

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

In this Issue:

[Comments from the Editor](#)

[Schedule for Agent Articles](#)

[Finding Pesticide Labels....Fast](#)

[Three Workshops for Training Extension Professionals and Vocational Agriculture](#)

[Teachers on High Tunnel Technology to be conducted in 2004](#)

[Crop Diagnostics: What's Wrong With This Crop?](#)

[The Organic Way- The Issue of Pressure Treated Lumber](#)

[Bug vs. Bug-Shore Fly Control in Greenhouse Vegetable Production](#)

[That's A Berry Good Question!!!](#)

[Nitrogen Fertilization of Established Blueberry Plantings](#)

[Potato Musings](#)

[Upcoming Meetings](#)

Tip for the Month--“That each passing day culminates another successful step climbed in your ladder of life and that your goals become brighter and warmer the longer you strive for them”--Unknown

Comments from the Editor

Bill Lamont, Department of Horticulture

I think that spring is finally in the air! We had a couple of pretty chilly nights this past week. I want to thank Scott Guiser for his excellent article “**Finding Pesticide labels.... Fast**” and I look forward to receiving George Perry’s article for the May 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.

[Back to top](#)

Schedule for Agent Articles

Bill Lamont, Department of Horticulture

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

[Back to top](#)

Finding Pesticide Labels....Fast

Scott Guiser, Extension Educator Bucks County

Heard about a new insecticide, fungicide or herbicide and want to look over a label ... fast? Give [cdms.net](#) a try. This site lists more than 1600 pesticide labels from more than 90 manufacturers. Just select US-Ag Crop from the home page and then type in the brand name of the product that you're interested in. It will take you quickly to options where you can print out labels and MSDS sheets along with a link to the manufacturer. All of the supplemental labels are also available.

Say you heard that Stinger will control Canada thistle in strawberries and want to know the rates, timing and whether it's OK to use in Pennsylvania. Yep, the supplemental label with complete directions is there. What's more, as you browse through the listing, you see that Stinger also has a supplemental label in cole crops, spinach and peaches!

How about that new fungicide, Pristine, that Alan MacNab talked about at winter meetings? Yep it's there. And in addition to the label, the manufacturer has posted additional technical information.

One shortfall of the site is that you cannot search by common chemical name. So if you want to see all of the brands names for chlorothalonil (Bravo) you're out of luck. If the common name is in the brand name, as in 2,4-D or sulfur, you'll hit pay dirt. Best of all it's free. Bookmark it.

[Back to top](#)

Three Workshops for Training Extension Professional 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 up to 500 miles 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.

[Back to top](#)

Crop Diagnostic: What's Wrong With This Crop?

Michael Orzolek, Department of Horticulture

In the last five years, many vegetable growers have contacted their extension office or local county agent to diagnose or verify foliar/fruit disease symptoms or abnormal growth of the vegetable crop they are producing in respect to vegetative or reproductive growth. Growers have blamed their problems on nutrition imbalances, insects, or diseases which are generally common to field crop production systems. Ironically, there has been a steady increase in plant growth problems in vegetable production that have been environmental in nature. Both air and water contaminants have caused substantial plant and economic loss since 1989 in Pennsylvania fields. Unfortunately, it is very difficult for the vegetable grower to detect early injury symptoms on vegetables growing in the field before calling for professional help. There are specific symptoms growers should be looking for with most environmental problems.

Volatile Herbicides

In springtime especially, application of volatile pesticides can produce dramatic responses in tomato and other vegetables. The volatile chemicals are generally herbicides that are applied in a liquid form and change to a gas form on contact with the soil surface. The phenoxy herbicides such as 2,4-D and benzoic acid herbicide Banvel (dicamba) are the most common volatile herbicides used for weed control in agronomic crops that have the potential to drift off target up to one-half mile from the site of application. Typical plant symptoms include: shorten internodes, abnormal leaf shape and size, twisted stems, and abnormal flower development. The injury pattern tends to be random in the field and not all plants will be affected.

Water Contaminants

Water contamination can occur if there is a shallow well, pond and/or surface water source and unusually heavy rains follow the application of chemicals (water soluble formulations) in the field. Unfortunately plants tend to be more sensitive to chemical contaminants than humans and injury to plants can be

observed at levels as low as a part per billion (ppb). Atrazine and 2,4-D have been positively identified as water contaminants in several shallow wells in the last 5 years. These two herbicides may be just the tip of the iceberg since a new chemistry herbicide was identified as a contaminant in a tomato crop in 1995. Injury symptoms range from marginal yellowing or browning of the leaves of plants to abnormal plant growth and total death of the plant. Several herbicides that are found in water as contaminants can cause developing tomato fruit to have differential growth rates of the locular tissue in the fruit resulting in catfaced tomatoes.

Growers are encouraged to have their water source tested for any contaminants prior to water usage in the field on young transplants or vegetable seeds.

Diagnosing the Problem

It is important to make the correct diagnosis of the plant problem since lack or delay in treatment may cause a delay in crop maturity and/or crop loss. Visual symptoms on the plants may be difficult to separate from nutrition or pesticide application problems; therefore, try to eliminate both nutrition and pesticide application problems before pursuing the air or water contaminate route. Nutritional disorders generally can be found as a distinct pattern in the field, affecting the entire row of plants or part of the field. In addition, usually specific parts of the plant are affected for example; leaves - terminal, mid section or lower leaves, and/or fruit. Both soil and tissue testing should be considered to help verify suspicion of a nutrient disorder. A disease problem can have a more general infection pattern throughout the entire field or random without any pattern in the crop. Since fungi, bacteria, and viruses can infect vegetable crops, correct identification of the problem is very critical in containing additional spread of the disease organism in the field as well as total eradication of the problem. In addition, there have been several incidences where nematodes have caused economic damage in the vegetable crop.

Key to Identifying Environmentally Related Plant Problems in the field

- A. Is pattern of injury random or general in the field?
- B. What part of the plant is affected?
- C. Are plants stunted?
- D. Are there necrotic lesions on the leaves?, Stem?, Fruit?
- E. Is stem pith green or brown?
- F. Are all varieties affected or just the open-pollinated types?
- G. Has there been any serious fluctuation/deviation from baseline soil/water pH or soluble salt levels?
- H. Has there been any extreme variation in soil moisture or water application to the plant or growing system?
- I. Were your plants clean (insect and disease free when planted in the field) and did you get your plants from another grower?
- J. Has there been tobacco products being used in the greenhouse where the transplants were grown?
- K. Have the symptoms you are observing occur rapidly (within 48 hours) or have they gradually developed over time?

If any symptoms described in the above keys are found on plants in your field or you have answered yes to any of the question, write down the information on a piece of paper to keep for your records. A second

copy of your Plant Diagnostic report can be submitted with plant or tissue samples to your local County Extension Office, State Plant Disease/Pest Clinic, professional consultant or Land Grant University Specialist.

Excellent Reference:

Diagnostic Techniques for Improving Crop Production by Benjamin Wolf. 1996. Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580. Pp.426.

[Back to top](#)

The Organic Way- The Issue of Pressure Treated Lumber

Elsa Sanchez, Assistant Professor of Horticultural Systems Management

Last Fall we began transitioning 4 high tunnels to organic production. One question that has arisen concerning them is what do we do about the pressure treated lumber used in their construction? Since many of you may be tackling the issue of finding substitutes for pressure treated wood also, it seemed like a good topic to address in this article.

According to the National Organic Standards, *the producer must not use lumber treated with arsenate or other prohibited materials for new installations or replacement purposes in contact with soil or livestock.* This does not apply to the use of lumber that is isolated from production. Much of the pressure treated lumber used in the framing of the high tunnels is in contact with the soil near the crop. However, since the high tunnels were constructed in 1998, several years prior to starting the transition phase, we can use the pressure treated lumber currently in the framing of the tunnels until it needs to be replaced. When it needs to be replaced we will need to find alternatives. In some situations where existing pressure treated lumber is deemed to be a significant hazard a certifying agency can require a grower to make alterations prior to granting certification. It is best to evaluate your situation and options with your certifying agency. Also remember to include changes in your Organic System Plan.

Chromated copper arsenate or CCA, deemed a restricted use pesticide by the EPA, was most commonly used to treat the pressure treated wood found in retail outlets. Then in February 2002, the EPA announced that CCA-lumber for residential use would be replaced by lumber treated by alternative preservatives, not containing arsenic, by December 31, 2003. Lumber is now treated with other preservatives and may include copper azole, alkaline copper quaternary or ammoniacal copper citrate. These three options have not yet been evaluated by the National Organic Standards Board or approved by the National Organic Program. It is best to work closely with your certifying agency in evaluating their use.

Other substitutes for CCA pressure treated lumber include non-treated lumber, alternative lumber products and lumber treated with approved products prior or after it is purchased. Non-treated lumber has the disadvantage of being prone to rotting. Some species of trees resist rotting more than others (see the table below). Lumber from many of these species may be unavailable in your area or cost prohibitive to use. However, all of the species listed below grow in Pennsylvania and many are native to Pennsylvania so you may have them growing on your farm. Possible uses may be as fence posts, in trellising or as plant supportive stakes. Keep in mind that typically even the highly resistant species will not last as long as pressure treated wood.

Highly Resistant

Resistant

Moderately Resistant

Slightly or Non-Resistant

Black Locust	Cedars	White Pine	Alders
Osage-orange	Redwood	Honey Locust	Ash
Red Mulberry	White Oak	Bald Cypress	Beech
Yews	Sassafras	(young growth)	Birch
	Junipers		Hemlock
	Catalpa		Buckeye
	Bald		Hickory
	Cypress		Maples
	(old growth)		Red Oak

Source: Bond, B. Wood Use Around the Farm. <http://web.utk.edu/~tfpc/publicat/decay.htm>

Alternative lumber products include stone, bricks, cinder blocks, concrete, wire mesh, metal and plastic and composite materials. Among the uses of these materials are in building fences and permanent raised beds.

Another choice is using lumber that has been treated with allowable products prior to or after it is purchased. According to the National Organic Standards, boric acid is an allowable substance for structural pest management when not in direct contact with organic food or crops. It has been used to protect lumber from rotting. Boric acid is water-soluble and will leach from treated lumber in contact with soil or water. For this reason, it is generally not used for lumber intended for outdoor locations, for example, as fencing material. It is applicable for other construction purposes. There are other substances available for treating lumber. However, many of them have not yet been evaluated for compliance with the National Organic Standards. It is best to work closely with your certifying agency in evaluating products. For example, if your certifying agency is Pennsylvania Certified Organic, it has found Natural Select – Wolmanized Wood, Perseve –ACQ and Disodium Octaborate Tetrahydrate in compliance with the National Organic Standards.

For more information:

Organic Alternatives to Treated Lumber by Lance E. Gregner. This is an ATTRA publication and can be viewed at <http://attra.ncat.org/attra-pub/summaries/lumber.html> or obtained by calling 1-800-346-9140 (English) or 1-800-411-3222 (Spanish).

Garden Use of Treated Lumber by Richard Stehouwer. This is a Penn State Cooperative Extension Bulletin, number CAT UC173. It can be viewed at <http://pubs.cas.psu.edu/freepubs/uc173.html> or obtained by calling 1-814-865-6713.

Note:

Thank you to the people responded to last month's article, Finding Organic Vegetable Seed, with additional sources for organic vegetable seed.

Ronnigers Potato Farm
HCR 62 Box 332A
Moyie Springs, ID 83845
208-267-7938
www.ronnigers.com

Walker Farm
Jack, Karen & Kristin Manix
1190 US Route 5
East Dummerston, VT 05346
802-254-2051
www.walkerfarm.com

Snow Seed
21855 Rosehart Way
Salinas, CA 93908
831-758-9869
email: snowseedco@att.netsnowseedco@att.net

Environmental Seed Producers
PO Box 2709
Lompoc, CA 93438
805-735-8888
www.espseeds.com

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

[Back to top](#)

Corn Rootworm In Sweet Corn

Shelby Fleischer, Department of Entomology

[Back to top](#)

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

Cathy Thomas, Integrated Pest Management Program
Pennsylvania Department of Agriculture

Shore flies (Ephydriidae) are sometimes confused with the dark winged fungus gnat. Both insects thrive in a moist greenhouse environment, have similar biology and feed on fungi, and decaying matter. Shore fly larvae are not known to feed on plant tissue unlike fungus gnat larvae which can be cause economic damage to plant roots. When they occur in high numbers, the adult stage of both pests can be a nuisance to employees and to customers in retail greenhouses. Additionally, fungus gnat and shore fly adults and larvae can spread spores of fungal pathogens.

It is important to identify which fly is attacking your crops since the control strategy for each pest varies. Shore flies are very difficult to control since control options are limited in edible crops and biological controls that attack fungus gnats may not be effective for shore fly control.

Life Cycle

Adults shore flies (2mm) are more robust than the delicate fungus gnat. The dark shore fly has short bristlelike antennae and each wing has five pale spots. These characters are easy to identify with a 15x hand lens.

Adult shore flies lay oblong, white eggs (up to 300) on algal scum or in very wet areas with decomposing organic matter (potting mix, pots, floors, near water spigots). Eggs hatch in to tiny first stage larvae (maggots) that have two forked, dark-tipped breathing tubes at the rear. Two additional larval stages occur with the mature larva reaching a length of 2.5 mm. The pupae are dark brown, curved and tapered on both ends with a tough skin that provides protection from insecticides. All of these stages are found within the crust of algae and on the top layer of potting mix. The life cycle from egg to adult requires approximately 4 weeks depending on temperature. Development time decreases as the temperatures rise.

Damage

The primary damage caused by shore flies is “fly specks” or excrement left on foliage of seedlings or mature plants.

Control

Monitoring

Monitor weekly for shore fly and fungus gnat development with yellow sticky cards, especially in propagation areas. Inspect plants and soil surface for adult shore flies.

Cultural methods

- Avoid overwatering and fertilizer run-off.
- Eliminate algae on benches, walls, mats, and on soil under benches with a registered algicide.
- Practice good sanitation and remove all plant debris from greenhouse.

Biological

Hypoaspis miles (predatory mite) – this predatory soil mite provides some control over shore fly larvae if they are not in standing water. Shore fly larvae can survive in standing water, however the soil mite can not. This soil mite is commercially available through most biological control suppliers.

A new biocontrol being researched is *Atheta coriara*, a soil dwelling staphylinid beetle that feeds on fungus gnats, shore flies and thrips pupae. This beetle is not yet commercially available.

Two widely used biological products for fungus gnat control, *Steinernema feltiae* (beneficial nematode) and Gnatrol? (*Bacillus thuringiensis*) are not effective in controlling shore flies.

Drenches with Biorational pesticides

Soil treatments can be used to control the larval stages of shore flies. Treatments are mainly insect growth regulators used to interrupt hormones and prevent maturation of the insect to the adult stage. Many synthetic insect growth regulators are approved for shore flies in ornamental crops, however, they are not approved for greenhouse vegetable production. The following treatments are approved for greenhouse vegetables.

•Azadirachtin (Botanical) – when ingested or absorbed by the insect larva, the molting process is interrupted. Several products containing this active ingredient are commercially available.

• *Beauveria basianna* (fungus, microbial) – the spores of this beneficial fungus attach to the larva and penetrate the cuticle eventually infecting the body cavity.

Remember when applying these products that they are not “rescue treatments” - use as a preventative when insect populations are at low levels.

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

Cathy Thomas
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(717) 705-5857
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[Back to top](#)

That's A Berry Good Question!!!

Kathy Demchak, Department of Horticulture

Q. I have a question on mulching blueberries with sawdust. Some literature recommends mulching specifically with softwood sawdust, while other literature recommends mulching with hardwood sawdust. Why is there a difference, and does it matter which type of sawdust I use? (Anon.)

A. I've wondered about this myself. I checked out a number of studies done in different locations, hoping to find one where someone compared softwood sawdust to hardwood, but couldn't find any. (If anyone out there knows of any information on this, let me know!). It seemed likely that the reason for the differences in recommendations might simply be due to availability of materials for the studies. Those done in locations where softwood sawdust was available (Southern states, or Canada) found that softwood sawdust worked, and hence recommended softwood sawdust, which those done in locations where hardwood sawdust was available (Northeast U.S.) found hardwood sawdust to be acceptable. There's some reference to softwood sawdust being acidifying. In studies where soil was mixed with sawdust, the pH initially dropped, but then rose as the sawdust decomposed, regardless of whether the study used softwood sawdust or hardwood sawdust. This could be a bit troubling for blueberry growers, and it's always a good idea to check the pH of the mulch you are going to use. If it's above 7, it's probably better to find another source just to be safe. The pH of our decomposed sawdust at PSU has often been high, but the use of ammonium sulfate for fertilization has always dropped the pH of the mulch layer to an acceptable range (and sometimes too low) range. So, we tend to alternate between using urea and ammonium sulfate to keep the pH in the correct range (4.5-5.0).

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.

[Back to top](#)

Nitrogen Fertilization of Established Blueberry Plantings

Kathy Demchak, Department of Horticulture

In the past, nitrogen application to blueberries was thought of as an early-spring task. However, if you've heard Dr. Gary Pavlis from Rutgers Univ. discuss blueberry plant nutrition in the last few years, you've heard him make the point that nitrogen is not taken up in any appreciable quantity before the plants reach bud break. Therefore, nitrogen application should be delayed until budbreak, and preferably applied in a split application, with half applied at budbreak, and the remainder applied about 4 weeks later. Furthermore, he has found that, simply put, the more frequent and smaller doses of nitrogen that the blueberry plant gets, the better. This is no different than the theory behind 'spoon-feeding' any other crop – smaller, more frequent applications result in nitrogen (or any other nutrient) being more efficiently used, with less of the nutrient being lost to leaching, as long as it is being applied when the plant is taking it up. In addition, the nutrient is constantly present and available for use whenever the plant needs it. Nitrogen should still never be applied past the beginning of July, as new growth that might be encouraged late in the season would be more susceptible to winter injury. Changes will be made in the tissue analysis printout produced by Penn State's Agricultural Analytical Services Lab to match this recommendation.

[Back to top](#)

Potato Musings

Bill Lamont, Department of Horticulture

Websites of Interest: University of Nebraska

Bill Lamont, Department of Horticulture

Dr. Alexander D. Pavlista, Professor of Agronomy and Horticulture and Extension Potato Specialist at the University of Nebraska Panhandle Research and Extension Center
4502 Avenue I, Scottsbluff, NE 69361
phone: 308-632-1240, fax: 308-632-1365 and
e-mail: apavlista@unl.edu has developed several websites of interest.
The first one is for the Upcoming 2004 Annual Meeting of the Potato Association of America that is being held in Scottsbluff, NE. <http://www.panhandle.unl.edu/paa>

The second website is for Nebraska Potato Eyes which is Dr. Pavlista's newsletter which is full of excellent information on potatoes. <http://www.panhandle.unl.edu/peyes.htm>

The third web site is for Dr. Pavlista's Potato Education Guides. The Potato Education Guide is full of information on all aspects of potato production. The Guide is continually updated with new research-based recommendations and guidelines. <http://www.panhandle.unl.edu/potato/>

[Back to top](#)

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

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

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.

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.

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.

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