

**Sustainable Agriculture Research and Education Program
Producer Grant Final Report**

**Season Extension Through Annual Organic Strawberry Production and Fall
Vegetable Production**

1. Restate the goals of your project

Market garden profitability in Maryland is limited by a series of potentially manageable factors including: uneconomical strawberry production due to weeds, disease and sap beetles; restricted seasons due to cold and frost; cost of off-farm inputs; and lack of clearly distinguishable signature crops. Two growers, each in a dramatically different climate, investigated the feasibility of growing annual organic strawberries and organic fall (tomato and squash) vegetables as signature crops and through management practices that minimize disease, reduce pesticide use, reduce erosion and fertilizer run-off through green manures/cover crops, and use a Maryland fertilizer source that has been degrading the environment.

**2. Update the information on your farm since you received a producer grant.
Include acres farmed, crops/livestock.**

Both farm operations are: (1) diversified family farms that combine fruits, vegetables and livestock; (2) Maryland Certified organic farms; (3) market direct to consumers *and* sell direct to retailers; (4) owned by the growers; (5) involve two full-time growers in the operation. There are several differences in the operations. Rices have 13 acres of fruit, 5 acres of vegetables, flowers, and cows; is located in colder area of mountains of Western Maryland; and have one co-worker who is part-time farmer. Hastings have 10 acres of vegetables, 2 of fruit, and chickens; and are located in the warm area of Maryland's Eastern Shore.

3. Who were your cooperators and what were their roles in the project?

Bill Hastings - Organic farmer who raised annual strawberries and fall tomatoes into vetch.
Bob Rouse - Extension Specialist who helped devise the strawberry treatment.
Rick Hefebauer - Extension Specialist who helped devise the strawberry treatment and incorporated information into Maryland Fruit recommendations.
Eric Rice - Organic farmer who grew annual strawberries and fall squash into vetch.

4. Tell us what you actually did in your project and how it was done.

- Annual Strawberry Production segment followed this protocol:
- Applied equivalent of 3 and 1/2 to 5 tons per mulched acre of composted poultry and cow manure in August.
 - Hilled-up and firmed a 12" bed, laid drip irrigation, and covered with black and IRT plastic
 - Mulched row middles with straw or pine needles.
 - Transplanted Chandler variety strawberry plug plants into hill beds into single row on 12" spacing and water-in the set plants.
 - Winter covered rows with spun-bond row cover in late fall (December).
 - Managed row cover in spring to promote early harvest and reduce frost damage.
 - Compared results to other strawberries managed under different organic system on farm.
 - Monitored and recorded dates, yields, pests, disease, and prices.

The Fall Vegetable Season Extender used the following protocol:

- Seeded hairy vetch into growing area during September at rate of 25 lbs./acre.
- Mowed or rolled vetch about June 1, leaving vetch "remains" in place; 1/2 strip mowed and 1/2 all mowed.
- Transplanted/planted fall vegetables (tomatoes and winter squash) in mid June. Staked and tied tomatoes. Applied additional mulch to completely mowed patch and in strips, as needed.
- Monitored pests and disease and used copper and other organically approved pest materials as needed.
- Harvested and noted data on yield and season (many tomatoes are picked green to extend season).
- Compared yields to other identical crops not planted into vetch.

5. What were your findings and accomplishments? Did you have unexpected results? If so what were they?

The major findings from the project were as follows:

Strawberries

- Annual, raised bed, organic strawberry production is not only possible in Maryland, but is a good idea.
- The experimental strawberry regime is very useful on Maryland's Eastern Shore where the crop came to market 2+ weeks earlier than conventionally grown berries in the same area.
- The crop functioned as a "signature" crop for the Eastern Shore grower who sold every pint of production and who maintained a \$2/pint price for the entire season.
- Chandler berries in the organically managed system on the Eastern Shore achieved and held huge berry size for the entire season. Berries out-sized other conventional varieties.
- The organically managed system on the Eastern Shore actually provided roughly comparable yields and returns for two years rather than simply managing the crop as an annual. In the second year, while there were no pests or diseases, about 10% of the berries lost size, probably due to the greater number of flower buds in the crown.
- The compost, black or IRT plastic, mulch, and clean-picking were sufficient to prevent pest, weed, and fertility stress for two seasons. Some sap beetles came into the planting in the second year, but no other pests were observed either year in either planting.
- The strawberry regime advanced the season in Western Maryland by about a week. However, it was still 2+ weeks behind conventionally grown berries from Maryland's Eastern Shore. There was no price premium for Western Maryland berries.
- Composted manure provided adequate fertility for the crop and its renewal.
- Chandler berries in the West performed roughly comparable to other conventional varieties, without size advantages. In fact, straw mulch conventional varieties actually outsized blanket-covered Chandlers.
- Chandler plants without protection in Western Maryland were 25% less hardy than other varieties like Earliglow.
- Average plant size at covering (Date December) on the Eastern Shore was "dinner plate" (8-10") size while the size in Western Maryland was teacup saucer (3-4") size.

Vegetables

- Fall vegetables after vetch is a viable alternative.
- Vetch mowing was difficult although it did kill plants. Rolling/crimping the vetch with a cultipactor worked much more effectively.
- The strip paths worked best. They mulched the area while the un-killed vetch reseeded and regrew, providing insect habitat and replanting a cover for the fall.
- No additional nitrogen was necessary for either squash or tomato, after vetch.
- Both patches were un-irrigated and still produced some yield even with the ensuing drought. The tomatoes produced a commercially viable crop, but received substantially more rainfall than did the squash. Tomatoes were even picked green, stored, and marketed in December.

6. Is there any specific site information relevant to your project or the results?

The unexpected result was the relatively poor performance of the strawberry system in the Maryland mountains when compared to the performance of the Eastern Shore. The system, including varietal selection, seems ideally suited to the warm, late growing conditions of milder areas.

7. What were your economic findings (if relevant to your project).

Yield figures and dollar returns in Western Maryland were roughly identical between control group and treatment berries. However, on the Eastern Shore, berry size (and therefore yield) was greater in the treatment plot. Moreover, treatment berries held a consistent \$2/pint price beginning and all the way through the season as compared to a price of \$1.50/pint for conventionally grown and non-treatment berries - due both to size difference and increased supply. That difference translated into a \$6/flat price increase for the grower. No actual yield figures were kept on the vegetables due to the drought.

8. Have the results from your project generated new ideas about what is needed to solve the problem you were working on? What would be the next step?

Probably need continued varietal work on cold weather strawberries. Also probably need to discuss ways of killing vetch organically other than mowing. Rolling/crimping worked effectively.

9. Will you continue to use the practice you investigated? Why or why not?

The strawberry regime continues to be used on the Eastern Shore farm, providing 25-33% of the farmer's annual income. Strawberries are grown on the Western Maryland farm, but they simply use organic practices. Tomatoes are still grown on both farms. However, the Eastern Shore farm chooses not to cover crop because of last spring production - the season that provides 60% of the farm's annual revenue. The Western Maryland farm continues to cover crop vegetable ground most years.

10. What do you tell other producers about your project and the results?

We talk about the success and opportunity with:

- Annual strawberries in Southern Maryland and on the Eastern Shore.
- Using cover crops in the farm plan.
- Establishing signature crops for your operation.

11. Explain what you did in your outreach program? Please send a copy of any articles written about your project.

We made presentations at a number of professional meetings including at least the following:

- Eastern Shore Vegetable Growers Annual Meeting
- Western Maryland Annual Growers Meeting
- Maryland Organic Food and Farmers Association Annual Meeting
- New Jersey Annual Growers Meeting
- Wye Field Day - University of Maryland
- Workshop at annual statewide Future Harvest Festival

We did not publish any articles; however cooperating extension agent Bob rouse did incorporate information into his write-ups/work-ups on the potential and practice of annual strawberry production.

12. Please include 2-3 slides or photographs of your project. Please include clear information describing the slides or photographs.

We are looking for pictures and will forward them.