Title: Comparison of Runner-tip Production Among Classes of Certified Nursery Stocks of Strawberry Cultivars

Research or Extension Proposal: Research

Progress Report

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Objective:
Comparison of runner-tip production among Foundation, Registered and Certified plants of the strawberry cultivars Chandler, Camarosa, Sweet Charlie and Bish.

Justification:
Overall, the southeastern US (other than Florida) ranks third nationally in fresh strawberry production. Major cultivars grown in the plasticulture system in the region are Chandler, Camarosa and Sweet Charlie. Between 35 and 40 million bare-root and plug plants are planted in berry fields annually. Until recently growers had to rely primarily on planting stocks produced in nurseries in California and Canada. These stocks are not derived through certification programs, or even if they were (California), frequently harbor diseases and pests such as anthracnose fruit rot, Phytophthora crown rot, angular leaf spot and mites. The use of infected transplants can lead to outbreaks of anthracnose fruit rot in commercial berry production fields and can contribute to lower yields and financial loss to the grower. The most economical approach to control anthracnose and other diseases and pests is through the use of clean planting stocks produced through micropropagation and plant certification programs, preferably within this region where it will be easier to maintain strict controls over all steps and aspects of the plant production system.

The production and performance of runner-tips may vary among three classes of certified plants. Under present certification schemes, Foundation plants (derived from Nuclear Stocks) are used for production of Registered plants, and these plants are used for production of Certified bare-root plants and runner-tips (plug plants), which are then used to produce fruit. However, if the demand for Certified runner-tips (plug plants) increases

in the future, and the demand is higher than the supply, it may be necessary to also use Certified plants for runner-tip production. The nurseries also may benefit economically from using Certified plants for runner-tip production because these plants are less expensive than Registered plants.

The purpose of this study was: 1) to determine how three classes (Foundation, Registered and Certified) of strawberry cultivars Chandler, Camarosa, Sweet Charlie and Bish perform in comparison to runner-tip production; and 2) to evaluate performance of plug plants produced from usable runner-tips for fruit production.

Methodologies:

Runner-tips of four strawberry cultivars, Chandler, Camarosa, Sweet Charlie and Bish were produced at the Central Crops Research Station in Clayton, NC in 2005. The test was designed as a randomized split plot (main plot cultivars; split plot plant class) with four replications. Four strawberry cultivars (Chandler, Camarosa, Sweet Charlie and Bish) and three classes of plants (Foundation, Registered and Certified), or a total of 9 treatments were included in the test. Only, Foundation and Certified plants of Camarosa and Foundation plants of Sweet Charlie were available for this test. Dormant bare-root Foundation plants were obtained from the Sandhills Research Station and Registered and Certified plants from one certified nursery in NC. Plants were transplanted in methyl bromide treated soil on white/black plastic in double rows with 14" spacing between plants (overheating of black plastic during the summer results in dieback of runner-tips). Each treatment was 22 plants but only runners from 20 plants (or less) were harvested and evaluated. The test consisted of 36 plots. Spacing between plots was 30". Test was planted on 3 June 2005. GPS for this test was: N 35^0 40.036' W 078^0 29.774'

All runners were removed on 7 July 2005 and new runners are tips were allowed to grow. Those runners and tips were harvested on 8 Sep 2005 and graded tips were plugged in 50-cell trays in MetroMix and maintained under intermittent mist in a greenhouse at the Central Crops Research Station. Only runners with harvestable tips suitable for rooting that had crown size of approximately ¼"- 3/8" or 0.63-0.95 cm were used. Plug plants were transplanted in methyl bromide treated soil on black plastic in double rows with 14" spacing between plants, 16 plants per treatment. The test was designed as a randomized split plot (main plot cultivars; split plot plant class) with four replications and 36 plots. Yield evaluation will be done in the spring of 2006. Anova was used to analyze differences in tip production/plant and among different classes of plants for Bish and Camarosa, while average number of tips was used to show differences among all four cultivars since Camarosa and Sweet Charlie did not have all classes of plants in this test.

Results:

1. Number of usable runner-tips per plant for Bish and Chandler (Fig.1). No significant difference was found between the cultivars. Both Bish and Chandler are statistically similar in the number of tips per plant for all three classes of plants combined.

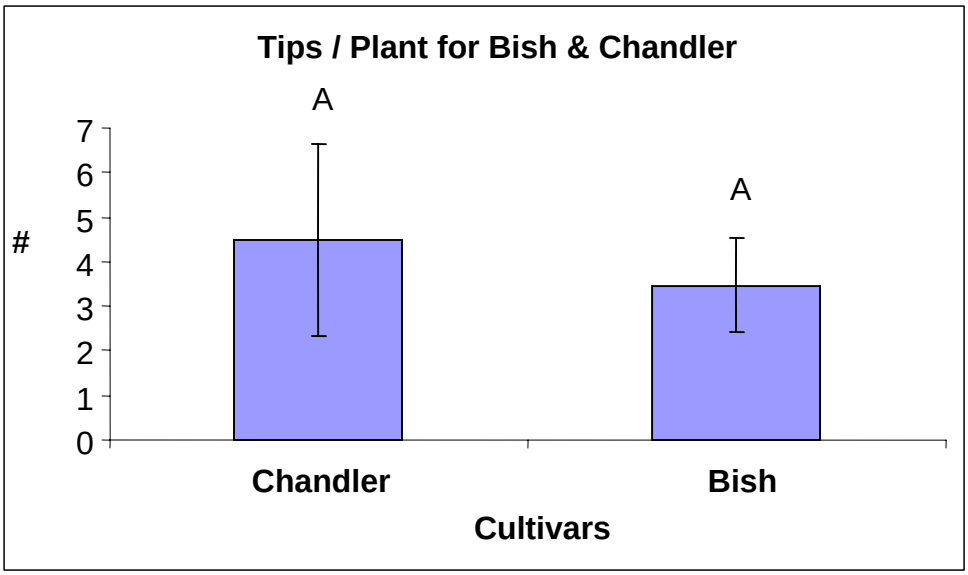

Fig. 1. Number of tips/plant for strawberry cultivars Bish and Chandler.

2. Number of usable runner-tips per plant for three classes of plants for Bish and Chandler (Fig.2). Significant differences were found for classes of plants ($p = 0.0075$). Certified plants produced a higher number of tips than Registered and Foundation plants for both Bish and Chandler. Although, there is a tendency that shows greater values for Registered compared to Foundation, they are not statistically different.

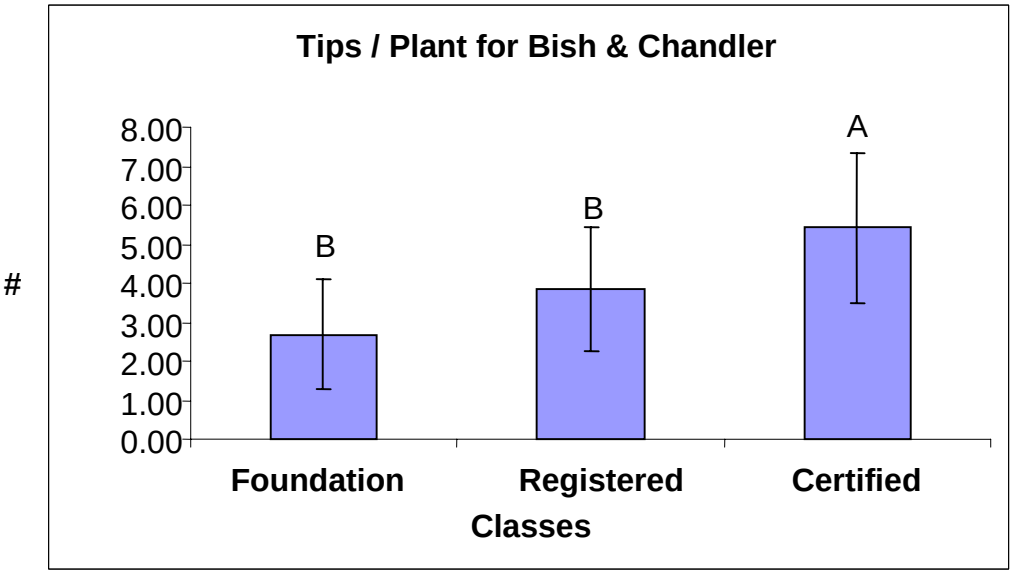

Fig. 1. Number of tips/plant for Bish and Chandler for three classes of plants.

3. **Number of usable runner-tips per plant for four cultivars (Fig.3).** The average number of tips per plant was shown for all four cultivars and three classes of plants.

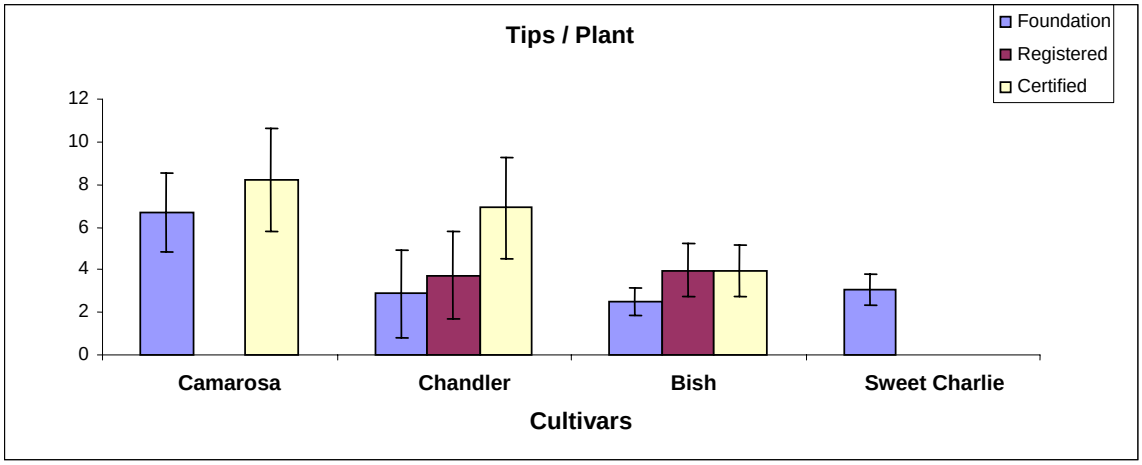

Fig. 3. Average number of tips per plant.

Conclusions:

Both Bish and Chandler were statistically similar in the number of tips per plant produced. Significant differences were found for classes of plants ($p = 0.0075$). Certified plants produced a higher number of tips than Registered and Foundation plants for both Bish and Chandler. Camarosa and Sweet Charlie were not included in the final analysis because of the missing treatments. However, again this year Camarosa was the most prolific producer of runner tips for Foundation and Certified classes among four cultivars.

Currently we are comparing the performance of plug plants derived from Foundation, Registered and Certified Camarosa, Chandler, Sweet Charlie and Bish plants, for fruit production under grower conditions. If there are no differences in fruit yield and quality, then both Registered and Certified plants can be used in certified nurseries to produce runner-tips and plug plants in order to meet the needs of the strawberry fruit industry in the region.

Impact Statement:

The most economical approach to control anthracnose and other diseases and pests is through the use of clean planting stocks produced through micropropagation and plant certification programs, preferably in the southeast where it will be easier to maintain strict controls over all steps and aspects of the plant production system.

APPENDIX

Fig. 4. Runner-tip production at the Central Crops Research Station in Clayton.

Fig. 5. Production of plug plants in a greenhouse.

Fig. 6. Plug plants in the fruit production field planted on 17 October 2005.