

Blackberry Cultivar Evaluation - Quicksand

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Introduction

Blackberry (*Rubus*), a native plant, grows well in Kentucky and new improved blackberry cultivars offer a chance for crop diversification and a high income per acre crop for Kentucky agricultural producers. Blackberries have multiple uses including fresh or processed consumption, wine production and medicinal purposes. *Rubus* has lower establishment and labor costs than many horticultural enterprises. It is also important to note that blackberries have the potential to be grown on hilly land and strip mine sites and have a low erosion potential in conjunction with sod strips. With available mechanization, blackberries can be grown on a large scale and mechanically harvested or they may be grown on small scale and hand-harvested for local fresh markets.

Methods

A thorny and thornless blackberry cultivar and advanced breeding selection trial was planted as a randomized complete block in May 2000 on raised beds. For the thorny cultivars, six plants/replication were planted 2 feet apart in the row. The thornless erect cultivars were planted with four plants/replication at a spacing of 3 feet in the row. Plants of a thornless semi-erect cultivar (Triple Crown) were planted 4 feet apart in the row with three plants per replication. All rows were spaced 8 feet apart. There were a total of five replications for all the cultivars and selections with a 3-foot space between replications. The blackberries received a single application of 50 lb actual N/A from ammonium nitrate in March of 2001, 2002 and 2003. *Entries or selections preceded by an "A" and followed by a number are unreleased breeding selections, are not for sale, and are not available in commerce at the time of this testing and reporting.* The blackberries were observed for vigor, winter/spring hardiness, disease problems, as well as fruit yield, berry size, appearance, and firmness.

Results

Many thorny and thornless blackberry cultivars have a tendency to de-harden and break dormancy early in Quicksand where 60-70° F in January and February may be followed by 10-20° F in March and April. This weather pattern occurs at least once every four or five years and did so in 2002 and 2003. Thornless cultivars such as Hull and Triple Crown, while considered less hardy than thorny blackberries, do very well here under our growing conditions because they are slow to break bud and remain dormant later into the spring. Table 1 shows the bloom development and the presence of florican injury for both years. Canes showing injury at that time tend to die during warm weather prior to harvest, reducing yield and berry quality.

The 12 cultivars being tested at Quicksand were evaluated three years after planting for survival (Table 3). A grower who invests \$2,700 to \$3,300 in order to establish an acre of blackberries needs at least two good fruiting years to break even and begin making a profit. Among the 12 cultivars being tested, eight still had plant stands of 80% or better, whereas four of the cultivars had stands of 60% or less. An unidentified *Phytophthora* species was isolated from the decaying roots of many of the

blackberry cultivars with poor stands.

Yield and berry size of the three thorny blackberry cultivars tested are shown in Tables 5 and 6. Kiowa produced the highest average yield (5,675 lb/ac) and had the least amount of visible cane injury. Unfortunately, Kiowa is very susceptible to a fungal disease called double blossom. In a warm humid climate it would be hard to raise Kiowa without having a good fungicide spray program. Kiowa also has a tendency to lay down, thus making picking and mowing difficult. The selection A-1854 had a tremendous fruit set in 2002 but the injured floricanes in all five reps slowly went down hill, resulting in a smaller berry size. The plants did not recover and have died out (Table 2). Shawnee had a average yield of 5,566.5 lb/ac and has an attractive berry but is also subject to cold temperature floricane injury. In past trials at Quicksand, Shawnee has had problems with hardiness and double blossom and was included in this trial as a check for those problems.

The highest yielding thornless blackberry (Tables 5 and 6) was Triple Crown (8,102 lb/ac) followed by A1689 with a two-year average of 5,173 lb/ac and Ouachita (A-1905) with 4,919 lb/ac average. The three cultivars A-1857, Navaho and A-2049 all suffered severe floricane injury and plant death. In 2003, the fruit from Navaho were so small and dried they were not marketable. The plants died out in 2003. The numbered cultivars A-1689 and Ouachita (A-1905) appeared to suffer less cane injury and produced attractive fruit. The fruit quality of these two selections made them the “pickers’ choice” among all the blackberries harvested the past two years. Additional tests are needed to determine the long-term suitability of any blackberry cultivar to our climatic conditions, and further tests are planned for 2004 on these and additional blackberry cultivars and selections planted in 2002.

Table 1. Blackberry Cultivar/Selection Bloom and Floricane Evaluation						
Cultivar/Selection*	Percent full bloom		Floricane injury		Comments	
	5/04/02	4/25/03	5/04/02	4/25/03	5/04/02	4/25/03
A1963	0	0	injury	8%	3/5 reps visible injury.	4/5 reps visible injury
A1539	80	30	none	10%	-	4/5 reps visible injury
A2049	48	50	injury	-	3/5 reps visible injury	plants died out.
A1857	37	0	injury	40%	2/5 reps visible injury	4/5 reps injury
A1854	98	45	injury	10%	1/5 reps visible injury	plants dead 3/5 reps
A1960	15	0	injury	76%	4/5 reps visible injury	5/5 reps injury
A1689	1	0	slight injury	0	1/5 reps visible injury	0/5 reps injury
Ouachita (A1905)	6	0	none	5%		1/5 reps injury
Navaho	1	0	severe injury	65%	4/5 reps severe injury	5/5 reps injury Plants dying
Kiowa	5	0	none	17%	-	5/5 reps injury
Shawnee	61	11	none	7%	-	5/5 reps injury
Triple Crown	0	0	none	0	-	0/5 reps injury Healthy plants.

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Table 2. 2003 Blackberry Cultivar Survival Rating Evaluation									
Cultivar	Date	Plant¹ #/Year			Avg # Florican e²	Avg % Florican e injury³	Avg # primocanes⁴	Disease Rating⁵	Comments
		2000	2001	2003					
A-1963 T ⁵	7/28	6	5.8	5.6	18	78	16.8	0	good regrowth
A-1539 T	7/28	6	5.2	5.2	9.8	74	15.8	0	good regrowth
A-2049 T	7/28	6	5.8	1.6	0.4	-	0.4	-	dead/dying plts
A-1857 T	7/28	6	6	5.0	10.6	90	8.8	-	3/5 reps dying
A-1854	7/28	6	5	3.2	-	-	-	-	5/5 reps dying
A-1960 T	7/28	6	6	3.6	6.4	92	5.8	-	5/5 reps dying
A-1689 T	7/28	4	2.4	4	5.2	74	12	-	2/5 reps dying plts
Ouachita (A-1905 T)	7/28	6	5.2	4.8	14.2	88	11.6	-	4/5 reps good regrowth
Navaho	7/28	4	4	2.4	5.2	57	4.6	-	5/5 reps dying out
Kiowa	7/28	6	4.6	5	10	90	7.6	DB	3/5 reps dying out
Shawnee	7/28	6	5.6	5.8	11.4	92	13	DB	good regrowth
Triple Crown	7/28	3	3	3.6	7.2	1	9.4	0	5/5 reps healthy

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1 = number of live plants/rep; 2 = number of floricanes present; 3 = % injury or death to the floricanes 0=no injury, 1=10-20% death while 5=80-100 death. 4=new primocane present actual count/rep; 5 = presence of disease DB-Double Blossom, OR-Orange Rust, PH-Phytophthora Root Rot 0 - no disease 5- 100 % diseased. 5 = T means the cultivar is thornless.

Table 3. Survival of Blackberry Cultivars After Two Years	
Cultivar	Percent Plant Survival¹
A-1963 T ⁵	93
A-1539 T	87
A-2049 T	27
A-1857 T	84
A-1854	53
A-1960 T	60
A-1689 T	100
Ouachita (A-1905 T)	80
Navaho	60
Kiowa	83
Shawnee	97
Triple Crown	120
<p>* Entries or selections preceded by an "A" and followed by a number are unreleased breeding selections, and are not available in commerce at the time of this testing and reporting. ¹Blackberry survival after two full years. Plant survival is based on live plants in 5 replications.</p>	

Table 4. 2002 Thorny Blackberry Cultivar/Selection Evaluation-Quicksand									
Cultivar/ Selection*	Harv. start ¹	Harv. days ²	Lb. fruit/ac	Fruit size (oz.)	Taste ³	Appearance ⁴	% SS ⁵	Diseas e rating ⁶	Remarks
Kiowa	6/27	40	7185 A	0.322	T	A+	8.0	2.4	Double Blossom
A-1854	6/18	35	4052 A	0.123	S,T	A	9.0	0.6	
Shawnee	6/20	36	4010 A	0.382	S	A	8.4	2.5	Double Blossom
LSD			3805	0.478					

* Entries or selections preceded by an "A" and followed by a number are unreleased breeding selections, and are not available in commerce at the time of this testing and reporting.
LSD5% Least significant difference at the 5 % level
¹ The first day of harvest for that cultivar.
² The number of days between first and last harvest for each cultivar.
³ Taste of fresh fruit, T=tart, S=sweet, B=bland
⁴ Appearance = A- below average, A=average, A+=above average.
⁵ %SS is the percent soluble solids of fresh berries
⁶ Disease ratings are on a 0 to 5 scale 0=no disease seen, 5=100% of plants have disease present

Table 5. 2002 Thornless Blackberry Cultivar Evaluation									
Cultivar/ Selection*	Harv. start¹	Harv. days²	Lb. fruit/ac	Fruit size (oz.)	Taste³	Appearance⁴	% SS⁵	Disease rating⁶	Remarks
Triple Crown	7/06	28	7623 A	0.193 A	S	A	10.0	0	
A1689	6/30	37	4793 B	0.188 B	S	A	9.3	0	
Ouachita (A1905)	6/24	41	3472 BC	0.183 C	S	A+	10.2	0	
A1963	6/26	33	2165 CD	0.178 D	S	A+	8.3	0	
A1960	6/23	40	2103 CD	0.166 E	S	A+	9.9	0	
A1539	6/19	43	1873 DE	0.164 E	T	A+	9.2	0	
A1857	6/20	26	801 DEF	0.134 F	ST	A	10.9	0	uneven drupelets
Navaho	6/26	23	537 EF	0.010 H	ST	A-	8.8	0	uneven drupelets
A2049	6/21	28	452 F	0.119 G	ST	A-	10.5	0	
LSD5%			1369	0.004					
<p>* Entries or selections preceded by an "A" and followed by a number are unreleased breeding selections, and are not available in commerce at the time of this testing and reporting. LSD5% Least significant difference at the 5 % level ¹ The first day of harvest for that cultivar. ² The number of days between first and last harvest for each cultivar. ³ Taste of fresh fruit, T=tart, S=sweet, B=bland ⁴ Appearance = A- below average, A=average, A+=above average. ⁵ % SS is the percent soluble solids of fresh berries ⁶ Disease ratings are on a 0 to 5 scale 0=no disease seen, 5=100% of plants have disease present.</p>									

Table 6. 2003 Blackberry Cultivar Evaluation						
Cultivar/ Selection*	Harv. start¹	Harv. days²	Lb. fruit/ac	Fruit size (oz.)	Taste³	Appearance⁴
A-1963			2843.7	0.175	S	A
A-1539			6178.3	0.189	S	A
A-2049			703.3	0.19	ST	A-
A-1857			4945.9	0.159	ST	A
A-1854			3908.6	0.122	ST	A
A-1960			2242	0.151	ST	A
A-1689			5552.1	0.212	S	A
Ouachita (A1905)			6366.1	0.173	ST	A
Navaho			1577.2	0.087	ST	A
Kiowa			4165.4	0.312	ST	A+
Shawnee			7123	0.118	ST	A+
Triple Crown			8581.8	0.122	S	A+
LSD5%						

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