

Evaluation of thornless semi-erect and erect blackberry training systems and varieties for Kentucky - 2001 & 2002

John Strang, April Satanek, John Snyder, Chris Smigell, Doug Archbold, Phillip Bush, Dave Lowry and Darrell Slone, Department of Horticulture

Introduction

Blackberries continue to be a popular market item for Kentucky consumers and most growers find that high quality blackberries are readily marketable. This study is being conducted as part of the New Crop Opportunities Fruit Project at the Horticulture Research Farm in Lexington, Kentucky. The first part of the study has been designed to evaluate two training systems for three thornless, semi-erect blackberry varieties using a double-T four wire trellis. The second part is to evaluate the use of a plastic bailing twine trellis for cane stabilization versus no trellis for two thornless, erect blackberry varieties.

Materials and Methods

Semi-erect thornless blackberry plants were set the spring of 2000 into black plastic-mulched beds. Each plot consisted of three plants of either Hull Thornless, Triple Crown or Chester spaced eight feet apart in the row with 12 feet between rows. Each plot was replicated 3 times in a randomized block design. All plants were trained on a double-T four wire trellis with the lower two wires 2 ft apart and the top two wires 4 ft apart. Two training systems were used - a conventional system and the Oregon system.

In the conventional system, primocanes were topped when they had extended one foot above the top of the trellis. Dead fruiting canes that had croppped were removed in the fall. During early spring dormant pruning, spindly canes and/or those that had red necked cane borer swellings were removed. Lateral branches were pruned back to 18 inches in length and those that were within 18 inches of the ground were removed completely.

Primocanes were not summer tipped for the Oregon system. In the spring canes were not thinned, although those with red necked cane borer swellings were removed. Low laterals, within 18 inches of the ground, were removed. Laterals above this were not cut back and were wound around, and sometimes loosely tied, to the closest trellis wire extending away from the plant.

Arapaho and Apache erect blackberry plants were set three feet apart in the guard rows on the north and south sides of the semi-erect blackberry plot. Trellising treatments (supported and unsupported) and varieties were each replicated three times in a completely randomized design. Plots consisted of three plants of the same blackberry variety. Metal fence posts were set at intervals of 9 feet and plastic bailer twine was run on both sides of the supported treatment at a height of 3.5 feet.

During the first (2000) growing season, canes were allowed to trail and grow as much as possible. In the spring of 2001, the erect blackberry canes were pruned severely to encourage the development of more vigorous shoots for the following season. During the summer of 2001 and 2002, primocanes were tipped at a height of about 3 ft. Spindly canes and those with red necked cane borer swellings were removed in the spring of 2002. Laterals were cut back to a length of 16 to 18 inches.

The black plastic mulch was removed during the spring of 2001 and plants were watered by hand as needed. The summer of 2002 was dry and a trickle irrigation system was installed. Plants were fertilized in February with calcium nitrate at the rate of 8 lb/100 ft row (43.5 lb N/A). Weeds were controlled by hand weeding, spot treatment with Roundup and in 2002 with Princep 4L. A conventional fungicide spray program using Kocide, Captan, Nova and Benlate was maintained. Japanese beetles and green June beetle pressure was severe in 2002 and both Sevin and malathion were used for control. Bird pressure was also severe early in 2002 and an avian alarm was set up. The plants were harvested in 2001 and 2002. Data were collected for yield, fruit size, and fruit soluble solids.

Analysis of the 2002 data suggested that there was a mix-up in labeling of the Arapaho and Apache plants at planting. A visual inspection of the plants during the dormant season indicated that this was so. Arapaho canes remain green during the winter, while Apache canes turn red. Plants and plots were subsequently relabeled and the data analysis was corrected. This resulted in the loss of precision in the 2002 data.

Results and Discussion

Statistical analysis was not conducted on the 2001 yield data (Table 1), but trends for berry weight and soluble solids (% sugar) content were similar to those obtained in 2002. Triple Crown tended to be the highest yielding and Hull Thornless the lowest yielding in 2001, while this was reversed in 2002, although there was no significant difference in yield. The fruit load in 2001 could have been responsible for the reversal in 2002. Arapaho and Apache had very low yields in 2001 due to severe spring pruning.

Results for the semi-erect blackberries for 2002 are presented in Tables 2, 3 and 6. There were no significant differences in yield between the three semi-erect blackberry varieties or between training systems. Triple Crown had a larger berry size than the other two varieties. Triple Crown berries also had 1.3 percent higher soluble solids (sugar) content than Chester, which in turn had two percent higher soluble solids content than Hull Thornless. The Triple Crown fruit were noticeably sweeter than the other berries. They also had a higher pH (Table 6) than Chester and Hull Thornless. Pickers felt that Triple Crown had the most attractive looking fruit. Average berry size was slightly larger for the conventional training system in contrast with the Oregon training system. There was no difference in berry pH between the conventional and Oregon training systems (data not shown).

Results for the erect blackberries are indicated in Tables 4 and 5. There was no difference in yield, average berry weight or soluble solids content between the Apache and Arapaho plants. Nor was there a difference in yield or berry weight between the no trellis and string trellis treatments. However, there was a trend for Apache to yield more than Arapaho and for the string trellis plants to yield more than the no trellis plants. These trends may become more apparent in future harvests as a correction for a mix-up in the Arapaho and Apache plants at planting, which resulted in a loss of two degrees of freedom in the 2002 analysis, is rectified. The string trellised plants did have slightly lower soluble solids content. Berry pH did not differ between the Arapaho or Apache varieties and this was not affected by trellising (data not shown). Bird losses were more severe on the erect blackberries because these were the first to ripen. Pickers felt that of the two thornless erect blackberries, Apache had the more attractive fruit.

Table 1. Thornless blackberry yield, berry weight and soluble solids, 2001 harvest

Variety	Avg. yield (lb/A)	Avg. berry wt. (g)	Soluble solids (%)
Triple Crown	6,471	7.6	10.0
Chester	5,908	5.2	7.6
Hull Thornless	1,897	5.5	6.5
Apache ¹	2,517	8.0	11.4
Arapaho ¹	353	4.3	11.7

¹ The erect thornless blackberries were pruned severely the spring of 2001.

Table 2. Thornless semi-erect blackberry variety yield, average berry weight and soluble solids, 2002 harvest

Variety	Yield ¹ (lb/A)	Avg. berry wt. ¹ (g)	Soluble solids ¹ (%)
Hull Thornless	13,459 a	5.4 b	8.6 c
Chester	10,865 a	5.2 b	10.6 b
Triple Crown	9,815 a	6.9 a	11.9 a

¹Numbers followed by the same letter are not significantly different (Duncan Waller LSD P=0.05).

Table 3. Thornless semi-erect blackberry yield, average berry weight and soluble solids based on training system, 2002 harvest

Training System	Yield ¹ (lb/A)	Avg. berry wt. ¹ (g)	Soluble solids ¹ (%)
Conventional	10,722 a	6.0 a	10.3 a
Oregon System	12,037 a	5.7 b	10.4 a

¹Numbers followed by the same letter are not significantly different (Duncan Waller LSD P=0.05).

Table 4. Thornless erect blackberry variety yield, average berry weight and soluble solids, 2002 harvest

Variety	Yield ¹ (lb/A)	Avg. berry wt. ¹ (g)	Soluble solids ¹ (%)
Apache	6,131 a	6.6 a	10.6 a
Arapaho	2,947 a	7.0 a	10.9 a

¹Numbers followed by the same letter are not significantly different (Duncan Waller LSD P=0.05).

Table 5. Thornless erect blackberry yield, average berry weight and soluble solids based on training system, 2002 harvest

Training system	Yield ¹ (lb/A)	Avg. berry wt. ¹ (g)	Soluble solids ¹ (%)
No trellis	3,786 a	6.0 a	11.0 a
String trellis	5,291 a	7.6 a	10.4 b

¹Numbers followed by the same letter are not significantly different (Duncan Waller LSD P=0.05).

Table 6. Thornless semi-erect blackberry pH, July 9, 2002 harvest

Variety	Berry pH
Triple Crown	3.2 a
Chester	2.9 b
Hull Thornless	2.9 b

¹Numbers followed by the same letter are not significantly different (Duncan Waller LSD P=0.05).