECB but will not always provide complete control. In addition an early corn earworm flight may arrive during silking. Thus insecticide applications may still be needed to achieve high levels of clean corn. Use selective insecticides with low impact on natural enemies (aka beneficials). *Trichogramma* that are inside host eggs are somewhat protected from the spray and many will survive but adult wasps may be killed by insecticides that are harsh on beneficial organisms.

Ordering *Trichogramma* PLACE YOUR ORDER NOW!

Trichogramma ostrinae may be ordered from IPM Laboratories in Locke New York 315 497 2063 www.ipmlabs.com. To ensure that you will be able to receive *Trichogramma* this year you must call IPM labs as soon as possible. When placing your order have the number of acres you wish to release in and the size and number of plantings you have for early corn.

Results from 2008 *Trichogramma* SARE Project

In 2008 the Vegetable Program worked with 14 growers on improving or introducing *trichogramma* release programs in sweet corn and peppers. They released in forty four acres of early sweet corn and 19 acres of peppers and the efficacy of the wasps was observed. Efficacy was measured by egg parasitism infestation levels in release fields and harvest data (summarized below). We released during the last week of May and continued to release weekly at a rate of 30K/acre through the month of June. Our timing in 2008 seemed to be perfect. Infestation levels were very low in release fields of the 26 fields we released in only 11 (less than half) were over threshold and needed a spray. The rest never got above threshold and therefore never warranted a spray. The majority (75%) of growers involved with the project were able to reduce or eliminate the number of pesticide applications made in early corn compared to previous years for the same time period. This was a huge saving to growers who are accustomed to applying 3-5 insecticide applications for ECB in the early season. The highest infestation level found at harvest from a release field that was never sprayed was around 12% however most were in the 0-2% range.



Sprayer Calibration

Long Island Fruit & Vegetable Update No 7 2009
Andrew Landers Cornell University

Sprayer Calibration: Efficient and accurate spray management starts with proper sprayer calibration. Over application results in increased costs or offtarget contamination while under application may result in poor control and/or repeated applications. Some simple steps and formulas are described below outlining how to calibrate multiple nozzle boom liquid sprayers. Sprayer calibration involves a small investment of time but one that could bring substantial economic return.

The equipment required to calibrate includes; a tape measure stopwatch and a measuring jar graduated in ounces. For the most accurate calibration Cornell recommends measuring the output of each nozzle (gallons per minute GPM) measuring nozzle pressure (pounds per square inch PSI) with a pressure gauge on the spray boom and measuring travel speed (miles per hour mph) in the field. The best way to measure travel speed is to pull the sprayer with the tank half filled with water on terrain similar to that which the sprayer will be operated on.

Travel Speed: 1) Measure a 100 ft long test course with the tape measure; 2) Run the course in both directions; 3) Using a stop watch measure the time required to travel the course in each direction; 4) Average the two runs and use the formula to calculate speed: [MPH = ft. traveled/seconds traveled x 0.68]. *Be sure to record your tractor gear and engine revs.*

Next record the nozzle type on your sprayer (i.e. 11004 flat fan) the application volume (GPA) from the manufacturer's label the nozzle spacing (inches) and the measured sprayer speed (MPH) from above. Then calculate the required nozzle output using the formula: [GPM = GPA x mph x nozzle spacing / 5940].

Now set the correct pressure at the gauge and collect and measure the output of each nozzle for one minute. The output of each nozzle should be about the same as calculated from the formula above. All nozzles should be replaced where in accuracy is greater than 10% in either direction. For banded boom sprayers the only difference is the input value used in the last formula.

For single nozzle banding applications; [nozzle spacing = sprayed band width (inches)] and for multiple nozzle directed applications; [nozzle spacing = row spacing (inches) / number of nozzle per row].

An Effective, Low-Rate, Post-Emergence Herbicide Program for Sweet Corn

(continued from page 1)

The top rate on the Impact label is only $\frac{3}{4}$ ounce per acre which means that growers would be applying slightly more than a thimble full of active ingredient per acre (if it worked as a stand alone post emergence program).

In 2008 we tried a single post emergence application of Impact (3/4 oz) 48 ounces of methylated seed oil and 2 pounds of ammonium salts (Target Control Adjuvant) to control all the weeds in 4 sequential plantings which together made up an acre of sweet corn. The mix was applied with 25 gallons of water per acre. The 4 plantings were made weekly between June 12 and July 3 at the UConn Plant Science Research Farm in Storrs CT. The single herbicide application was applied to all 4 plantings on 7 July just 4 days after seeding the last planting.

Neither the crop nor the weeds had emerged in the last planting at the time the spray was applied (control treatment). We made the application to the last planting to evaluate how well Impact worked as a "pre emergence" product since it is only listed for use as a post emergence product on the label. The goal of the study was not to advocate treating several plantings at the same time although that was certainly convenient but rather to evaluate the product on different size weeds. Both the corn and the weeds in the first three plantings were 6 3 and 1 inches tall respectively and the weeds were thick as a carpet when the herbicide was applied on July 7. No pre emergence herbicide was used.

The dominate weeds in the field included lambquarters pigweed ragweed purslane and crabgrass with a mix of other species in lesser quantities. There were no perennial weeds in this field. By 17 July (10 days after application) **all the weeds in the first three plantings were dead or showed visible signs of dying.** There were no weeds left at all in the third planting where weeds were tiny when treated. In the fourth planting where the product had been used as a pre emergence instead of a post emergence herbicide there were a few escaped late emerged pigweed lambquarters and crabgrass plants and quite a bit of purslane (purslane is not listed on the label as controlled). **At harvest, the ground under the first and second plantings were still completely free of weeds, there was only an occasional late-emerged lambquarters or shepardspurse plant in the third planting,** but the weed control was unacceptable in the fourth planting. Even the purslane and the crabgrass were killed in the first 3 plantings.

Based on our results the best season long weed control was achieved by making the application when weeds were 3 to 6 inches tall. However since many weeds are not controlled beyond 3 to 4 inches tall (e.g. mallow shepardspurse ladys thumb smartweed thistle barnyardgrass crabgrass foxtail and panicum) according to the label the best spray timing would probably be while weeds are 2 to 3 inches tall. Most other weeds are not controlled beyond 6 inches tall according to the label. That means that if you waited until the weeds were 6" tall and were late making your application due to adverse weather or some other unforeseen event you would have no way to control the weeds in that planting and yields would suffer or the planting may be lost entirely.

Also controlling weeds by the 3 inch stage makes sense according to the critical weed free period established for sweet corn which dictates that weeds must be controlled by the start of week 3 to keep from adversely affecting yields (see North east Sweet Corn Production and IPM Manual). The 6 inch tall weeds in the first planting of this study were over 3 weeks old when the herbicide was applied and thus yields although not measured were probably adversely affected. Weed growth would have been slower if these plantings had been made in April or May instead of June and July so even 3 inch tall weeds would be over 3 weeks old for early season plantings. This study did not determine how well this post emergence program would work in early corn. Keep in mind that if more weeds emerge after application as the soil warms in early sweet corn fields you can not reapply Impact during the same season. Also the label warns that applications during periods of plant stress "such as cold temperatures and/or drought" may reduce performance. So this may not be the best early season program but may still be worth a try (there are other post emergence products available for rescue treatments if necessary).

Note that I am not recommending that growers treat multiple sequential plantings at one time. If you attempt this inevitably at some point in the future something will delay an application and weeds may become too large to kill in the oldest planting and it will cost you money. It is safer to treat each planting individually as the weeds reach 2 to 3 inches in height.

Also note that most other vegetables should not be planted for 18 months after an Impact application. So **Impact is best used in a corn following corn situation and not when other vegetables will follow in rotation.** It is also good to remember to practice resistance management to help prolong the useful life of this new tool. Avoid using herbicides from the same family/group in a tank mix or in sequence (i.e. Callisto pre emergence Impact post emergence) and try not to rely on the same herbicide program every year on the same land.

Oh I almost forgot to mention one of the best things about Impact. Although it costs almost \$600 per jug it is used at such a low rate that the cost per acre is about \$15. Imagine a complete weed control program for \$15 per acre (not including additives).



¼ oz. Impact, 48 oz. MSO, 2 lbs. ammonium salts

1st Planting



Picture taken after harvest

Update on UConn's, Trap-Based, Bt Sweet Corn, Earworm Threshold Trials

Jude Boucher Extension Educator
Commercial Vegetable Crops

Two years ago I wrote an article called 'To Grow or Not to Grow Bt Sweet Corn' (Crop Talk Vol. 3 No. 1 2007; www.hort.uconn.edu/ipm/) in which I described the potential benefits and risks of using Bt genetically modified sweet corn. For instance one of the new risks that we have identified since that article was published is poor quality control. One grower was sold a non Bt corn that was labeled as a Bt corn which became highly infested with corn earworm (CEW) and infected with rust. This planting was a complete loss. The other half of the planting contained real Bt corn of the same variety (from another seed company) and did not get rust or worms. So obviously one of the benefits of Bt sweet corn is that it is less likely to get as many worms as non Bt corn. But can we translate fewer worms (resistance) into fewer sprays? Sometimes growers confess to spraying Bt sweet corn "just to be on the safe side" even when moth catches in traps indicate relatively low pest pressure. Based on 2006 seed prices we figured that a grower would need to save 3 to 5 sprays just to offset the increased cost of the Bt seed and that doesn't compensate for added risks. I went on to say in that article that in order to reduce sprays new trap based action thresholds for Bt corn must be constructed so that growers know if and when the GM sweet corn needs additional protection against CEW.

In 2006 Galen Dively the Vegetable Specialist from the University of Maryland spoke at the Connecticut Vegetable & Small Fruit Growers' Conference and recommended that Bt sweet corn be sprayed once or twice at 4 and possibly 8 days after silk depending upon CEW pressure and plant stress (drought wet etc.). However he couldn't quantify the moth pressure or plant stress that necessitated a spray or a second spray. During the summer of 2006 we tested Galen's thresholds at UConn's Plant Science Research Farm and both a single and double spray produced clean corn at harvest. The problem was that even the unsprayed control treatment of Bt sweet corn was almost worm free (1% infested) at harvest despite a peak catch of 26 moths per night in pheromone traps. This level of pest pressure would have caused most ears in an unsprayed non Bt variety to become infested. Growers requested trap based thresholds so they could be sure the new corn varieties needed to be sprayed before making the application. Here is a summary of what we have learned since then.

In 2007 and 2008 we experimented with applying a first spray (Warrior) to the Bt variety BC0805 sometime between 4 and 18 days after silk and a second spray between 11 and 16 days after silk. Moth catches during silk in these studies peaked at between 10 to 25 moths per night. What we found was that the infestation at harvest even in the unsprayed control plots was erratic from year to year and did not seem to correlate with the number of moths captured in pheromone traps. For instance unsprayed control plots in 2006 and 2007 had peak moth catches of 25 or 26 moths per night but 1% worm damage at harvest the first year and 12% the next. In 2008 a peak of just 10 moths per night produced an 11% infestation at harvest. Moisture stress did not seem to help explain these differences either as the first and third years were wet while 2007 was dry.

What was consistent between the different studies was that "high" moth counts earlier in the silking process had much more effect on the worm infestation at harvest than did high moth counts later in the silking process. This matches what is already documented in the literature for this pest on standard sweet corn.

So we learned that when there are high moth counts (i.e. >10 moths/night) early in the silking process it is very important to apply a spray between 4 and 6 days after silk (at least it is important most of the time – not in 2006). All plantings that received a timely first spray in our studies produced 98-100% clean corn compared to unsprayed control plots which often had less than 90% worm free corn. This matches what Galen told us back in 2006: most Bt sweet corn needs to be sprayed at least once approximately 4 days after silk. In our experiments a second spray didn't seem to be necessary at least up to 18 moths per night (26 moths/night if you count 2006). We have to wait for higher moth pressure to further test the necessity of a second spray.

In our studies we also calculated that using Bt corn with a single insecticide application saved an average of 5 sprays per planting for CEW alone and up to 2 additional sprays for ECB and FAW control compared to spraying regular sweet corn with the old IPM thresholds. That was for corn that silks during August or September which generally requires more sprays than early season corn. In each of our trials savings in costs for insecticide more than offset the increased price of Bt corn seed.

In conclusion if you could plant 3 or 4 Bt sweet corn varieties in the same planting that had different development times and met your standards for marketability quality then you would have a simpler pest management system for sweet corn that saves you time chemical equipment hours money energy soil compaction beneficial insects applicator exposure and provides consistent quality. These benefits do not come without additional risks that include the possibility of such things as insect resistance to Bt a consumer backlash for using GM food products over production and lower market price secondary pest issues (i.e. sap beetles) pollen drift and liability problems lethal and sub lethal effects on non target organisms (i.e. monarch butterflies) unknown human health concerns associated with consuming Bt and quality control issues. However if you plant Bt and non Bt varieties in the same block/ planting then currently you have to contend with two pest control threshold systems: one based on trap catches and another on days after silk. We plan to continue our trap based CEW threshold studies for at least one more season. When I know more you'll know more.



New England Tree Fruit Management Guide

The 2009 New England Tree Fruit Management Guide includes extremely useful information particularly with regard to pesticides & pest management. A number of new products were added this year. The guide covers all tree fruit crops grown in New England including apples pears and stone fruit. They are now available from the UConn Communications and Information Technology Office; Unit 4035; 1376 Storrs Road; Storrs CT 06269 or call 860 486 3336. The cost of \$35 includes shipping & handling. Credit cards accepted.

Second Twilight Meeting of the Connecticut Pomological Society

Wednesday June 10 at 5:30 PM at Blue Hills Rd. Wallingford CT

Blue Hills Orchard is a 5th generation 300 acre orchard specializing in the wholesale market. There will be a tour of the orchard and packing house. A new tower orchard sprayer will also be on display. A light dinner and refreshments will be served after the tour. This is the President's meeting part of Eric's commitment to the Connecticut Pomological Society's leadership role. The agricultural related representatives will be attending this meeting and will be available to answer your questions.

Directions: From I 91 North or South take exit 13 go left onto Rt 5.

Right onto Toelles Road Right onto Hartford Pike Left onto Mansion Road and Right onto Blue Hills Road. The packing house is on the left.

Farmers' Market Opportunity

The local 4 H's are in the process of planning the Tolland County 4 H Fair which will be held at the Tolland County Extension Center (Rt. 30) in Vernon on August 7-9. This year 4 H would like to share their fair with local farmers by offering two different options for vendor spots during the fair:

1. There will be a formal Farmers' Market in the fairgrounds on Saturday afternoon August 8th from 3-6 PM. Vendor spots will cost \$10 for a 10 ft. spot during the Farmers' Market.
2. There are also vendor spots available for the length of the fair (Fri. Sat. Sun) for \$50-\$150. These spots are limited.

For more info or to reserve a spot please call Kelly Trueb at 860 490 8451.

Ordering IPM Supplies

Here is a list of some supplies you may need to monitor pests this season:

<u>Pests</u>	<u>Supply Type/Brand</u>	<u>suggested # to order</u>
European corn borer	Scentry Heliiothis Trap	2 traps for ECB peppers
Corn earworm	Scentry Heliiothis Trap	2 traps for CEW sweet corn
ECB or CEW	SHT Replacement top	check old tops for holes
Fall armyworm	Green Unitrap	1 2 per farm
Pepper maggot	AM Trap (yellow sticky trap)	25 traps (pack)
Corn earworm	<u>Hercon</u> pheromone lures	10 lures (pack)
European corn borer	Trece pheromone lures	4 Iowa (Z) + 4 NY(E)
Fall armyworm	Trece or Scentry lures	4 lures per trap
Fall armyworm	Vapona II (toxic strip)	1 per trap
Pepper Maggot	Strong Ammonia Solution	2.5 liters

Lures and traps can be purchased at Great Lakes IPM (www.greatlakesipm.com 800 235 0285).

Note: to use the UConn IPM Action Thresholds to determine the spray interval required be sure to purchase Hercon brand lures for your corn earworm traps. The Strong Ammonia Solution for pepper maggot traps can be purchased at Fisher Scientific Fair Lawn NJ 07410 (201 796 7100).

Note: The 2008 2009 New England Vegetable Management Guide has been sold out. You can still access the guide at www.nevegetable.org

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