

The Vegetable Gazette

Vol. 5, No. 1 - January 2001

Horticulture Department
The Pennsylvania State University

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Tip for the Month: "Success is a journey, not a destination"

Comments from the Editor

Bill Lamont, Department of Horticulture

We have begun Volume 5 of the Vegetable and Small Fruit Gazette. I look forward to continuing working as editor and serving your needs throughout the next year. For all my colleagues in the other departments just a reminder that the Vegetable and Small Fruit Gazette will come out as near to the 1st of each month and this means that I would like to receive your articles the last week of the previous month. Steve Bogash has started the New Year off with his excellent article and I look forward to a continuous stream of articles from county extension personnel. I have published the schedule in this newsletter so that you know what month you are expected to have an article into me. Cathy Thomas will be continuing her excellent articles on biological control. As always, the Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns. The month of January also presents growers with some excellent educational opportunities at the county, state and national levels. I would refer you to the extensive listing of upcoming meetings at the end of the gazette. Happy New Year!!!

Schedule for Agent Articles

Bill Lamont, Department of Horticulture

Jan.-Steve Bogash, Feb.-Emily Swackhammer, Mar.-George Perry, April- Scott Guiser, May- Laura McNutt, June-Tom Butzler, July- Dwane Miller and Jim Welshans, August-Eric Oesterling, Sept.-Ron Hostetler, October-Mary Concklin, November-John Esslinger, December-Andy Muza

Inservice Training for 2001 Bill Lamont, Department of Horticulture

April 17-18, 2001- Department of Entomology-"Insects Pests of Greenhouse Vegetable and Ornamental Crops"- Contact: Paul Heller 814-865-3008

Tentative (Months may change)

July 2001- Departments of Horticulture, Entomology, and Plant Pathology-"Production of Vegetables, Small Fruits and Cut Flowers in High Tunnels"- Contact: Bill Lamont 814-865-7118

August 2001- Departments of Horticulture, Entomology and Plant Pathology-"Potatoes- A-Z. Contact: Bill Lamont 814-865-7118

September 2001- Department of Horticulture- "Proper Post-Harvest Handling and Storage of Vegetables and Small Fruits" Contact: Bill Lamont 814-865-7118 or Mike Orzolek, 814-863-2251

Bug vs. Bug

Biological Control of Fungus Gnat Larvae
Cathy Thomas, Integrated Pest Management Program,
Pennsylvania Department of Agriculture

Fungus gnats, a common greenhouse pest, are known for infesting cuttings and other young plant materials, potted and long term crops such as greenhouse vegetables. Monitor and treat for this pest when transplants for the spring crop are started. An effective biological control for treating the larval stage of this pest is using the insect-parasitic nematodes, also called entomopathogenic (lethal parasites of insects) nematodes. Insect parasitic nematodes have been used successfully in many industries such as greenhouses, nursery, mushroom and turf industries. Nematode products are exempt from re-entry intervals and worker protection standards. The nematode used in fungus gnat control products is *Steinernema feltiae*.

Life Cycle

Nematodes are simple roundworms that are shipped to the grower in the infective juvenile stage. When applied to the soil, the infective juvenile seeks out and penetrates the fungus larva entering

the body via natural openings or areas of thin cuticle. Once inside the body, the nematodes release a bacteria from their intestines, which results in infection of the insect larva and death within 24-48 hours. The nematodes feed on broken down tissue in the insect cadaver and develop into adults. A new generation of nematodes is produced within two weeks. Thousands of new infective juveniles emerge from the insect cadaver in search of fresh hosts. Infected fungus gnat larvae appear brownish-yellow rather than the healthy white color.

Application

Steinernema nematodes are delivered to the grower as either a clay formulation or liquid suspension. Follow label directions for application. Once in suspension, apply nematodes to the compost/soil surface as a drench.

- Apply, routine preventive treatments to prevent crop damage.
- Treat as soon as possible after sowing seed or inserting cuttings.
- For slow growing crops, reapply nematodes at six-week intervals.
- If fungus gnat populations are already established it may take 2-3 weeks before you see a reduction in adult fungus gnats.

For optimum performance consider these factors:

- Soil temperature must be 55-90 degrees F
- Use nozzle screens of at least 50 mesh or coarser during application
- Do not store for extended periods
- Irrigate compost before and after application (nematodes require moisture for movement)
- Keep compost moist for the first two weeks after application
- Do not apply within 7 days of a nematicide application

Suppliers of Nematodes

- IPM Labs, Locke, NY 315-497-2063, ipmlabs@baldcom.net
- International Technology, Bio Best Products, CO 303-661-9546
- Griffin Greenhouse and Nursery Supply, (Nemasys³) 1-800-732-3509
- (Many biological control suppliers sell nematodes)

Useful websites

www2.oardc.ohio-state.edu/nematodes/
www.biologicco.com/
www.biobest.be

www.bugsandbees.com
www.koppert.com
www.nysaes.cornell.edu/ent/biocontrol/websites.html

Please contact me if there are specific issues you would like to see addressed in this column.

Cathy Thomas

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Getting the Maximum Life out of High Tunnel and Greenhouse Polyethylene Coverings

Steve Bogash, Commerical Horticulture Agent

Polyethylene greenhouse coverings are seldom cheap. Good coverings with a multi-year warranty can be a significant part of the operating expense of your cold frame, high tunnel or greenhouse. It makes sense to do everything within reason to avoid practices that will reduce the usable lifetime of your coverings. Properly selected, well-secured polyethylene can provide years of active use. Understanding how plastics prematurely degrade and methods to avoid this degradation will repay the grower in reduced operating expenses.

Securing the plastic to your structure

By far the best method to secure polyethylene to your structure is with aluminum locking channels. If the locking channel has a plastic liner that contains a plasticizer or the framework is PVC an extra layer of polyethylene is strongly recommended. Polyethylene should never directly contact PVC as the reaction between the two will rapidly degrade the covering. If nails are used to secure polyethylene, the plastic should be sandwiched between two layers of lath and nailed every 6-8". With nailing, getting a uniform tension and pressure on the plastic is especially important. If the poly is not uniformly tight, it is especially sensitive to damage in high wind situations. For single layer applications or if the locking channel is not secure enough, try sandwiching a short piece of polyethylene in the groove with the covering.

Plastic against wood, pressure treated wood, or other dark surfaces

Applying a heavy coat of white latex paint or a specialty product such as POLYPAINT? over wood or other dark surface can significantly reduce the degradation of polyethylene where it comes into direct contact with that surface. Dark surfaces absorb heat which will degrade the plastic and polyethylene will react with the chemicals in pressure treated lumber if they are in direct contact.

Reducing wear/abrasion points

While today's films are extremely durable and resistant to abrasion, it only makes sense to pay careful attention to all contacts points between the plastic and the supporting structure. Loose

and protruding bolts and other connectors can readily wear through your covering. Regular inspections prior to use and especially before recovering are strongly recommended. Examining the covering immediately prior to removal is an easy time to locate potential problem spots as they are most easily spotted at this time. Remember, your structure moves constantly in the wind, which can easily loosen connectors, and pop boards out of place.

Careful attention to locating your structure can reduce wind damage as well as using evergreen plantings. Pyramidal Arborvitae and Leland Cypress among many others, are two fast growing evergreen tree/shrubs that are very useful in wind screening. Don't create future maintenance problems by locating these too close to your structure. Allow room for growth and access to production areas.

Properly installed inflation kits

Is your inflator kit installed properly? It still amazes me how many greenhouses have their inflator kit installed to use warm moist air from the inside of the greenhouse. A properly installed inflator kit will pull air from the outside of the structure at a height that will reduce the chance of drawing in snow or debris. This will decrease condensation in between the layers and subsequently reduce algal growth and lessen thermal degradation.

Avoiding chemical exposure

After installation, avoid surface contact and extended exposure of the covering to pesticides, especially those containing bromine, chlorine, fluorine, iodine, sulfur, petroleum, and copper wood preservatives. See the following list for details:

Some specific agricultural chemicals known or suspected to degrade polyethylene

Listed below are chemicals that are either known or suspected to have the potential to prematurely degrade polyethylene or the additives that are used in stabilizing polyethylene. These additives are very important as they are used to increase the lifetime of the plastic by reducing Ultraviolet (UV) degradation. If your plastic is designed to increase IR capture or reduce condensation, loss of these additives will also reduce overall performance.

Banrot

Chloropicrin

Chlorine Gas

Chlorpyrifos: Dursban, Lorsban, etc.,

Dithiocarbamates: Manzate, Maneb, Penncozeb, Dithane, Polyram and many others.

Fluvalinate: Mavrik

Vinclozolin: Ronilan, Ornalin

Dienochlor: Pentac

Chlorthalonil: Bravo,

Pentachloronitrobenzene: Terrachlor

Oxamyl: Vydate

Chloride

Methyl Bromide

Bromine Gas

Sulfur

Permethrin and other synthetic pyrethroids

Captan
Diazinon
Mancozeb: Penncozeb, Dithane, Manzate,
Copper Hydroxides: Phyton 27, Kocide, etc.
Copper sulfate
Chlorine bleach
Bromoxynil: Buctril
Silver Thiosulfate
Methomyl: Lannate

It is important to note that how you apply chemicals has a great degree of effect on how much damage is done to the plastic. Although foggers and aerosol bombs give much better coverage, they tend to coat the plastic to a greater extent than sprayers that apply the materials directly to the plants. Another factor to consider is the increased volatilization of chemicals at higher temperatures. Applying pesticides during the hottest part of the day will likely result in increased damage to the covering material. Since most faults in coverings occur at physical wear points, limiting the degree of damage due to abrasion will reduce final failure due to chemical degradation. The degradation of two different polyethylene greenhouse films were documented in a paper in the recent proceedings of the 15th International Congress for Plastics in Agriculture titled "Effect of the Pesticides on the Degradation of EVA Plastic Films for Greenhouse Covering. In this paper both light transmittance and tensile strength were significantly reduced in as short a period as 16 weeks in the presence of copper, sulfur and chlorine containing pesticides.

Much of the information for this article is courtesy of Tyco Plastics, manufacturer of Tufflite Brand greenhouse coverings.

Producing Quality Peppers in High Tunnels with Compost and Drip

Erik P. Burkhart, Graduate Student
Department of Horticulture

Note: Eric will be presenting his results at the Mid-Atlantic Fruit and Vegetable Convention in the Season Extension Technology Session on Tuesday morning.

An ongoing research project at the Pennsylvania State University Center for Plasticulture at Rock Springs is currently evaluating the possibilities for integrated crop management by combining locally-produced compost with season extension technology (High Tunnels and plastic mulches) and drip irrigation. Initiated in the fall of 1999, the objective of this study is to identify and characterize any differences in plant growth and yield as influenced by source of fertility (compost or inorganic fertilizer) as well as type of mulch (compost or plastic). In addition, all experimental plots are being evaluated using High Tunnel technology in an effort to determine the potential usefulness of these structures to vegetable crop producers looking to extend the growing season or to those who would like to provide more reliable conditions for high-value crops.

One of the anticipated results from this research is a comparative analysis of several key components associated with vegetable crop production, i.e. drip irrigation, plastic mulches, high tunnels, as well as the development of a framework within which their integration can be properly considered. It is also expected that data from this study will ultimately serve to provide growers with information and recommendations (via extension-related activities) for the utilization of compost as a full or partial replacement for inorganic nutrient fertilizers. This latter focus is important since it offers the grower the potential to expand into the "certified organic" market---widely reported to be growing at a rate of 20% annually---an excellent option for those seeking to balance farm profitability with ecologically-sound farming practices, both in Pennsylvania and abroad.

Crop: Bell pepper (*Capsicum annuum*) var. 'Paladin'
 Date Transplanted: May 26, 2000
 Plot design: Randomized block using nine high tunnels with three fertility replications; Four raised beds per tunnel: two plastic mulch, two compost mulch

18 inch center spacing (22 plants per bed, 88 per tunnel, 792 plants total) Three fertility rates: 632 gallons compost per tunnel (= compost 1), 1,264 gallons compost per tunnel (= compost 2), and fertigation at a rate of 2.1 total lbs. N-P-K per tunnel, 15-30-15 (= fertilizer)

Pesticides: Safer Insecticidal Soap, Biological control (*Hippodamia convergens*, *Aepheids colemani*)

Irrigation: Drip irrigated for ~3.0 hours per week for 20 weeks (~13.5 inches total)

Summary:

Slight differences in bell pepper growth were noted between fertility treatments with compost 1 plots outperforming the other treatments with respect to final height and biomass accumulation. There was no incidence of disease in any of the plots. Aphids were the most significant insect pest during the growing season but were successfully controlled using natural predators and parasitoids. On two occasions (mid-July and mid-August), however, insecticidal soap was needed to provide immediate aphid population control. Infestation appeared to be comparable across treatments although aphid pressure in the compost 2 treatments was notably more intense. Five harvests were made beginning in July and ending in October. Cooler soil and ambient temperatures during late September and October reduced plant productivity considerably resulting in small harvests during these months. Harvested fruit was graded according to USDA standards using the categories of Fancy, Number 1, and Number 2. Cull data was not collected.

Table 1. Harvest weights and number of fruit (wt/frt) for the 2000 growing season

		<u>Compost 1</u>		<u>Compost 2</u>		<u>Fertilizer</u>	
		Compost	Plastic	Compost	Plastic	Compost	Plastic
Jul 16	Fancy	21.2/55	93.7/233	9.3/23	48.1/113	39.8/104	79.8/209
	No. 1	17.8/68	15.3/55	7.2/27	12.3/43	20.6/72	17.4/64

	No. 2	.6/2	1.6/4	0/0	07/2	.8/4	2.3/8
Aug 05	Fancy	73.8/144	163.7/321	21.6/41	48.8/100	91.9/184	161.8/304
	No. 1	31.2/80	55.5/147	12.8/36	42.3/114	29.0/81	74.0/197
	No. 2	2.4/8	2.6/8	1.7/5	6.9/23	1.7/7	3.0/9
Aug 22	Fancy	197.0/362	268.2/463	105.2/201	127.6/250	223.3/395	179.4/318
	No. 1	55.2/149	48.4/120	35.2/100	47.9/132	33.5/84	30.6/70
	No. 2	4.3/10	0/0	1.3/5	4.6/16	.3/1	0/0
Sep 16	Fancy	66.1/115	26.2/45	52.5/94	41.6/80	25.5/46	14.8/26
	No. 1	19.1/41	10.5/25	24.2/59	26.5/65	7.8/18	5.0/11
	No. 2	6.2/11	0/0	0/0	0/0	0/0	0/0
Oct 27	Fancy	94.7/198	93.1/208	62.3/114	43.2/87	63.3/135	53.1/122
	No. 1	12.1/41	27.9/95	6.1/18	9.8/30	23.8/75	32.2/102
	No. 2	0/0	0/0	0/0	0/0	0/0	0/0

Potato Musings

Potata Sessions at the Mid-Atlantic Fruit and Vegetable Convention

Bill Lamont, Department of Horticulture

Tuesday PM

Session E

Potatoes

Tuesday, January 30, 2001, PM

Topics and Speakers

Presiding: Bob Leiby, Lehigh County Cooperative Extension

1:30 PM The Need for Innovative Marketing in Potatoes- Joseph Sieczka, Cornell University
516-727-3595

2:00 Marketing Fresh Market Potatoes-How Do We Do It?-A Panel

Keith Masser- Grower, Schylkill County

Smoky Wessner-Grower, Lehigh County

Mike Huya-Grower, Crawford County

Roger Springer- PA Potato Grower Cooperative

Weis: Charlie Brennaman

Giant: Dan McCullough

Acme:Bob Quigley

3:00-3:15 Industry Show and Tell

3:15 Cornell Potato Breeding Program- Expectations in the Future- Dr. Walter DeJong,

Department of Plant Breeding, Cornell University

4:00 Marketing Specialty Potatoes- Wayne Snyder, RD 2 Box 158, Delhi, NY 13753

4:30 Adjourn

Session E

Potatoes

Wednesday, January 31, 2001, AM

Topics and Speakers

Presiding: Ron Hostetler. Cambria County Cooperative Extension

9:00 AM Timing Nitrogen Applications- Dr. Carl Rosen, Department of Soil, Water and Climate, University of Minnesota

9:30 Role of Calcium in Potato Production-Dr. Carl Rosen, University of Minnesota

10:00-10:15 Industry Show and Tell

10:15 Comparison of Fungicide Seedpiece Treatments on White Potato Cultivars-Dr. Stephen Johnston, Extension Plant Pathologist, Rutgers University

11:00 Controlling Pathogens in Potato Storages -Dr. Randy Rowe, Department of Plant Pathology, The Ohio State University

11:30 Interactions Between Manure and Potato Production- Dr. Keith Kelling, Department of Soil Science, University of Wisconsin-Madison

12:00-1:30 PM Lunch and Visit with Exhibitors

Session B

Potatoes

Wednesday, January 31, 2001, PM

Topics and Speakers

Presiding: Tom Butzler, Clinton County Cooperative Extension

1:30 PM Potato Scab and Silver Scurf-What Do We Know- Dr. Randy Rowe, Plant Pathology, Ohio State University

2:00 White Potato Insect Management-What's New? -Dr. Gerald Ghidui, Extension Entomologist, Rutgers University

2:30 Stress Effects During Potato Development that Influence Post-Harvest Processing Quality- Dr. Joe Sowokinos, Department of Horticultural Science, University of Minnesota

3:00-3:15 Industry Show and Tell

3:15 The Use of CMM (Chemical Maturity Monitoring) to Extend Chipping Quality in Storage--
Dr. Joe Sowokinos, University of Minnesota

4:00 Questions for Panel on Storage of Potatoes for Chip Market

Glen Hetherington-Hetherington Farms (Chip Market)

Bob Hite- (Chip Market)

Dr. Joe Sowokinos , University of Minnesota

Dan Sharretts-Synder of Berlin

Mitch Kinney-Utz Potato Chip Company

4:30 Adjourn

County Winter Potato Meetings

Bill Lamont, Department of Horticulture

February 22, 2001: Cambria and Somerset Regional Vegetable and Potato Meeting, Ebensburg, PA. Contact: Ron Hostetler (814) 472-7986

March 1, 2001: Lehigh/ Schuylkill County Potato Growers Meeting. Contact: Bob Leiby (610) 391-9840

March 14, 2001: Erie County Potato and Vegetable Growers Meeting. Contact Andy Muza (814) 825-0900

March 15, 2001: Western Pennsylvania Potato and Vegetable Meeting. Contact Tom Zundel (724) 662-2323

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

January 6-11, 2001: Pennsylvania Farm Show, Harrisburg, PA. Contact: Dr. Pete Ferretti, (814) 863-2313.

January 12, 2001: Susquehanna Regional Vegetable Meeting, Mifflinburg, PA. Contact: Jeff Mizer (570) 837-4252

January 15, 2001: New Holland Vegetable Growers Day, New Holland, PA. Contact: Tim Elkner (717) 394-6851

January 16, 2001: Belleville Vegetable Growers Meeting, Belleville, PA. Contact: Tom Ford (814) 693-3265

January 18, 2001: Morrison's Cove Produce Auction Meeting, Martinsburg, PA. Contact: Tom Ford (814) 693-3265

January 30- Feb 1, 2001: Mid-Atlantic Fruit and Vegetable Growers Convention, Hershey, PA. Contact: Bill Troxell (717) 694-3596.

February 6, 2001: Northeast Vegetable Growers Meeting, Thompson's Dairy Bar, Clarks Summit, PA. Contact: John Esslinger (717) 963-4761

February 8, 2001: Tri-County Vegetable and Small Fruit Meeting, Penn Township Community Bldg., Shippensburg, PA. Contact: Steve Bogash (717) 263-9226

February 13, 2001: Schuylkill County Regional Vegetable Growers Meeting, Extension Office, Pottsville, PA. Contact: George Perry (570) 622-4225

February 14, 2001: Southeastern Vegetable Growers Meeting, Heritage Restaurant, Franconia, PA. Contact: Mary Conklin (610) 489-4315

February 15, 2001: Kutztown Vegetable Auction Growers Meeting, Fleetwood Grange Hall, Kutztown, PA. Contact: John Berry, Lehigh County Extension Office (610) 391-9840 or Laura McNutt, Berks County Extension Office (610) 378-1327

February 21, 2001: Lebanon County Winter Vegetable Meeting, Shaefferstown Fire Hall, Shaefferstown, PA. Contact: Ginger Pryor (717) 270-4391

February 22, 2001: Cambria and Somerset Regional Vegetable and Potato Meeting, Ebensburg, PA. Contact: Ron Hostetler (814) 472-7986

February 27, 2001: Strawberry and Raspberry School, Adams County Extension Office, Gettysburg, PA. (717) 334-6271

March 1, 2001: Lehigh/ Schuylkill County Potato Growers Meeting. Contact: Bob Leiby (610) 391-9840

March 5, 2001: North Central Vegetable Meeting, Lockhaven, PA. Contact: Tom Butzler, (570) 726-0022

March 13, 2001: North Central Vegetable Producers Conference, Coudersport, PA. Contact: Greg Burns (814) 776-5331

March 14, 2001: Erie County Potato and Vegetable Growers Meeting. Contact Andy Muza (814) 825-0900

Regional

January 16-18, 2001: New Jersey Annual Vegetable Growers Meeting, Trump Taj Mahal, Atlantic City, NJ. Contact: Phil Traino (609) 985-4382.

February 6, 2001: New York State Berry Growers' Association, Owego, NY

February 7-9, 2001: Ohio Fruit and Vegetable Growers Congress and Ohio Roadside Marketing Conf., Toledo, OH. Contact: John Wargowsky (614) 249-2424.

February 9-10, 2001: PASA (Pennsylvania Association for Sustainable Agriculture) 10th Annual Farming For The Future Conference, The Penn Stater Conference Center Hotel, State College, PA Contact: Shirley Gryczuk (814) 863-7235.

February 13-15, 2001: New York Vegetable Conference, Holiday Inn and Convention Center, Syracuse, NY. Contact: Jean Warholic (607) 539-7648.

National

January 9-11, 2001: Great Lakes Vegetable Growers Convention and Farm Market Show, Grand Center, Grand Rapids, MI. Contact: Dave Smith (734) 848-8899.

January 10-16, 2001: North American Berry Conference, Sheraton Fallsview Hotel, Niagara Falls, Ontario. Contact: Erin Griebe, (517) 548-4990

January 16-20, 2001: National Potato Council 52nd Annual Meeting, San Diego, CA. (303) 773-9295