

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Tip for the Month: "Being happy doesn't mean everything's perfect, it just means you've decided to see beyond the imperfections"

Comments from the Editor

Bill Lamont, Department of Horticulture

Well here we are beginning 2003. Hopefully this year we will be blessed with a great growing season, with just the right soil and air temperatures, timely rainfalls, minimal disease pressure and not a lot of insect pests to worry about. That is what I wish for everyone. We will see if it turns out that way. The month of January is full of educational opportunities, so be sure to check the list of upcoming meetings at the end of gazette. I want to thank Steve Bogash for his excellent article "Report: Pennsylvania Statewide Specialty Cut Flower Evaluation: Sunflowers 2002", and I look forward to Scott Guiser's article that will appear in the February issue and also want to encourage my colleagues from other departments to contribute articles throughout the year. 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

February	Scott Guiser
March	Tim Elkner
April	Lee Young
May	George Perry
June	Tom Butzler
July	Eric Oesterling
August	Tom Ford
September	Cheryl Bjornson
October	Mary Conklin
November	John Esslinger
December	Andy Muza

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Use of Plasticulture for the Production of Melons

Michael D. Orzolek, Department of Horticulture

Since Cucurbits in general and melons specifically love warm temperatures, production of melons (cantaloupe and watermelons) in much of Pennsylvania is a challenge both from the standpoint of temperature and moisture. Melon plants stop growing below 45°F and will have a difficult time maturing fruit when average night temperature drops below 50°F. Optimum growth of melon plants is between 75° and 85°F daytime temperature.

For the average grower in Pennsylvania growing on bare soil, the planting date for melons is generally between May 20 and June 15, assuming that there will not be extremes in day and night temperatures. While mature cantaloupe and watermelon plants are somewhat drought tolerant, they require consistent soil moisture levels (80% of available soil moisture) after seeding or transplanting and until they reach the 10-12 leaf stage of growth. On the other hand, excess rainfall 2 weeks prior to fruit harvest will dramatically reduce soluble sugars and fruit quality. The use of plasticulture will help eliminate/prevent these environmental stresses on melon plants during the growing season.

For the production of high quality melons, the use of raised beds, plastic mulch, drip irrigation and row covers will insure success and consistent marketable yields. The use of plasticulture in the production of melons will: 1) increase soil temperature 8° to 12°F warmer than bare soil, 2) increase/maintain soil water holding capacity, 3) reduce/eliminate weeds, 4) maintain/increase soil tilth and 5) reduce/eliminate fertilizer and pesticide leaching under the bed. I will discuss the individual components of plasticulture in the following sections below.

Raised Beds - Making a 6 to 8 inch raised bed prior to applying plastic mulch in the field helps to; a) increase soil temperature, b) produce a tight fit of plastic on the soil surface, c) prevent plant/fruit damage from excessive water (heavy thundershowers), d) reduce soil erosion when beds follow soil contour and e) helps to produce a higher quality, cleaner fruit. Many equipment manufacturers sell a multi-function machine which will make a raised, pressed bed, lay the ag film snugly on top of the bed and also place drip tape at a desired depth in the bed at one pass. In addition, a fertilizer applicator can be placed on top of the bed maker/mulch applicator to add nutrients into the bed.

Plastic Mulch - Since plastic mulch increases soil temperature, soil moisture and maintains soil tilth, seeding or transplanting melons within 2 to 5 days after application of the plastic in the field is recommended. Plastic film can be purchased at a thickness of 0.3 to 1.5 mil, embossed or smooth and colors of clear, white, black, blue, IRT green, IRT brown, red, yellow and silver. The plastic film you purchase can be tailored to your needs based on crop being grown, number of crops to be grown on the film, length of time to be left in the field and pest elimination requirements. The thicker the film, the longer it can be left in the field; 1.5 mil plastic will last two years/multiple crops in the field. However, in general, the thicker the film, the higher the cost; unless the purchase is an ultra-thin plastic film 0.3 mil or less. Embossing imparts more elasticity/stretchability compared to the smooth plastic film. As to color, melon plants will produce higher early and marketable yields on IRT green, blue or silver compared to the standard black. The silver mulch also repels aphids so that aphid vectored viruses are eliminated in the field.

Drip Irrigation - Water comprises 94% of melon fruit which would verify the importance of water in the growth and development of melon plants and fruit. Whether seeding or transplanting melons, application of water is extremely important to maintain soil

capacity for germination of melon seeds or the regeneration of root and shoot growth of melon transplants. Drip irrigation is very efficient in; directing water to the crop and not the weeds, reducing/eliminating foliar diseases, and injection of fertilizers and/or pesticides. Since many soils in Pennsylvania are silt loams to clay loams and generally have between 1.5% to 2.5% organic matter, they tend to have relatively high cation exchange capacity (CEC), low to moderate water infiltration rates, and moderate to high water holding capacity. Because of these characteristics, growing melons on these soils and raised beds/plastic mulch is more effective when at least 40% of the fertilizer requirement is added preplant rather than totally through the drip irrigation system. Fertigation of nitrogen (approx. 7 to 10 lbs/A) after crown set fruit are harvested does help to increase fruit production and maintain plant health and vigor. Scheduling water application on measurement of actual soil moisture levels (irrometer or tensiometer) will help to maintain active plant growth throughout the growing season and high sugar, high quality fruit. Remember that soluble solids or sugars are translocated to the fruit within the last two weeks prior to the fruit being full slip. Application/reception of excessive moisture during this period of carbohydrate movement from plant to fruit will dramatically reduce the sugar level and overall quality of the fruit.

Row Covers - Since melon crops return a relatively high gross per acre and require warm temperatures both day and night, use of polypropylene row covers is both economical and productive. Applying row covers on the raised bed/plastic mulch after seeding or transplanting melons will; increase both ambient and soil temperature resulting in increased plant growth, reduce/elimination plant dessication, maintain higher soil moisture levels, and exclude insect feeding on young plants. However, once female flowers are observed on plants, the row cover must be removed to allow for pollination by honeybees. While polyester row covers are available, the stiffness of the material compared to polypropylene will cause leaf abrasion and potential delays in fruit maturity.

Low Tunnels - In locations that are rather windy in the spring of the year and plant dessication is a principle cause of plant mortality, use of low tunnels will help both establishment and early production of melons. Low tunnels are usually 1-mil rolls of perforated (for ventilation) polyethylene stretched over metal hoops (no. 9 wire) placed every 6' to 8' over the row of melon plants. The tunnels are immediately placed over the row after transplanting and left in place until the afternoon high temperatures exceeds 85°F for 3 successive days.

TIPS FOR SUCCESSFUL MELON PRODUCTION WITH PLASTICULTURE

Use raised beds (4 to 6" high) when laying plastic in the field compared to flat beds to insure better water and nutrient management in the field.

When laying plastic in the field, make sure soil is at least 85% of water-holding capacity.

Wait at least 2 to 3 days after laying plastic mulch in the field before transplanting or seeding melons through the plastic.

After seeding and especially after transplanting melon plants through plastic mulch, monitor soil moisture level underneath the plastic mulch and maintain moisture level by use of drip irrigation system.

Monitor melon plants for both cucumber beetle and aphid populations since both insect species can rapidly reproduce and vector viral or bacterial organisms to young melon transplants.

Remove row cover or mulch from low tunnel when first female flowers appear in field.

Place at least one active beehive per acre of production to insure pollination and fruit production.

Fertigate with low levels of nitrogen (5 to 7 lbs/A) throughout the growing season.

Apply one pound per acre Boron pre-bloom stage either through the drip irrigation system or as a tank-mix with fungicide spray.

Reduce water application to melon crop within 2 weeks of the bulk harvest of melons in the field to improve soluble solid levels and higher fruit quality.

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Report: Pennsylvania Statewide Specialty Cut Flower Evaluation: Sunflowers 2002

Steve Bogash, Commercial Horticulture Agent, Joshua McCulloch & Gwen Umbreit, Program Assistants

For the 2002 growing season, growers working in cooperation with Penn State Cooperative Extension hosted on-farm cut flower sunflower trials at five sites scattered throughout PA. In total, 34 cultivars were provided to the host farms. For the second year of these trials, it is very important to note the difficult growing conditions during the 2002 season as there was very little rainfall after spring. This probably resulted in reduced leaf spotting and other fungal pathogens, but certainly limited growth and regrowth after first harvest on sites without irrigation. In spite of the difficult growing season, a number of cultivars stood out from the pack. It will be interesting to rerun the trial in 2003 with many of last year's entries and see how they fare under another season's growing conditions.

Each grower was provided with a minimum of 25 seeds for each cultivar they were trialing and an evaluation notebook to keep during the season. Cultivars were tracked for number and length of stems, color, and flower size. Cooperators were asked to score the plants using a 1-5 scale with 5 as the highest score in the following areas: Marketability, Vase Life, Color, and an Overall Rating. While every grower provided

evaluations based on marketability, color and an overall rating, vase life was only evaluated on one site. We did a vigorous vase life trial at the Franklin County Horticulture Center which will be discussed later in this report.

The "Strongly Recommended" picks below all scored 4 or higher in the overall rating and the second category of "Worth Growing" scored 3.0 to 3.9. Failing to make an overall rating of at least 3.0 does not mean a specific cultivar should be discounted completely. The harsh growing season, specific needs of the growers involved and other factors could very likely remove a cultivar that make be excellent for your use.

Strongly recommended for specialty cut flower production:

Brilliance (overall rating 4.00) Medium yellow with a dark brown disk. A classic sunflower, but some growers found the heads too large. Pollen-free.

Double Solar (overall rating 4.00) Golden yellow with no visible disk. Very late to bloom with stunning single flowers. Not your classic sunflower. Pollen-free.

Full Sun (overall rating 4.75) Gold petals with a yellow brown disk. Classic single-stem sunflower similar to Sunbright. Pollen-free.

Goldburst (overall rating 4.00) Full double sunflower a little smaller than Double Solar with gold petals that fade to slightly green on the disk.

Joker (overall rating 3.50) Red disc flowers with outer petals that range from orange-red to yellow-red. Highly variable in color range. While Joker's overall score is lower than others in this category, many growers find this cultivar very marketable. Pollen-free.

Moonbright (overall rating 5.00) Tall single stem cut flower with yellow petals and a brown disc. Flower size 5-8", some sites commented that the flowers are a little too large for florist trade. Pollen-free.

Sunbeam (overall rating 4.00) Golden yellow with a green / gold center. Mostly pollen free.

Sunbright (overall rating 5.00) Golden yellow with a brown disc. Growers report that this flower is what florists want and should be the measuring stick for other single sunflowers. Pollen free.

Sunbright Supreme (overall rating 4.00) Gold with a brown disk. Blooms a little earlier than Sunbright. Some pollen.

Worth growing but falling slightly short of the strongly recommended list:

Dorado Select (overall rating 3.75) Golden petals with a dark face. Good long stems and pollen free.

Starburst Lemon Aura (overall rating 3.00) Growers liked the color and had good acceptance among florists. They noted that this one had some problems, but due to marketability, they would try it again. Pollen-free.

Terra Cotta (overall rating 3.00) Unique orangish-brown color with some specialty market potential. Pollen-free.

Some that rated highly in 2001, but failed to make the grade in 2002:

These may be worth consideration as our cooperators varied quite a lot in the amount of irrigation water they had available this year and their individual marketing niches.

Golden Glory
Goldrush
Holiday
Munchkin
New Cut Gallardia
Soraya
Summertime
Sunsplash
Ikarus

Vase Life Trials

As noted earlier in this report a complete vase life trial was run at the Franklin County Horticulture Center. All flowers were placed directly into water as harvested. Once in our processing area, stems were stripped, then dipped into a mild soap solution, then recut before being placed into Aquaplus floral preservative at 40g/gallon. The room was air conditioned to approximately 72°F. Flowers were removed from the trial as soon as they were no longer vase worthy as determined by the research technician.

Results from both the recommended and worth growing lists:

Brilliance: 10-12 days
Dorado Select: 5-8 days
Double Solar: 14 plus days
Full Sun: 8-9 days
Goldburst: 10-12 days
Joker: 7-11 days
Moonbright: 12 days
Starburst Lemon Aura: 11-13 days
Sunbeam: 7-9 days
Sunbright: 9-10 days
Sunbright Supreme: 9-10 days
Terra Cotta: 8-11 days

Two flowers that did not make the grade this year in the recommended lists, but had excellent vase life were Superior Gold at 16 days and Summertime at 11-16 days.

Funding for this trial program was provided by the Pennsylvania Vegetable Growers Association (PVGA) and the Franklin County Horticulture Center.

Special thanks to the cooperators and agents that followed these plantings through this tougher than usual season:

Robert Ambrose
Tom Becker
Tom Butzler
Dave Delbo

Donna Dubs
Scott Guiser
Dave Ritter
Eydie Shafer

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Bug vs. Bug - Managing Plant Diseases with Biofungicides

Cathy Thomas, Integrated Pest Management Program
Pennsylvania Department of Agriculture

Mealybugs have the ability to feed on a wide range of host plants. Foliage plants in greenhouses and interior plantscapes are very susceptible to mealybugs and vegetables such as tomato, cucumber and eggplant can serve as host plants as well.

Mealybugs are part of a family known as scale insects. Mealybugs are not covered with a hard shell like most scales insects, but instead are covered with a white, waxy powder with thread-like projections around the perimeter. This waxy powder can serve as a barrier to effective control with chemicals. Clusters of mealybugs look like a cottony mass. The key to controlling this pest is to detect infestations before they become too dense. Biological controls should be introduced when mealybugs are first spotted at low population levels for the most effective control.

Life Cycle

There are two main mealybug pest species attacking greenhouse crops, the citrus mealybug (*Planococcus citri*) and the longtailed mealybug (*Pseudococcus longispinus*). Mealybugs have sucking mouthparts and their feeding weakens and stunts plants causing leaves to turn yellow and appear distorted. Mealybugs like aphids secrete sticky honeydew that serves a substrate for black sooty mold development, ruining the cosmetic value of the plant.

Citrus mealybug produces eggs that are in cottony structures called ovisacs. Eggs hatch in about 10 days into small nymphs called crawlers. The crawlers move about the plant to find a suitable feeding site and then begin to feed on plant sap. There are 3 nymphal stages in the life cycle that takes approximately 30 days at 86 degrees F.

Long tailed mealybugs produce fewer eggs than citrus mealybug. Females produce live young or lay eggs that hatch into the crawler stage. There is no cottony ovisac as there is with the citrus mealybug.

Biological Control

Cryptolaemus montrouzieri - The mealybug destroyer

Cryptolaemus is a predatory ladybird beetle. Originating from Australia, this predator is one of the most effective biocontrols for citrus mealybug or mealybug species producing cottony egg masses. Adults and young larvae eat every stage of the mealybug. The adult beetle can reach a length of 4 mm; its head, thorax and abdomen are orange-brown. A female beetle lives approximately two months and lays 10 eggs a day in a mealybug colony or in a group of mealybug eggs. Eggs hatch into larvae that can reach a length of 13 mm and can be recognized by its white wax like filaments. Because of this white secretion, the larva and prey look very similar and the larva is sometimes mistaken for the pest. Young larvae hatch out as voracious predators of smaller stages of mealybugs, whereas the larger larvae will eat mealybugs of any size. *Cryptolaemus* is most active when the weather is sunny, with optimal temperature of 68 degrees F for a few hours each day and relative humidity of 70 - 80%.

Leptomastix dactylopii - tiny wasp, parasitoid.

This tiny parasitic wasp is very efficient in controlling mealybugs, however it is only effective against citrus mealybug. When infestations are heavy, this parasite works well with *Cryptolaemus*. The adult female wasp searches the leaves for the larger stages of the mealybug. Upon finding a suitable stage, the wasp will lay an egg in the body of the mealybug and a new parasite will emerge from the parasitized body of the mealybug. One wasp can parasitize 50 - 100 mealybugs. The lifecycle takes approximately three weeks at 75 degrees F.

These biocontrols are commercially available from most biocontrol suppliers. For a list of suppliers, visit this website: <http://www.cdpr.ca.gov/docs/ipminov/bensuppl.htm>

Tips for using biocontrols effectively

- Discontinue the use of residual pesticides, 4 - 6 weeks prior to introducing biocontrols - check residues with suppliers
- Identify the species of mealybug attacking the crop
- Start introducing biocontrols when pest populations are low
- Follow supplier recommendations for release rates
- Disperse biocontrols on the day of receipt

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Pesticide Groups for Berries- Part 1

Kathy Demchak, Department of Horticulture

As mentioned in an earlier article, this month we'll cover the groups that berry fungicides fall into for resistance management purposes. Insecticides and miticides will be covered next month, and herbicides after that.

You will see, on some of the newer pesticide packaging, words such as "Group 11 Fungicide", as with Cabrio, for instance. Growers often ask with what other pesticide they should alternate a particular material, and this labeling should help to answer their questions. However, the labeling is voluntary, so only time will tell how many packages bear this information. The "activity groups" into which pesticides fall are based on the mode or target site(s) of action that each pesticide has. To delay the buildup of resistance to a particular chemical, it should be alternated or combined with a material with a different mode of action (one that falls in a different activity group). With fungicides labeled for berry production in PA, the activity group, and fungicides currently in each category are listed below. This information was obtained from "Pesticide Registration (PR) Notice 2001-5, Guidelines for Pesticide Registrants on Pesticide Resistance Management Labeling" on EPA's Web site (<http://www.epa.gov>).

Fungicides:

Group 1 - Inhibition of tubulin formation: benomyl (Benlate) and thiophanate-methyl (Topsin M)

Group 2 - Affect cell division, DNA and RNA synthesis, and metabolism (dicarboximides): iprodione (Rovral) and vinclozolin (Ronilan)

Group 3 - Demethylation inhibitor: myclobutanil (Nova)

Group 4 - Phenylamides - affect RNA synthesis: metalaxyl (Ridomil)

Group 9 - Anilinopyrimidine: cyprodinil (one of the active ingredients in Switch)

Group 11 - Quinone outside inhibitors: azoxystrobin (Quadris and Abound) and pyraclostrobin (Cabrio)

Group 12 - Phenylpyrroles: fludioxinil (the other active ingredient in Switch)

Group 17 - Hydroxylanilide: fenhexamid (Elevate)

Group M - multisite activity: fosetyl-Al (Aliette), fungicides containing copper or sulfur as the active ingredient, thiram (Thiram), ziram (Ziram), captan (Captan or Captec), and dodine (Syllit)

You'll notice that Group M fungicides are the ones about which we generally (but not always) worry less about resistance buildup, and often recommend for combination or alternating with other fungicides that have a more specific activity. Fungicides that fall

into the same activity group should not be alternated with each other for resistance management purposes.

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That's a Berry Good Question!!

Kathy Demchak, Department of Horticulture

Q. I have a pesticide that's labeled for caneberries. Does this category refer to only the brambles, or are blueberries also included, since they have canes? (Anon.)

A. The subgroup "caneberries" refers to just the brambles. Blueberries fall in the "bushberries" crop subgroup. With older labels that didn't use crop groupings, materials could only be used on the crops stated on the label, leaving minor crops such as elderberries or gooseberries with few chemical options for pest control. Crop groupings allow pesticides to be used on various crops in a group or subgroup, even if they are not specifically mentioned on the label.

Here's a brief explanation of where the small fruit crops fall in crop groupings. There are four major groups: strawberries, grapes, cranberries, and berries (further divided into the subgroups caneberries and bushberries). Strawberries, grapes, and currants are each in their own group, sufficiently different from other crops to be kept separate. If the label does not state that a material is for use specifically on strawberries, grapes, or cranberries, the material cannot be used on them. The label may refer to 'berry crops', but not specifically mention strawberries, grapes, or currants. In that case, the material can be used on caneberries or bushberries, but still is not to be used for strawberries, grapes, or currants, unless they are mentioned somewhere else on the label. The berry group is further divided into caneberries and bushberries. Caneberries refers to raspberries, blackberries, and any hybrids of the two (boysenberries, tayberries, etc.). Bushberries refers to berries that grow on a bush (!), and therefore covers blueberries (highbush and lowbush), huckleberries, currants, gooseberries, and elderberries. These crop groups may be modified in the future if needed changes become apparent.

The above was condensed from information found on the IR-4 Web site. For further information, or for information on how vegetable and tree fruit crop groups are grouped, visit the IR-4 Web site at <http://pestdata.ncsu.edu/ir-4/index.cfm> and click on the topics under 'Crop Grouping' on the right.

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

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Potato Musings

Bill Lamont, Department of Horticulture

Schedule for the Potato Sessions at the 2003 Mid-Atlantic Fruit and Vegetable Growers Convention, Hershey, PA, February 4-6, 2003

Bill Lamont, Department of Horticulture,
Program Chairman for Potato Sessions

I would encourage all potato growers to plan on attending the potato sessions at the Mid-Atlantic Fruit and Vegetable Growers Convention on Feb. 4 and 5. I think that we have an excellent slate of speakers and that will cover a wide range of topics of interest to those involved with growing, processing and marketing potatoes.

Tuesday, February 4, 2003 PM

Session E

Potatoes

Tuesday, February 4, 2003, PM

Topics and Speakers

Presiding: Bob Leiby, Lehigh County Cooperative Extension

1:30 PM **Update on Nonconventional Additives on Potatoes**- Dr. Keith Kelling, Department of Soil Science, 1525 Observatory Drive, University of Wisconsin, Madison, WI 53706-1299. Phone: 608-263-2795, Fax: 608-265-2595, E-mail: kkelling@facstaff.wisc.edu

2:15 **Quality Oriented Potato Management**- Dr. Matthew Kleinhenz, Department of Horticulture and Crop Science, Ohio State University, OARDC, 1680 Madison Avenue, Wooster, OH 44691. Phone: 330-263-3810, Fax: 330-263-3887, E-mail: kleinhenz.1@osu.edu

3:00-3:15 Industry Show and Tell

3:15 **Potato Production in Ontario**- Dr. Eugenia Banks, Potato Specialist, Ontario Ministry of Agriculture and Food, 1 Stone Rd, Guelph, Ontario, Canada N1G 4Y2, Phone: 519-826-3678, Fax: 519-826-4964, E-mail: eugenia.banks@sympatico.ca

4:00 **Weed Control in Potatoes-including Volunteer's**- Dale Moyer, Cornell Cooperative Extension, 423 Griffing Ave., Suite 100, Riverhead, NY 11901 Phone: 631-727-7850 Ext 324, Fax: 631-727-7130, E-mail: ddm4@cornell.edu

4:30 Adjourn

Wednesday, February 5, 2003 AM and PM

Session E

Potatoes

Wednesday, February 5, 2003, AM

Topics and Speakers

Presiding: George Perry. Schuylkill County Cooperative Extension

9:00 AM **Organic Potato Production-** Dr. Matthew Kleinhenz, Department of Horticulture and Crop Science, Ohio State University, OARDC, 1680 Madison Avenue, Wooster, OH 44691 Phone: 330-263-3810, Fax: 330-263-3887, E-mail:

kleinhenz.1@osu.edu

9:30 **Getting the Rocks Out--An Innovative Production System-** John Twillinger, Huntsinger Farms, RD#1, Box 2, Hegins, PA 17938 Phone: 570-682-3342 Fax: , E-mail:

huntsing@epix.net

10:00-10:15 Industry Show and Tell

10:15 **Use of Manure in Potato Production-** Dr. Keith Kelling, Department of Soil Science, 1525 Observatory Drive, University of Wisconsin, Madison, WI 53706-1299.

Phone: 608-263-2795, Fax: 608-265-2595, E-mail: kkelling@facstaff.wisc.edu

11:00 **Potato Insect Management-**An Update- Dr. Joanne Whalen, Extension Specialist II, Entomology & Applied Ecology, University of Delaware, Newark, DE 19716

Phone: 302- 831-1303, Fax:, E-mail: jomark@dmv.com

11:30 **Update on Fungicide Seed Piece Treatments-** Dr. Steve Johnston, Extension Plant Pathologist, Rutgers University, Cook College, 121 Northville Rd, Bridgeton, NJ 08302. Phone: 609-455-3100. E-mail: johnston@aesop.rutgers.edu

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

Session B

Potatoes

Wednesday, February 5, 2003, PM

Topics and Speakers

Presiding: Tom Butzler, Clinton County Cooperative Extension

1:30 PM **Calcium Study Using Atlantic and Reba Varieties-** Dr. Melvin Henninger, Extension Vegetable Specialist, Department of Plant Science, Foran Hall, 59 Dudley Rd., Rutgers University, New Brunswick, NJ 08901. Phone: 732-932-9711 Ext. 120, Fax: 732-932-9441 Email: henninger@aesop.rutgers.edu

2:00 **Update on Management Strategies for Late Blight and other Diseases** - Dr. Barbara Christ, Professor, Department of Plant Pathology, 405 Buckhout Laboratory, Penn State University, University Park, PA 16802. Phone: 814-863-2068, Fax: 814-863-7217, E-mail: ebf@psu.edu

2:30 **Influencing Chipping Quality in the Field**- Joe Sieczka, Cornell University, 3059 Sound Ave, Riverhead, NY Phone: 631-727-3595, Fax: 631-727-3611, E-mail: jbs5@cornell.edu

3:00-3:15 Industry Show and Tell

3:15 **Herr Potato Chip Company-Looking Toward the Future**- Eugene Herr, Herr Foods Inc., PO Box 300, Nottingham, PA 19362 Phone: 610-932-9330 Ext. 6539, Fax: 610-932-1190, Email: gene.herr@herrs.com

4:00 **The Challenge of Marketing Specialty Potatoes** - Dr. William James Lamont Jr. Department of Horticulture, The Pennsylvania State University, University Park, PA 16802, Phone: 814-865-7118, Fax: 814-863-6139, E-mail: wlamont@psu.edu

4:30 Adjourn

Powdery Scab

Sara R. Mahoney and Barbara J. Christ
Department of Plant Pathology

Due to the recent discovery of the potato mop-top virus (PMTV) in the United States I thought a more extensive description of its vector, *Spongospora subterranea*, the powdery scab pathogen, would be appropriate. Powdery scab in itself is a disease that causes considerable losses due to unmarketable tubers and potato seed. Growers have been forced to live with this disease since there are no effective chemical controls and very few efficient cultural controls that can be used against it.

Symptoms

Powdery scab occurs only on the below ground portions of the plant. It is impossible to detect an infection by looking at the foliage. Only the potato roots, stolons, and tubers are attacked. A typical infection will appear at a tuber lenticel or eye as a purplish brown lesion, which is sometimes sunken. This lesion develops into a tan pimple-like swelling. The scab lesion enlarges and the periderm will rupture producing tan wart-like outgrowths with powdery masses of cystosori or the "spore balls" of the pathogen. The lesions are surrounded by the torn edges of the periderm, which are sometimes raised. Wound periderm will form beneath the lesions, which will darken and eventually decay. This will appear as a shallow depression filled with powdery masses of spore balls.

Cankers may develop under extremely wet conditions when the wound periderm does not form and the pathogen continues to re-infect the same area. Symptoms may also appear as a russet-like checking on the skin or as scurfy areas on the tuber surface where spore masses can often be found. Often there are also increased *Rhizoctonia* infections when powdery scab is present.

On the roots and stolons milky white to tan galls will form that eventually turn brown and break down to release powdery masses of cystosori into the soil. The lesions on the stolons, roots, and tubers provide an entranceway for other pathogens often resulting in decay and more extensive damage to the plants.

Powdery scab can be confused with *Rhizoctonia*, which will also cause a russet-like checking on tubers. More often this disease is mistaken as common scab, which is caused by an actinomycete. Common scab lesions are circular, raised, corky, and tan to brown in color. These lesions do not rupture and form the masses of spore balls found with powdery scab

Powdery scab has been found throughout the world in most potato-producing areas. This disease however develops best under cool, moist conditions so it is most severe in temperate climates and at high altitudes in the tropics. Infection is greatest when the soil is moist and soil temperatures are between about 52-65°F. *S. subterranea* survives in the soil as cystosori. These resting spores will germinate to release a zoospore, which will infect the epidermal cells of roots, root hairs, stolons, young shoots, and tubers.

Cultural Management

- Plant clean seed that appears to be free of powdery scab especially when planting in disease free areas.
- Avoid highly contaminated areas.
- Keep equipment clean and disinfected to prevent movement of the pathogen from infested soils.
- Plant less susceptible varieties such as russets, which rarely get tuber infections but will develop galls on roots and stolons.
- Adequate soil drainage will help to reduce the severity of this disease.
- This pathogen can survive digestion so do not use manure fertilizer if it is from animals that have eaten infected potatoes.
- Rotate out of Solanaceous crops in infested fields for at least 3-5 years. Research has shown that many rotation crops such as tomatoes are alternative hosts for powdery scab.
- Control Solanaceous weeds, such as nightshade.
- Keep soils dry during tuber set to help prevent infection.

The potato mop-top virus vector

PMTV is a soil borne virus, which is transmitted to potatoes in a persistent manner by the powdery scab organism. The virus can survive for many years in the resting spores of powdery scab in the soil. The most efficient way to control this virus in a contaminated area is to control powdery scab.

References:

Christ, B.J. 1998. Identifying Potato Diseases in Pennsylvania. College of Agricultural Sciences, Pennsylvania State University, University Park, PA.

de Boer, R. 1997. Institute for Horticultural Development webpage. Retrieved 12/4/02 from <http://www.nre.vic.gov.au/agvic/ihd/r&d/doc-026.htm>

Stevenson, W.R., Loria, R., Franc, G.D., Weingartner, D.P. 2001. Compendium of Potato Diseases. 2nd Ed. The American Phytopathological Society. St. Paul, MN.

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Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

January 11-18, 2003: Pennsylvania Farm Show, Harrisburg, PA. Contact: Dr. Pete Ferretti, (814) 863-2313.

January 17, 2003: Morrison's Cove Produce Auction Meeting, Martinsburg, PA. Contact: Tom Ford (814) 693-3265

January 20, 2003: New Holland Vegetable Growers Day, New Holland, PA. Contact: Tim Elkner (717) 394-6851.

January 21, 2003: Tri-County Vegetable and Small Fruit Meeting, Penn Township Community Bldg., Shippensburg, PA. Contact: Steve Bogash (717) 263-9226

January 23, 2003: Susquehanna Regional Vegetable Meeting, Mifflinburg, PA. Contact: Jeff Mizer (570) 837-4252.

January 30, 2003: Lebanon County Auction Vegetable Meeting, Shaefferstown Fire Hall, Shaefferstown, PA. Contact: Ginger Pryor (717) 240-4391.

February 11, 2003: Cambria and Somerset Regional Vegetable and Potato Meeting, Ebensburg, PA. Contact: Mike Harteis (814) 472-7986

February 18, 2003: Northeast Vegetable Growers Meeting, Thompson's Dairy Bar, Clarks Summit, PA. Contact: John Esslinger (717) 963-4761

March 4, 2003: Schuylkill County Regional Vegetable Growers Meeting, Extension Office, Pottsville, PA. Contact: George Perry (570) 622-4225

March 5, 2003: Lehigh/Schuylkill County Potato Growers Meeting, Schnecksville Grange in Neffs PA. Contact: Bob Leiby (610) 391-9840

March 5, 2003: Southeastern Vegetable Growers Meeting, Heritage Restaurant, Franconia, PA. Contact: Mary Conklin (610) 489-4315

March 6, 2003: 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

March 18, 2003: Central Vegetable Meeting, Pleasant Gap, PA. Contact: Tom Butzler, (570) 726-0022

March 19, 2003: Erie County Potato and Vegetable Growers Meeting. Contact: Andy Muza (814) 825-0900

March 20, 2003: North Central Vegetable Producers Conference, Emporium, PA. Contact: Tom Butzler (570) 726-0022

March 21-22, 2003: Passive Solar Greenhouse Workshop: Design, Construction and Year Round Production, Sonnewald Natural Foods, Spring Grove, PA. Contact: Steve or Carol Moore (717) 225-2489, or sandcmoore@juno.com.

Regional

January 14-16, 2003. Vegetable Growers Association Annual Meeting and Trade Show. Trump Taj Mahal Casino and Resort in Atlantic City, NJ.

January 15-17, 2003. Ohio Fruit and Vegetable Growers Congress/Ohio Roadside Marketing Conference/Ohio Christmas tree Winter Meeting. Toledo Sea Gate Centre, Toledo, OH. Contact: Tom Sach (614) 249-2424.

February 4-6, 2003. Mid-Atlantic Fruit and Vegetable Conference, Hershey, PA. Contact: Bill Troxell (717)-694-3596 or e-mail: wt.pvga@tricity.net

National

December 5-7, 2002. National Potato Council Seed Seminar. Hoiday Inn by the Bay, Portland, ME. Contact: (207) 769-5061.

January 7-11, 2003. National Potato Council 54th Annual Meeting. Loews Ventana Canyon Resort, Tucson, AZ. Contact: (202) 682-9456.

International

World Potato Conference. Kunming, China. See www.potatocongress.org