The Vegetable and Small Fruit Gazette

Vol. 9, No. 3- March 2005

Horticulture Department
The Pennsylvania State University

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Comments from the Editor

Elsa Sánchez, Department of Horticulture

I want to thank Steve Bogash for his excellent articles, **New Pressure Treated Lumber: Things you really need to know and Damping Off Management using Biorational Fungicides**, and look forward to Eric Oesterling's article for the April issue. I also want to thank everyone who contributed articles to this issue and I want to encourage others to join us in upcoming issues.

If you have an event that you would like to advertise, please send it to me. As always, the Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

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Quote for Thought from Pete Ferretti

Pete Ferretti, Department of Horticulture

When you reach for the stars,
you may not quite get one,
but you won't come up with
a handful of mud either.
-Leo Burnett

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Schedule for Agent Articles

Elsa Sánchez, Department of Horticulture

March – Steve Bogash	April – Eric Oesterling
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New Pressure Treated Lumber: Things you Really Need to Know

Steve Bogash, Regional Horticulture Educator

By now, all of the pressure treated lumber you will find in stores has been treated with one of the new, more "environmentally friendly" pressure treatment chemicals. The former, long-used, but more toxic treatment known most commonly as CCA has been out of use for over a year, so stocks of lumber using that treatment process should be gone.

The "A" in CCA stood for inorganic arsenic which worked well in keeping insects and microbes from destroying the wood, but introduced a potent poison into the environment. Today's pressure treating chemicals rely on copper in new formulations to stabilize it in ground contact and wet conditions. You will see codes such as ACQ-C, ACQ-D, and ACQ-D Carbonate on some lumbers. These are all versions of Alkaline Copper Quatenary. Other pieces of lumber will bear codes like CBA-A or CA-B which indicate they were treated with a Copper Azole-based material. The commonality among these materials is in the use of copper as the primary decay-preventing chemical. Research so far indicates that these new materials should work to prevent decay for decades much as the old CCA treatment did.

Although some early articles indicated that these new copper-based, pressure-treated, woods may be compatible with certified organic production, Pennsylvania Certified Organic (PCO) has found them to be incompatible due to the addition of a synthetic pesticide in at least some formulations. According to PCO, organic growers using these new lumbers can apply a latex or oil-based paint prior to use to prevent leaching of these materials. If you are certified organic or transitioning to organic, be sure to check with your certifier prior to using any pressure-treated lumber.

One of the big changes you will notice when you purchase these new pressure treated woods is in the price. The new lumber is going to cost you more since the new treatments cost more. Our long-term expense as a society will probably be lower if you factor in that we will no longer be creating massively expensive to clean up toxic waste sites as we did with CCA treatment plants.

Another change is in the grades. Pay careful attention to the specific application on the end tag. Due to the higher expense of the new chemicals and the fact that we don't always use the wood in contact with the ground, some of the wood will bear the recommendation "Above Ground." Less chemical has been forced into the wood to save money. Be sure to use only wood labeled for ground contact as posts or retaining walls. The key for the consumer is to read the end tag on the lumber. Any lumber sanctioned by the American Wood-Preservers Association will bear their initials "AWPA" and have a fairly easy to understand tag.

The greatest change for carpenters is in the hardware required to connect these new copper-based pressure treated lumbers. This new wood is much more corrosive to fasteners than CCA. Do not use nails, screws or connectors that are labeled "galvanized" as these will start to corrode in just weeks. At a minimum, use fasteners labeled "hot-dip galvanized." Your better choice is to use stainless steel screws and bolts Type 304 or 316. Some screw manufacturers claim their zinc galvanized coatings although not hot-dip are usable on all pressure treated woods. Be sure to ask if they warrant their use before committing a major deck or wall project to questionable fasteners. The age-old farmer's habit of using up whatever fasteners are in their shop before purchasing new ones will backfire with these new corrosive woods. Lumber and time are far more expensive than purchasing the correct fasteners.

Polymer-coatings may be a viable alternative, but so far none have gotten the nod from the ASTM (American Society for Testing and Materials) for use in the new pressure treated lumbers. Some independent labs have confirmed the performance of these polymer coatings. Again, look for the warranty.

Joist hangars, post anchors and other hardware need to be considered as well. Look for an ASTM label that says they conform to ASTM A653. Two lines you can find on the market today are the TZ line from USP and ZMax from Simpson Strong-Tie. As stores transition to these new lumbers, finding the right connectors may take time and planning. Marine and coastal suppliers will probably have what you need as they are accustomed to selling to people building in a corrosive environment.

Lastly, you cannot use aluminum flashing. It will start to corrode immediately. Look for copper, galvanized or membrane flashing. While not specifically noted in any of the research materials used in developing this article, it should be assumed that some compatible flashing will need to be placed between any pressure treated wood and aluminum siding to prevent rapid degradation of the siding.

Many of the fasteners and other products may require special ordering, but a long-lasting outdoor project is easily worth the planning and advance ordering that go into getting the right materials.

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Damping Off Mangament Using Biorational Fungicides

Steve Bogash, Commerial Horticulture Educator

This article is a summary of research lead by Sally Miller, State Extension Specialist at Ohio State University in 2004. The full text is available at the OSU website under the title: “Management of Damping-Off in Vegetable Seedlings”: http://vegnet.osu.edu/library/res04/dampoff.pdf. There are a number of articles in this same library that are of interest to vegetable growers.

Sterile media was inoculated with the damping-off causing fungal organism Rhizoctonia solani (R. solani) and used to fill 288 cell flats. These flats were seeded with the cabbage variety ‘Bravo’. Seven treatments were evaluated for their efficacy against Rhizoctonia damping-off: Mycostop, Prestop, Phosphonate (Prophyte & Phosphyte), Muscador, MG1A2R, Wayne 1R and Seacide. All of the treatments were applied at planting except Muscador. Muscador is a biofumigant so was mixed with the planting media 7 days prior to planting. Greenhouse temperatures were set at 80°F daytime and 70°F nighttime with automatic watering.

Muscador provided the best control with damping-off limited to 1% with phosphonate providing effective control at below 5%. Seacide was considered phytotoxic with total damping-off at 36.5%. See the table below for all of the treatments efficacy levels:

Treatment	**Percent Damping-off**
Seacide	36.5%
Mycostop	20.8%
Inoculated control	14.6%
Prestop	8.3%
Wayne 1R	11.5%
Phosphonate	4.7%
Mg1A2R	13.5%
Non-treated, non-inoculated	1%
Muscador	1%
Muscador, non-inoculated	0%

In a typical greenhouse seedling situation where the grower is following good sanitation, damping-off levels are generally low. Some damping-off is a normal irritation of greenhouse production. Based on the results of this study, there are several biorational alternatives to traditional fungicides that are worthy of consideration. Your author will keep on the lookout for studies comparing these biorationals to traditional fungicides.

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Direct Marketing Pennsylvania Grown Edamame to Professional Chefs in Metro-Philadelphia: Follow-up Survery Results

Dru Montri, Kathleen Kelley and Elsa Sánchez, Department of Horticulture

This is the third of four articles in the series on direct marketing edamame to professional chefs.

In order to further understand chef preferences and demand for edamame, a follow-up survey was completed approximately two weeks after providing the chefs with edamame. Chefs were asked to taste each of the three cultivars and use the edamame in a recipe of their choice prior to the follow-up survey. The survey was administered to determine shelling preferences, quality of the edamame supplied and chef interest in buying edamame from small-acreage growers in Pennsylvania. These results are meant to provide relevant information about the needs and interests of this group and to establish a basis for those that are interested in direct marketing edamame to restaurants.

Eleven of the 18 chefs preferred shelled edamame (beans removed from the pod). These chefs responded that this level of processing was valuable to them because shelling was “too time consuming.” It is important to understand how chefs will use edamame at a specific restaurant prior to deciding if the edamame should be shelled or left inshell. The best option is to ask the chef directly how he or she plans to use the product. If the edamame will be used as an appetizer, it will most likely be served in the pod. However, a chef that prefers to use edamame as an ingredient in a dish will most likely prefer a shelled product. A higher price should be charged for shelled edamame to cover costs associated with the additional labor needed to shell the beans.

Chefs were also asked to compare the quality of the Pennsylvania-grown edamame supplied for this study with the quality of the edamame they had previously obtained from other sources. Of the 10 chefs that had used edamame prior to this study, five noted that the edamame supplied was superior to edamame obtained form other sources, four responded that the quality was the same and one chef noted that the edamame was inferior to edamame obtained from other sources. As mentioned in the first article of this series, consistent quality is a key attribute chefs consider when making a purchasing decision. Based on these results, Pennsylvania-grown edamame supplied in this study is of competitive quality with edamame already on the market.

All chefs were then asked if they had an interest in obtaining contact information for small-acreage growers in Pennsylvania who produce edamame. Fourteen of the chefs gave a positive response indicating that there is a demand for Pennsylvania-grown edamame among the Metro-Philadelphia chefs who participated in this study.

Edamame produced by small-acreage growers may appeal to these chefs and become a potential source of supply. Establishing a relationship with the customer is a crucial first step (Bachmann, 2004). Prior to planting edamame, small-acreage growers would be advised to first build a relationship with an interested chef to determine specific needs and preferences. Details such as exact quantities and shelling preferences should be explicitly explained to avoid potential disputes. A chef’s reputation depends on the product being supplied, so it is their responsibility to be selective. It is also important to understand the time constraints on chefs and that it will be necessary to work with the chef to provide the most convenient product for them.
Since many chefs indicated that all cultivars were acceptable in the sensory evaluation, cultivar selection may be best determined by the grower. This decision should be based on the field’s geographical location, days to maturity, yields and pod characteristics which are favorable to the targeted consumer – in this case professional chefs.

The final article in this series will address chef interest in using edamame as an ingredient in a dish. It will also showcase an original recipe created by a Metro-Philadelphia professional chef.

Reference:

Bachmann, Janet. 2004. Selling to Restaurants. ATTRA. 1 Nov. 2004. <http://www.attra.ncat.org/attra-pub/selling to restaurants.html>

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The Organic Way- Different Colored Plastic Mulches for Tomato Production

Elsa Sánchez and Mike Orzolek, Department of Horticulture

Using plastic mulches in tomato production can have many benefits such as increasing soil temperatures especially in early spring, reducing weed problems, conserving moisture, reducing certain insect pests and higher crop yields. Mulches are available in many different colors including green, silver, red, clear, gray, black, white, green, blue and brown. The question is which colored plastic is best for tomato production? Mike Orzolek conducted a study from 1995 to 1999 to evaluate red, red/black, brown IRT (InfraRed Transmissible), green IRT, black, silver, white, white/black, blue, orange, gray, clear, olive, and yellow plastic mulches for tomato production.

The study was located at the Horticulture Research Farm, Russell E. Larson Research Center, Rock Springs, PA. All of the plastic mulches were applied in the field with a Rain-Flo (Rain-Flo Irrigation, East Earl, PA) bed shaper/mulch layer with drip irrigation. ‘Sunbeam’ and/or ‘Mountain Supreme’ tomatoes were evaluated in 1995, 1996, 1997 and 1999. Weeds were managed in 1995 by applying an herbicide prior to laying the plastic mulch and weeds between rows were periodically hand hoed. In succeeding years, weeds between rows were managed by cultivation and hand hoeing. The plastic mulches were not evaluated in an organic system. However, you may consider trialing them on a limited basis and directly compare them to your standard production methods. Also, when using plastic mulches they must be removed at the end of harvest or growing season.

In 1995, the highest yields were harvested from plants grown on black plastic for both cultivars (Table 1). The lowest marketable yields were harvested from plants grown on either IRT green or blue plastic for ‘Sunbeam’ and IRT green or yellow plastic for ‘Mountain Supreme’. Tomato plants grown on blue, silver and brown plastic had smaller fruit compared with plants grown on the other colors. Early blight infestation was reduced when tomato plants were grown on yellow, green IRT or orange plastic regardless of cultivar.

In 1996, the highest marketable yields were harvested from ‘Sunbeam’ plants grown on red plastic, especially compared to using yellow, black and green IRT plastics (Table 2). Plants grown on red plastic had more fruit per plant compared to plants grown on black plastic. The lowest marketable yield was harvested from plants grown on the green IRT plastic compared to plants grown on red, silver or yellow plastic. A plant defoliation rating suggested that growing plants on red plastic reduced the incidence of early blight compared to the other colors, especially black.

In 1997, marketable yield from ‘Sunbeam’ grown on red, black, silver or yellow plastic was not very high and there was no significant difference between tomato plants grown on either red or black plastic (Table 3). There was a significant reduction in early blight defoliation of tomato plants grown on red plastic compared to black plastic.

Marketable yield of ‘Sunbeam’ grown on ten different colored plastics in 1999 reinforced the observation that tomato plants grown on red plastic will produce much higher yields of marketable fruit compared to plants grown on black plastic (Table 4). Fruit from plants grown on silver and red plastic ripened earlier

compared to fruit from plants grown on white/black 52% plastic which appeared to delay fruit maturity. The response of tomato to the different mulch colors is directly related to the soil temperatures beneath the mulch film and the reflected light from the surface of the plastic.

Based on the data reported, tomato plants grown on red or silver plastic significantly produced more marketable fruit 2 out of 3 years compared to black plastic. Other factors influencing plant response to plastic mulch color include seasonal environmental stress (both moisture and temperature), cultivar, nutrition, soil moisture and quality of the plastic. It is safe to say that when growing conditions are optimum, as in 1997, plant response to plastic mulch color will be minimal

Table 1. 1995 - Yield and early blight rating of ‘Sunbeam’ and ‘Mountain Supreme’ tomato grown on various colored plastic mulches at the Horticulture Research Farm, Rock Springs, PA.

Mulch Color	**Source**	**Total Marketable Yield (T/A)**		**Early Blight Ratings**	
		'Sunbeam'	**'Mt. Supreme'**	**'Sunbeam'**	**'Mt. Supreme'**
Black	1	35.5	40.8		
Black	4	34.8	37.4	4.2	4.5
Gray	4	33.2	34.8	6.5	5.8
Brown	3	33.0	37.7	5.9	5.0
Brown	1	29.9	26.8	5.2	5.3
Yellow	4	29.9	26.6	2.5	2.0
Orange	1	28.9	37.0	3.2	2.2
Silver	3	28.4	26.6	3.3	2.8
Green (IRT)	2	24.8	25.8	2.8	1.8
Blue	4	24.5	31.1	5.7	5.3
LSD .05		7.8	6.9	2.0	2.0

•Source of plastic: 1 – Four Seasons Agric. Products, Atlanta, GA; 2 - Climagro, St-Laurent, Quebec, Canada; 3 – PolyWest Inc., San Diego, CA; 4 - Rochelle Plastic Films, Rochelle, IL
•Early blight rating: 1= 10% defoliation to 10 = 100% defoliation. Ratings were recorded on August 29, 1995.

Table 2. 1996 - Yield of ‘Sunbeam’ tomato grown on various colored plastic mulches at the Horticulture Research Farm, Rock Springs, PA

Mulch Color	**Total Marketable Yield**	**Average fruit weight (oz)**	**Cull %**

	(T/A)		
Red-1	54.0	9.0	12.4
Silver	46.4	9.3	14.7
Red-2	45.0	9.2	14.2
Red	41.1	9.5	18.0
Yellow	31.9	9.3	17.8
Black	30.3	9.2	24.3
IRT	28.6	9.0	14.2
LSD	12.8		8.9

Table 3. 1997 - Yield of ‘Sunbeam’ tomato grown on various colored plastic mulches at the Horticulture Research Farm, Rock Springs, PA.

Mulch Color	Total Marketable Yield (T/A)	Avg Fruit Weight (oz)	Cull %	Early Blight % defoliation
Red	16.2	6.1	8	14
Silver	13.4	6.3	11	30
Red	13.9	6.1	9	16
Red/black	15.1	6.2	10	19
Yellow	14.3	5.9	11	24
Black	16.0	6.6	13	23
IRT	14.5	6.5	11	27
LSD	2.4		NS	8

Table 4. 1999- Yield of ‘Sunbeam’ tomato grown on various colored plastic mulches at the Horticulture Research Farm, Rock Springs, PA.

Mulch Color	Total Marketable Yield (T/A)	Percent US #1	Cull %

Silver-1	32.3	68	19
Red UV	31.0	65	17
White/black-52%	30.0	30.0	67
Blue UVPE M/B	30.4	64	21
Green IRT	27.8	68	24
Blue PE M/B	28.6	65	20
White M/B	28.5	65	22
White PE M/B	29.8	59	21
White/ black-65%	27.1	64	22
Brown IRT	28.3	60	20
Silver-3	26.9	59	20
Black- control	22.8	69	21
Silver-2	26.0	60	30
Olive IRT	25.1	60	19
LSD	8.8		7

Source of plastic film: North American Films, Philadelphia, PA

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Late Blight Prevention on Tomato Seedlings Grown in Greenhouse and High Tunnel Structures

A.A. MacNab, Penn State

Make sure late blight is not present on tomato, potato or petunia plants in any nearby greenhouse-like structures. Late blight spores can spread for miles by wind.

People who have been near late blight infected plants should not enter greenhouse-like structures where tomato seedlings are being grown. Late blight spores can be introduced on workers hands, clothing, tools, etc.

Do not grow tomato seedlings in structures where late blight has recently been present. If late blight has been present in a structure, all plant material should be destroyed and surfaces sanitized at least 2 weeks before seeding tomatoes.

Do not grow ornamental plants or potatoes in structures where tomato seedlings are grown. Recent work has shown that the late blight fungus that affects tomatoes and potatoes, can also infect petunias and some other ornamental plants, and can also be introduced into greenhouses on petunia cuttings.

Minimize periods of time when environment favors late blight development within greenhouse-like structures. A key factor to focus on is relative humidity (RH). Infection by the late blight fungus can occur when there are 10 consecutive hours with a RH of 90% or more; chance of infection increases with longer high-RH periods and higher temperatures (up to 80°F). Relative humidity should be kept below 90% as much as possible. This is difficult, especially during long periods when rainy and cloudy conditions persist. Usually ventilation and heating will lower relative humidity; unfortunately, this can be expensive when outside temperatures are low.

A few preventive fungicides can be applied to tomato plants in greenhouse-like structures. Included are sprays of maneb, mancozeb, and fixed coppers. In addition, Previcur Flex, a material with some systemic properties, has a new label for use as a drench. Some fungicides labeled for use in the field are not labeled for use in greenhouses. Check the label to make sure use of the material in the greenhouse is not excluded; follow the label. If the grower thinks there are no sources of late blight within 50 miles, one application of fungicide may be adequate before transplanting to the field. However, if late blight is suspected to be present within 50 miles, multiple applications of fungicides could be useful.

Tomato seedlings that are infected by the late blight fungus should never be transplanted, and should be destroyed.

Any grower who suspects presence of late blight on tomatoes, potatoes, or petunias should contact the local extension office, the Penn State Plant Disease Clinic, or the PDA Plant Disease Clinic. The diagnosis can be checked and additional assistance can be provided as needed.

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2004 Sweet Non-Bell Pepper Variety Trial

Timothy E. Elkner, Horticulture Extension Educator, Lancaster County

Sweet bell peppers are commonly grown on many farms throughout the Pennsylvania. With the increased consumer interest in fresh produce, an opportunity exists to grow additional types of peppers. Some growers have started growing hot peppers to meet the demand for this product. There is another group of peppers – the sweet non-bell types – that may provide an additional crop to be grown to satisfy consumer interest and increase farm income. The purpose of this trial was to evaluate sweet non-bell peppers for yield and quality.

Six week-old transplants were set in raised beds covered with black plastic on July 9, 2004 at the Penn State Southeast Research and Extension Center in Landisville, PA. The beds were on 8 ft. centers and the plants were set 18” apart. There were 12 plants per replicate and three replicates per variety (when there were sufficient plants). The plants were irrigated when needed with trickle irrigation. Standard fertility and pest management practices were followed. Peppers were harvested when color developed or at full maturity (depending upon variety) on the following dates: September 9, 23, 30 and October 11. A final harvest that included colored and all green mature fruit was done on October 20. Fruit were counted and weighed at each harvest and graded into marketable and non-marketable fruit.

The complete listing of varieties and types of peppers planted can be found in Table 1. Yield data can be seen in Table 2. Yields for many of the later season varieties are probably lower than can be expected because the plants in this trial were started late and transplanted to field later than normal. In addition, the cool, wet season delayed maturity so some of the later maturing cultivars never developed colored fruit. The final harvest included green mature fruit from all plants in order to get a reasonable estimate of yield potential. Phytophthora became a problem in some sections of the field by the end of the season and contributed to lowered overall yields as well.

Super Greygo was the highest yielding cheese pepper. The yields for this entire group of peppers were lowered by severe corn borer losses in earlier fruit. Growers trying this type of pepper need to scout carefully and maintain a good spray program to reduce yield losses to this pest. The cheese peppers seemed to be the preferred host among all the pepper types in this trial. The average fruit size in this group was also low. This was likely a result of a heavy fruit set and growers should monitor fruit set in their plants and may need to thin the fruit in order to get the more desired large fruit.

Lipstick and Antohi Romanian were the highest yielding peppers in the pimento types. Antohi Romanian fruit developed yellow and then turned red at maturity. A mix of mature and immature fruit of this variety made an appealing package and might be a useful way to market this pepper. Super red pimento and yellow cheese pimento were more like the cheese types in shape and suffered from heavy borer damage as well.

The Sweet Italian group of peppers contained fruit of different sizes and shapes so it is difficult to make direct comparisons. Growers should investigate potential markets before planting and choose their varieties based on preferences in their market. Navarone produced the largest peppers in this group while Nardello Sweet was the smallest. Giant Marconi had the highest yield per plant.

Biscayne was the highest yielding Cubanelle pepper. Key West was a nice medium green color but was the lowest yielding cultivar. Pageant was the only banana pepper in this trial but it was a very attractive fruit and had high yields. Growers with a market for this type of pepper may want to trial this variety.

Photographs from all varieties can be viewed at: http://lancaster.extension.psu.edu . Select “Horticulture/Gardening” and then “Research Results” under *County Links*.

Table 1: Pepper varieties, source, maturity (catalog listing), actual maturity and general comments for 28 sweet pepper varieties grown at the Southeast Agricultural Research and Extension Center, Landisville, PA – 2004

Variety	**Seed Company**	**Maturity**	**Actual Maturity**	**Comments**
Cheese				
Round of Hungary	Johnny’s	75 days	83 days	Ribbed, Flattened
Giant Hungarian Cheese	Myers		94 days	Ribbed, Flattened
Super Greygo*	Stokes	68 days	76 days	Smooth, Flattened
Pimentos				

Lipstick	Johnny's	73 days	67-76 days	Heart Pimento
Apple	Johnny's	77 days	83 days	Heart Pimento
Antohi Romanian	Johnny's	78 days	76 days	Pimento-type
Super Red Pimento	Stokes	70 days	94 days	Flat Pimento
Yellow Cheese Pimento	Stokes	73 days	83-94 days	Flat Pimento
Sweet Italian				
Italia	Johnny's	75 days	67-76 days	Corno de Toro-type
Sofia*	Stokes	68 days	83 days	2-lobed, bull-noised
Navarone*	Stokes	74 days	94 days	Blunt-noised, thick flesh
Laparie*	Stokes	72 days	94 days	Thin-fleshed, dark
Super Shepherd	Stokes	68 days	76-83 days	Thick flesh, sweet
Italian Longhorn	Seedway, Myers	65 days	76-83 days	Shepard-type, thick walls, sweet
Sweet Italian	Seedway	65 days	83-94 days	Thick walls, sweet
Bulgarian Sweet Roaster	Myers	65 days	83 days	Blunt-nosed
Giant Sweet Italian	Myers	68 days	76 days	Hybrid Super Shepherd, blunt nosed
Giant Marconi	Burpee	72 days	94 days	Standard
Nardello Sweet	Seeds of Change	65-70 days	76-76 days	Heirloom- shaped like hot pepper
Marconi Red	Seed Saver's	70-90 days	94 days	Heirloom
Corno di Toro Rosso	Baker Creek	-----	94 days	Heirloom
Cubanelle				
Biscayne*	Johnny's	80 days	76 days	Yellow-green fruit
Key Largo*	Seedway	63 days	76 days	Yellow-green fruit

Aruba*	Seedway	67 days	76 days	Medium-green fruit
Key West X3R*	Myers	60 days	76 days	Yellow-green fruit
Golden Havana	Myers	60 days	76 days	Yellow-green fruit
Banana				
Pageant	Seedway	71 days	76 days	Yellow banana

*Hybrid

Table 2: Marketable yield, weight, average number of fruit per plant and average weight of fruit per plant for 28 sweet pepper varieties grown at the Southeast Agricultural Research and Extension Center, Landisville, PA – 2004

Variety	Total Number of fruit	Total weight (lb.)	Total # of plants	Number of fruit/plant	Weight of fruit/plant	Average fruit weight (lb.)
Cheese						
Round of Hungary	121	30.8	36	3.4	0.9	0.25
Giant Hungarian Cheese	93	29.6	35	2.7	0.8	0.32
Super Greygo*	103	32.3	24	4.3	1.3	0.31
Pimento						
Lipstick	272	47.0	36	7.6	1.3	0.17
Apple	159	27.7	36	4.4	0.8	0.17
Antohi Romanian	236	44.2	36	6.6	1.2	0.19
Super Red Pimento	72	18.2	36	2.0	0.5	0.25
Yellow Cheese Pimento	90	22.7	36	2.5	0.6	0.25
Sweet Italian						

Italia	160	37.1	36	4.4	1.0	0.23
Sofia*	184	54.2	34	5.4	1.6	0.29
Navarone*	74	33.1	19	3.9	1.7	0.45
Laparie*	137	35.2	24	5.7	1.5	0.26
Super Shepherd	127	35.6	36	3.5	1.0	0.28
Italian Longhorn(SW)	160	42.4	36	4.4	1.2	0.27
Italian Longhorn(MY)	172	38.1	36	4.8	1.1	0.22
Sweet Italian	199	44.5	36	5.5	1.2	0.22
Sweet Bulgarian Roaster	136	44.9	34	4.0	1.3	0.33
Giant Sweet Italian	181	47.9	36	5.0	1.3	0.26
Giant Marconi	91	30.8	12	7.6	2.6	0.34
Nardello Sweet	376	31.5	24	15.7	1.3	0.08
Marconi Red	67	17.3	22	3.0	0.8	0.26
Conro di Toro Rosso	80	26.3	36	2.2	0.7	0.33
Cubanelle						
Biscayne*	424	100.8	36	11.8	2.8	0.24
Key Largo*	214	47.8	24	8.9	2.0	0.22
Aruba*	87	23.7	12	7.3	2.0	0.27
Key West*	240	64.8	36	6.7	1.8	0.27
Golden Havana	331	77.2	36	9.2	2.1	0.23
Banana						
Pagaent	580	90.8	36	16.1	2.5	0.16

*Hybrid

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New Web-based Tool Determines If Bt Corn is Profitable

Kristie Auman-Bauer, PA IPM Program

New and emerging technologies will help keep corn growers on top of their pest problems and profitable well into the future, says a professor of entomology at Penn State.

According to Dennis Calvin, timely and accurate information available through Web-based technology can improve production and profits, minimize environmental impacts and keep growers profitable and in business. “Our new, interactive Web-based program can forecast pest problems in a specific area and estimate the potential crop yield loss,” said Calvin, speaking at the Pennsylvania Agronomic Education Conference held recently at Penn State.

Calvin works in conjunction with ZedX Inc., an information technology company that specializes in the development of weather-dependent, decision-support products for specific industries such as agriculture and energy, to develop corn and pest phenology models. He helps ZedX link weather models with insect and weed models that enable growers to time pesticide sprays and other management tactics to develop weather data maps. The use of such technology can be a part of a grower’s integrated pest management (IPM) program.

IPM aims to manage pests -- such as insects, diseases, weeds and animals -- by combining physical, biological, genetic and chemical tactics that are safe, profitable and environmentally compatible.

By using the weather data maps, Calvin says they’ve been able to determine what economic impact bio-engineered crops such at Bt corn will have in specific areas. In the development of Bt corn, a gene from the bacterium *Bacillus thuringiensis* is added to enable the hybrid to produce toxins that control European corn borer and other pests. The European corn borer, a targeted pest of Bt corn, costs U.S. corn growers more than $1 billion annually in yield loss and crop protection costs. “Once the targeted pest ingests the tissue of the plant containing the Bt crystalline protein, the toxin acts on the insect gut lining causing it to break down, killing the insect,” says Calvin. Currently, over 39 percent of the nation’s corn acreage is now Bt corn.

However, since seed corn containing the Bt gene costs more than seed without the gene, it is not always profitable for a grower to use the Bt seed. According to Calvin, many factors can affect growing decisions, including geographical location, climate type, planting date, corn market prices among other factors. Calvin developed a tool that takes all of these factors into account and advises the grower whether or not using a Bt hybrid will be profitable. This tool, called the Bt Evaluation Tool (BET), is now available to all U.S. corn growers through the Penn State Web site http://www.essc.psu.edu/bet. “By looking at the weather-pest linked models, we can determine what effect pests, such as European corn borer, will have on a crop by determining the stage of the insect’s life cycle and plant maturity. We can then calculate the per acre value of using Bt corn by looking at the average yield, market value and expected loss caused by each insect in the plant,” Calvin explains.

According to Calvin, BET can determine yield loss for each insect generation at specific sites throughout the growing period. Thus, growers can better determine their level of risk and if it will be profitable to plant Bt corn or another hybrid. “The tool takes 33 year averages of European corn borer losses and ten year averages of crop costs and compares them to technology costs to determine the average net benefit. The

tool is interactive, so you can input your own planting date and relative maturity of the hybrid planted, seeding rates, etc., to see what your economic benefits would theoretically be," he says.

In addition to information provided by BET, maps of weed emergence and insect life stages will be available through Penn State's Department of Entomology Web site at http://www.ento.psu.edu/ beginning in April. They also hope to develop prediction maps for diseases such as soybean rust in the near future.

Calvin's presentation on pest development prediction models was one of several topics presented at the annual Pennsylvania Agronomic Education Conference. According to Dwight Lingenfelter, conference co-chair and cooperative extension agronomist with Penn State's Crop and Soil Sciences, the goal of the conference is to share ideas, research and knowledge among agronomic educators and agribusiness representatives. "The objective of the society is to promote useful and practical information on plants and soil, biotechnology, soil conservation and the economics of new technology. One of our focus areas is how new technology can improve crop productivity, enhance farm profitability and maintain environmental quality," says Lingenfelter. For more information on the society, see their Web site at http://paes.cas.psu.edu.

The Pennsylvania IPM program is a collaboration between the Pennsylvania State University and the Pennsylvania Department of Agriculture aimed at promoting integrated pest management in both agricultural and nonagricultural situations. For more information, contact the program at (814) 865-2839, or Web site http://paipm.cas.psu.edu. To view our archived news releases, see Web site http://paipm.cas.psu.edu/newsrelease.html.

For more information contact: Kristie Auman-Bauer, PA IPM Program; (814) 865-2839; kma147@psu.edu

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That's a Berry Good Question!!!

Kathy Demchak, Department of Horticulture

Q. In different years, our blueberry plants set different numbers of fruiting buds at the tips of individual canes, even though we try to prune to keep the crop load consistent. We can't identify any changes in our management practices that might cause this. What determines the length of the fruiting zone on individual blueberry canes, and what makes this vary from year-to-year? (Bob Trax, Sr., Trax Farms, Finleyville, PA).

A. I had to do some homework to find out the answer to this one! But here goes. When blueberry shoots grow, at first all of the buds that form in the leaf axils for the next year's growth are vegetative. However, at some point during the late summer and fall, some of these buds are converted to flower buds, starting at the tip, and working down the stem. Conditions that are conducive to this conversion are short days and cool temperatures, though there are (as there almost always are) differences due to cultivar, cane age, and plant health. High temperatures tend to inhibit this conversion, as does early defoliation. Since in this case, we're considering the year-to-year differences, it's likely that the primary factor making the difference from year-to-year is temperature, with a long cool fall (but not frost) being the circumstance most conducive to a long fruiting zone developing. An extremely warm fall, or early frost, could have the opposite effect.

References:
http://edis.ifas.ufl.edu/HS220, Reproductive Growth and Development of Blueberry by J.G. Williamson and P.M. Lyrene.
Blueberry Science. 1998. Paul Eck. Rutgers Univ. Press.

Got a question? Chances are that someone else has the same question, but isn't asking! Send your question to Kathy Demchak, at 102 Tyson Bldg., University Park, PA 16802, or via email to kdemchak@psu.edu. You will be credited with the question, or can remain anonymous, as you wish.

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Berry Pesticide Tables

Kathy Demchak, Department of Horticulture

In last month's newsletter article, concerning the fact that our new Mid-Atlantic Berry Guide is "In press", I said "I'll give you Web site addresses where you can get time-dependent information, updated pesticide tables, etc., etc., to supplement the 2002-04 version until the new guide is available. If you don't have Web access, your local Extension office will be able to help." So, here you go… If you go to http://hortweb.cas.psu.edu/extension/smallfruits/index.htm, and click on the word "Updates" next to the Commercial Berry Guide, you'll be able to get updated pesticide tables. However, I don't want this to be used as a substitute for getting a complete copy of the new guide when it becomes available (or having the old one…). Though pesticide information changes quickly, and hence needs to be updated frequently, it is only a small portion of the information needed to be effective in pest management. The complete guide contains the cultural guidelines to helps you avoid pest problems in the first place, helps with identifying the problems that do develop, and contains a wealth of other information that's important in production and pest management. If, when you click on the Web link, it's not functioning yet (it's being worked on as I write this), check back in a few days - we might have hit a glitch, but should be up and running shortly.

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Upcoming Meetings

Elsa Sánchez, Department of Horticulture

Local

March 3, 2005: Lehigh/Schuylkill County Potato Growers Meeting, Schnecksville Grange in Neffs PA. Contact: Bob Leiby (610) 391-9840

March 4-5, 2005. Passive Solar Greenhouse Workshop, 1522 Lefever Lane, Spring Grove, PA 17362. Contact: Steve and Carol Moore (717) 225-2489 or sandcmoore@juno.com.

March 12, 2005: North Central PA Vegetable Growers Meeting, Penns Valley Area High School. Contact: Tom Butzler (570) 726-0022. (Tentative Date).

March 15 or 16, 2005. Erie Vegetable Growers Meeting, Erie, PA. Contact: Andy Muza (814) 825-0900. (Tentative Date).

October 14-15, 2005. Passive Solar Greenhouse Workshop, 1522 Lefever Lane, Spring Grove, PA 17362. Contact: Steve and Carol Moore (717) 225-2489 or sandcmoore@juno.com.

Regional

Februrary1-3, 2005. Mid-Atlantic Fruit and Vegetable Conference, Hershey, PA. Contact: Bill Troxell (717)-694-3596 or e-mail: wt.pvga@tricountyi.net

February 14-17, 2005. Empire State Fruit and Vegetable Expo, Omni Center, Syracuse, N.Y.

National

March 1 – 4, 2005. 15th annual Greenhouse Tomato Short Course, Jackson, MS. For More Information: http://www.greenhousetomatosc.com

March 2-5, 2005. 2005 Chip Seminar, Adams Mark Hotel, Jacksonville, FL. Contact: (303) 873-2334.

March 5-8, 2005. National Agricultural Plastics Congress. The Francis Marion Hotel, Charleston, SC. Contact: www.plasticulture.org/conginfo2005.htm.

International

September 5-9, 2005. Potato 2005. Emmeloord, the Netherlands. Contact: www.potato2005.com.

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