

VEGETABLE AND SMALL FRUIT GAZETTE

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Tip for the Month: "Smile and brighten the world around you." -Bill Lamont

Comments from the Editor
Bill Lamont, Department of Horticulture

As the words to that famous song from the Broadway musical says, "June is busting out all over, all over the meadows and the fields". That is certainly true in Pennsylvania, as the landscape is blooming with color and the fields are buzzing with activity. At the Horticulture Research Farm we have been busy transplanting vegetables on a wide-array of colors of plastic mulches and colored paper mulches and making first and second planting's of vegetables in the high tunnels. Beginning with this issue we have also added a new monthly column- "Bug Against Bug", authored by Cathy Thomas, Senior Extension Associate, Greenhouse IPM which I hope that you will find useful. As always, I thank my colleagues in the other departments for their contributions to this publication and encourage them to keep up the good work. I also want to thank Mary Concklin for her excellent article on "Solar Pump for Irrigation Systems". The Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

Warm Winter, Cool Spring: Early And Extended Insect Populations
Shelby Fleischer, Department of Entomology

Insect development is driven by temperature once temperatures exceed a minimum threshold. Because temperatures vary from year to year, growers should not expect insects to arrive at the same calendar date each year. Recording temperatures on a

farm allow growers to calculate degree days and get a good idea of when to expect specific pests. What can we expect insect populations to do in our early crops this year?

The warm winter suggests that populations will arrive early, and field reports show early and damaging populations of alfalfa weevil and seedcorn maggot. There is also an unconfirmed report of the presence of corn earworm, which does not typically overwinter in Pennsylvania, but some individuals may have this year. In a similar situation, last year we had overwintering diamondback moth, and I would not be surprised to see that again in 2000. We should be prepared to protect against early damage from corn flea beetle to help stop transmission of Stewart's wilt in the early-planted sweet corn. Other pests that overwinter as adults include some species of mites (and we've had early mite problems in strawberries), and striped cucumber beetle.

But while the winter was warm, the spring has been cool in many areas. Insect populations tend to become extended when temperatures are cool. The variation in development from one instar to the next among individuals in a population is greater when temperatures are cool. Therefore, it will take longer for the entire population to complete one life stage, and there will be greater overlap among life stages. Bottom line is that the insects will be there longer.

Meanwhile, if it stays cool, the plants grow slower. This increases damages potential from pests like the seedcorn maggot. In warm weather, the plant can grow past the damage caused by the maggot. But in cool weather, the pest can cause sufficient damage to force replanting. Seed treatments at planting for seedcorn maggot are effective, but rescue treatments are not. If you are still planting in cool conditions, consider adding a seed treatment.

Another plant factor: vegetable growers may have their plants growing faster than nearby field crops if they are using inputs (plastic mulch, irrigation) that field crops are lacking. This creates a magnet for pests that move to the most vigorously growing plants. A classic example is the European corn borer. Be careful that your sweet corn is not a magnet for adult European corn borers looking to lay eggs in the best sweet corn in town. You are not the only one who views early-planted fields as an important investment: the female European corn borer also views it as their best investment for their young, and will preferentially place their eggs in those fields. Put up pheromone traps, scout your early-planted fields, and be prepared to use insecticides if you need clean ears. We hope to be on-line with the regional pheromone trapping data by early June.

Meanwhile, one piece of good news: if the 1st generation corn borer has a hard time finding actively growing field corn because of the cool spring, then we may not see much of a 2nd generation. That 2nd generation causes most of the damage to most of our sweet corn acreage. So keep scouting...

The Perils of Transplanting Vegetables 2000
Mike Orzolek, Department of Horticulture

Transplanting vegetables in the spring of each year can be very trying and anxious experience even for the veteran grower. Assuming that you have grown or purchased healthy, actively growing transplants with no insect or disease problems, establishment of the plants and subsequent growth is influenced by several factors. Transplants require

complete root to soil contact (air pockets on the soil can lead to root death) and the root-ball should be covered with soil to prevent water loss and desiccation of the roots. Soil temperature as well as moisture will also affect plant establishment after transplanting. Little root growth occurs below 50°F soil temperature. Soil should be at least 75% of capacity for active growth to occur. In addition, one assumes that ambient or air temperature at night especially will not drop below 40°F. Young succulent transplants have a difficult time of establishment when exposed to constant winds in excess of 20 mph; both mechanical damage and increases in plant transpiration and water evaporation from the soil will occur. When growing in coarse soils (especially sands) high winds can move sand particles which will cut tender stem tissue of young plants at the soil line resulting in considerable plant loss. Use of low tunnels/row covers will help alleviate these problems. If plants do not stand erect in the field, but are lying down or leaning at a 45° angle, stems exposed to high temperatures under sunny skies will become sunburned to the point of non-functional xylem and phloem tissue (water and sugar conducting tissue in stem). Attention to insect pressure is critical since a few adult or larval insects can destroy a young transplant. Foliar diseases are generally not a problem with young transplants, but each year is different and vigilance is a must. Damping-off organisms can be more of a problem early in plant establishment, especially in wet years. Symptoms of herbicide injury occasionally show up on transplants where high rates of herbicides have been used on corn/soybeans or herbicides applied to agronomic crops have a long half-life with significant residual herbicide detectable in the following year.

Maintaining healthy plants and active growth after field establishment will help insure successful transplant establishment, growth and maximum yield and quality.

Solar Pump for Irrigation Systems

Mary Concklin, Penn State Cooperative Extension – Montgomery County, Horticulture

On May 3rd, a solar powered submersible pump was demonstrated for use with a drip irrigation system. Although this particular pumping system was used last year to provide water to various pastures for livestock it was shown to be effective with a drip system or other low volume irrigation systems. At this farm, the water was pumped 700 feet uphill from the water source to a holding tank where it then flowed downhill in a gravity fed pipe to the drip line and to pastures. At the juncture of the drip line and the feed pipe we had 11 pounds pressure - more than enough for this type of system or other low volume delivery systems.

The pump can be operated manually or automatically with a timer. The savings with this type of system will be seen in the lack of fuel or power bills. The solar pump is a low maintenance system as compared to a diesel or gas powered system, is clean, and quiet. A disadvantage is the relatively high initial capital investment. However if you were to purchase a diesel or gas pump you may consider the investment of a solar powered pump to be comparable. There are several types of pumps available: a submersible diaphragm pump which produces 10 – 230 feet of head and delivers 0.8 – 3.8 gals per minute; a submersible centrifugal pump which produces 10 – 400 feet total head and delivers 1.6 – 20 gals per minute; and surface centrifugal and surface rotary vein

pumps which produce 5 – 400 feet of total head and 1.4 – 14.8 gals per minute. Although this works well for a drip irrigation system, the pressure and volume are not enough to operate overhead guns.

A solar power source may be a favorable alternative if you are 1/3 of mile or greater away from existing power lines. However there are no storage batteries with this system so if the sun doesn't shine the pump does not operate. If you are considering installing an irrigation system and you are not near a power source, you might want to take a look at a solar powered system along with the other options. Although this spring has not been droughty, the summer is still to come. After last year, many growers should take a serious look at installing some type of irrigation system.

Bug Against Bug

Cathy Thomas, Senior Extension Associate, Greenhouse IPM

Welcome to the new Vegetable Gazette column that will address greenhouse biological control issues. Biological control or biocontrol is using one organism against another. In other words using good bugs to battle bad bugs. For those of you who have not met me yet, I have worked on numerous IPM/biocontrol related projects since 1989 with Penn State Extension. For six of those years, I worked with Dr. Mike Orzolek in the Department of Horticulture, developing biocontrol programs for commercial greenhouse vegetable growers. I also recently completed a Masters degree in Entomology with special emphasis on biological control of greenhouse whitefly in greenhouse tomato production.

Since January 2000, I have been working on a project funded by the Environmental Protection Agency under the Pesticide Environmental Stewardship Program. The goals of the project are to reduce worker exposure to pesticides and provide alternative IPM/biocontrol management techniques to meet grower Food Quality Protection Act (FQPA) concerns. Using alternative technologies such as natural enemies along with “soft pesticides” are a sign of the times. My plan is to use this column to provide the information needed by growers to make the change to a biological control management system.

There are already successful applications of this approach in the PA greenhouse vegetable industry. For instance, Boyd Mertz greenhouses in Northumberland Co historically relied on traditional pesticide program for producing 1.5 acres of greenhouse tomatoes. Through several years of research and application, the pests in this tomato range are now managed with a variety of commercially produced natural enemies in conjunction with soft pesticides to treat hot spots. The elimination of broad-spectrum insecticides also allows for the migration of indigenous natural enemies such as ladybeetles, syrphid flies and lacewings into the greenhouse environment. This is “free” pest control.

This technology is dependable and effective; however, the grower has to know how to get started. The first step in starting a biocontrol program is to gather information. Seek out sources of information from resources at your county extension office, the PA Dept of Agriculture, grower organizations, and trade publications. For information on biocontrol suppliers, log onto this web site, www.anbp.org. Specific information on biocontrol organisms can be found by going into web sites prepared by the producers of

natural enemies, i.e. Koppert Biological Systems at www.Koppert.com. and Biobest biologicals at www.biobest.be. I welcome ideas, comments and suggestions from you for future articles in this column. Let me hear from you!

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Garlic Demand Soars
Bill Lamont, Department of Horticulture

This sounds like a Steve Bogash commercial. U.S. garlic use has soared, hitting a record-high 3.1 pounds per person in 1999, three times the level in 1989. Despite impressive growth for vegetables such as broccoli, bell peppers, and carrots, no other vegetable has experienced stronger growth in demand over the past 10 years. The strong surge in use during the 1990s likely reflects: rising popularity of ethnic foods and restaurants, persistent publicity about the health benefits of garlic, and demand from the health supplements industry.

Vigorous demand has resulted in a doubling of U.S. garlic production over each of the last two decades. Output was record large in 1999, and wholesale garlic prices this spring are a third lower than a year earlier. Farm value of the U.S. garlic crop is about \$200 million. The take home message-eat more garlic.

June Vegetable Disease Reminders
A. A. MacNab, Plant Pathology Department

The following diseases should be considered early in June. Some will appear in June. For others, control measures must be taken now to minimize disease severity later in the season. Growers who have experienced significant losses from diseases should review diagnosis and control information. Diagnosis information is available in the PSU publication titled "Identifying Diseases of Vegetables". Control information is available in "Commercial Vegetable Production Recommendations".

A. Beans:

Mosaic viruses: For commercial plantings, do not make successive plantings in adjacent areas; although few plants may be affected in early plantings, number of plants affected usually increases in successive plantings as more virus inoculum from previous plantings becomes available to aphid vectors. Do not plant near clovers; they are a source of viruses that can affect beans. Maximum density plantings may minimize losses.

B. Celery:

Leaf blight: Maintain a regular fungicide program in plant beds. If blights get started in plant beds, control will be more difficult and expensive later in production fields.

C. Cucumber:

1. Bacterial wilt: Stop the vector (cucumber beetle) from feeding on plants. Several insecticides provide good control. Maximum density plantings may minimize losses.

2. Mosaic: Grow only CMV-resistant vars. There is also good resistance to other diseases. Scab and powdery mildew usually are next in importance.

D. Muskmelon:

1. Collapse: This late-season problem can be avoided by promoting early harvest. Polyethylene mulch is important in many areas of Pennsylvania.

2. Powdery mildew: When possible, gardeners should use powdery mildew resistant varieties such as Earlygold (early only); Saticoy, Eclipse, and Athena (roadside and shipping type); and Marygold (casaba type). When necessary, fungicides can be used later in the season. Two new strobilurin fungicides, Quadris and Flint, are labelled for use, with either one alternated with Bravo.

3. Fusarium wilt: If long rotation is not possible, use resistant varieties such as Athena (res to races 0, 1 and 2), Saticoy (res to race 2), Superstar (res to race 2), and Eclipse (res to race 2).

E. Peppers:

1. Bacterial leaf spot: Start with disease-free plants. Where diseases are expected, follow a regular preventive spray program. Start early and continue with fixed copper for several weeks until you are relatively certain young plants are not carrying the bacterial pathogen. The following new varieties have resistance to races 1, 2, and 3 of the pathogen: Boynton Bell, Commandant, Enterprise, X3R Camelot, and X3R Wizard.

2. Viruses: Where viruses have been a problem, plant only varieties resistant to TMV and, when possible, to other viruses. Maximum density plantings may minimize losses. Aphid controls followed to stop transmission of aphid-borne viruses (CMV and Etch) have not been very successful for virus control.

F. Sweet Corn:

1. Stewart's bacterial wilt: Disease is expected to be greater than usual since last winter was relatively mild.

2. MDM Virus: Where this virus was a problem in past years, try varieties claimed to be resistant. A couple are listed in the Commercial Vegetable Guide (Earlibelle, Merit). Maximum density planting may minimize losses. This disease usually is not important in early plantings.

G. Tomato:

1. Bact. spot and speck: Where inoculum is suspected (old tomato fields, transplants with symptoms), spray with a tank mixture of fixed copper plus either maneb or

mancozeb, or with ManKocide. Start as soon as plants are established and continue at 7 to 10 day intervals, especially during wet periods.

2. Early blight: In new fields where disease-free transplants were used, fungicide sprays should not be needed until the end of June. However, if diseased transplants were planted, or if fields were planted to tomatoes last year, start a preventive spray program now. Quadris is a new fungicide that is excellent for control of tomato early blight.

3. Late blight: Primary inoculum can be introduced with infected seed tubers, from cull piles, and in/on volunteer potato plants. Inoculum also could be introduced with tomato transplants. If inoculum is present, late blight will have the potential to develop whenever environment favors the disease (wet and cool conditions). The major control after plantings are established is to keep plants covered with protective fungicides whenever environment favors the disease.

Armyworm Confusion: Are Look-A-Like Moths Making You Spray More Frequently Than You Need?

Chris Harding, Shelby Fleischer and John Grehan, Department of Entomology

During the past eight years Pennsylvania has used pheromone lures to monitor for the 3 "worm" pests of sweetcorn, European corn borer, corn earworm and the fall armyworm. Proper monitoring allows growers to increase spray frequency when populations are high and decrease spray frequency when populations are low. Using trap counts to adjust spray frequency results in fewer total sprays, offering a benefit in terms of both dollar savings on pesticide and time saved by not spraying.

A pheromone trap is designed to attract only males of the desired species using chemicals that resemble insect sex pheromones (sexual attractants). However, insect pheromones are very complicated blends of volatile chemicals and similar species are often attracted to similar blends. If a lure does not have the exact chemicals in the correct proportions, it may attract insects other than the insect you want to trap. It is these unwanted (although often very similar) insect species that are called non-target captures. Non-target captures artificially inflate the trap count giving the appearance that there is more pest insects than is truly the case. When an error from non-target captures is not corrected, it can result in recommendations to spray when sprays are not needed. For both the European corn borer and the corn earworm, pheromone traps have been effective in accurately representing the population by mostly capturing the desired species. Unfortunately, the current pheromone lure for the fall armyworm attracts a few species besides fall armyworm.

In 1999, the most common non-target capture in fall armyworm pheromone traps was an insect called *Leucania phragmatidicola*, a moth without a common name. *L. phragmatidicola* feeds on grass and is not known to be a pest of sweetcorn. When a fall armyworm pheromone trap erroneously captures high numbers of *L. phragmatidicola* it gives the appearance that the fall armyworm population is greater than its true size. This case of mistaken identity can result in unnecessary spray applications. Users of blacklight traps must be just as careful in their identification because the blacklight traps will capture most nocturnal insects and therefore almost certainly have look-a-like species to the fall armyworm. We have developed a web page with pictures highlighting some of

the characters that can be used to identify the fall armyworm and distinguish it from *L. phragmatidicola*. You can find this website at:

<http://www.ento.psu.edu/vegetable/armyworm/armyworm.html>

We recommend that everyone using pheromone lures to monitor for fall armyworm double check the trap capture by comparing the captured specimens to the above website. Double checking the trap capture may take a few minutes, but it is much less costly in both time and resources than an unnecessary spray. Although some moths may look similar, with a little diligence and experience, anyone can learn to distinguish fall armyworm from lookalike species.

Pherologist (scientists that research pheromones) are constantly working to improve pheromone lures and reduce non-target captures. Hopefully we will have a fall armyworm lure within the next few years that will make secondary identification unnecessary. Until that time, use the website or other resources to ensure accuracy in your fall armyworm trap counts.

That's a Berry Good Question!

Kathy Demchak, Extension Associate, Department of Horticulture

Q. My blueberry plants have canes with loads of berries, but very few leaves. Why? (Eddie Rankin, Twin Springs Fruit Farm. George Perry (Schuylkill Co. Coop. Ext.) also found this happening in several blueberry plantings.)

A. The following explanation was excerpted from an article by Gary Pavlis in "The Blueberry Bulletin" (Rutgers Coop. Ext.), after the problem was noticed in New Jersey, as well. "The lack of leaves usually points to a root problem. It could be grubs, it could be root rot. In non-irrigated fields, the lack of leaves is due to root damage due to lack of water during the drought. This fruit probably will not ripen, and the plant may not survive. Late summer/fall water applications are critical."

No grubs or signs of root rot were found in the fields that had been checked, leaving last summer's drought as the culprit. Even fields that had been irrigated apparently didn't receive enough water. Blueberries are shallow-rooted, and need a lot of moisture, making them a crop that really benefits from trickle irrigation. If tensionmeters are used to monitor soil moisture, turning on the irrigation at 25 cb of suction gives good results. Also, the use of a heavy layer (6-8") of rotted organic mulch helps a lot. Eddie had noticed that in his field, the area under a thicker-than-usual mulch layer did not have this problem.

Got a question? Send it to Kathy Demchak, at 102 Tyson Bldg., University Park, PA 16802. You will be credited with the question, or can remain anonymous, as you.

Potato Musings

Bill Lamont, Department of Horticulture

Spudman Magazine Article on Colored Potatoes

If you are not receiving this magazine you need to consider taking a subscription. It is full of information and one that caught my attention in the last issue was “Rainbow of Opportunities” about specialty potatoes and the tests that Nora Olsen is conducting at the University of Idaho’s Kimberly Research and Extension Center. I am continuing to evaluate specialty potatoes here in Pennsylvania and I view these potatoes as one way to diversify our offering in the marketplace. It takes a combination of field, marketing and culinary evaluation of these potatoes to move them into wider acceptance.

Potatoes in High Tunnels

On March 16th seedpieces of Dark Red Norland and W8475 (red potato that only makes B size potatoes) were planted in double rows on four raised red plastic mulched beds with a in-row spacing of 12 inches and 15 inch spacing between the double rows. Drip irrigation was applied at the same time the plastic mulch was using a small plastic mulch/drip irrigation application unit built especially for use in the high tunnels. Fertilizer was broadcast prior to application of the plastic mulch and drip irrigation tape. Floating row cover was applied to half of the potatoes. Plant emergence was faster under the row cover; similar to our observations in field studies we have conducted using plastic mulch, drip irrigation and row covers for production of potatoes. No disease, insect problems have been noted. One half of the potatoes will be vine killed on June 16th and then all the potatoes will be harvested on June 26th. The high tunnel will then be rototilled and ornamental gourds will be planted as a second crop.

Potato Transplants in High Tunnels

Some of the potatoes planted from transplants didn’t seem to be growing off. When we pulled them up, we found that they had a tuber the size of a silver dollar attached. The use of transplants has some interesting possibilities but we need to do more work.

Temperatures Under Ultra-Thin Clear Plastic

I covered by hand some potatoes planted on bare ground with the ultra-thin, clear plastic that Mike has been using for early sweet corn production and the soil temperatures at the 2 inch depth yesterday (bright sunny day) were 108, 106, 106 and 108 degrees F. Some of the uncovered potatoes on bare ground were starting to emerge but not the covered ones. Checking the potatoes under the clear plastic revealed that the potatoes had sprouted and were growing. I want to see if the potatoes push through this material like the corn does. Use of this material would be for very early potatoes to warm the soil up. The temperatures experienced at this time are too warm for the potatoes and actually retards their growth.

World Potato Congress

Here is an unique opportunity to meet all the representatives of the entire potato sector during the World Potato Congress 2000 held September 3-6, 2000 in Amsterdam. As part of the Congress, there will also be a Trade and Technology Show. At least 15,000 visitors from many countries are expected to attend.

The safety of foodstuffs, fresh potatoes and processing, diseases, the production of seed, cultivation methods, breeding and marketing - all are subjects that are of major importance to maintain the prominence of the potato in the global economy. Participation in the World Potato Congress will provide an opportunity to take a look behind the scenes of the potato industry. For more information on the World Potato Congress, contact NPC at 303-773-9295 or npcspud@ix.netcom.com.

Potato Leafhopper

New Jersey reported early activity of leafhoppers (PHL) in potatoes. This is several weeks earlier than usual. Keep your eyes open for this pest. It can sneak up on you. However, Admire will provide very good control of this pest early on. With the mild winter we had insect pests may be more of a problem this season and growers should be keeping a close eye on their fields.

Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

August 14, 2000. Vegetable and Small Fruit Field Day, Horticulture Research Farm, Rock Springs, PA. Contact: Mike Orzolek: 814-863-2251

August 15-17, 2000. Ag Progress Days, Ag Progress Day Site, Russell E. Larson, Research Center, Rock Springs, PA. Contact: Bob Oberheim 814-692-5262.

Regional

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

National

September 23-26, 2000: 15th International Agricultural Plastics Congress and the 29th National Agricultural Plastics Congress, Hershey, PA. Contact: Pat Heuser, Executive Secretary, American Society for Plasticulture (814) 238-7045.

