# The Vegetable and Small Fruit Gazette

Vol. 8, No. 2- February 2004

Horticulture Department
The Pennsylvania State University

**In this Issue:**



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**Tip for the Month--**"The love of gardening is a seed that once sown never dies"- Gertrude Jekyll

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## Comments from the Editor

Bill Lamont, Department of Horticulture

Snow, snow, snow…As I look out my office window it is really coming down. I am going to Minn. tomorrow to speak at the Upper Midwest Regional Fruit and Vegetable Conference. From one snow covered area to another. Be sure to check the many local, regional and national meetings still pending in the Upcoming Meeting list. Thanks to Tom Butzler for his excellent article **"On-Farm Comparison of Fertility Treatments on Sweet Corn"** and I look forward to receiving Steve Bogash's article for the March 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

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| March | Steve Bogash |
| April | Scott Guiser |
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| July | Eric Oesterling |
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## On-Farm Comparison of Fertility Treatments on Sweet Corn

Tom Butzler, Mark Douglas, Craig Altemose, and Brooks Way

An on-farm comparison of fertility treatments to one Sweet Corn variety planted and harvested at two different times during the season was carried out at the Way Fruit Farm in Centre County, Pennsylvania as part of a Sustainable Agriculture Research and Education (SARE) Program. This was an evaluation of which treatment was most economical, had the best sugar content, and nutrient utilization. The treatments consisted of: 1) 50 pounds of nitrogen applied just prior to planting as a broadcast and incorporated 2) a nitrogen recommendation based on Pre-Sidedress Nitrate Soil Test (PSNT) taken when the corn was 8 to 12 inches tall, and 3). A nutrient foliar treatment (Brooks Way wanted to know if the foliar fertilizer would give the plant a boost right when it was needed (applied when corn silking) and improve the sugar content. In addition, foliar feeding was convenient in the sense that it could be mixed with insecticide applications.)

Two replicated trials consisting of these three treatments replicated four times in each trial were planted, one in early May and the second in early June, 2003. All treatments were applied after each trial was soil sampled and brought up to recommended soil test levels for P and K.

PSNT recommendations were made if the test level was less than 25 ppm nitrate. The recommendations were based on a yield goal of 120 bushels of dry shell corn per acre. We used this goal based on field corn because Penn State has no yield goal for sweet corn. Both trials were sprayed with the herbicides: Prowl 3 EC at 1 quart & Bicep Lite II, Magnum at 2 quarts per acre pre-emergence to control weeds. The planting rate was 18,000 seeds/acre.

Harvests were taken August 18 & August 25, 2003 in Trials1 and 2 respectively. Measurements were based on the number and weight of marketable ears from the middle 20 feet of rows 4, 8, 12, and 16 out of each plot. Yields were interpolated to one acre. A Brix test was performed for sugar content of one ear selected at random from each row sample harvested in each plot. The 2003 year was a record setting year for rainfall. Irrigation was only needed once to help incorporate the side dress nitrogen fertilizer recommended in the PSNT treatments. Wire cone traps with appropriate lures were used to trap and monitor corn earworm and European corn borer. A bucket trap was used to monitor fall armyworm. The results of this monitoring did not show a need for increased insecticide spraying.

The cost for treatment 1 (broadcast nitrogen) was $558.55 per acre, treatment 2 (PSNT) was $548.10 per acre, and treatment 3 (foliar feed) was $540.62 per acre. Net return to management for treatment 1 (broadcast nitrogen) was $2419.16 per acre, treatment 2 (PSNT) was $3088.21 per acre, and treatment 3 (foliar feed) was $2416.07 per acre. There was no difference is sugar content between the three treatments. As a result of the test, the grower plans to use a PSNT test on all sweet corn grown in 2004.

Project participants were Brooks Way of Way Fruit Farm, Thomas Butzler, Craig Altemose, and Mark Douglass, Penn State Cooperative Extension.

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## 2004 Vegetable and Small Fruit Field Day

Mike Orzolek, Department of Horticulture

The 2004 Vegetable and Small Fruit Field Day will be held on Wednesday, July 14, 2004 at the Horticulture Research Farm, Rock Springs, PA. The event is jointly sponsored by the Pennsylvania Vegetable Growers Association, and the Penn State Cooperative Extension Service. The theme for the 2004 Field Day will be Tillage and Varieties. In addition to the various pieces of tillage implements that will be demonstrated in the field (some fields will have been tilled prior to the Field Day), there will be over a hundred vegetable varieties (as many as 18 crops) either growing in the field or at the High Tunnel Research and Education Facility. The High Tunnel facility will also be on the tour for guests to visit. Participants can see Dr. Sanchez's project of transitioning four high tunnels to certified organic production using tomatoes as the crop this season.

Small fruit projects to see will include plasticulture strawberry production, matted-row strawberry variety trial, blueberry irrigation study, bramble production in high tunnels and day-neutral strawberry varieties grown in gutters in the high tunnels. Please mark your calendar for this event and keep reading the Vegetable Gazette for additional information on the Field Day as time gets closer to July.

If you have any questions regarding the Field Day events, trade show, or schedule, please contact Dr. Mike Orzolek at mdo1@psu.edu or at 814/863-2251.

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## 8 Tips for Transitioning to Organic Production

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

The transition phase can be difficult for growers transitioning to organic production. During the transition phase the farming system is undergoing many changes in physical, chemical and biological properties. The transition phase is typically accompanied by reduced yields until the farming system reaches a new equilibrium. Further, crops produced during the transition phase cannot be marketed as organic or transition organic. As a result growers must be prepared to operate with the reduced incomes typically accompanied with reduced yields during the transition phase. Below are some tips for the transition phase adapted from Zinati (2002). Keep in mind that factors such as location, soil type, pest pressure and environmental factors can affect the efficacy and implementation of these tips.

1. Select land with a high nutrient status, good soil structure and low pest pressure to transition first. A grower can transition separate fields at different times to organic production. A strategy for transitioning fields, particularly with high pest pressures may be to use a pre-transition phase (See tip 8).

2. Include legumes in the crop rotation to supply nitrogen to the soil and reduce pest pressure. Different legumes add different amounts of nitrogen to the soil. The Commercial Production Recommendations Guide for Pennsylvania includes a table with nitrogen values for different legumes used as green manures. Even when the legume is grown as a cash crop, incorporating the plant reside after harvest can add some nitrogen to the soil.

3. Start the transition by planting a crop with low nitrogen needs. This strategy will provide more time for adding nitrogen to the soil using other fertility management tools including green manures, manures and compost.

4. Use green manures, manures and compost to increase soil organic matter, water infiltration and reduce soil erosion. Green manures, manures and compost are already important tools for fertility management in organic systems.

5. Alternate cool season crops with warm season crops to break weed cycles. In surveys of organic growers, weeds typically are listed as the biggest pest problem in organic production. This is one strategy for their management.

6. Use timely disking and over-seeding as other strategies to manage weeds.

7. Experiment on a small-scale before adopting a pest management strategy on a large scale. This can reduce risks in the event the pest management strategy fails.

8. While a 3-year transition phase is required for certification, a pre-transition phase may help alleviate decreased yields during the transition phase. A pre-transition phase may be useful for fields with high pest pressure. During a pre-transition phase conventional pest management tactics are used along with organic tactics to reduce pest pressures. Once pest pressures are reduced organic pest management tactics are used exclusively.

References

Zinati, G.M. 2002. Transition from conventional to organic farming systems: 1. Challenges, recommendations and guidelines for pest management. HortTechnology 12:606-610.

Commercial Vegetable Production Recommendations Pennsylvania 2004.

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## Bug vs. Bug - Compatibility of Pesticides with Natural Enemies

Cathy Thomas, Integrated Pest Management Program
Pennsylvania Department of Agriculture

Sticky traps are an important tool in an Integrated Pest Management Program and alert growers to pests that are present. Adult stages of pests such as whiteflies, western flower thrips, fungus gnats, shoreflies and winged aphids may be detected on sticky cards. Adult trapping alone may not always be a good indicator of damage being caused by immature life stages, therefore, weekly plant inspection should be used in combination with sticky card monitoring. The information obtained from sticky card monitoring can be used to determine if a treatment is needed, the proper timing of a treatment (biological or chemical), and helps in evaluating the effectiveness of the control actions.

**Types of Traps**
Rectangular 3 x 5 inch traps are typically used in greenhouse crops. Sticky tapes and ribbons can be used, however these are primarily used for control of insects.
Bright yellow is the color most commonly used to trap most species of insects. Keep traps in good condition and change them at least every other week, or weekly if needed.
This will vary with insect population levels.

Blue traps are most attractive to western flower thrips and other thrips species.
This color is useful in crops that are sensitive to thrips damage and require close monitoring.

**Interpreting Trap Information**
To identify insects on sticky traps a 10x to 15x power hand lens will be necessary. Traps should be checked once a week or every 2 – 3 days if you suspect a problem. Examining traps weekly will give you idea of population trends. Record the number and type of pests caught on each card. Keep this information for future use. A guide to identifying insects on sticky traps can be obtained through IPM Laboratories, Locke, NY, (315) 497-2063, ipmlabs@ipmlabs.com or explore these web site for more information:
http://www.ipm.ucdavis.edu./PMG/selectnewpest.floriculture.html.

Fungus gnats and shoreflies – Fungus gnat adults have long legs and antennae. There is “Y” shaped vein on the tip of their wing. Horizontal placement of cards just above the soil surface is more effective that vertical placement. Shoreflies have five clear spots on their wings with shorter antennae than a fungus gnat. Hang cards vertically for shorefly monitoring.

Thrips – Usually the tiniest insect found on traps. The slender abdomen appears pointed at the rear and hairs line the edges of the wings. Female thrips are dark brown compared to the yellow – brown males. Thrips are attracted to both blue and yellow traps.

Whiteflies – Slightly larger than a thrips. White wings become less visible the longer they are entrapped. Monitor at vents and doors for migrating whiteflies. In the fall, the bandedwinged whitefly appears on the cards as the outside plant hosts die. This species appears gray from the black bands across their wings.

Winged Aphids – Yellow sticky cards will detect winged aphids but not the nymphal stages. Winged aphids may indicate a serious aphid infestation in the crop. Aphids have two distinct black spots on their wings and two “tailpipes” or cornicles at the rear of their abdomen.

Suggestions on using sticky cards

•Use at least 1 or 2 cards per 1,000 square feet. Additional cards may be placed near doors, vents and in areas of insect-susceptible plant species.

• Reduce the number of cards if you are using beneficial insects such as parasites or other winged species.

• Replace cards weekly if insect populations are high or if there is debris on cards.

• Place cards in houses before introducing crop to monitor for overwintering pests. A card placed just above the floor level can detect thrips or fungus gnats.

• Place cards 1 –2 inches above plant canopy and move the cards as the plant grows.

•Place cards near plants that are favored hosts for certain pests. (ie. thrips on african violets, impatiens, and chrysanthemums)

•Reduce or eliminate blue traps if you are using bumble bees for pollination. Bumble bees are attracted to blue.

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

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## Research Update- Strawberry Row Cover Work

Kathy Demchak, Department of Horticulture

In the fall of 2003, a study at Rock Springs was initiated in which different types of row cover treatments were applied to 'Chandler' plants to examine their use both to increase fall growth, and to provide winter protection. Fall treatments applied on September 26 were 1) no row cover (control), 2) a 0.55 ounce/square yard row cover (Agribon® AG-19), and 3) a 1.25 ounce/square yard (Typar® T-518) row cover applied. The changeover to winter treatments was made on October 24. The winter treatments were 1) a 1.25 ounce/square yard (Typar® T-518) row cover, plus straw (applied on December 13), 2) a 1.25 ounce/square yard (Typar® T-518) row cover alone 3) a 2.0 ounce/square yard row cover (Agribon® AG-70), and 4) a double thickness of a 0.55 ounce/square yard row cover (Agribon® AG-19). A datalogger was used to measure air and soil temperatures in 3 replications of each fall and winter treatment. PAR (photosynthetically-active radiation) was measured using a handheld PAR sensor. Though this study was only recently established, some unexpected findings have resulted. One assumption made was that the 1.25 oz./sq. yd. fabric used in this study would have more insulation ability than the 0.55 oz/sq. yd fabric used. While heavier weights of row cover made by the same manufacturer may have this effect (or may not as types of weaves differ), it was not the case when comparing light to heavy-weight row covers of different manufacturers. Generally, both air and soil temperatures were slightly higher in the fall under the 1.25 oz/ sq. yd. fabric (a maximum of 1-2 degrees, but usually less

than 1 degree) as compared to the 0.55 oz/sq. yd. material. However, it must be stressed that in this case, the 1.25 ounce per square yard fabric has been more durable to date, and so is likely to be worth the extra cost for that factor alone. In addition, light reduction from these two types of row covers was similar, but varied from October to December, so sunlight angle might also play a role. Winter data is still being analyzed, and will be reported later. Yield effects of all treatments will be determined next spring.

This research was supported in part by agricultural research funds administered by The Pennsylvania Department of Agriculture. Thanks to Ken-Bar, and Polymer Group, Inc., for row cover material used in this research.

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## Potato Musings

Bill Lamont, Department of Horticulture

## Potato Irrigation

Bill Lamont, Department of Horticulture

If you have looked out your window you are probably not really thinking about irrigating potatoes but how to plow all the snow out so you can move potatoes out of storage. Even though many growers in Pennsylvania rely on “Mother Nature” to supply them with the necessary moisture for their potato crop, water management and /or lack of adequate rainfall are probably the most important factors determining yield and quality of potatoes. Knobby tubers, growth cracks, internal necrosis, blackspot, hollow heart, heat sprouting, and other disorders are directly related to amount and distribution of water during the growing season. Diseases such as seed piece decay, rhizoctonia stem canker, and late blight can also be related to amount and distribution of water. Factors to be considered are method of application (rainfall or overhead irrigation), timing of irrigation, and quantity of irrigation.

While the amount of water required to permit optimum growth of potatoes varies somewhat with variety, humidity, sunlight, and length of growing season, the seasonal requirement for varieties in all areas will be at least 18 inches of water or 496080 gallons/acre. Where irrigation is practiced, the soil profile should be at or near field capacity at the beginning of the season and additional water supplied to the plants in frequent, light amounts during the growing season.

For irrigation management decisions, it should be remembered that: 1) the effective rooting depth of potatoes is 2feet, 2) the soil should not be allowed to dry below 65 percent of field capacity and during crop growth it is preferable to maintain the soil above 70-75% of available water to avoid any limitations of yield and tuber quality, 3) moisture levels above field capacity will seriously affect yield and quality, and 4) soil types can vary threefold in their respective water holding capacities.

Studies in several different growing areas have shown that daily water needs increase linearly until about two weeks after maximum row coverage is achieved. From this time on the plant’s daily water requirements holds nearly constant until the vines begin to mature (cast off), at which time the water requirement declines. Potato roots do not do a good job of taking up water. For this reason, potatoes should be irrigated often, especially when the tubers are forming. If the soil is allowed to become too dry before irrigating then small, poorly shaped tubers will be formed.

The amount and rate of water that should be applied during any given irrigation depends on the infiltration rate and water holding capacity of the soil, in addition to the amount of water already in the soil and the stage of plant growth, including depth of rooting.

Sprinkler irrigation provides the most flexibility and the best opportunity for efficient water application. This includes center pivot systems used in some parts of the state.

Summary of Water Management for Irrigated Production of Potatoes

Growth Stage 1. Sprout Development

Avoid planting in excessively wet or dry soil. The soil profile should contain a moderate amount of moisture (70-80% of available soil water). This provides good planting conditions and adequate water for sprout development. If the soil is excessively dry, it should be irrigated before planting (usually not a problem in PA). Postplant irrigations prior to crop emergence are not advisable, because of the risk of inducing seed piece decay and soil crusting.

Growth Stage 2. Vegetative Growth

As plants emerge and grow, most soils can be maintained a 75-85% available soil water.

Growth Stage 3. Tuber Initiation

The soil should be maintained at 80-90% of available soil water during tuber initiation. This provides the moisture required for optimal tuber set and reduces the development of common scab on newly formed tubers. If problems with brown center and hollow heart are anticipated, the soil should be kept drier (70-80% of available soil water), especially during cool weather.

Growth Stage 3. Tuber Bulking

The potato crop's highest demand for water occurs during tuber bulking: 80-90% available soil water should be maintained at this stage. Water stress during bulking can significantly affect tuber yield and quality and the development of disease in the crop. However, excessive irrigation (in which the soil is held near saturation and vines are kept wet for long periods) should be avoided, to minimize the development of early blight, late blight, aerial stem rot, and Sclerotinia stalk rot.

Growth State 4. Maturation

Demand for water is reduced as the plants begin natural senescence. Soil moisture can be allowed to decline to 60-65% of available soil water to promote skin set. High moisture (above 65% available soil water) should be avoided during maturation, to minimize disease problems and enlarged lenticels, which can increase the potential for bacterial soft rot in storage. Excessively dry soil at harvest (below 60% available soil water) can hinder effective harvesting, increasing tuber bruising caused by soil clods, and favor blackspot bruising.

One final thought is that the use of drip irrigation is that this method of irrigation results in a very high water-use efficiency and low total use of water (7 inches of water to produce a potato crop versus 18 inches), excellent uniformity of distribution and low energy requirements and low- pressure requirements. Application of fertilizers and some pesticides can be made through the drip irrigation system. The major disadvantage of drip irrigation is a high annual capital cost and it also requires the water to be filtered to prevent plugging of the drip outlets.

**Sources of information:**

Rowe, R.C., editor. Potato Health Management. APS Press, 178 pages, 1993.

Commercial Potato Production in North America. Potato Association of America Handbook. 46 pages. 1993

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## Potato IPM School for Chip and Tablestock Producers

Bill Lamont, Department of Horticulture

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

Feb. 13 – Cambria County Potato Meeting, Somerset, PA

Feb. 18 – Kutztown Auction Vegetable Growers' Meeting – Fleetwood, PA

Feb. 18 & 25 – Bucks County Vegetable Study Circle Meetings – Doylestown, PA

Feb. 19 – Mid-Atlantic Pumpkin School – Lancaster, PA

Feb 24 – Schuylkill County Regional Vegetable Growers' Meeting – Pottsville, PA

Feb. 24 - Family Farm Meeting – Lebanon, PA

Feb. 25 – Lackawanna County Vegetable Growers' Meeting – Clark Summit, PA

Mar. 3 – Regional Potato Meeting – Schnecksville, PA

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. 17 – Central PA Vegetable Growers' Meeting – Pleasant Gap or Lock Haven, PA

Mar. 18 – Northern Central PA Vegetable Growers' Meeting – location to be announced

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

## Regional

February 5-7, 2004. Pennsylvania Association for Sustainable Agriculture's 13th Annual Conference, Farming for the Future, Conference Center, Penn State University, University Park, PA. Contact: Brian Snyder (814)-349-9856.

February10-12, 2004 Empire State Fruit and Vegetable Expo in Rochester, NY. Contact Lindy Kubecka, (315)- 687-5734.

February 25, 2004. Bay Area Fruit School (Small and Tree fruits), Wye Research and Education Center, University of Maryland, Queenstown MD 21658. Contact: Michael Newell for agenda mnewell@umd.edu or 410-827-7388 (CCA credits and MD and Delaware pesticide credits offered)

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