

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Comments from the Editor

Elsa Sánchez, Department of Horticulture

I want to thank Scott Guiser and Shelby Feischer for their excellent article, **Got Sweet Corn Worms???**, and look forward to Tom Butzler's article for the August issue. I also want to thank everyone who contributed articles to this issue and I want to encourage others to join us in upcoming issues. As always, the Vegetable & Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

Quote for Thought from Pete Ferretti

Pete Ferretti, Department of Horticulture

Talk is cheap...until you hire a lawyer.

*-The Lion
May 2005*

Schedule for Agent Articles

Elsa Sánchez, Department of Horticulture

July– Scott Guiser	August– Tom Butzler
September– Lee Young	October– Cheryl Bjornson
November– John Esslinger	December– Andy Muza

Got Sweet Corn Worms???

Scott Guiser, Bucks County Cooperative Extension
Shelby Fleischer, Penn State Entomology

Penn State's pest monitoring program is a valuable tool for all sweet corn growers. It is a joint project of Penn State Extension, the Pennsylvania Vegetable Growers Association (PVGA), and others in the northeast U.S. A visit to the website www.pestwatch.psu.edu is all that's needed to keep track of damaging pests such as European corn borer (ECB), corn earworm (CEW) and fall armyworm (FAW). The website allows you to see pest activity in your area and what's coming your way from a more southerly region. If you're not interested in visiting the website, a call to 1-800-PENN-IPM also provides this pest information for Pennsylvania growers.

Although these insects are somewhat predictable, closer attention to their activity means you know when you need to shorten (or lengthen) spray intervals. This means better worm control without making wasteful, unnecessary sprays.

Starting last year, Penn State entomologist Shelby Fleisher's weekly, toll-free phone message was added to the website. It can be found on the left side of the main page under "Timely Tips." The message is updated weekly. If you live close to a neighboring state, similar "tips" from these states are posted.

Shelby's message is available via the 1-800 PENN-IPM toll-free line and in PVGA's weekly report, but those with Internet access will find the website fast, easy to use, and more up-to-date because its website is updated daily, whereas the telephone message is based only on what is present on the website on Tuesday mornings.

More than 30 farms in Pennsylvania and 250 farms throughout the northeast U.S. report insect trap data to the website. Click on "interactive maps" and you'll see a map with current and recent captures of ECB, CEW and FAW. The map is updated continuously as data are provided by cooperating farms. In addition to Pennsylvania, the map shows trap captures to our south, as far as Maryland and Virginia, giving us a preview of pest pressure.

An additional feature at the website is the link to ECB phenology (also known as "degree-day") models. The link is a button, shaped like a thermometer, placed along the right-hand toolbar of the "interactive maps." These phenology models do an excellent job of estimating when ECB is just beginning to enter each life stage. You should apply sprays during the time ECB are hatching and moving through first and second instar. If you wait until ECB are in later stages (fourth and fifth instar), the larvae may already be inside the ear of corn.

Let's take a look at the current situation. First generation ECB larvae are present and feeding in sweet corn. Sprays before or at "row tassel" (when tassels are just seen emerging from the whorl) are critical to clean up this destructive pest. Once tassels have emerged, the larvae move into the stalk, where they are protected from insecticides. Next, they bore down the stalk and into the butt-end or side of the sweet corn ear.

In mid-July, we usually enter a period when first generation ECBs are no longer a target; they have either been controlled or are in the ear. The next "worm" threat is corn earworm (CEW), which migrates from the south and is often not present in early July. Some years they arrive as early as mid-July, sometimes not until almost August. In this interval, growers can often lengthen the period between sprays to the maximum. Keep a close eye on CEW trap captures on your farm or visit the website daily to monitor for arrival of CEW by looking at sites to the south or east. When CEW arrives, spray intervals must be shortened, depending on the number of adult moths in the traps.

After CEW arrives, second generation ECB usually emerges and both pests are present. Also, fall armyworm may immigrate at this time. By early to mid-August insect pressure is very high and remains high for the rest of the season.

So, enjoy the "lull" that may exist in early and mid-July and visit www.pestwatch.psu.edu regularly to stay informed about sweet corn pests. If you'd like to become part of the sweet corn monitoring program, contact your local county extension office or Shelby Fleischer, Penn State extension entomologist (sjf4@psu.edu).

*Note: In addition to pest monitoring information, the **Pestwatch** website contains fact sheets and information about insect and disease management for almost all vegetable crops. Links to other universities give you access to quality information about all aspects of pest management for vegetable crops in the northeast. Check out www.pestwatch.psu.edu . It's a site worth visiting.*

Sweet Corn Timely Tips

Shelby Fleischer, Penn State University

This is the weekly timely tips message for the sweet corn trapping network for the week ending June 28, 2005. It is read into the 1-800-PENN-IPM line and post to the Pestwatch website (www.pestwatch.psu.edu), and is talked about in the previous article that Scott Guiser and Shelby Fleischer authored.

This information from Pennsylvania and neighboring states are best reviewed as maps on the WEB at www.pestwatch.psu.edu. Both the website and this message report average counts per day.

Corn earworm (CEW), which primarily migrates from the south, is present but at very low densities. Most sites are reporting less than one catch-per-day, and these low values are also true in Maryland and Virginia. There is no need to spray for corn earworm at this time.

European corn borer (ECB) counts last week showed a band of high captures extending across the center and into the southeast of the state. If you have taseing corn, the higher sites in the southeast suggested a four day spray schedules. Other locations varied from a five-day interval, to no spray. If you are not yet taseing, we recommend scouting the corn for egg masses and damage. Look for shothole

damage, tassel clipping, and larvae in the whorls. If damage is low, try to wait until row-tassel to apply a spray to clean up that infestation. Sprays timed at early row tassel help clean up ECB populations.

I believe the flight we measured represents the middle to tail end of the first generation, mixed with the emergence of the univoltine generation. The offspring from the earlier individuals from that flight are in various larval stages. Phenology models suggest that the later instar larvae are starting to appear in much of the area of PA where vegetable crops are grown, and will begin pupating in 7-10 days. Another second generation, representing the 2nd flight of ECB, is starting in the middle VA area and will reach northern VA in about seven days. Projecting further, we may see overlapping flights from the tail end of the 1st and the beginning of the 2nd generation in about two weeks.

Fall armyworm captures are low to absent, except for one small hotspot in York Co.

Corn rootworms are in the later larval stage, and adult emergence is more than a week away.

In summary, the species that invade from the south – CEW and FAW have not yet arrived in damaging numbers. The resident species – the ECB – are present as adults from the overwintering population and as larvae from these adults. You should check your stands now for these 1st generation ECB larva. Look for shothole damage, tassel clipping, and larvae in the whorls. Sprays timed at early row tassel help clean up ECB populations. Second generation ECB are still a couple weeks away, but high counts from the first generation occurred throughout the center and southeastern part of PA.

This is a cooperative project with Penn State Extension and the Pennsylvania Vegetable Grower's Association. Thank you and we will update this message within a week.

Cucurbit Downy Mildew Warning

Alan A. MacNab, Penn State University

Downy mildew of cucurbits has appeared much earlier than usual in southern New Jersey (Cumberland Co.), now is present in Gloucester county, and is suspected to be widespread in southern New Jersey at this time. It appears that inoculum was introduced on transplants grown in Florida. It was first reported June 13 in the one planting grown from the transplants. On June 24, the disease was detected in another planting about 1 mile northeast of the original planting, and on June 29 in a planting about 12 miles east of the first field.

For growers in southeastern Pennsylvania, I suggest application of fungicides effective against downy mildew. A mixture of two fungicides with one of them having translaminar systemic activity would be best. Materials and rates are included in the 2005 Commercial Vegetable Guide. Translaminar materials that are listed for cucurbits include Tanos, Previcur Flex, Cabrio, Pristine, and mefenoxam (Ridomil Gold and Flouronil). Remember that the three materials that contain some strobilurin (Tanos, Cabrio and Pristine) should be alternated with materials that do not contain a strobilurin.

In all my years at Penn State I have never heard of cucurbit Downy Mildew being present this early in the season. And in New Jersey, it is 2 weeks earlier than in 2004. I expect that growers will remember that this disease was a major problem throughout the southeast, Mid-Atlantic, and Pennsylvania areas last year.

Please get this message to growers as soon as possible and let me know when downy mildew appears in new locations. Downy mildew symptoms include yellowish to brown angular spots that can appear first on crown leaves. However, younger leaves can also be affected and in some cases, entire plantings can be affected so quickly (within a few days) and so severely that growers frequently report that the fields appear to have symptoms of "frost" injury.

Downy Mildew in Cucurbits: Occurrence of QoI Resistance in the USA and Impact on Managing Disease

Meg McGrath, Department of Plant Pathology, Cornell University

This article was prepared by Meg McGrath, Department of Plant Pathology, Cornell University; Tim Elkner and Alan MacNab, Penn State University made minor changes for use in PA.

Strains of the cucurbit downy mildew fungus resistant to QoI (also known as strobilurin) fungicides were detected in GA and NC in fall 2004 and in FL in spring 2005. The genetic mutation detected is the same as that in QoI-resistant cucurbit powdery mildew fungal strains. These strains exhibit qualitative resistance, thus resistant strains are highly insensitive to QoIs. It is not possible to re-gain control by increasing the application rate or shortening the interval with this type of resistance.

Development of resistance was not surprising. The cucurbit downy mildew pathogen has developed resistance to other fungicides. Other pathogens have developed resistance to QoIs thus demonstrating that this fungicide group is at high risk for resistance development. Conditions were very favorable for downy mildew in 2004.

Effect of QoI resistance on managing downy mildew in 2005 cannot be predicted. Only 4 samples have been examined, thus the frequency and distribution of resistant strains is not known. In fungicide efficacy experiments being conducted in GA and NC where 2 of the tested pathogen isolates were collected, QoI fungicides were not as effective as expected based on previous results. However, this could have been due to high disease pressure resulting from downy mildew starting to develop earlier than usual, and conditions being very favorable for disease development.

Fortunately, there are additional management practices for cucurbit downy mildew control. These include making adjustments to fungicide programs (Item 4 below), and attention to other control methods as follows:

1. Select cucumber and melons varieties with resistance to downy mildew when possible.
2. Minimize leaf wetness by selecting sites with good air movement and without shading.
3. Avoid overhead irrigation during early morning when leaves are wet from dew, and during late evening when leaves will not have an opportunity to dry before dew forms.
4. Non-QoI fungicides labeled for this disease must be combined and alternated with QoI fungicides (a) to reduce selection of resistant strains and (b) to protect against loss if resistance does occur and affect efficacy of the QoI fungicides.

It is critical to know what fungicides contain an active ingredient in the QoI fungicide group, which is Group 11 in the system being used by EPA and the Ag Chemical industry. Some of the products, plus their active ingredient(s) and Group number in parentheses that are registered for use on cucurbits

include the following:

Amistar (azoxystrobin; Group 11),
Cabrio (pyraclostrobin; Group 11),
Flint (trifloxystrobin; Group 11),
Reason (fenamidone; Group 11),
Pristine (pyraclostrobin; Group 11 + boscalid; Group 7), and
Tanos (famoxadone; Group 11 + cymoxanil; Group 27).

Non-QoI fungicides that could be tank-mixed with QoI fungicides (Group 11) and applied in alternation with QoI fungicides are:

1. Translaminar fungicides with some ability to enter and/or move in leaves:

Curzate (cymoxanil; Group 27),
Acrobat (dimethomorph; Group 15),
Previcur Flex (propamocarb; Group 28),
Gavel (zoxamide; Group 22, and mancozeb; Group M2),
Phosphorus acid fungicides (Phostrol, ProPhyt, and Fosphite; Group 33),
Ridomil fungicides (mefenoxam; Group 4)

2. Protectant fungicides which do not enter leaves:

Bravo (chlorothalonil; Group M4),
Maneb (maneb; Group M2),
Dithane (mancozeb; Group M2), and
Copper fungicides (Group M1).

Curzate reportedly has good curative activity (about 3 day kickback), thus it is a good choice for the first application after downy mildew is detected. However, it has poor residual activity (only 1-2 days), thus it is critical to tank-mix it with a protectant fungicide and to follow-up with another systemic fungicide when disease pressure is high.

Furthermore, although downy mildew can be very destructive, luckily it occurs sporadically in the northeastern US, and usually does not affect yield because downy mildew develops so late in the season. Development of downy mildew in the eastern US plus forecasts for new outbreaks that include the northeast region are posted at a North Carolina State University web site:

www.ces.ncsu.edu/depts/pp/cucurbit/

See the following web sites for more information on downy mildew and its management plus photographs of symptoms:

vegetablemdonline.ppath.cornell.edu/NewsArticles/Cuc_Downy.htm

vegdis.cas.psu.edu/VegDiseases/Identification_files/cucurbits.html

vegdis.cas.psu.edu/03Diseases/D400_Farm.html

Please Note: The specific directions on fungicide labels must be adhered to -- they supersede these recommendations, if there is a conflict. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.

4th Blight Message of the Season Prepared through Thursday, June 30, 2005

Alan MacNab, Vegetable Pathologist at Penn State.

On June 30, late blight was confirmed to be present in a field of potatoes in Cumberland Co. in southern New Jersey. To my knowledge, to date, there has been NO late blight reported in Pennsylvania. Tomato and potato growers in SE-PA should scout their fields closely and frequently for presence of late blight. We do not know if any spread has occurred from the single New Jersey field where late blight is present.

During the past 2 weeks, weather has not favored development of late blight throughout PA. So I do not expect late blight will appear soon in Pennsylvania fields UNLESS the late blight fungus was present nearby in potato seed tubers or cull piles, or in tomato greenhouses. Once late blight is present near an area, as it is now in southern New Jersey, spores could spread by wind up to 50 miles from any active source where symptoms are present. Wherever these spores land on tomato and potato plants, late blight symptoms could appear about a week later, with timing dependent on weather and fungicide coverage.

Based on our weather analysis for PA, there are four areas where there have been 10 consecutive rain favorable days. If late blight were present in any of these areas, disease symptoms could appear about 2 weeks after that threshold is reached. Dates and areas that the threshold was reached are May 30 for Butler, June 7 for Luzerne, June 16 for southern Huntingdon, and June 24 for Erie. Additional areas where a short term severity threshold (CS7) was reached around June 5-10, include Northumberland, Lancaster (Leola), Lehigh, Lycoming, Lancaster (Mt.Joy), Schuylkill, Dauphin (Gratz), Berks, and Franklin counties. In my opinion, these thresholds likely would NOT result in late blight development UNLESS inoculum was present within or next to a field. However, with the first report of late blight in NJ, growers should keep a close watch and check this 1-800-PENN-IPM message weekly.

And for TomFAST, the EARLY BLIGHT forecaster, to date, conditions have not favored early blight development except that plantings under severe drought stress would become more susceptible to infection. For many areas of PA, we are approaching the severity-value threshold when the first spray should be applied. For Lehigh, Lycoming and Luzerne counties, the threshold has been reached and the first spray should have been applied. The first spray will be needed soon in Washington, Butler, Northumberland, and Lancaster (Leola); it will be later next week in Centre, Cambria, Potter, Lackawanna, Schuylkill, Berks, Erie (Corry), and Franklin; and somewhat later at Lancaster (Mt.Joy), Dauphin (Gratz), Huntingdon, and Erie (next to the lake).

Finally, if you hear any reports of LATE BLIGHT present in or near PA, please phone a report to Alan MacNab, at 814-692-7990. We will continue to monitor conditions in PA, and will update this message weekly, or more frequently when necessary. This is a cooperative project involving PDA, Penn State Extension, and PA growers.

Keep an Eye Out for Bramble Borers

K. Demchak, Department of Horticulture

Early summer is the time of year to watch for the first symptoms of infestations of various types of borers in brambles. Over the past year, I've gotten quite a few calls from folks who have a borer of one type or another in their brambles, but usually by the time I get the call, the damage is already widespread. At this time of the year, especially on hot afternoons, wilting cane tips - the first sign - are fairly easily seen. When a borer is the problem, at first only a tip here or there is wilted while the rest of the tips appear normal. Once a wilted cane tip is noticed, look for other symptoms to help identify what type of borer is the problem. Symptoms may be two rings of punctures about 1/2-inch apart within the top 8 inches of the cane (raspberry cane borer), a cane swelling up to 3 inches long that is slight at first, but will be more obvious in late stages (red-necked cane borer, or less commonly raspberry cane maggot), or a large hole in the side of the cane (stalk borer, which isn't usually a big problem). There may be more than one type of insect present. Once the area of damage is found, if caught early, the eggs or larvae will still be located within several inches of the injury, so pruning out these canes 4-6 inches below the area of damage is the first step in preventing further damage. Plantings near woods and wild bramble populations are usually affected to the greatest extent.

Wilted cane tips will continue to appear throughout the summer. Sprays that are applied need to be targeted towards the adults, because the larvae are protected inside of the canes. They usually are applied late pre-bloom if damage is widespread, but the culprit should be identified first to ensure that the timing is correct. Keep in mind that some pruning during the summer, with additional pruning of damaged canes during dormant pruning, may be all that is needed.

Canes that died as berries were forming should be checked for signs of tunneling in the cane and crown area. Crown borers (not mentioned above) will cause tunneling in the crown area, but because of the timing of damage, tips may not wilt until damage is advanced. Death of fruiting canes may have a variety of other causes including winter injury or a root rot.

Red, White and Blue Potatoes for the 4th of July

Bill Lamont, Department of Horticulture

For the roadside or direct marketer having “new” or fresh potatoes for his/her customers can mean the opportunity to make some pretty good money early in the season. If the potatoes are sold in conjunction with fresh garden peas and pearl onions you have the potential for some really big bucks. With that thought in mind we have pursued the use of plasticulture (high tunnels, plastic mulches, drip irrigation and row covers) to provide early potatoes for the direct marketer. As part of the research efforts at the High Tunnel Research and Education Facility we are developing cropping schemes that include double and triple cropping in the high tunnels.

For several springs we have been planting potatoes in one of our 17’ by 36’ high tunnels around early April each year. We have chosen Red Pearl (W8475-R), a red-skin/white flesh that only makes B size potatoes from the Wisconsin Potato Breeding Program; Eva- a white skin/white flesh from the Cornell Potato Breeding Program; and Michigan Purple- a purple skin/white flesh from Michigan State Potato Breeding Program in order to have some red, white and blue skinned potatoes for the 4th of July.

Each year the ground was prepared, and fertilizer was broadcast at the rate of 1,200 lbs. of 13-13-13 per acre and incorporated prior to laying four rows of red plastic mulch with drip irrigation using a small plastic mulch/drip irrigation applicator mounted on a 21 HP tractor. The drip tape was placed down the center of bed and buried 3 inches deep. The beds were spaced 44 inches apart and the top of the bed was 18 inches wide. The potatoes were hand-planted on double-rows 13 inches apart, with the potatoes spaced 8 inches apart in the row. The high tunnel was divided in thirds, so each variety had 4 rows with 30 plants per row or a total of 40 feet of row. Potatoes were irrigated as needed and in the 5 years that we have been doing this they have never been sprayed with any pesticides.

The potatoes have been dug by hand around the later part of June each year so as to be ready for the 4th of July market. On the average Red Pearl has yielded 120 lbs. of potatoes, the Eva yielded 100 lbs. of potatoes and Michigan Purple yielded 139 lbs of potatoes. The number of tubers with any defects is usually less than 10 tubers. Red Pearl yielded 375 tubers/30 plants or 12.5 tubers per plant. Eva yielded 112 tubers/30 plants or 4 tubers per plant and Michigan Purple yielded 90 tubers/30 plants or 3 tubers per plant.

The skin colors were excellent on all varieties. To take advantage of the skin colors of the potatoes and the 4th of July holiday we constructed an American flag (3’ wide by 5’ long) and took pictures of it back in the first year. These potatoes lend themselves to marketing in small baskets, in attractive displays, in poly bags, and can command a high price. If a person had a 17’ by 96’ high tunnel and grew these varieties alone in 4 rows at the same spacing the yields would be Red Pearl-1, 104 lbs. of potatoes, Eva- 920 lbs. of potatoes and Michigan Purple- 1,278 lbs. of potatoes. We have been testing the pricing of these potatoes at our student run Cellar Market and have been selling the excellent tasting Red Pearl for \$2.50 a quart which is around .7 of a lb. We have sold them all. Once the potatoes are harvested then a

cucumber crop could be planted, followed by a fall broccoli crop. One could even do a late season crop of potatoes in the high tunnels. Have a great 4th of July. I bet that Thomas Jefferson used a high tunnel in order to have red, white and blue potatoes for his 4th of July gatherings...

CSA Strategies for Member Retention

Jon Clark, Martin Lenihan, Kathy Brasier
KAIC and Dept. of Agricultural Economics and Rural Sociology
kbrasier@psu.edu

This article was first published in the Keystone Ag Innovation Center's Ag Innovator Newsletter, April/May 2005.

In the last issue of The Ag Innovator, we gave some basic information about CSAs, or community supported agriculture operations. These are farms in which customers (members) buy a share of the farm's produce for the season. The members share the risk of farming with the farmers, and in return, know where their food is grown and by whom. For those farmers who are interested in or are already running CSAs, recruiting and retaining members is a key concern. Recent research on CSA members helps us understand who they are, what they expect, and what keeps them in a CSA.

Members "who are most likely to stay committed to the CSA are those who joined not just to obtain a certain kind of produce, but also because of social and environmental concerns" (Goland 2002). For some consumers, eating is a political act, a way of achieving environmental and social justice goals. They may be interested in maintaining the economic viability of local farmers, supporting their communities, looking for a personal connection to their food and local growers, or desiring food grown in a particular way (such as organic).

These consumers are willing to pay the price to achieve their social and environmental goals. They accept the relative inconvenience of picking food up at limited times and locations. They are willing to spend the extra time necessary to learn about unfamiliar produce and to prepare unprocessed foods. They tend to be reasonably well-off, and care more about protecting the environment and supporting local farmers than they do about pinching pennies. Yet, according to a study by Cooley and Lass (1998), they often pay less for food from a CSA than they would have paid for comparable food at a supermarket.

Those members who join because of their social and environmental beliefs are also likely to accept the idea of sharing risk with the farm operators. If bad weather results in slim pickings for a few weeks, they do not begin to doubt whether they are getting their money's worth. They do not expect farmers to buy produce elsewhere so that their box is always full. Yet farmers sometimes struggle with whether to allow their members to share the risks they have, in fact, agreed to share. In a study of CSAs in Central Pennsylvania, Durrenberger (2002) described how a farmer agonized over whether to buy produce elsewhere when the farmer's crop failed, particularly because the farmer suspected that the farmer was partly to blame for the failure. Members who want to protect the environment and sustain the viability of local farms are likely to weather the storm with a farmer, even when the weather is not to "blame" for a temporary setback. Farming is a risky business, and these consumers are willing to share the risk.

They do, however, expect to be more involved in the process than non-CSA consumers. This means CSA members may expect to have a say in what is produced. Consumer research carried out in the Mid Atlantic region and California showed that shareholders expected to be involved in the selection of the produce they received and appreciated a mix of produce (Perez 2002, Oberholtzer 2004). Giving consumers a say in what they take home can also help them control the amount of waste they produce. If a farmer gives consumers too much produce, or vegetables they don't like, the consumers might be forced to throw some away (Perez 2002).

In marketing their CSAs, farmers should consider emphasizing their methods of production, their nearby location, their connection to the local community, and the role both the farmer and members play in creating a local food system. They might stress the fact that buying produce from a CSA can produce less packaging- and transportation-related waste than buying produce from a supermarket. They also could stress that buying local is a way of keeping farmers on the land without having to intensify production in ways that create environmental and health risks. And they might consider a process in which members would have some control over what they take home in their boxes (such as an annual planning meeting, a survey, or a member advisory board).

For more information about CSA member retention and marketing, see:

Cooley, J.P. and D.A. Lass. 1998. "Consumer Benefits from Community Supported Agriculture Membership." *Review of Agricultural Economics* 20:227-237.

Durrenberger, E.P. 2002. "Community Supported Agriculture in Central Pennsylvania." *Culture and Agriculture* 24(2):42-51.

Goland, C. 2002. "Community Supported Agriculture, Food Consumption Patterns, and Member Commitment." *Culture and Agriculture* 24(1):14-25.

Oberholtzer, L. 2004. *Community Supported Agriculture in the Mid-Atlantic Region: Results of A Shareholder Survey and Farmer Interviews*. Stevensville MD: Small Farm Success Project (<http://www.smallfarmsuccess.info>).

Perez, J. 2002. "Community Supported Agriculture on The Central Coast" in *The Cultivar*, Santa Barbara CA, Centre for Agro-ecology and Sustainable Food Systems, University of California Santa Barbara: (<http://zzyx.ucsc.edu/casfs/research/Cultivar%20201.pdf>)

The Organic Way-Diagnosing Cultural Problems in the Field

Elsa Sánchez, Kathy Demchak & Graham Sanders, Department of Horticulture

This article was written by Pete Ferretti in 1977. The topic is as relevant today as it was then. We've slightly revised it, but the content was only changed minimally.

Diagnosing cultural problems in the field is a little like being a Crime Scene Investigator (CSI). The key is in finding and interpreting evidence in the field. Below are some factors that cause and tips for identifying cultural problems.

Major Trouble Factors

Some of the major factors that can cause or result in trouble for vegetables during growth or harvest are:

Parasites – diseases (fungal, bacterial, viral); insects; nematodes; mites; slugs; animals; birds. These are not considered cultural problems; however, some cultural practices can promote their development and ruling them out can help in making a successful diagnosis of cultural problems. Evidence of parasites can be direct or indirect. Direct evidence includes spores of fungi, eggs of insects, webbing of mites, etc. Indirect evidence is harder to interpret because it can be similar to symptoms related to weed competition, environmental factors, soil conditions and human decision errors such as stunting, yellowing of leaves, wilting, etc.

Weed competition – When diagnosing cultural problems, consider the weed pressure in the field. Weeds can rob the cash crop of nutrients and moisture and shade and crowd the cash crop which results in poor

development of the cash crop. Additionally, the cash crop can be injured from the actual process of removing weeds.

Environmental factors – Environmental factors including temperatures (too hot, too cool, freezing), sunlight (intensity and day length), rainfall (low, high), humidity, hail and winds play a large role in plant development and when unfavorable can cause crop damage or loss in quality and yield.

Soil conditions – Like environmental factors, soil conditions including texture (sandy, clay), drainage, structure (compaction), acidity (pH) and fertility influence plant development and when unfavorable can cause crop damage or loss in yield or quality.

Human decision errors or mistakes – Mistakes in managing the crop can sometimes lead to crop damage. Some areas for mistakes are in:

1. **Pre-planting considerations** including crop and cultivar selection; planting dates; age and condition of transplants; seed quality; cropping patterns and rotations; morning or afternoon sun; shade to full sun; previous use or management of the land.
2. **Culture** including soil preparation and tillage; seedling techniques; plant spacing and arrangement; plant protection; root pruning; foliage pruning; irrigation practices; proper fertility.
3. **Chemical use** including spray damage; pesticide residues; fertilizer burn; drift from other sources; excessive nutrients.
4. **Harvesting** including timing; techniques and adjustment of equipment.
5. **Overall Management** including failure to plan ahead and do things at the right time.

Quirks of nature – Surprises from Mother Nature can lead to crop damage or loss in quality or yield including environmental conditions or diseases leading to a lack of insect activity for pollination; heaving due to alternate freezing and thawing; lightning; genetic (cultivar)- environmental interactions; hail; smog; air pollution inversions; proximity to a black walnut or butternut tree (juglone toxicity).

Multiple factors – Combinations of the above factors can interact to cause strange effects.

Tips for Diagnosing Cultural Problems

Some common mistakes in trouble shooting cultural problems include failure to reflect back to occurrences that could have triggered the trouble, tendency to overly blame fertilizer or watering practices, not examining or considering the root system, and underestimating the effect of adverse temperatures on plants. For example, the dry conditions currently being experienced in much of the eastern US during may have an influence on many warm season vegetables that in some cases could extend throughout the season. There is no doubt that without irrigation the rooting of these crops can be slowed drastically, resulting in very slow development and in some cases loss of plants, yield and quality.

Remember, one key to successful vegetable farming is being a good trouble shooter. This includes recognizing when to solicit professional advice from a Cooperative Extension Educator or Specialist and industry representatives. It is better to seek assistance before or while a crop is growing, if possible. This is especially true when plant growth is unsatisfactory, since surviving plants often provide clues to the cause of the trouble. To wait until the crop has been removed and the field prepared for the next crop is destroying valuable evidence.

In trouble shooting one should keep an open mind and remember that there can be numerous possible causes of low yields or poor quality or even crop failure. Sometimes the problem may be obvious and easily corrected, while other times it may be obscure and come to light only after considerable probing deduction by putting several facts and observations together, and even some guessing. In some cases there is no answer at all; at least until new research reveals some additional information.

Then too, there is the unusual or so called “once in a life time” type of problem that apparently arises from the impinging of several factors on a certain field or crop to cause a serious abnormality, the specific combination of which may never occur again. In other words, trouble shooting is not always simple, easy, or quick.

Upcoming Meetings

Elsa Sánchez, Department of Horticulture

Local

October 14-15, 2005. Passive Solar Greenhouse Workshop, 1522 Lefever Lane, Spring Grove, PA 17362. Contact: Steve and Carol Moore (717) 225-2489 or sandcmoore@juno.com.

Regional

September 17 & 18, 2005. 2005 Small Farm Expo, GDS Fairgrounds in Newfoundland, Wayne County, PA. The Northeast Small Farm & Rural Living Expo is an educational event sponsored by Penn State, Cornell, and Rutgers along with groups such as PDA, Farm Bureau, RC&D, and local Conservation Districts. Featured at the Small Farm Expo is a slate of educational workshops, machinery and equipment demonstrations, and a trade show. Previous Expo's have drawn 4,000 to 5,000 people during the two day event. Visit www.smallfarmexpo.org for more information on the Expo.

January 31 – February 2, 2006. Mid-Atlantic Fruit and Vegetable Convention. For more information contact the Pennsylvania Vegetable Growers Association at pvga@pvga.org or visit <http://www.pvga.org/>

National

August 17 – 19, 2005. North American Strawberry Growers Association Eighth Annual Summer Tour, “Farming on the Urban Fringe”. An exploration of farming operations and farm markets in the Lower Hudson area of New York State; Based at the Courtyard by Marriott, Fishkill, NY. For more information contact Georgene Thompson, 717-243-1349 or georgenethompson@comcast.net or visit <http://www.nasga.org>.

January 4 – 6, 2006. North American Berry Conference; Being held in conjunction with the Southeast Regional Fruit and Vegetable Conference at the Savannah International Trade and Convention Center, Savannah, GA, Hotel to be Determined. For more information contact Georgene Thompson, 717-243-1349 or georgenethompson@comcast.net or visit <http://www.nasga.org>.

International

September 5-9, 2005. Potato 2005. Emmeloord, the Netherlands. Contact: www.potato2005.com.