

# PLANT & PEST ADVISORY

ORGANIC FARMING EDITION \$1.50

SEPTEMBER 19, 2002



## Controlling Phytophthora – A Farmer’s Success Story

*The following interview with Farmer Bob Muth of Muth Farm in Williamstown, NJ, was conducted by Michelle Infante-Casella, Agricultural Agent, Rutgers Cooperative Extension of Gloucester County in 1999.*

Q: How many years have you farmed vegetables?

A: 16 years

Q: How many acres of vegetables do you grow on an annual basis?

A: 10-12 acres of tomatoes, peppers, strawberries, okra, melons, and squash.

Q: What is the total acreage you farm?

A: 60 acres tillable, therefore, I have about 48-50 acres in hay, rotational crops, or with municipal leaves spread.

Q: When did you first see Phytophthora blight on your farm?

A: In 1988 it first started and I only had about 5-6 pepper plants die.

Then I did not see any for 5-6 years after that, but in 1996 it was back. 1996 was a wet year and infection increased in my peppers as the season went on. In 1997, I saw some in a field I had never had Phytophthora in before. I must have carried it in on equipment.

Now with all of the precautions and a dry year in 1998 I haven’t seen any since.

Q: Where do you think the source of this disease came from?

A: On my farm it was most likely air-borne from another farm and could have traveled miles in the winds of summer storms. Originally, it may have come to New Jersey in contaminated soil that was on the roots of transplants grown in fields down south.

Q: How close is the nearest vegetable farm to your fields?

A: The nearest is about 1 mile directly away. Being that far away is a benefit when it comes to the aerial phase of Phytophthora traveling from field to field. Many farmers in Southern New Jersey are closer in proximity to each other.

Q: What controls do you use for Phytophthora blight?

A: Mainly cultural controls, especially rotation, to prevent the disease and then chemicals like fungicides and fumigants as a precaution. I have seen what it can do to fields that are not rotated and the results are devastating.

Q: How did you decide to use rotations?

A: I credit Dr. Steve Garrison of Rutgers. When I was an undergraduate

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student at Cook College, I had Steve as a professor. He told us that to control diseases you cannot rely exclusively on chemicals. He said some growers have tried this and failed. He taught us that using good rotations and sanitation, followed by clean-up treatments with chemicals is the best way to go. Once I used rotations for a few years, I was convinced that it was the only way to produce a high yielding, high quality crop.

Q: What do you do in the way of sanitation to prevent Phytophthora blight?

A: We faithfully clean the equipment and tractors before going into another field, even if we do not see signs of Phytophthora in the field we were in. We make sure to clean our baskets after packing in the shed.

Q: What other controls or practices do you use?

A: I follow Dr. Steve Johnston's steps to prevent Phytophthora blight in pepper. We back fill the planting hole immediately after planting with the water wheel transplanter. We use high, domed raised beds, drip irrigation, and plastic mulch. First and foremost is our use of rotation and adding municipal leaves to our soils to build organic matter.

Q: Could you explain your crop rotation plan?

A: I rotate out of vegetables for at least 4-5 years. The year after vegetables I may put in a hay crop of timothy and orchard grass that I cut and sell. I will put timothy alone in fields with my best soils. If the soil is a bit rough or gravelly, I will add in orchard grass. Orchard grass establishes better than timothy. Other rotational crops I use as green manures include winter rye and vetch mixtures, winter rye alone, and sudangrass in the summer. Using sudangrass after legume cover crops helps to recycle the nitrogen from the legume crop. The sudangrass utilizes the nitrogen in its own growth and then releases the organic nitrogen when it decomposes. I like to use a green manure crop just before planting vegetables. If I go right in after hay, I may have some clumping left from the hay crop, especially when turning it under in the fall after a dry summer. If not using cover crops or green manure crops I set aside other parts of the farm to spread municipal leaves.

Q: Could you explain the amount of leaves applied?

A: I spread a 6" layer on top of the soil which is about 20 tons of dry matter per acre. In the beginning the leaves had some trash in them. However, the municipalities have worked on that problem and they are coming to the farm much cleaner than they used to. We are doing the municipalities a favor by taking the leaves that are no longer able to be brought to the landfills and we are getting an organic matter benefit to our soils. Spreading leaves does mean working extra months in the winter after leaf collection takes place, but it is worth it to my soils.

Q: Could you explain the pros and cons of leaves?

A: Well, again, leaves help with increasing organic matter in my soils. In fact, I have a field that tested 5% organic matter. That is unheard of in our mineral soils in Southern New Jersey. I attribute this to leaf application and good cover crops and green manures. I also feel that there are some nutrient benefits to adding leaves. I see my soil tests coming back with increased potassium after leaf application. It does take a few years for the leaves to decompose and release nutrients, but I usually plant my hay crop or green manure crops into fields that have recently received leaves. Also, increasing the organic matter and using leaves, will cool the soil temperatures and increase soil moisture. This sometimes delays earliness in crops, especially tomatoes, peppers, and melons. It may not be a good idea to use high amounts of leaves on fields where you want early production.

Q: What benefits do you see from using an integrated approach to controlling Phytophthora on your farm?

A: The number one benefit is economics. I am spending less money using rotations and leaves. I don't have the chemical bills of some farms. Even if and when chemicals alone fail, you still have to pay the salesman. I haven't seen the rotation system, along with the other tools (including chemicals) fail. Using all the tools available works. I find it a healthier system for me, my land, and the environment. My workers feel safer in the fields and the neighbors see me spraying less and getting better looking crops. In fact, some of my neighbors saw how healthy my crops were and how I treated my lands and asked me to farm their lands rent-free. They used to charge rent to other farmers but were unhappy with what was being done to their soils. I am less stressed about anticipating the disease coming on, because I don't think it will. Even though I am putting half of my lands in cash crops (vegetables and hay) I have increased my bottom line. Yields are higher and inputs have decreased. I am not rushing to crop every acre and produce an excess of product that the market cannot handle. If more farmers took their lands out of vegetables to grow rotational crops to improve their soils, the supply of vegetables may decrease and prices may stay more stable. In the meantime, our lands would benefit and our chemical bills would decrease. Our good crop lands are dwindling due to development and we must treat the lands left with respect. In relation to that, we must be concerned with our water sources and not apply any more pesticides or fertilizers than we have to that may wind up in our water. Shouldn't we prepare the farms for our future generations? □

# Sweet Corn Crop Nitrogen Status Evaluation by Stalk Testing

Joseph R. Heckman, Ph.D., Specialist in Soil Fertility

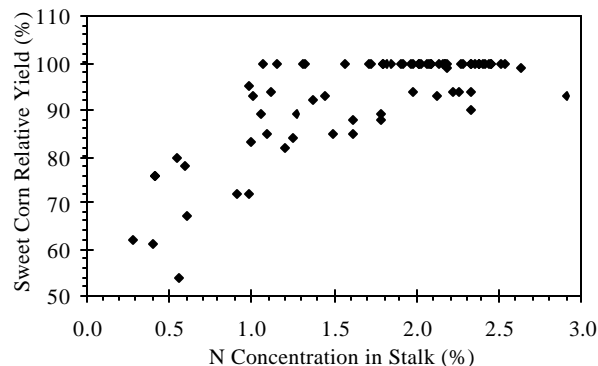
Stalk N testing is a diagnostic tool that is useful for evaluating sweet corn crop nitrogen status. Corn stalk N testing is based on the assumption that the plant accumulates excessive N in the basal stalk tissue when abundant amounts of N are available in the soil. The purpose of this tissue test, which is performed at the time of sweet corn harvest, is to enable growers to learn from experience whether their N fertility program is on target. The results from stalk testing indicate whether the crop received insufficient, optimum, or excessive amounts of N. Although this information comes too late to make corrective measures for the current crop, the findings are useful for improving N management practices in future growing seasons. The information provided by the test can validate the current N fertility practice, or it can recommend adjustments for future growing seasons.

Figure 1 shows the relationship between sweet corn yield and the concentration of N in the stalk. Clearly, very low concentrations of N in stalk tissue are associated with low relative yields and very high concentrations are associated with near maximum yield. Stalk N concentrations in the range of 1.6 to 2.2 % are considered optimum. Concentrations above 2.2% N suggest that the N fertilizer application rate was excessive. The interpretations for stalk N testing in sweet corn are given in Table 1 (on page 2).

The usefulness of stalk N testing was shown by the results of stalk samples collected on the day of harvest from commercial sweet corn fields in New Jersey during the summers of 1997 to 1999. Stalk N concentrations ranged from 0.6 to 3.7% N. The average stalk N concentration was 1.9% N. Based on the interpretations in Table 1, 18% of the samples were classified as N deficient, 16% as marginal, 31% as optimal and 35% as excessive in N status. On average about twice as many growers currently using the stalk N test would be encouraged to reduce N application rates as would be encouraged to increase N rates. However, actual changes in recommendations would depend on a grower's specific results. Also, changes in the N fertility program should not be based on the results from a single field or a single growing season. Growers should instead base changes in their N fertility program on finding a pattern of under or over application of N.

## Where to Use the Stalk N Test

Stalk N testing is generally not needed to detect N deficiency in sweet corn because the symptoms of N



deficiency in corn (yellowing of the older leaves and small ear size) are readily apparent. The stalk N test is most useful for detecting excessive N applications to sweet corn because symptoms of excess N are generally not visual. The test is also useful for validating the current N fertility program in use to grow the crop.

Stalk N testing is useful when sweet corn is grown using either nitrogen fertilizer or organic N sources. Because N availability from manure or compost is difficult to quantify, stalk N testing can help to validate or recommend adjustments in future applications.

The pre-sidedress soil nitrate test (PSNT) is also helpful earlier in the season when sweet corn is grown using organic N sources. The PSNT soil test can predict if enough N is available to grow the crop or if the crop needs sidedress N fertilizer. The use of the stalk N test at the end of the season can confirm the accuracy of the PSNT soil test.

Stalk N testing is only recommended for use with full season (greater than 70 day) sweet corn hybrids.

## Time of Sampling for Stalk N Test

Stalk N testing was originally developed for use with field corn in which case the sampling was performed at time of maturity for grain or silage harvest. In sweet corn the stalk N test must be performed at an earlier growth stage, when sweet corn ears are ready for eating. The stalk samples must be collected on the same day as sweet corn harvest. Taking stalk samples from corn plants that had the ears removed days before is not recommended because this may influence the accuracy of the test results.

## How to Sample for the Stalk N Test

Collect stalk samples on the day of sweet corn harvest by cutting the stalk at 6 and 14 inches above the ground. Collect about 15 of these 8-inch segments of stalk tissue in a random pattern from plants in the field to be sampled (but avoid sampling from areas of the field that do not have a uniform plant stand). Remove all leaf tissue from the stalk segments. Place the stalk segments in a paper bag that is labeled with the date and field name. If the sample cannot be sent immediately to the laboratory for analysis, it may be held for a few days in a refrigerator or if it can be dried (24 hours at 70° C), the sampled can be held indefinitely. Send

SEE STALK N TEST ON PAGE 4

# Partial Budgeting

David L. Lee, Salem County Agricultural Agent and Jack Rabin, Associate Director for Farm Services, NJAES

## When to use a partial budget

Partial budgeting is an ideal farm financial management tool to use when trying to decide on making small, specific changes in your operation. A partial budget helps you compare how costs, returns, and potential profits are affected by a proposed change in your farm operation.

A partial budget analysis can be used when comparing crop alternatives with similar requirements, e.g., growing peppers instead of tomatoes, grape tomatoes instead of rounds, soybeans instead of corn, etc. It can be used when deciding whether to change or adopt new production practices, e.g., adopt drip irrigation or buying a new transplanter. It can help you decide whether to buy a new piece of equipment vs. lease, or lease vs. custom hire. It can help you decide whether to increase production or not.

## Limitations of partial budgeting

Partial budgeting is not intended for major farm reorganizations. If a change will impact several aspects of the farm, a whole-farm budget may be necessary. Rutgers Cooperative Extension has training in both programs available. Four other limitations of partial budgeting are:

1. It restricts you to comparing only two alternatives.
2. It requires you to have good data. It gives inaccurate results if you enter inaccurate data. It is hard to do without good crop budgets.
3. It does not account for the time value of money (cash vs. financing).
4. It estimates profitability of change, and alternative to your current operation, not to the profitability of your farm business as a whole.

Partial budgeting's weakness of not considering how a change impacts a whole farm is also its strength: simplicity; do-ability for the average grower and their family. Sometimes, considering all things impacted by a single change is just too tedious or difficult. For example, allocating common costs like insurance or fuel to specific crops on a highly diversified operation seems next to impossible. In its simplicity, partial budgeting provides you with useful answers.

## Components of partial budgeting

To use a partial budget to help you make decisions, you must be able to answer four questions about the change:

1. What new or additional costs will be incurred?
2. What current costs will be reduced or eliminated?
3. What new or additional returns will be received?
4. What current returns will be reduced or lost?

Partial budgeting looks similar to the form below. You should be able to arrange your answers into this format on a sheet of paper or computer spreadsheet. For information on Workshops for the Farm Financial Management Component of the Garden State Re-Engineering Initiative Program, call the RCE of Salem County Office at 856-769-0090. Workshops are held throughout the State. For an example of a completed partial budget, call Dave Lee at Salem County RCE or Jack Rabin at 732-932-5000, ext. 610.

Problem: ( <i>Proposed change</i> )	
Section I - Costs	Section II - Benefits
A. Additional Costs B. Reduced Returns C. Total Costs (A + B)	D. Additional Returns E. Reduced Costs F. Total Benefits (D + E)
Section III - Analysis	
G. Net Change in Profits (F - C) H. Benefit/Cost Ratio (F ÷ C)	

### STALK N TEST FROM PAGE 3

the stalk samples to an agricultural testing laboratory that can perform the test. Request that the sample be analyzed for Total Kjeldahl Nitrogen or TKN. The samples may also be analyzed for nitrate (NO<sub>3</sub>-N) but stalk N test interpretations are more reliable for TKN.

#### References

Heckman, J. R., R. Samulis, and P. Nitzsche. 2002. *Sweet Corn Crop Nitrogen Status Evaluation by Stalk Testing*. HortScience.

Heckman, J.R. 2000. *Laboratories for Soil Testing and Plant Analysis*. FS 155, 2 pp.

Heckman, J.R., D.J. Prostack, and W.T. Hlubik. 1994. *Presidedress Soil Nitrate Test (PSNT) Recommendations for Sweet Corn*. FS 760, 2 pp. □

Nitrogen	NO <sub>3</sub> -N	Interpretation
----- % -----		
< 1.1	< 0.6	N-deficient, under fertilized
1.1 to 1.6	0.6 to 1.1	Marginal, may be under fertilized
1.6 to 2.2	1.1 to 1.5	Optimal range, N sufficient
> 2.2	> 1.5	Excessive, over fertilized

# Agricultural Crop Damage Caused by Deer During Drought Stress

John Grande, Ph.D., Director, Rutgers University-Snyder Research and Extension Farm

It has been previously noted that farmers experience increased crop losses from deer depredation during periods of extended drought stress. Although we may not know the exact reasons for this, it appears that the lack of nonagricultural food sources is limited during a drought and deer feed more aggressively on agricultural food sources. This double impact farmers experience during drought periods creates increased financial hardship.

One possible method to reduce deer depredation to high-value crops, especially during periods of drought stress, would be to consider planting "trap crops" in an area that would intercept the movement of deer from their daytime bedding to their nightly excursions into high-value crops. The graph below evaluating the use of portable electric fences consisting of a single strand of "hot tape" electrified with a deer fence charger, provides some preliminary information on the possible use of "trap crops" in conjunction with

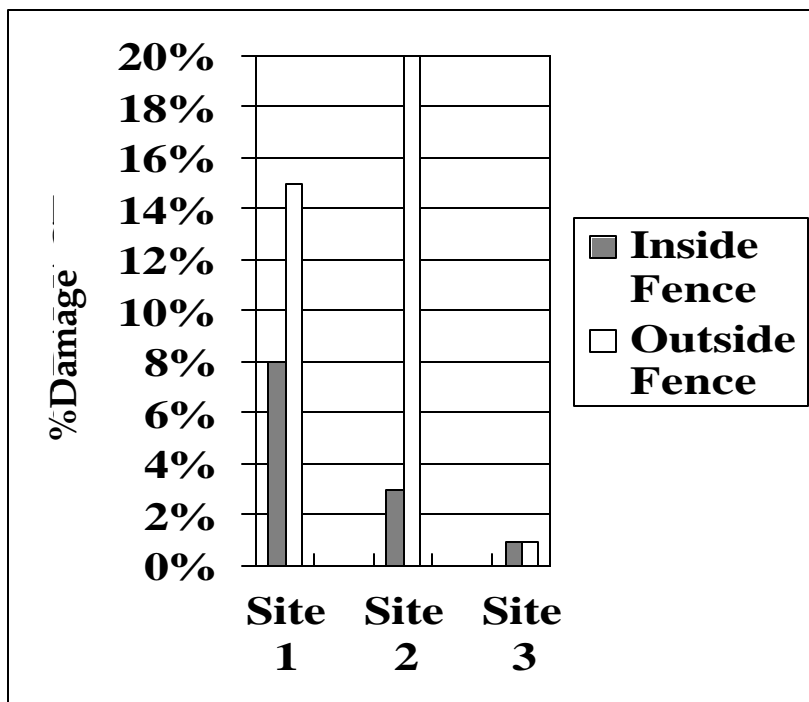
inexpensive portable electric fencing referred to as "hot tape".

The graph compares the amount of deer depredation to pumpkins grown outside the electric fence to inside the electric fence. The fenced in areas were from one to two acres in size. What was interesting about this study is noted in site 3 where very little difference and minimal damage was noted between deer depredation inside and outside the electric fence. Observations indicated that a soybean field between the wooded area and the pumpkin field was experiencing very significant amounts of deer depredation. The possibility exists that the soybeans were the preferred food source and coupled with the installation of portable electric fencing provided enhanced crop protection. This is speculation based on a single observation, but establishing a small planting of soybeans in conjunction with other deterrents such as portable electric fencing might be worth evaluating on a site specific basis in crop areas experiencing significant amounts of deer depredation.

For further information, refer to Rutgers Cooperative Extension Factsheet "Portable Electric Fencing for Preventing Wildlife Damage" available on the web at: <http://www.rce.rutgers.edu/pubs/pdfs/fs888.pdf> or through your county Extension office. Also available is the Factsheet "Who to Call Regarding Wildlife Damage" at <http://www.rce.rutgers.edu/pubs/pdfs/fs887.pdf>.

Deer Damage to Pumpkins Inside and Outside Electric "Hot Tape Fence"

Site 3  
"Hot Tape with  
"Trap Crop"



## When the Media Calls

William T. Hlubik, Middlesex County Agricultural Agent

Farmers have enormous daily challenges. When reporters call for timely quotes on crop conditions from drought, frost, pests, etc., growers could provide information to fill a government report. Unfortunately, the public response can often be financially devastating for farmers reporting crop related problems. When consumers hear or read of problems with area produce, the typical response is to avoid buying local produce because the quality is now in question. Hence the farmer is faced with the dilemma of crop related problems in addition to fewer people willing to buy their products.

Several of our farmers have learned this lesson the hard way and have adapted by putting a positive spin on even the worst of times when talking with reporters. A great response from one of our growers regarding the effects of heat and drought on his vegetable and fruit crops was, "Yes, our yields were reduced but the fruit is much sweeter and the vegetables have a rich robust flavor that will melt in your mouth". The year before, this same grower had experienced a 50% drop in direct marketing sales after he was interviewed by a local reporter and explained how much the local crops were hurt by the drought. As a result, things got even worse financially after he talked to the media.

We may have a burning desire to inform the public on the trials and tribulations of farming, but consumers simply want a quality product at an economical price. Public sympathy rarely translates into increased sales and simply encourages consumers to shop elsewhere. The valuable lesson learned by many of our direct marketers is that no matter what the question from the reporter, always remain positive in your response. □

## Food Safety During Harvest

Craig Hollingsworth, UMass Extension

*Adapted from the New England Extension Food Safety Consortium.*

Good sanitation practices during harvesting can help to reduce the risk of microbial contamination of fresh produce. Soil, fertilizers, harvesting equipment, water, workers, pets and pests can all be sources of harmful microorganisms that can cause foodborne illness. Therefore it is important that grower's set up measures to help prevent these sources of microorganisms from contaminating produce.

Good sanitation practices include cleaning and sanitizing all food contact surfaces, encouraging worker hygiene and training and keeping animals out of fields, orchards and packing house.

**What do we mean by "food contact surface", "cleaning" and "sanitizing?"**

- A food contact surface is a surface that comes into contact with the fresh produce any time during harvesting, packing or transporting.
- Cleaning means to remove soil and residues from food contact surfaces by washing and scrubbing with soap or detergent, then rinsing with clean potable water.
- Sanitizing means to treat a food contact surface with a sanitizing solution that will kill most microorganisms. Surfaces must be cleaned first before they can be sanitized. Soil and soap residues can inactivate the sanitizing solution.
- A sanitizing solution is made by mixing a small measured amount of a sanitizer with potable water according to the directions given by the manufacturer.
- A sanitizer is a chemical compound designed to kill microorganisms. The most commonly used are chlorine bleach and quaternary ammonium compounds.

Take a walk through your harvesting operation and check for these signs of potential food safety hazards:

- Pets, livestock, poultry or wildlife in fields
- Human or animal waste in fields and orchards
- Sick or unclean workers
- Dirty harvest containers
- Produce laden with dirt or manure
- Broken and dirty harvest equipment

**What can you do?**

- Wash, rinse and sanitize, when possible and practical, all crop containers before harvest.
- When sanitizing, use an approved sanitizer according to the manufacturer's directions. Common sanitizers include chlorine bleach and quaternary ammonia. Store sanitizers and solutions away from the produce.
- Cover harvest containers to keep crop dust, animals, insects and birds out.
- Clean harvesting aids each day with potable water. This means they should be free of visible soil and residue.
- Keep harvesting equipment in good working order. Set up a maintenance schedule.
- Train workers to follow good hygiene practices.
- Do not haul produce in equipment that has been used to transport garbage, manure or animals.

*Submitted by Win Cowgill, Hunterdon County Agricultural Agent. □*

# Rodale, Rutgers and NOFA-NJ Collaborate

*Bill Sciarappa, Monmouth County Agricultural Agent*

A recent field meeting was held at Stone Hill Farm in Monmouth County, NJ and entitled "Regenerating Small Family Farms from the Ground Up." The program was funded by the USDA Initiative for Future Agriculture and Food Systems and was delivered through a unique collaboration among the Rodale Institute, Rutgers Cooperative Extension (RCE) and Northeast Organic Farming Association of New Jersey. Eighty-one participants attended on a hot and sunny day. The morning session was held in a beautiful old Dutch style barn and started with the welcome and introductions of RCE Department Chair Bruce Barbour and Rodale President John Haberern.

Bruce provided an overview of how these collaborations are important to agricultural programs and how they are synergistic to groups interested in sustainable agriculture in these changing times. John gave an international perspective of how these sustainable methods are achieving success throughout the world, especially in Asia and how the Rodale Institute works with people worldwide to achieve a regenerative food system that renews environmental and human health.

Jeff Moyer, Rodale's farm manager for many years in Kutztown, PA, gave more regional examples of successful regenerative farming. Jeff stressed transition from animal feed soybeans to human food tofu-type soybeans for greater profitability. Dr. Don Lotter, also of the Rodale Institute, detailed the complex soil life and the important interactions in these organisms in the soil and their soil habitat. Don explained how understanding these relationships can aid the farmer in rebuilding his land base and improving soil nutrients and soil structure.

Bill Sciarappa, RCE Agriculture and Natural Resource Management Agent, discussed some new cropping concepts for consideration such as organic blueberry production, ethnic vegetable varieties and entertainment agriculture. Bill was especially pleased to report that organic blueberry production in his area had gone from zero to over 100 acres within three years and had a 2X increase in net returns.

Dean Michael Hamm of the Department of Nutritional Sciences spoke about his involvement with the Cook College students in running a hands-on organic farm at Rutgers University. Mike also provided science based information on nutritional comparisons of organic food production and the value of vegetable based diets in general throughout the world.

Shortly after a very pleasant lunch under a large outdoor tent, NOFA-NJ Director Karen Anderson

updated the group with the latest changes in the organic certification process. Basically Karen reported that the USDA has developed new rules and regulations for organic certification which is now verified by third party organizations such as NOFA-NJ. Hopefully, this change will increase consistency and standardization of organic approaches, continue to foster growth of organic production and increase organic market opportunities.

Then Stone Hill farm manager Brad Silversmith led the group on a wonderful tour of the 400 acre farm which has begun transition to more sustainable methods over the last two years, after a long history as a conventional soybean, corn and cattle operation.

Walking through gently rolling hills, Brad demonstrated some of the regenerative soil building efforts with buckwheat and other cover crops. He pointed out the drought resistance and marketability of sunflowers grown for ornamental purposes, the difficulties with weed control and the wide variety of organic heirlooms and unusual vegetables he grows for his clients and his employer. Some examples were varieties of annual artichokes (in New Jersey!!), Edamame soybean with 35% protein, habanero hot peppers, giant pumpkins, specialty herbs and numerous heirloom tomatoes. These stimulating examples in the field promoted much grower-to-grower discussion along the way and everyone learned from these growers' experiences. Also, many of the morning speakers were quite helpful in answering questions that arose along the way.

This "regenerative" tour went quite well overall and helped foster interaction among these three organizations that have a lot of common ground to be built upon. We all believe in healthy soil, healthy food and healthy people. We again thank Stone Hill Farm for their hospitality and we look forward to continued collaboration in the future in helping serve our sustainable farming community. □

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## Calendar of Events

September 21 & 22, 2002 - Northeast Regional Small Farm Expo West End Fairgrounds, Gilbert, PA. For information, contact Rutgers Cooperative Extension offices in Warren County at 908-475-6503 or Hunterdon County at 908-788-1338.

September 30, 2002 - South Jersey Sustainable Vegetable Twilight Meeting, 6:00 pm, Sorbello and Wheeler Farms Packing House, Russell Mill Road, Swedesboro, NJ. Contact: Michelle Infante-Casella, RCE of Gloucester County, 856-307-6450 ext. 1.

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