

New York high-tunnel pepper variety trial

Final Report for ONE05-047

Project Type: Partnership

Funds awarded in 2005: \$6,563.00

Projected End Date: 12/31/2005

Region: Northeast

State: New York

Project Leader:

[Judson Reid](#)

Cornell Vegetable Program

Project Information

Summary:

The Finger Lakes Produce Auction is a farmer owned cooperative, incorporated in 2001 in Penn Yan, NY. The establishment of this auction has created a marketing opportunity for local fruits and vegetables. Buyers come from throughout New York and Pennsylvania for flower sales beginning in April. Buyers have expressed interest in early season fruits and vegetables at these sales. Greenhouse and high tunnel tomatoes are currently the only early produce to accompany flower sales.

Researching and promoting other warm season crops that could be grown in high tunnels

and greenhouses more will provide new market opportunities for growers and help retain buyers at the auction throughout the growing season.

Cooperating farmer Howard Hoover constructed a 20'x96' high tunnel for this project. Working together with Extension Associate Judson Reid a variety trial of colored bell peppers was initiated on May 10. An organic, biological root treatment (Bioyield) was applied in a split-plot design.

Harvest and data collection began on July 8, 2005 and ended October 25. Yield data was recorded for each harvest using a digital scale. Yields per block were recorded at each harvest with a digital scale. Total weight per block in pounds was recorded as well as number of fruit. Mean fruit per plant, mean fruit weight, and mean yield in weight per plant and mean boxes per block (.5 bu) were calculated. Data were analyzed using Analysis of Variance (ANOVA), and treatment means were separated using Fishers Least Significant Difference.

In our trial no significant difference was found between treated (Bioyield) and untreated plants as measured by mean fruit per plant, mean fruit weight or mean weight per plant. No relationship was observed between treatment and variety. Significant differences were observed between varieties (treated and untreated data aggregated). Blue Jay yielded significantly greater mean fruit per plant than all other varieties. Blue Jay, Early Sunsatation and King Arthur yielded significantly greater mean weight per plant than Blushing Beauty and Red Knight.

The gross income from the highest yielding variety, Blue Jay, would be \$2960 per

2000 square foot high tunnel if a price of 10/box were assumed. However, the grower prefers having multiple varieties to create a mixture of colors for both wholesale and retail customers. Varieties Blue Jay, Early Sunset and King Arthur were the highest yielding and fit this color spectrum. We concluded that peppers can be utilized in Northeast high tunnels, although their economic return is less than half that of tomatoes.

Our results were shared at the Finger Lakes Produce Auction annual meeting as well as multiple on-farm demonstrations.

Introduction:

As fuel costs increase, unheated high tunnels are gaining ground among sustainable farmers. These structures resemble greenhouses, but have no forced heat or ventilation. Tomatoes are the most common high tunnel crop. Researching and promoting other warm season crops that could be grown in high tunnels and greenhouses will provide new market opportunities for growers.

Project Objectives:

- To compare 5 colored bell pepper varieties in an unheated high tunnel by measuring yield in total weight, total number of fruit, and mean fruit weight.
To observe disease and insect pest trends in the high tunnel, and manage them in a sustainable manner.
To evaluate the effects of a beneficial fungus applied to the root system of peppers (Bioyield).
To share our information with other growers in the region.

Research

Materials and methods:

100 seeds each of 5 bell pepper varieties were sown into 50 cell flats containing ProMix (Premier Horticulture) at a Dundee, NY greenhouse in early March 2005. 1 flat per variety was sprinkled with the biological root treatment Bioyield on March 15. The pepper plants were transplanted into a Lima Silt Loam within a 20x96' high tunnel in Penn Yan, NY on May 10. Transplants were staggered in a double-row with 12" in-row spacing on 3' centers. Varieties were arranged into 22-plant blocks, which were randomized within 4 separate repetitions. A split plot of treated (Bioyield) and untreated plants was established within each block, for a total of 11 treated and 11 untreated plants per block/variety.

Fertilization was accomplished through drip tape with 9-15-30 and calcium nitrate. Predatory mites (*Phytoseulis persimilis*) were introduced on July 27 to control Two Spotted Spider Mites (*Tetranychus urticae*). Yields per block were recorded at each harvest with a digital scale. Total weight per block in pounds was recorded as well as number of fruit. Mean fruit per plant, mean fruit weight, and mean yield in weight per plant and mean boxes of peppers per block (.5 bu) were calculated. Data were analyzed using the SAS Analysis of Variance (ANOVA) procedure, and treatment means were separated using Fishers Least Significant Difference.

Research results and discussion:

In our trial no significant difference was found between treated (Bioyield) and untreated plants as measured by mean fruit per plant, mean fruit weight or mean weight per plant. No relationship was observed between Bioyield treatment and variety.

Significant differences were observed between varieties (treated and untreated data aggregated). Blue Jay yielded significantly reater mean fruit per plant than all other varieties. Blue Jay, Early Sunsation and King Arthur yielded significantly greater mean weight per plant and boxes per block than Blushing Beauty and Red Knight.

Research conclusions:

We concluded that colored bell peppers could be successfully grown in a Northeast High Tunnel. We did not see any benefit to the use of Bioyield, but were pleased with the control of Two Spotted Spider Mites with the release of predatory mites. Although the variety Blue Jay was the highest yielding variety in our trial we would not exclude other varieties from future production. A combination of red, yellow, and purple peppers is most appealing to the customers of the cooperating grower. Varieties King Arthur, Blue Jay, and Early Sunsation met these color requirements and yielded statistically similar boxes per plot.

Participation Summary

Education & Outreach Activities and Participation Summary

PARTICIPATION SUMMARY:

Education/outreach description:

Over 50 growers attended a summer twilight meeting at the high tunnel. Judson Reid presented the project findings to 40 growers at the Western New York Fresh Market Vegetable meeting December 14 in Lockport; and will present at the Finger Lakes Produce Auction annual growers meeting on January 9 and the Empire State Fruit and Vegetable Exposition on February 16. A group 30 of Indian agricultural professionals observed the project in May. Other visitors included 15 Humphry Fellows, representing countries such as China, Madagascar and Nigeria as well as a class of graduate students studying farmer-centered extension at Cornell University (both in October). Our results will be posted on the Cornell Vegetable Program's webpage and reach 400 grower's in the monthly Vedge Edge publication.

Project Outcomes

Project outcomes:

The gross income from the highest yielding variety, Blue Jay, would be \$2960 per 2000 square foot high tunnel if a price of 10/box were assumed. However, the grower prefers having multiple varieties to create a mixture of colors for both wholesale and retail customers.

Assessment of Project Approach and Areas of Further Study:

Areas needing additional study

The study of nitrogen management in high tunnels is necessary to assist in color development of bell peppers. Additional crops should be evaluated for their role as rotation crops for high tunnels. High tunnel spacing of bell peppers requires attention. Paring of crop yield data and Produce Auction price trends would benefit auction growers.

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