

**Paul C. And Edna H. Warner Endowment Fund for Sustainable Agriculture
Report Form**

Fall through Spring Sustainable- Organic Lettuce Production in Ohio

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Summary:

This project was designed to address grower requests for reliable information on the relative merits of season extension tools. In fall to spring 2010/2011, we initiated comparisons of season extension techniques that modified both the root and shoot zone microclimate of leafy crops at five sites across Ohio and collected data on crop productivity and cost of treatment application to evaluate the potential of the various techniques. Our aim was to help Ohio farmers be more successful, especially in local markets through the use of season-extending tools and techniques.

Objectives:

- 1) document the productivity of season-extending systems in on-farm tests across Ohio.
- 2) assist farmers in applying the knowledge gained in these and companion tests underway at OARDC.

What was done?

These on-farm experiments were all completed using a randomized complete block design with three to six levels of root and shoot-zone microclimate modification each replicated three times. Microclimate treatments including (1) control, (2) root-zone microclimate modification, (3) continuous shoot-zone microclimate modification, (4) root and continuous shoot zone microclimate modification, (5) nighttime shoot-zone microclimate modification, and (6) root and nighttime shoot-zone microclimate modification. Organically certified primed and pelleted 'Outredgeous' red romaine and 'Roxy' red butterhead lettuce seeds were used. Plant stand counts of direct seeded plots were taken pre-harvest while stand counts on transplanted plots were taken at harvest. Final yield measurements were taken on representative rows or plants in each plot 4 to 5 weeks after planting.

What were the results?

Although there can be an additional layer of management needed to optimize many methods of microclimate modification, the use of both shoot and root-zone temperature altering techniques were shown to increase crop growth and yield in a late fall growing season for leafy lettuce crops in this multi-site study.

At all sites, air and soil temperatures were increased by the use of agricultural plastics, either continuously or only at night and by the addition of soil heating. These temperature trends were consistent whether employed in outdoor plots or in a high tunnel, with or without the addition of raised bed, and in both mineral field soil and an organic growing medium. The highest air temperature averages were seen when slitted polyethylene was used as a low tunnel to cover crops continuously.

How have the results contributed or will they contribute sustainable agriculture?

In the past several decades, vegetable crop production has changed through the use of agricultural plastics (plasticulture) that allow the immediate environment surrounding crops (microclimates) to be altered to more closely achieve optimum growing conditions. Methods of microclimate modification have the ability to alter both root and shoot zone growing conditions

through the use of row covers, low and high tunnels, plastic mulches, and drip irrigation. These methods, also known as season extension techniques, have the ability to increase production within traditional temperate growing seasons and also to extend the productive season for crop growth and harvest. This extension of the growing and marketing season can have many economic advantages for horticultural producers because of the potential for a more local supply of vegetable products over the widest possible portion of the calendar year. Yet, Ohio farmers – across the range of experience and operational size -- require additional information on these tools and techniques in order to employ them most effectively.

Considering the uncertainty that some Ohio growers have displayed in evaluating low and high tunnel purchases and integration into their operations, we have concluded that research-based information, workshops and other educational resources could improve grower success. To facilitate dissemination of the information gained in this project, a Wiki site was created following collection and analysis of the on-farm data (<http://coldfingersclub.wikispaces.com/>). This site is divided into a general overview page that discusses the overview and goals of the project and the combined analysis of multiple sites. Additionally, each individual site (identified only by number, not grower name) has a page with site-specific data and pictures at multiple points in the experiment. In addition to the digital distribution of results from this microclimate study on the Wiki page, presentations on this project have been carried out throughout the winter and spring.