

# The Vegetable and Small Fruit Gazette

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**Horticulture Department  
The Pennsylvania State University**

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## **Comments from the Editor**

Elsa Sánchez, Department of Horticulture

I want to thank John Esslinger for his excellent article, **The High Tunnel Demonstration**, and Cheryl Bjornson for submitting the article, **Managing Open Hunting on Farms**. I also look forward to Andy Muza's article for the December 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. As always, the Vegetable & 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**

*What do you get when you divide a pumpkin by its circumference?*

*Pumpkin pi.*

*-The Lion*

*October 2005*

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## Schedule for Agent Articles

Elsa Sánchez, Department of Horticulture

November– John Esslinger	December– Andy Muza
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## The High Tunnel Demonstration

John Esslinger, Extension Educator, Commercial Horticulture

The 17' by 36' demonstration high tunnel in Lackawanna County is part of Penn State's Center for Plasticulture, but it has helped local farmers in a big way. The number of high tunnels in the region has grown steadily. We are currently completing our 5th season of growing in the demonstration tunnel and have been learning as we go. The Lackawanna County tunnel is currently located on the Mark Phillips farm. Mark has done an excellent job of tracking yields and economic data. His effort is greatly appreciated. Growers are invited to come to a twilight meeting at the Phillips farm each May to see the tunnel and participate in discussions with local high tunnel growers.

We have focused on growing tomatoes in our tunnel. Tomatoes work well into the overall marketing and operation of the Phillips farm. In 2004 we experimented with gladiolas and peppers, but the tomatoes have brought the best return.

While there are many tomato varieties grown in local high tunnels, we have found that Mt. Spring and Mt. Fresh have performed the best. We like the early maturity and flavor of Mt. Spring. We have gotten excellent quality from Florida 47, but have been a little disappointed in the yield. The following are the 2004 yields per plant by variety:

Mountain Spring	34.3 lb./plant
Florida 47	25.4 lb./plant
Mountain Fresh	38.0 lb./plant.

While the 2005 harvest is not complete, the trend is the same as in 2004.

Tomato yields were exceptional in 2004. 2089 lbs of tomatoes were harvested and sold from the three 36' long rows. The average price per 25 lb. box was \$36.00. The gross income generated by the 3 rows of tomatoes was \$3,008. The income per plant was just over \$46.

In 2004, the fourth row in the tunnel was split with half being planted to peppers and half planted to gladiolas. The quality of the gladiolas was exceptional, but profit potential was limited when selling at the farmers' market. Field grown gladiolas were also available at the Scranton Farmers' Market since it does not start until mid-July, which eliminated the advantage of a high tunnel. We had a mite problem in the peppers, but felt that peppers had good profit potential. In 2005, a full row was dedicated to pepper production. Mites did not appear in the peppers in 2005.

We are starting to run into a few other challenges in the tunnel. Early in the 2005 season, we noticed some salt injury. Salt builds up faster in a tunnel because there is no precipitation to wash it out of the

root zone. We also lost a few tomato plants to stem rot. While these challenges can be overcome, they demonstrate that growing in a tunnel requires good management.

Growing in a high tunnel can be profitable, but is not for everyone. You need to be in a marketing situation that consistently pays a premium for high quality and season extension. You will need to be available to manage the tunnel early in the season when time for most growers is already limited. Just like field production, you will only get out of a tunnel what you put into it.

Additional information can be obtained by purchasing the *High Tunnel Production Manual* published by the Center for Plasticulture High Tunnel Research and Education Faculty. The Center for Plasticulture web site also has excellent information at [www.plasticulture.cas.psu.edu](http://www.plasticulture.cas.psu.edu).

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## Managing Open Hunting on Farms

By Tim Smail, PA Forestry and Wildlife Consultants and submitted by Cheryl Bjornson, Chester County Horticulture Educator

*Note from Cheryl Bjornson: Our fruit and vegetable growers here in Chester County suffer from high crop losses due to deer and their encroachment onto their farms from suburban sprawl issues and increased survival and birth rates. There is a high anxiety and frustration level for our growers in attempting to control deer for they do not have the time and monies to lower the deer population around their operations. Deer management takes time and is a necessary part of any farming operation. The article to follow is written by Tim Smail who I have worked with in collaborations to help teach consumers and farmers the benefits and trials and tribulations of deer management and control.*

MANAGEMENT: Hey, I've got a farm to run; I can't afford to be playing nursemaid to every hunter who decides he wants to hunt my place!

You're right, and there's no reason why you should have to, but, like every other aspect of your operation, hunting should be managed. You should put some thought into that management, and you shouldn't wait until the first day or the middle of deer season to start thinking about it. Deer season is almost upon us. Does that mean it's too late to do anything? No, it's never too late to start; start as soon as you can. You'll have better results next season than you will this season, but part of that will be because you started this season instead of waiting until next year.

First of all, you need to know who your hunters are, and you need a *written* record. Get a bound notebook and write "HUNTING 05/06" on the front cover in **bold** letters. Set it aside; don't use it for anything else, but keep it handy...by the phone or at the front door. Start writing down the names and contact info for all the hunters you can think of who you have given permission to hunt. Every time someone calls or knocks on your door asking for permission to hunt, find that notebook, and write down all the information you can about the person. You want to be able to find them and contact them later. Either give them permission or don't, but record your discussion, and record it while it's taking place; don't wait until later....You won't do it later.

When someone stops you on the street or at church to ask permission, give them your phone number and ask them to call you; tell them you're trying to make a record of everyone who has permission to hunt. They may be neighbors or good friends, but if *they* can't be bothered, then neither should *you*. There is **no reason** why this should create hard feelings. When you find someone hunting on your property for whom you do not have ID and contact information, ask for it. If you don't know them, ask to

see their hunting and drivers licenses. They're required by law to have their license and identification with them while hunting and to show it to you, and they should be happy to do so. Carry a pocket notebook and a pencil with you when you leave the house. Write down all this information and later record it in your HUNTING 05/06 notebook.

Wait a minute! You said I wouldn't have to play nursemaid to all the hunters on my place! If this amount of record keeping is too much trouble for you, assign it to one of your hunters, but make sure it's someone you can trust, and don't give away the farm. Hunters, in general, are happy to help out. If your hunters aren't willing, even eager, to help, then they're not the kind of people who you want hunting on your property anyway. Make sure your helpers know exactly what you expect of them. Write it down, keep a copy, and give a copy. That way there's no question. Did you, or did you not, say that this hunter could give others permission to hunt? You might rather keep that responsibility for yourself and just let your helper keep the information for you....In either case, now tell those who ask for permission to contact your helper. Meet with your helper periodically to keep each other up to date, discuss relevant matters, and make your decisions. Everyone needs collaboration and supervision.

You've now taken the first, the most important, and the most difficult step towards managing hunting on your property. You've established a presence and, in doing so, you've put everyone on notice that you, the landowner, are here, intend to take control, and that management will follow.

Your hunters have taken their first step in becoming involved in management by cooperating and offering to help.

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## **Pumpkin Tillage Evaluation Study-2005**

M. D. Orzolek and R.L. Oberheim, Department of Horticulture

### **Tillage Treatments:**

Primary tillage in this field was with a spading machine (mid-May) and a moldboard plow (mid-May). Secondary tillage on the spaded soil was with a rototiller, while an s-tine was used as a secondary tillage implement on the moldboard plowed section of the field. On the south end of the field, about 0.3 acres, pumpkin transplant were transplanted with a no-till transplanter into hairy vetch that was treated with glyphosate and paraquat and had been planted the previous year.

**Variety:** Gold Standard

**Transplanting Date:** May 31, 2005

**Fertility:** November 4, 2004 -applied 2.0 T/A of calcitic lime; May 9, 2005 applied 200 lbs./A of 34-0-0, 200 lbs/A of 11-52-0 and 200 lbs./A of 0-0-60.

### **Weed Management:**

Weed management on the no-tilled sections of this pumpkin field consisted of an application of Command 4EC (6oz./A), Induce (1.0 pt/A), Prefar (6.0 qts./A), Touchdown (3.0 qts./A) and Weedar 64 (1.0 pt./A) pre-transplant on May 17. The tilled areas of this field received Dual Magnum (2.0 pts./A) and Alanap (4.0 qts./A) pre-transplant on May 17 and the entire pumpkin field (1.0 acre) received an application of Sandea (0.5 oz/A) on June 16, 2005.

**Insect Control:**

Asana XL was applied at the rate of 6.0 to 7.0 oz/A on the following dates: June 10, June 16, July 7, July 26, August 4, August 9, August 19, and September 2, 2005 because of the large populations of cucumber beetles that were observed throughout the growing season.

**Disease Control:**

Fifteen fungicide applications were made between June 28 and September 9, 2005 and included the following fungicides that were alternated in this disease management program: BravoWS, Quadris, Nova 40W and Phostrol.

**Design:** Randomized complete block with 4 replications.

**Sample size:** 144 sq ft.

**Table 1.** Soil penetrometer readings of various tillage treatments taken at the Horticulture Research Farm, Rock Springs, PA. – 2005.

Treatment	Penetrometer readings – pounds/square inch			
	Before	After- 41/4	June 15 – 12" depth	
	Tillage	Spading	In-row	Between row
Tillage-Spading	492	150	260	350
Tillage-Moldboard			330	430
No-till			380	560

**Table 2.** Plant development of 'Gold Standard' pumpkins grown in various tillage treatments at the Horticulture Research Farm, Rock Springs, PA. – 2005.

Treatment	No. of leaves June 15	Avg. leaf length-in. June 15	No. of leaves June 30	No. of female flowers June 30
Tillage-Spading	6.2	2" to 4"	13.2	0.4
Tillage-Moldboard	4.4	2" to 4"	10.0	0.4
No-till	8.2	4" to 6"	19.2	0.4

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**Table 3.** The marketable yield of 'Gold Standard' pumpkins grown in various tillage treatments at the Horticulture Research Farm, Rock Springs, PA. 2005.

Treatment	No. of	Wt. fruit	Avg. fruit wt. (lbs)	% yellow stem	Range of fruit size (lbs)
Tillage – Spading	2723	15.9	11.7	8.3	2.6 to 19.0
Tillage-Moldboard	2662	14.5	10.9	2.8	4.6 to 17.7
No-till	3328	15.7	9.4	20.5	5.3 to 16.4

**Comments:**

This study was conducted to evaluate the value of optimum tillage practices for the production of pumpkins. There have been many growers who have adopted no-till pumpkin production in the last 5 years in Pennsylvania; but limited work has been done regarding tillage practices prior to transplanting pumpkin plants in the field.

The use of the spading machine allowed us to till earlier in the year under wetter soil conditions compared to moldboard plowing. In addition, spading will breakup plow pans and compacted areas of the soil to a depth of 12 inches.

The highest yield of marketable pumpkins (T/A) was harvested from both the spading and no-till treatments followed by moldboard treatment. However, the highest number of fruit per acre was harvested from the no-till treatment followed by both tillage treatments. Growth of the pumpkin plants was more rapid earlier (Table 2) in the no-till treatment compared to both tillage treatments. However, on June 30, even though the pumpkin plants were visibly larger in the no-till treatment, all tillage treatments had the same number of female flowers. Fruit size was also affected by tillage treatment, with the largest fruit harvested from the spaded or moldboard plots and smallest fruit from the no-till plot.

On August 17, the tillage treatments had different problem weed species in the field. In both the spading and moldboard plow treatments, both lambsquarters and velvetleaf were serious problems. However, in the no-till treatment, lambsquarters and eastern black nightshade were serious problems; in some areas of the field, nightshade populations were so large that they covered over the pumpkin crop.

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### Three New Pesticide Options for Berries

Kathy Demchak, Dept. of Horticulture

Here are some new options for chemical pest control in berries in PA. If you're from another state, please be sure that these products are registered in your state before using them. Thanks to Dr. Doug Pfeiffer at Virginia Tech for his assistance with information for this article.

Kanemite™ 15SC (active ingredient: acequinocyl) from Arvesta™ is a new miticide for use on strawberries against two-spotted spider mites and strawberry mites. It has a unique mode of action (Group 20 Subgroup B), so other miticides can be alternated with it for resistance management purposes. The label states that no more than two applications should be made per year (one would be even better to delay resistance development), and there should be a minimum of 21 days between applications. This material is relatively harmless to predatory mites and beneficial insects. The use rate is 21-31 fl. oz./acre. The PHI is 1 day, and the REI is 12 hours.

A new supplemental label for Capture® 2EC (active ingredient: bifenthrin) from FMC now allows its use as a soil drench against raspberry crown borer larvae. Capture® had previously been labeled for use on caneberries as a foliar spray against leafrollers, orange tortix, root weevils (adults), and spider mites (maximum rate must be used for efficacy). However, this supplemental label may be of greater value in PA, especially considering that the only other material that could be used for crown borer larvae was azinphos-methyl (known as Guthion or Sniper), and that use would not have been allowed after Sept. 30, 2006. The soil drench, at 6.4 oz of product/acre, is to be directed to the crown of the plants in the fall or spring. This timing targets stages in the crown borer life cycle when the larvae are vulnerable. If Capture® is used in the spring prior to bloom, you can make either foliar or soil drench applications, but not both. The PHI is 3 days, though this is of concern essentially for the foliar applications with other pests. The REI is 12 hours. You may also already be familiar with this active ingredient as it is labeled for strawberries as Brigade.

There's a new use for Danitol® 2.4EC (active ingredient: fenpropathrin) from Valent®, which had been labeled for an assortment of insects on strawberries. Now Danitol® 2.4EC also can be used on most bushberries (blueberries, gooseberries, and elderberries – see the label for other crops) against blueberry maggot, Japanese beetle, and obliquebanded leafroller. It can be used against cane borers on currants as well. The PHI for most of the bushberries (blueberries included) is 3 days; however, the PHI for currants is 21 days. The rate in all cases is 10 2/3 to 16 fl. oz./acre. Applications must be made using ground equipment. The REI is 12 hours.

Both Capture® and Danitol® are pyrethroids, so they can affect a fairly wide range of non-target organisms including bees, beneficial insects and aquatic organisms. Both of these materials are restricted use, and carry the signal word "Warning". Kanemite® carries the signal word "Caution". Be sure to follow all label precautions.

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## **The Organic Way - Gray Mold on Raspberries and Cultural Management**

Elsa Sánchez, Department of Horticulture

Botrytis diseases are arguably the most common diseases of ornamentals and vegetable, fruit, field and greenhouse crops. Gray mold of brambles is caused by the fungus *Botrytis cinerea* and is the most common bramble fruit rot.

### **Gray Mold Disease Cycle**

Disease cycles are the chain of events involved in disease development. In contrast, life cycles can be defined as the series of events throughout development. For example, for plants life cycles span from

seed to seed and for fungi from spore to spore. Disease cycles include the interaction between plants and pathogens.

Terminology associated with the gray mold disease cycle includes:

- Mycelium – the vegetative, threadlike part of the fungus. *Botrytis* mycelium can survive the winter.
- Sclerotium - a mass of overwintering mycelium covered with a rind. The rind is usually dark in color.
- Conidia – spores that attack the raspberry plant. They are asexual, appear gray/brown in mass and are born on conidiophores.
- Conidiophores - special types of mycelium where conidia are produced. They are dark in color.

Mycelium overwinters on plant debris and canes. Sclerotia can overwinter on canes or in the soil. Overwintering mycelium or sclerotia can be spread by moving plant debris or soil. When temperatures warm to 64 – 73°F and conditions are damp mycelium grow and conidiophores and conidia are produced. Conidia are released from conidiophores and spread by wind and splashing water. Conidia can then invade the raspberry plant through flowers or wounds. At this stage, the fungus usually lies dormant in immature berries until they are nearly ripe or after harvest. However, a blossom blight can also develop when it is very rainy during bloom time, although this is rarer. Gray mold development is favored by cool, wet conditions especially during bloom and berry ripening. The disease cycle continues with mycelium and sclerotia overwintering.

### **Signs and Symptoms**

Gray mold signs and symptoms develop on all parts of the raspberry plant. Sclerotia may appear on canes in the late winter and may be noticed when pruning. Additionally, lesions can develop on the canes in the spring or fall. Mycelium and conidiophores may be evident on dead or dying leaves at anytime of the year. Mycelium and conidiophores may be present on dead flower petals in early spring particularly if conditions are wet. Signs and symptoms on berries can develop anywhere but, are more common on the stem end of the fruit. It is common to observe clusters of infected berries. Individual infected drupelets appear watery or tan followed by the appearance of mycelium.

### **Identifying Gray Mold on Berries**

Gray mold can be identified by the presence of mycelium, conidiophores and conidia which together are fluffy and gray in appearance. It can be difficult to identify without the presence of conidiophores and conidia because the mycelium can resemble that of other fungi. If mycelium is present in the absence of conidiophores and conidia, placing the infected berry in moist and warm conditions (about 70°F) in the light can stimulate the development of conidiophores and conidia. After conidiophores and conidia develop gray mold can be identified by the unaided eye or a 16x hand lens. We have also taken close-up photographs using digital cameras to aid in identification.

### **Cultural Strategies for Gray Mold Management**

Cultural management strategies exploit weaknesses in the disease cycle. Weaknesses in the gray mold disease cycle include overwintering on plant debris. Using sanitation practices that include removing leaves, mummied berries and prunings from the planting can help in reducing the amount of inoculum available for infecting the raspberry plants. Over ripe berries are very susceptible to gray mold development; therefore, removing over ripe fruit from the planting or picking on a frequent harvest schedule to avoid having over ripe fruit in the planting can help in reducing gray mold. Conidia are primarily spread by wind and to a lesser extent by splashing water. Splashing water can be the result of rain which is generally uncontrollable. However, it can also be the result of overhead irrigation. Use drip irrigation systems instead of overhead irrigation when possible.

Other cultural strategies include maintaining a healthy planting and planting disease-free nursery stock. Promoting good air flow through the planting can decrease moisture levels in the planting which favor gray mold development. Management strategies for promoting air flow begin with good site selection. Good pruning techniques including maintaining hedgerows during summer also promotes good air flow as does managing weeds. Orienting hedgerows with wind facilitates drying within the planting. Postharvest strategies for gray mold management include removing field heat from the berries quickly and using refrigerated storage. Removing infected fruit from storage can also decrease gray mold spread.

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## Upcoming Meetings

Elsa Sánchez, Department of Horticulture

### Local

None listed at this time.

### Regional

January 31 – February 2, 2006. **Mid-Atlantic Fruit and Vegetable Convention.** For more information contact the Pennsylvania Vegetable Growers Association at [pvga@pvga.org](mailto:pvga@pvga.org) or visit <http://www.pvga.org/>.

### National

January 4-6, 2006. **North American Berry Conference.** The conference will be held at the Savannah International Trade and Convention Center in Savannah, GA. The conference date has been moved from its normal February date to make it easier for growers, researchers, educators and suppliers to also participate in the Southeast Regional Fruit and Vegetable Growers Conference being held January 6-8, immediately following the Berry Conference. NASGA is emphasizing the importance of registering early for the 2006 conference – because of the date change, and registration materials will be available on the NASGA website, [www.nasga.org](http://www.nasga.org) by mid August.

### International

None listed at this time.