

Progress Report to Southern Region Small Fruit Consortium

Title: Evaluation of Cultivars and Plug Date for Greenhouse Strawberry Production

Progress Report

Project: 2010-07

Project Type: Research

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Objectives:

- 1) To evaluate strawberry cultivars for fall and winter greenhouse production.
- 2) To evaluate strawberry plant spacing in greenhouse production.
- 3) To determine number of plants to grow in a ten inch hanging basket.
- 4) To determine the economical feasibility of growing off-season strawberries in greenhouses.

Justification:

There is demand for year-round supply of fresh strawberries in the U.S. Strawberries are currently shipped into the mid-south states during the off-season. Dr. Lieten of Belgium described in 2003 a similar situation in Europe where there was strong year-round demand for fresh strawberries. The early season (February-May) strawberries were largely supplied by southern Spain and Italy. He reported that during the previous decade there had been a “consistent increase in programmed ‘out-of-season’ strawberry production in several central Europe countries.” They developed production techniques using sequential planting dates, plastic tunnels and greenhouses that provided production 11 months of the year. In 1999,

there were approximately 400, 1300, 1500, and 7500 acres of tunnel or greenhouse production in Holland, Belgium, United Kingdom and Italy, respectively.

Strawberries are typically produced from late April until late June in the mid-south. Research is being conducted by others to extend the production period to earlier in the spring by use of tunnels. However, the highest strawberry prices occur during the fall in November and December. Dr. Takeda showed in 2005 that July-plugged plants had the potential to produce a significant fall crop from in the mid-Atlantic coast region by using a high tunnel production system. He reported that “Income from fall and spring strawberry production (double cropping) can help to raise farm profitability.” Cantliffe and colleagues reported in 2008 that profits from conventionally-grown greenhouse strawberries and greenhouse-grown organic strawberries were as much as 1.5 and 9.5 times greater, respectively, than field produced strawberries. Growers in the mid-South may use high tunnel and greenhouse production continually supply off-season strawberries.

Methodologies

Strawberry production experiments were established in late August to early September 2010 in a grower polyethylene-covered greenhouse, a University of Tennessee (UT) polyethylene-covered greenhouse, and in a bay of a UT glasshouse.

Greenhouse one:

Two experiments are being conducted at Martin’s Greenhouses in Rogersville, TN. The experiments are in a polyethylene-covered, propane heated greenhouse previously used for growing hanging baskets of flowers. The greenhouse was equipped with structures to hang baskets four to six feet above the floor and with drip stakes for supplying nutrient solution that had within row spacing of approximately 15 inches. In experiment one, plug plants of eight cultivars (‘Albion’, ‘Aromas’, ‘Camarosa’, ‘Strawberry Festival’, ‘Sweet Charlie’, ‘Treasure’ and ‘Ventana’) were planted in ten inch diameter hanging baskets on September 3, 2010. Each pot had three plants and pots were hung at four to six foot height on existing structures. Treatments were randomized in four replications and each experimental unit contained two pots (six plants). Marketable and total yields are being collected by the grower. The grower is using conventional pest control methods. David Bilderbach (UT Regional Area Farm Management Specialist) is collecting data for analysis of costs and economic returns.

Experiment two is being conducted to determine the effect of number of plants in a ten inch hanging basket on fruit yield, size and quality. Treatments of three cultivars (‘Strawberry Festival’, ‘Camarosa’, and ‘Sweet Charlie’) and three planting densities (two, three, or four plants per pot) were arranged in a split plot with cultivar as the main plot. The trial had four

replications and two pots per experimental unit. The trial is being conducted as described above.

Greenhouse two:

An experiment is being conducted in a 30 foot x 96 foot polyethylene-covered, propane heated, greenhouse on a UT research station in Knoxville, TN. The trial was planted August 22 to evaluate cultivars ('Albion', 'Aromas', 'Camarosa', 'Strawberry Festival', 'Sweet Charlie', 'Treasure' and 'Ventana'), propagation date (July 1 versus August 1), and plug plant conditioning (exposure to 41°F, 12 hour night) on plant flowering and yield.

Treatments are arranged in a randomized block design with seven replications and four plants per experimental unit. Plants are growing in six inch diameter pots on benches. Insect and mite pests are being controlled with IPM-biocontrol using predators and parasitoids. Data being collected includes initial bloom dates and fruit yield, size and quality. Alice Rhea (UT Regional Area Farm Management Specialist) is collecting data for analysis of costs and economic returns.

Greenhouse three:

In a glasshouse on UT campus, strawberry plants are being grown in six inch pots in trays designed to hold six pots of six inch diameter. An experiment is being conducted to evaluate the effect of planting density on yield and fruit size. The trial has six replications with two cultivars ('Strawberry Festival' and 'Camarosa') and four plant densities (3, 4, 5, or 6 pots/tray).

Results

Data collection thus far in all trials is very limited. About 95% of plants in greenhouse two are blooming at the time of this report (November 30) but only a few berries are ripe thus far. Data will be collected until field-grown strawberries become readily available in the spring. A full report will be submitted in the summer following completion of the experiments.

Conclusions

Impact Statement

Citation(s)

None, but a pre-proposal was submitted and then a full proposal submitted 11/15/10 to Southern Region Sustainable Agriculture Research and Education Program based partly on this research. The proposal was titled *Comparison of Biological Pest Control Systems to Conventional Systems for Greenhouse Production of Tomatoes and Strawberries*.