

2006 Research Report to the Southern Region Small Fruit Consortium

Title: An Alternative Systems Approach to Blackberry Production

Principal Investigator:

Dr. David W. Lockwood
252 EPS, 2431 Joe Johnson Drive
Dept. of Plant Sciences
University of Tennessee
Knoxville, TN 37996-4561
E-mail: dlockwood@utk.edu

Co-Investigator:

Dr. Walt Hitch
University of Tennessee
Plateau Research and Education Center
320 Experiment Station Rd.
Crossville, TN 38571
E-mail: jhitch@tennessee.edu

Objectives:

1. To evaluate the value of trellising in commercial, erect blackberry production
2. To evaluate the yield, berry size and berry quality of and alternate year bearing blackberry production system.
3. To evaluate the economic feasibility of an alternate year bearing blackberry production system.

Justification:

Interest in blackberry fruit has increased dramatically as knowledge of the health benefits associated with their consumption increases. Opportunities exist in blackberry production for growers searching to find alternate crops. The availability on erect, thornless blackberry cultivars has encouraged many growers to consider commercial blackberry production.

Blackberry production is a high labor enterprise. For optimum yields and to reduce the potential for pest problems, plants should be pruned several times throughout their lifespan. With both primocanes and floricanes existing in the planting simultaneously, the pruning operation cannot be mechanized to a very large degree resulting in a large expenditure in time and labor for growers. Although certain thornless blackberry cultivars can be grown without the use of a support system, yields and ease of management of the planting can be enhanced through the use of some type of trellis, resulting in increased expenditures in materials and labor.

Several training systems which offer the potential to reduce labor inputs in pruning are being explored. Trellis systems can be utilized to retain the productive advantage for canes taller than recommended for freestanding plants and to separate floricanes and primocanes within the row which should result in increased fruit quality

and pruning efficiency. Alternate year harvest should greatly lessen pruning costs as floricanes can be mowed off during the winter following fruiting. However, since this would also result in destruction of primocanes, that field would not fruit the following year. Having two blocks of blackberries where the sequence of fruiting followed by mowing are staggered would be necessary to achieve annual production. Yield reduction on a given area of land would be expected to be less with this system than where a field of equal size was managed for a crop every year. However, if the yield reduction was not excessive, the lower costs involved in alternate year cropping might result in an increased net profit.

Methodologies:

Tissue cultured, virus indexed Apache blackberry plants were purchased from Cedar Valley Nursery in Centralia, WA. in 2003. A site was prepared at the Plateau Experiment Station in Crossville, TN and the planting was established in mid-June 2003. Extended cool, overcast conditions at the nursery slowed plant growth resulting in delayed shipment of the plants. Irrigation was begun at the time of planting as per the recommendations of the nursery. Survival of the plants was good; however, very little new growth occurred the summer of planting. Due to this lack of growth, the summer of 2004 was devoted to establishing the planting. The planting was sufficiently developed to yield a partial crop during the summer of 2005 and to allow the establishment of the proposed treatments. The research proposal was set up to cover a 5 year period in anticipation of the time it would take to initiate the following treatments:

1. Freestanding with floricanes removal
 - top primocanes at 42 inches, remove floricanes immediately after fruiting, head laterals to 12 – 18 inches in late winter, remove laterals on lower 18 inches of canes, remove weak canes and thin remaining canes to 4 – 6 per linear foot of row.
2. Freestanding with no floricanes removal
 - top primocanes at 42 inches, no floricanes removal, no pruning on laterals
3. 2-wire vertical trellis (wires at 3 ft. and 5 ft. aboveground)
 - top primocanes at 65 inches, remove floricanes after harvest, prune laterals and thin canes as described in treatment 1.
4. V-system (2 wires 60 inches aboveground and 30 inches apart)
 - As primocanes grow, they are pulled to one side, secured to the wire and topped about 12 inches above the wire. The following year, primocanes are secured to the opposite wire. This results in harvesting alternate sides of the trellis each year. Floricanes are removed following harvest. Laterals are headed and canes are thinned in late winter.
5. Alternate row harvest
 - Half of the treatment is mowed off in winter every other year with the other half being mowed during alternate years. Elimination of floricanes from the

“primocane only” rows should result in more primocane growth and greater fruit production the following year. Primocanes in the “primocane only” sections are headed at 42 inches. Laterals on the sides of the rows adjacent to the drive areas will be mowed to a length of 12 to 18 inches in late winter. Laterals within the row will not be pruned.

6. Alternate row harvest with primocane suppression
 - Same as treatment 5 except that new primocanes in the floricanes fruiting row will be suppressed (by hand tipping or through the use of selected herbicides) until the beginning of harvest on one-half of the canes and until after harvest on the other half. The effect of primocane competition with floricanes will be determined by comparing treatments 4 and 5.
7. Mowing immediately after harvest to determine if sufficient primocane growth will occur to give acceptable yields the following year. (It soon became apparent that primocane growth following fruiting would not be adequate to produce acceptable levels of fruiting therefore this treatment is being modified to a “V-system” similar to that described in treatment 4, except that floricanes will be pulled to both sides of the V each year. The primocanes will be allowed to grow straight up between the floricanes so they will not interfere with floricanes removal following harvest.)

Results and Conclusions

This is a five year project. Since no appreciable growth occurred in the year of planting, the duration of the trials need to be extended through 2008, a total of six years.

The 2006 harvest began on July 18. Plants were harvested six times with the last harvest being on August 10. Fruit weight was measured for each treatment at each harvest. Individual berry weight and berries per pound was calculated at the first, fifth and sixth harvests. Soluble solids were measured at the first fifth and sixth harvest as well.

Crown gall continues to be a problem in this planting. The field has not been cropped in several years so carryover in the soil should not be an issue. The plants came from a reliable nursery. They were tissue-cultured and should have been clean. To date, cane losses do not appear to have had much of an impact on yields, but the potential exists if crown gall continues to increase.

With the growing season on the Cumberland Plateau, managing the planting by mowing off the plants immediately after harvest, fertilizing and irrigating to get enough cane growth and fruit bud formation for an economically viable crop the next year does not appear to have merit. Yields from this treatment were among the lowest reported and the floricanes were not erect, making harvest more difficult and reducing fruit quality potential.

Topping floricanes at 42 inches and allowing them to be freestanding has resulted in lower yields as compared to both the upright trellis where primocanes were topped at 65 inches or the V-trellis. Also, canes were not able to hold themselves erect without support when windy conditions occurred, especially when accompanied by significant rainfall.

To date, no detectable increase in disease problems has been recorded where floricanes have not been removed following harvest as compared to where they have been removed. With increasing age of the planting, however, more disease pressure should be expected where floricanes remain in the planting. The presence of old floricanes has made a big difference in ease of harvest.