DETERMINING THE PRESENCE OF A MICROCLIMATE IN HIGH TUNNEL INTERSPACES

GRANT NUMBER – FNE06-572

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PROJECT NAME AND CONTACT INFORMATION

Grant Number – FNE06-572

Title - Determining the presence of a microclimate in high tunnel interspaces.

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GOALS

My goal was to test the potential for the existence of a season extending micro-climate between our high tunnels as theorized in 2005.

High tunnels are useful structures for extending the season and protecting crops from the vagaries of nature especially for tender crops both annual & perennial e.g. tomatoes and raspberries, etc.

The major disadvantage with regard to high tunnels is that the space under them is substantially more costly than for open field growing thus any potential for extending their benefits would be advantages for growers.

FARM PROFILE

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We commenced full-time operation starting with garlic in 2002 and have steadily increased that to 2 acres by 2007. We added mixed vegetables and pastured chickens in 2003 and sell at farmers markets and restaurants. We were certified organic in 2004 on all fields and crops.

The soil consists of a gently rolling Ontario Silt Loam with a parent of glacial till consisting of a high limestone base with a plow layer of 13 inches. It has moderate organic matter, drains well and is high in calcium, potassium and phosphorous.

We were involved in two previous SARE grants in 2003 and 2005: The use of vinegar as an organic herbicide and High Tunnel Heirloom Tomato Trial & Economic Analysis.

PARTICIPANTS

Project lead – Fred Forsburg; owner of Honeyhill Farm.

Principal Advisor – Judson Reid, Cornell Cooperative Extension.

MODIFICATIONS TO ORIGINAL PLAN

The project was originally funded for 2006-2007 and the field trial was intended to commence in 2006. Due to a family illness the project start was moved to 2007.

PROJECT ACTIVITIES

Design:

- Two experimental plots were allocated, one between 20x96' high tunnels and one in open field 200 feet up wind of the tunnels. The high-tunnel interspaces are 20'.
- Into each plot 50 eggplants were transplanted into a woven plastic mulch material at 2' spacing
- Both plots received equivalent moisture and fertilizer and are comprised of equivalent soil conditions.
- Deployed weather instrumentation onto both plots to collect actual weather data.
- Data collected: temperature, wind speed, wind direction, soil temperature and moisture, rain fall and solar radiation.

Timeline:

- April — Define and plan the field trial
- May — Select and purchase equipment
- June — Plant test and control plots, deploy weather instruments, commence data collection
- June- August — Monitor equipment and crops
- September — Suspended field trial

CONDITIONS

The 2007 weather conditions in our area and the north east in general were unusually hot and dry. Most regions experienced water shortages, dry wells and crop losses. We lost most of our open field small crops e.g. carrots, peas, beets due to these conditions. The weather quickly turned from cool and very wet with 100% saturated ground directly to hot days in mid-spring and the soil become hard rendering un-irrigated land marginal in many instances.

RESULTS

The following are my observations at the conclusion of this field trial:

- There was no difference in plant size, maturity and yield between the test and the control plots.
- The data collected from the two weather stations were essentially equivalent thus no data analysis was required or conducted.
- Conclusion - No micro-climate was discovered during this field trail. .
- Due to the unusual weather conditions in 2007 we encountered no circumstances requiring us to close the roll-up sides on our high tunnels during the 3 month field trial. This situation has never occurred during our previous 4 year experince with high-tunnel growing.

ASSESSMENT

Lacking the necessity to lower the 5' rollup sides of the tunnels during the field trial the interspaces assumed the same conditions as the surrounding area thus no micro-climate conditions could form.

While the experiment failed to indicate the presence of micro-climate conditions during the field trail. We however believe potential exists thus will continue to experiment as the weather is our area can be quite variable as we have discovered these last five years.

Several seasons with seemingly unrelenting winds and cool spring and summer temperatures were the basis of this experiment.

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OUTREACH

There was no outreach due to the results of the field trial.

APPENDIX A – EQUIPMENT

Two - Identical weather stations:

Wireless Vantage Pro2

Inc.: Barometric Pressure, Humidity, Temperature, Rain, Wind Speed, Wind Direction

Solar Radiation Sensor

Soil Moisture/Temperature Sensor

WeatherLink software

REPORT SUMMARY

The goal was to test for the existence of a season extending micro-climate in high tunnels interspaces. Weather stations were deployed within both the test and control plots along with test crops of eggplant. Observations were collected on the growth and production of the crop along with collection of weather data throughout the growing season.

The field trail failed to detect any dissimilarity in empirical data between the test and control plots.

I believe a potential exists in seasons where conditions are harsher than existed during this field trial.

Fred Forsburg, 3/20/2008