

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Tip for the Month--“Argue for your limitations and sure enough they're yours”--Richard Bach

Comments from the Editor

Bill Lamont, Department of Horticulture

Snow, snow, snow is melting! Dare I say that spring is in the air! Probably I will cause another snowfall! Oh no.. This month marks the first installment of a new column devoted to organic production called “**The Organic Way**” written by Dr. Elsa Sanchez in the Department of Horticulture. This month's inaugural article, “**Finding Organic Vegetable Seed**”, describes the National Organic Standard regarding seeds and includes companies that sell organic seed. The winter meeting season is drawing to a close but there are still several opportunities left on the schedule so be sure to check the local, regional and national meetings still pending in the Upcoming Meeting list. Thanks to Steve Bogash for his excellent article “**Trends that Directly Impact Produce Marketing**” and I look forward to receiving Scott Guiser's article for the April issue. I want to thank colleagues from other departments 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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Schedule for Agent Articles

Bill Lamont, Department of Horticulture

April	Scott Guiser
May	George Perry
June	Lee Young
July	Eric Oesterling
August	Jeff Mizer
September	Emelie Swackhamer
October	Cheryl Bjornson
November	John Esslinger
December	Andy Muza

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Three Workshops for Training Extension Professionals and Vocational Agriculture Teachers on High Tunnel Technology to be Conducted in 2004

Bill Lamont, Department of Horticulture

We are offering three workshops funded by a Professional Development Grant from Northeast SARE Program to train extension specialists, county agents and vocational agriculture teachers on the use of high tunnel technology. The objective of the program is to train the trainers. Each workshop will be two days and lodging and mileage will be covered for participants. **The dates and location of the workshops are: April 13 and 14, 2004 and June 29 and 30, 2004 at the High Tunnel Research and Education Facility, Horticulture Farm, Rock Springs, PA and August 4-5 2004 at the University of New Hampshire Horticulture Farm, Durham, NH.** The states we are soliciting participants from are Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Virginia, Ohio and Washington, D.C. Class size will be limited to 50 per workshop. Each workshop will be two days with a mixture of classroom presentations on the different components of high tunnel technology, "hands-on" participation, and presentations by growers utilizing this technology.

A high tunnel manual will be given to each participant and will serve as a handy reference on all aspects of this technology. To sign up for the workshop or for more information contact Bill Lamont, Phone: 814-865-7118 or E-mail: wlamont@psu.edu.

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Trends that Directly Impact Produce Marketing

Steve Bogash, Regional Horticulture Educator

Change happens and that is a fact. None of us do business or market in the same way we did 20, 10, or even 5 years ago. We grow our fruit and vegetables using different practices. Our product mix has changed (or it should have). We package and price our products differently. And, our customers have changed. While there are many examples of each of the items listed above, for the sake of brevity we'll use just a single example: Pick your own (PYO) was once a way to get quantities of product for canning or freezing. Now PYO has largely become another version of agritourism or farm entertainment. Very few people bother to "put up" their own produce for future use. We as a society no longer value the difference between a processor's canned or frozen produce and our own enough to make the time for this process in our calendar. This article will point out many of the changes in our society and hopefully provide some good ideas for ways to take advantage of those changes.

Demographic Shifts: The U.S. population is aging. Proportionally, there are more of us over 55 than ever before. How will you take advantage of this shift? In general, as we age our households shrink. A dozen or even half dozen ears of corn is too much for dinner for 1 or 2 people. Price your corn by the ear, sell smaller melons or slices of melon, price everything individually and be sure the signage in your store has large enough type for easy reading. Look at your parking area from the point of view of the elderly. Is the surface easy to negotiate? Canes, walkers and wheelchairs do not move easily on loose pockmarked stone surfaces. Some additional factors to consider: Inactive taste buds require spicier foods and some diets require bland foods. Also, decreasing hand strength calls for easy open packages, pre-shucked corn, etc.

While our population is aging it is also changing in ethnic makeup. While the Hispanic population is larger and closer than ever before and is most often singled out representing this ethnic shift, other recent émigrés and "foodies" can provide substantial markets as well. Consider growing and marketing a wide range of hot and sweet peppers, garlic, herbs such as cilantro and basil, shallots, baby greens, spinach, and much more. Crossover cultural eating has become normal with many restaurants and television chefs featuring fusion dishes on their menus. The general populations' exposure to many ethnic dishes has also sparked an increase in their demand for products formerly considered to be "ethnic" foods.

Urbanization: Customers keep moving closer and our farms are under increasing pressure from developers. Take advantage of your new urbanite neighbors and direct market to them. Plan your assault on their food purchases carefully as these "new" customers have very high expectations. Your store hours need to work for them, your parking area needs to be accessible and easy to use, you and your staff need to be friendly and helpful and your products need to be grade A. Be sure to include recipes, provide suggestions on storage, have additional opportunities for purchases such as jams, jellies, and baked goods and work to make your place of business pleasant and attractive.

As you develop your retail operation, consider: finished plant material, on-premises candy and fudge making, fresh juices, farm zoo, farm tours, locally-produced furniture, local crafts, and ice cream. Keep your customers longer by having toilet facilities and cold drinks available. Make it easy for your neighbors to appreciate the "farm next door" by carefully managing your manure and pest control operations for minimal impact. Be sure to work closely with your insurance company and consider any local ordinances that may impact your expansion into these new operations.

Consolidation of Retailers/ Shippers/ Brokers: Of all of the trends that directly impact the produce industry, the consolidation of retailers is probably one of the greatest challenges to growing our wholesale Pennsylvania produce industry. In 1987 the top 20 retailers sold 37% of groceries, in 1999 the top 20 retailers sold 52% of groceries and the trend continues today. Wal-Mart is now the largest food retailer in the country and Target has decided to follow Wal-Mart into the food business. These large players typically prefer to supply their stores from large warehouses where it is at best challenging for smaller growers to do business. While there are some opportunities with large, consolidated, centrally distributed chains, these openings are limited and fraught with challenges.

Shippers and brokers have followed the trend in consolidation in order to meet the needs of the large chains. In order to meet these changes head-on, Pennsylvania growers will need to act cooperatively and grow the same cultivars, using similar practices, and pack using the same standards. The bright spot in all of this is the recognition on the part of large chains that their customers want “locally grown” produce. Many local growers have found openings with Wal-Mart and other grocers for specific products.

Increased demand for “Locally Grown”: Many consumers have learned to look for locally grown produce. They identify this with freshness as well as reduced risk from pathogens from imported produce. The large chains regularly survey their customers on this and other issues. Much to their dismay, their own customers regularly let them know that they want to be able to purchase locally grown produce in their stores. Every time another food crisis such as the now famous Chi Chi’s green onion hepatitis outbreak occurs, these numbers jump upward.

This is the one bright spot in the massive consolidation of the chain stores. For producers willing to jump through a few hoops, the big chains may provide an opening. In the meantime, any promotions and advertising done by local marketers should feature the locally grown aspect. Just be sure your produce matches consumers’ expectations. Remember, first they buy with their eyes, then, they buy with their taste buds.

Ready to Eat Foods: Convenience foods are the single most rapidly growing segment of the produce section today. Ready-to-go salads now represent more than 19% of grocery store produce sales alone. Since the average consumer decides what to have for dinner at about 4:00 PM, they have learned to take advantage of pre-cut oranges, melons, carrots, celery, and even apples. This is a particularly tough area for small to medium growers to compete in as the equipment expenses alone are huge to enter this market and it is fiercely competitive.

Eco-Labeling / Organic / Health related issues: Organic foods continue to grow at a rapid pace with an increase in these goods exceeding 20% per year for more than five years now. While still a very small part (less than 6%) of the overall produce market, those that buy organic are an extremely vocal, high produce using segment of the market.

Our population of aging baby boomers will not get old gracefully. They seem willing to seek nearly any method and product to delay the inevitable. Once blueberries were declared one of the food champions, sales of blueberries skyrocketed and have never slowed. Either through signage or labeling, consider including the latest nutritional information available with your produce. Many new cultivars have been bred for specific nutritional boosts, be sure to clearly identify these to your buyers.

While European trends do not always translate directly to the U.S. often they do make it here in some form. More than half of all European produce and flowers are now sold under an “Eco-Label” of one kind or another. While it remains to be seen if eco-labeling will arrive on our shores, branding is another issue. Apples have long been branded and the U.S. consumer is increasingly brand conscious. Do your customers know your brand yet?

Market segmentation is simply a fact in selling to the American public. Take the time to study your marketplace in order to make the best approach at the specific segment that best suits you and your

operation today and prepare for the inevitable changes so your business is ready for the next set of challenges.

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The Organic Way- Finding Organic Vegetable Seed

Elsa Sanchez, Assistant Professor of Horticulture Systems Management, Department of Horticulture

This year we are beginning to transition 4 high tunnels at the Russell E. Larson Agricultural Research Center to organic production. In the spring we plan to grow different cultivars of tomatoes in the tunnels and examine different ways of using hairy vetch to add nitrogen to the soil. Dr. Peter Ferretti and I have been studying production guides and scouring seed catalogs to determine which tomato cultivars we'll grow.

According to the National Organic Standard, growers must use organically produced seeds. There are exceptions when no equivalent organically produced variety is commercially available. First, growers can use non-treated, nonorganic seed when no equivalent organic seed is commercially available. Second, when non-treated seed is not commercially available, growers can use seed that has been treated with substances allowable in organic production. Seed used for producing edible sprouts must be organically produced with no exceptions.

To determine if equivalent organically produced seed is available, look for organically produced seed of cultivars with similar production and market qualities including pest resistance, days to maturity, color and taste. It is important to document where you looked for the seed for your certification records. Also, keep all seed labels for your certification records.

The table below lists vegetable seed suppliers who have organic seed for sale. Some of the suppliers have more organic vegetables and cultivars available than others.

For the high tunnels, we first decided on desirable characteristics for production and the tomato market. Then we studied the *Commercial Vegetable Production Recommendations* guide and *Growing Tomatoes and Eggplants* for suitable cultivars. Next we scoured seed catalogs to find the cultivars we decided on. All the cultivars we decided to grow were available as organic or non-treated nonorganic seed.

Burpee W. Atlee Burpee & Co. Warmister, PA 18974 888-333-5808 www.burpee.com	The Cook's Garden PO Box 535 Londonderry, VT 05148 88-457-9703 www.cooksgarden.com
Fedco Seeds PO Box 520 Waterville, ME 04903-0520 207-873-7333 www.fedcoseeds.com	Harris Seeds 355 Paul Rd PO Box 24966 Rochester, NY 14624-0966 800-544-7938 www.harriseseeds.com
	High Mowing Seeds

Heirloom Seed Project 2451 Kissel Hill Road Lancaster, PA 17601 717-569-0401 ext 200 www.landisvalleymuseum.org	813 Brook Rd Wolcott, VT 05680 802-888-1800 www.highmowingseeds.com
Johnny's Selected Seeds 310 Foss Hill Road Albion, ME 04910 800-437-4290 www.johnnyseeds.com	The Maine Potato Catalog Jim & Megan Gerritsen 49 Kinney Rd Brigewater, ME 04735 207-429-9765 www.woodprairie.com
Seeds of Change PO Box 15700 Santa Fe, NM 87592-1500 888-762-7333 www.seedsofchange.com	Seeds Savers Exchange 3076 N Winn Rd Decoran, IA 52101 563-382-5990 www.seedsavers.com
SeedWay Organic Grower Vegetable Seed Catalog 1225 Zeager Rd Elizabethtown, PA 17022 800-952-7333 www.seedway.com	Sow Organic PO Box 527 Williams, OR 97544 888-709-7333 www.organicseed.com
Territorial Seed Company PO Box 158 Cottage Grove, OR 97424- 0061 541-942-9547 www.territorialseed.com	Veseys Seeds PO Box 9000 Calais, ME 04619-6102 800-363-7333 www.veseys.com

Sources

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Ferretti, P.A., T.E. Elkner, A.A. MacNab, S.J. Fleischer and T. Bilik. Growing Tomatoes and Eggplants. Penn State Cooperative Extension Guide CAT UJ 230.

Please mail or email ideas for future column topics to Elsa Sánchez, Department of Horticulture, Penn State University, University Park, PA 16802 or ess11@psu.edu.

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Vegetable Transplants

Mike Orzolek, Department of Horticulture

With Spring just around the corner, thoughts of transplanting must be on everyone's mind and priority list. Assuming the transplant order was made several months ago for both local and Southern tray plants, there are several important plant characteristics that will help you determine if the transplants you intend to plant will establish quickly and grow rapidly or fail in the field.

Leafs - are the leafs healthy, green and free of lesions. Can you detect any insect(s) on the leaves, if so what are they and how do you control them before you plant them in the field. Lesions on leaves would indicate a possible disease problem and chlorotic or discolored leaves may indicate a possible nutrient deficiency. Age of the plant is important since leaf development and hence number of true leaves on the plant are correlated to the age of the plant. Plants with very few leaves or unhealthy leaves seldom develop normally when planted in the field.

Stem - is the stem too long and thin (spindly), will it maintain the plant upright, are there any lesions on the stem or is it girdled near the roots. If the stem exhibits any of these problems, chances are that the transplant will not develop normally or in a timely fashion in the field.

Roots - roots should be white, as large as the vegetative portion of the plant and actively growing if the plant is expected to establish rather quickly in the field. If plants are producing adventitious roots (roots growing on the stem above the original primary root), suspect injury from insects, disease, chemicals or mechanical damage. Roots that have been injured or stressed will take much longer to re-establish in the field and thus delay crop growth and harvest date.

Two other factors that will determine the success or failure of establishing your transplants are plant age and tray cell size. All vegetable transplants have an ideal age/size which enable them to continue active growth in the field after transplanting and be somewhat resistant to environmental stress. For example, the ideal age for tomato transplants is 6 to 8 weeks of age; younger plants than 6 weeks are not as resistant to desiccation from wind, low temperatures (below 45°F) and soil moisture deficits. On the other hand, older plants (greater than 10 weeks) have a relatively large vegetative mass that has initiated flowers and may be heading into the reproductive phase of growth; hence the plants will produce fruit, but only a fraction of their full potential.

Since the 1990's, the array of cell sizes available to the transplant grower is incredible ranging from 36 to 458 in the same exact tray dimensions. Cell size is determined by crop, period of growth under controlled conditions (greenhouse), space available for transplant production, number of plants required per acre, and length of time between receipt of the transplants from the producer to actual field transplanting (storage). Some crops do much better in large cell-trays such as 72 while others will continue active growth in 200 cell-trays or trays with more cells (338). Ideal growing conditions or the ability to control the environment in the transplant producing greenhouse will enable the producer to use smaller cell sizes and still produce healthy, stocky, actively growing transplants. However, if growing conditions are not ideal (low light, cold night temperatures, phosphorus deficiency) transplants will be spindly, stunted, or stressed especially in the small cell-size trays. If plants are shipped in trays to the grower, larger cell-size (1.5 inch or larger) trays will maintain the plants longer prior to field planting compared to the small cell-size (less than 1 inch) tray.

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Corn Rootworm In Sweet Corn

Shelby Fleischer, Department of Entomology

When considering insect management in sweet corn at planting, my first question is: "Did you rotate?". If you did, you effectively avoid problems from two corn rootworm species. If not, ideally you scouted for rootworm adults in the silking corn last summer, and can base a decision about a soil insecticide according to thresholds. If you are not rotating and did not scout, you should be concerned about corn rootworms and consider a soil insecticide at planting.

There are two species of corn rootworms: the western corn rootworm (WCR) and the northern corn rootworm (NCR). Both species are native to North America, and were recorded only from the north central states in the early to mid 1800s. The northern corn rootworm reached Pennsylvania in the 1950s, and the western corn rootworm in the 1980s. The WCR looks similar to the striped cucumber beetles, but the stripes are not as straight, and the abdomen is yellow in the WCR, but it is black in the striped cucumber beetle. The NCR is pale green to tan or dull yellow in color. In sweet corn or field corn, the adult beetles feed primarily on pollen and on the silk, and they can also feed on the leaves. In cucurbits, such as pumpkins, melons, etc., the beetles are easily found in the flowers mixing in with the striped cucumber beetle, probably also feeding on pollen. Thus, the adult feeding occurred last summer and fall.

The adults of both rootworm species lay their eggs at the base of corn plants in late summer or early autumn. The eggs overwinter in the top 6 inches of soil, and emerge next spring. Egg hatch occurs mostly during June, but extends from late May until early July in Pennsylvania. Larval development requires 4 to 6 weeks. Adult emergence follows for 4 to 6 weeks, with up to 1000 eggs per female being deposited from mid-July, throughout August, and into September.

Newly hatched larvae feed on root hairs and outer root tissue, and older larvae tunnel into roots and can even enter the plant crown. Root tips appear brown and chewed back. The root feeding affects plant uptake of water and nutrients, so the amount of plant damage is influenced by water availability. Vigorous plants can compensate under moist growing conditions by growing new roots faster than they are pruned off, but effective plant compensation may be better in field corn than sweet corn varieties. Although this larval feeding is typically the most significant damage by rootworms, later in the season you need to consider damage by adults feeding on silks.

The larvae that emerge in the spring will cause significant damage to the roots of corn unless one of two control measures are taken: (1) the field is rotated out of corn or cucurbits; or (2) a soil insecticide is applied at planting if corn or cucurbits is planted. The most effective option is to rotate. Only a single year rotation is required, and only a short distance of a few feet will be sufficient. That is because the newly hatched larvae must find corn roots to feed on within a few feet of where they hatch. When corn is rotated to legumes, the great majority of the larvae will starve within 1 year. Rotation to other grasses (wheat, rye, barley, oats or sorghum) is also effective because the larvae do not survive well on these other grasses. Even a 2-year rotation on larger fields is effective in most years, because it takes some time for the rootworm populations to immigrate in and build up within a continuous cornfield. Large rates of immigration could compromise a 2-year rotation, so scouting those fields in the fall is recommended. If you are rotating annually, it is not necessary to scout for rootworm adults - you can safely assume that the rotation is effective. There is an interesting case of a population that has adapted to a corn-soybean rotation by adults from one crop adapting to the other, but this concern is confined to the Midwest.

If rotation is not practiced, insecticide needs to be applied when the adult population exceeds threshold. The threshold is determined last fall, by estimating the number of adults per plant. On field corn, the

threshold varies from one to three beetles per plant. Sweet corn is more susceptible to damage, because of the smaller root system, and therefore should use the lower threshold. Insecticides can be applied at planting or at cultivation. Moving the time of application close to the time of rootworm egg hatch is the most effective, which occurs from late May until early July. Several of the insecticides listed for wireworms or grubs in the Commercial Vegetable Guide are also labeled for corn rootworms in sweet corn. Examples include Aztec, Force, Fortress (which requires SmartBox technology), and Lorsban 15G. Others listed for wireworm or grub control may also have a rootworm label in sweet corn. Check the label and follow directions on the label. Insecticides in continuous corn do protect the roots, but are not as effective as rotation - you can get rootworm population growth in unprotected areas of the soil even when soil insecticides are applied.

Since newly hatched larva must find roots to feed on, late plantings may also be an effective rotation. Planting after most of the population has completed egg hatch is an effective option. Future work with phenology models, which are being linked to the www.pestwatch.psu.edu website, should provide estimates of the end of egg hatch.

In Pennsylvania, rootworms are typically the most significant pest that would require a soil insecticide at planting in sweet corn. However, wireworms, grubs, or cutworms sometimes also cause problems with stand establishment. Wireworms are larvae of click beetles, and grubs are larvae of scarab beetles (June beetle, Japanese beetle, etc.). Problems from these are usually associated with weedy fields or fields recently moved into production from sod, forage, or pasture. Cutworms are larvae of night-flying moths. Weedy or minimum till fields are especially attractive for egg-laying.

Reference: Calvin, D. Western and northern corn rootworm management in Pennsylvania. Special Circular 333. Penn State Extension Publication.

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Bug vs. Bug - Biological Control of Aphids in Greenhouse Vegetable Production

Cathy Thomas, Integrated Pest Management Program

Pennsylvania Department of Agriculture

Effective and timely control of aphid populations in greenhouse vegetable production is important due to their ability to develop into large populations quickly. There are many different aphid species in PA greenhouses including, green peach aphid, potato aphid and melon aphid. The aphid that is usually found to infest vegetable crops, especially tomatoes (Solanaceae crops) is potato aphid (*Macrosiphum euphorbiae*). In addition to the ability to transmit viruses, aphids cause direct damage by feeding on plant sap to acquire the proteins and sugars needed for their reproduction. Aphids secrete excess sugars in the form of sticky 'honeydew'. Honeydew supports the growth of black sooty mold that affects plant photosynthesis, possibly reducing plant yields. Removing sooty mold from fruit increases handling time and can possibly render fruit unsaleable.

Life cycle

In greenhouse production, aphids are very prolific. Instead of reproducing by eggs, female aphids (stem mother) give birth to live offspring (3-10/day) which start to feed immediately. Within a week, this offspring will be ready to reproduce. Aphids can have two forms: winged or wingless. As colonies enlarge, aphids develop wings to migrate to less populated areas in the crop.

The most outstanding characteristic for identifying aphids is by the two cornicles (“tail pipes”) on the rear of their abdomen. Color is variable among species and is not accurate for identification. As aphids increase in size, they shed their exoskeletons (cast skins). These white cast skins, often mistaken for adult whiteflies, can be found on leaves or stuck in honeydew excretions.

Monitoring

Plant monitoring should begin at the seedling stage and continue through the duration of the crop cycle. Start plant inspection on lower leaves and continue up the plant to the growing tips. As aphids feed on growing tips, the leaves curl, sometimes looking like virus symptoms.

Yellow sticky cards are useful in detecting winged aphids. Hang sticky cards 4 – 6 inches from growing tips. IPM Labs (ipmlabs@baldcom.net) sells a chart with drawings of important insects found on sticky cards. Unfortunately, winged adults on sticky cards may indicate that there are clumped populations already established in the crop and they are migrating to less populated areas. The presence of ants in the greenhouse may indicate aphid development, since the ants feed on the excreted honeydew and thus protect the aphids. When introducing natural enemies, place them in an area protected from ants and control ants with baits or traps.

Biological Control

Several long-lasting and effective biological controls are commercially available for aphid control. Each natural enemy has an effective introduction strategy that will be discussed further in upcoming issues of this column.

Predators for aphid control

Ladybeetles (*Hippodamia convergens*): – Ladybeetles are sold as adults in pints, quarts and gallons. A general predator, ladybeetles are effective for cleaning up hot spots. They also feed on scales, thrips, and other soft – bodied insects.

Lacewings (*Chrysoperla rufilabris*) – Lacewings are sold as eggs, larvae. The larvae are voracious predators known as “aphid lions”. They will also feed on mealybugs, scales, spider mites and thrips.

Predatory Midge (*Aphidoletes aphidimyza*)- This midge is sold as the adult to be released in greenhouse. The adult midge lays eggs near aphid colonies and the orange larvae feeds on aphids.

Parasites for aphid control

Caution: Parasites for aphid control are very species specific. Identify the aphid species infesting your crop before ordering from your supplier.

Aphidius colemani – Used to control green peach aphid and melon aphids. This tiny parasitic wasp lays an egg in the aphid. The egg hatches into a larva which spins a cocoon, producing a new wasp. The wasp exits the aphid body, leaving behind a brown shell called an aphid mummy.

Aphidius ervi – Used to control potato aphids. This parasite has a similar appearance and life cycle as *Aphidius colemani*. This parasitic wasp is about twice the size of *A. colemani*.

Aphelinus abdominalis – Used to control larger aphid species such as potato aphid and glasshouse potato aphid. This wasp is about 3 mm long. The main advantage to using this parasite is that the female adult will parasitize for several weeks and it will also feed on the aphids.

Other effective controls for aphids include: screening vents, removing weeds in the greenhouse and outside greenhouse, inspecting incoming plant material, disposing of plant debris, and avoid growing ornamentals in vegetable production area.

Please phone or email me if there are specific issues you would like me address in this column.

Cathy Thomas
Integrated Pest Management Program
Bureau of Plant Industry/ Rm. 100
2301 N. Cameron Street
Harrisburg PA 17110
(717) 705-5857
c-cthomas@state.pa.us or cet3@psu.edu

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Research Update- High Tunnel Brambles

Kathy Demchak, Department of Horticulture

Since 2000, we've been growing red raspberries and blackberries in high tunnels. Through 2002, we obtained fairly impressive yield increases compared to field production (3 to 4 times as much marketable fruit per unit area) due to better growth and a longer harvest season. We also obtained better berry quality, and found it feasible to completely avoid pesticide use. We found that we could fruit the raspberries for both a summer and fall crop, but the fruiting season was actually shifted forward, with more production occurring in the summer than during the fall during 2002.

In 2003, we compared berry production with a 4' spacing between rows as compared to an 8' spacing for a second year. Once again we found that the yields per foot of row were cut in half by going to the closer row spacing, resulting in nearly identical yields on a per area basis. We also compared fruiting both Heritage and Autumn Britten for both the summer and fall crop to fruiting them for just the fall crop, expecting a larger fall crop if we didn't produce the summer crop. However, we were in for a bit of surprise, in that the amount of fruit harvested for the fall crop stayed about the same whether we kept the canes and produced the summer crop, or removed them and produced just the fall crop. However, the fruit ripened a few days earlier when the floricanes were removed and we produced just the fall crop. We'll be checking this out for a second year, in case there's cumulative effect that might become apparent, such as an effect on a build-up of plant reserves that might not have been apparent during the first year of treatments. The continual rain and high humidity in the tunnels did produce a somewhat lower percentage of marketable fruit, around 82%, than in past years, though compared to field production, this is still better than usual, especially in wet year.

Once again, thornless blackberries produced a tremendous crop, at 5.5 lb of marketable berries per linear foot of row, or over 30,000 lb/acre. This research was supported in part by agricultural research funds administered by The Pennsylvania Department of Agriculture.

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PA Strawberry Production Statistics for 2003

Kathy Demchak, Department of Horticulture

Given the nearly continual rains last spring, especially in the southeast part of the state during harvest, I was a bit apprehensive about looking at the strawberry production statistics for 2003. However, The Noncitrus Fruit and Nuts 2003 Preliminary Summary released by the USDA National Agricultural Statistics Service in January showed that for the 3rd year in a row, the value of strawberry production in PA was at a new high, at \$11.1 million. This keeps PA in 5th place nationally for value of production overall, and in 4th place for fresh-market value. There were about 1300 acres of strawberries grown, a figure which had been holding steady for 5 years, placing Pennsylvania 7th nationally in acreage of strawberries. Pennsylvania producers obtained the second highest price of the top ten producing states, with the average price slipping to \$1.34/pound, 3 cents per pound lower than last year's average price. New York producers obtain the highest price per pound, at \$1.55 per pound.

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Haygrove High Tunnel Tour, July 2004

Jessica Krueger, Haygrove Tunnels

Haygrove Tunnels Inc. announces the second annual North American grower tour of England. The tour will feature Haygrove's home farm with 220 acres of strawberries, raspberries, cherries and lilies produced under tunnels. The latest developments in Haygrove's multi-bay tunnels, season extension, mechanization and spectral filter horticultural films will be showcased. A half day visit to Fruit Focus, Britain's premier small fruit trade show, will also be included.

The July 24 – 31st tour will visit other growers using Haygrove tunnels, including Hilliers Nursery, Intercrop Farms (leading salad / vegetable producer), Edward Vinson Plants Ltd. (plant breeder / small fruit grower) and Hurst Farm (direct marketer / table top strawberry producer). Additional visits will include the city of Oxford, Windsor Castle (home of Queen Elizabeth II), Canterbury Cathedral, Chartwell House (Winston Churchill's home) and an open day to visit London.

The tour will depart from a selected hotel near Heathrow airport at 8:00 A.M. July 25 and return the same hotel late July 30. The price of \$799 is based on double occupancy (\$1199 single) and includes 7 nights lodging, coach transportation in England and two dinners sponsored by Haygrove. Airfare is not included. Sign up deadline is May 15, 2004 and space is limited.

To join this informative, educational tour, call 866-HAYGROVE.

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Potato Musings

Bill Lamont, Department of Horticulture

Potato Irrigation

Bill Lamont, Department of Horticulture

Potato IPM School for Chip and Tablestock Producers

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Spread the word to potato growers to mark on their calendars to attend the “**Tri-State Potato School for Chip and Tablestock Producers on Integrated Crop Management**” to be held on March 8 and 9, 2004 at the Ramada Inn (formerly the Holiday Inn), Erie, PA, which is located just off I-90 at exit 27. Room reservations can be made at 1-800-832-9101. Mention potato school to get the room rate of \$49.00 for a single or double. This program is a joint effort by Cornell University, Penn State University and the Ohio State University. Registration is \$90.00 and \$140.00 at the door. Pre-registration is payable to Cornell Cooperative Extension by Feb. 27, 2004. Send checks or money orders to Alan Erb, Cornell Cooperative Extension, 21 South Grove Street, East Aurora, NY 14052. Please include your name, address and phone number so Alan can respond back to you. Participants will get a 2004 Potato School Reference Book and pesticide recertification credits will be available. I would like to thank Dr. Alan Erb for providing leadership in getting this program off the ground.

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Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

March 5-6, 2004. Passive Solar Greenhouse Workshop: Design, Construction and Year Round Production. Sonnewald Natural Foods, Spring Grove, PA. Contact: Steve Moore (717)-225-2489 or sandcmoore@juno.com

Mar. 16 – Erie County Vegetable Growers’ Meeting – Erie, PA

Mar. 18 & 24 - Montgomery County Vegetable Study Circle Meetings – Collegeville, PA

September 24-25, 2004. Passive Solar Greenhouse Workshop: Design, Construction and Year Round Production. Sonnewald Natural Foods, Spring Grove, PA. Contact: Steve Moore (717)-225-2489 or sandcmoore@juno.com

Nov 3 and 4, 2004. 2004 Mid-Atlantic Vegetable Workers, Howard Johnson's in Newark, DE. Contact Joanne Whalen at jwhalen@UDel.Edu.

Regional

April 13-14, 2004. High Tunnel Workshop. Location High Tunnel Research and Education Facility, Horticulture Farm, Rock Springs, PA. Workshop is funded by Northeast SARE Professional Development Program to train extension specialists, county agents and vocational agriculture teachers on the use of high tunnel technology. The workshop will be two days and lodging and mileage will be covered for participants. The states we are soliciting participants from are Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island,

Vermont, West Virginia, Virginia, Ohio and Washington, D.C. The workshop will be a mixture of classroom presentations on the different components of high tunnel technology, "hands-on" participation, and presentations by growers utilizing this technology.

A high tunnel manual will be given to each participant and will serve as a handy reference on all aspects of this technology. To sign up for the workshop or for more information contact Bill Lamont, Phone: 814-865-7118 or E-mail: wlamont@psu.edu.

June 29-30, 2004 High Tunnel Workshop. Location High Tunnel Research and Education Facility, Horticulture Farm, Rock Springs, PA. Workshop is funded by Northeast SARE Professional Development Program to train extension specialists, county agents and vocational agriculture teachers on the use of high tunnel technology. The workshop will be two days and lodging and mileage will be covered for participants. The states we are soliciting participants from are Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Virginia, Ohio and Washington, D.C. The workshop will be a mixture of classroom presentations on the different components of high tunnel technology, "hands-on" participation, and presentations by growers utilizing this technology.

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August 3-4, 2004. High Tunnel Workshop. Location Horticulture Farm, University of New Hampshire,, Durham, NH. The workshop is funded by Northeast SARE Professional Development Program to train extension specialists, county agents and vocational agriculture teachers on the use of high tunnel technology. The workshop will be two days and lodging and mileage will be covered for participants. The states we are soliciting participants from are Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Virginia, Ohio and Washington, D.C. The workshop will be a mixture of classroom presentations on the different components of high tunnel technology, "hands-on" participation, and presentations by growers utilizing this technology.

A high tunnel manual will be given to each participant and will serve as a handy reference on all aspects of this technology. To sign up for the workshop or for more information contact Bill Lamont, Phone: 814-865-7118 or E-mail: wlamont@psu.edu. or George Hamilton County Extension Educator, 603-641-6060 or E-mail: george.hamilton@unh.edu

September 13, 2004. Grower Workshop on High Tunnel Production. High Tunnel Research and Education Facility, Horticulture Farm, Rock Springs, PA. Contact Person: Lisa White, Phone: 814-692-4635 or e-mail: ldw112@psu.edu.

March 8-9, 2004. Potato IPM School for Chip and Tablestock Producers, Quality Inn, Erie, PA. Contact: Alan Erb, Phone: (716) 432-3180

National

International

August 28-31, 2004. 17th International Lettuce and Lettuce and Leafy Vegetable Conference, Quebec, Canada. Contact: Dr. Sylvie Jenni (450)-346-4494 ext. 213 or jennis@agr.gc.ca