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Blackberry Production and Cultivars in North America East of the Rocky Mountains

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Cultivated blackberries (Rubus spp.) have been a popular fruit crop for years although the production area has been small compared to that for other fruit crops. The United States Census of Agriculture reported the blackberry production area in states east of the Rocky Mountains to be 703 ha in 1974, 390 in 1978, 591 ha in 1982 and 660 in 1987 (4, 5, 6). Moore (1) reported that blackberry production was increasing in 13 of 19 states and provinces surveyed, and this expansion was due to the development of a mechanical harvester, pick-your-own (PYO) marketing and new cultivar availability. Leading cultivars included 'Cherokee,' 'Cheyenne' and 'Comanche' of the thorny, erect group and 'Dirksen' and 'Black Satin' on the semi-erect thornless. Skirvin and Hellman (2) reported that with the exception of the major production area of the Pacific Northwest, the southwest United States held the greatest potential for growth in blackberry production based on new cultivars developed for mechanical harvest.

This report provides an update on blackberry production and cultivars of North America east of the Rocky Mountains. The information provided was gathered in a survey conducted in March, 1991.

A survey form, cooperatively developed with B. Strik, Oregon State University, was used to collect the production and related information (3). Respondents (Table 1) were asked to provide information on the following items: 1) production area for 1980, 1990 and 2000 (projected) for trailing, semi-erect and erect types, 2) most popular cultivars grown of each type and trend of planting, 3) promising cultivars, 4) market types, 5) harvest method, 6) major genetic limitations of current cultivars and 7) current research programs in each state or province. Most respondents provided production estimates since exact blackberry production figures were not available for each state or province.

Production and Projections

Commercial blackberry production existed in 26 states and in Eastern Canada. No production was reported in North or South Dakota, Wisconsin, Minnesota, Indiana or New England. The survey indicated that total production area increased by 77% from 1980 to 1990 and a projected increase of 51% should occur by 2000 (Table 2). Erect cultivars made up 65% of the total production area in 1990, 34% for semi-erect and 1% for trailing. Trailing blackberries were reported in five states: Georgia, North Carolina, South Carolina, Alabama and Texas. Production projections indicated a 62% increase in area for semi-erect cultivars by 2000 and a 46% increase for erect cultivars. Trailing production was projected to decline.

The Southwest had the largest total production area in 1990 followed by the upper Southeast and Midwest (Table 2). Projections suggest the Southwest should continue as the production area leader, followed by the Midwest and upper Southwest. The

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Table 1. Blackberry production and related information, survey respondents, 1991.

Name	State/Province	Region
Bruce Bordelon	Indiana	Midwest
Gerald Brown	Kentucky	Upper Southeast
John Clark	Arkansas	Southwest
Bill Courter	Illinois	Midwest
Tim Crocker	Florida	Lower Southeast
Adam Dale	Ontario, East. Canada	Northeast
Chad Finn	Missouri	Midwest
Joe Fiola	New Jersey	Northeast
Doug Foulk	Minnesota	Midwest
Richard Funt	Ohio	Midwest
Bob Gough	New England	Northeast
Barb Goulart	Pennsylvania	Northeast
David Handley	New England	Northeast
Eric Hanson	Michigan	Midwest
Ed Hellman	Kansas	Midwest
David Himelrick	Alabama	Lower Southeast
Ansel King	South Carolina	Lower Southeast
John Lipe	Texas	Southwest
David Lockwood	Tennessee	Upper Southeast
Stephen Myers	Georgia	Lower Southeast
Gail Nonnecke	Iowa	Midwest
Barclay Poling	North Carolina	Upper Southeast
Juanita Popenoe	West Virginia	Northeast
Marvin Pritts	New York	Northeast
Earl Puls	Louisiana	Southwest
Freddie Rasberry	Mississippi	Lower Southeast
Elden Stang	Wisconsin, North and South Dakota	Midwest
Don Steinegger	Nebraska	Midwest
Herb Stiles	Virginia	Upper Southeast
Harry Swartz	Maryland, Delaware	Northeast
Julia Whitworth	Oklahoma	Southwest

lower Southeast and Northeast had somewhat similar production and projections for 1990 and 2000.

Semi-erect blackberries comprised the largest production area for 1990 for the upper Southeast and Northeast while erect forms were predominant in the Southwest and lower Southeast. The Midwest had a slightly higher portion of production of erects than semi-erects. Semi-erects are projected to increase in production area in the upper Southeast and Midwest, have minor increases in the Southwest and Northeast and decline in the lower Southeast. Erects are projected to increase significantly in the upper Southeast, Southwest and Midwest and increase slightly in the Northeast.

Cultivars

'Boysn' was the most popular trailing cultivar, being listed as grown in all states with production of trailing types (Table 3). No projected production area increases were indicated for trailing cultivars.

All semi-erect cultivars listed are from the USDA breeding program and are thornless (Table 4). 'Black Satin,' 'Chester,' 'Hull' and 'Dirksen' all had a large production area. Of these, 'Chester' was consistently listed to increase in planting area. 'Hull'

Table 2. Regional and total production areas of trailing, semi-erect and erect blackberries for 1980, 1990, and 2000. States listed in the footnote produced blackberries and are ranked from highest to lowest production area.

Region/Type	Hectares 1980	1990	2000[z]
Upper Southeast[y]			
Trailing	2	2	4
Semi-erect	40	126	223
Erect	23	107	156
Total	65	235	383
Lower Southeast[x]			
Trailing	4	8	4
Semi-erect	8	16	6
Erect	49	147	186
Total	61	171	196
Southwest[w]			
Trailing	2	2	2
Semi-erect	6	24	34
Erect	214	375	577
Total	222	401	613
Midwest[v]			
Semi-erect	73	113	247
Erect	94	136	199
Total	167	249	446
Northeast[u]			
Semi-erect	146	132	156
Erect	19	17	26
Total	165	149	182
Type totals	**1980**	**1990**	**2000**
Trailing	8	12	10
Semi-erect	273	411	666
Erect	399	782	1,144
Grand Total	680	1,205	1,820

[z]Projected.
[y]Virginia, Tennessee, North Carolina, Kentucky.
[x]Alabama, South Carolina, Georgia, Mississippi, Florida.
[w]Texas, Arkansas, Oklahoma, Louisiana.
[v]Ohio, Missouri, Illinois, Michigan, Kansas, Iowa, Nebraska.
[u]Pennsylvania, New York, Maryland/Delaware, Eastern Canada, West Virginia, New Jersey.

planting trends were variable among respondents. 'Black Satin,' 'Dirksen' and 'Thornfree' were either steady or decreasing in planting projections.

'Black Satin' was the most popular semi-erect cultivar in the lower Southeast and 'Dirksen' was most widely planted in the Southwest (Table 5). Production of semi-erects in these regions, however, makes up a small amount of the total production area of this type. 'Chester' and 'Hull' were the most widely grown in the upper Southeast, 'Black Satin,' 'Chester' and 'Dirksen' in the Midwest and 'Black Satin' and 'Dirksen' in the Northeast. It should be noted that not all states in each region grow this type of blackberry (Table 5, Footnote).

'Shawnee' was the leading erect cultivar, followed by 'Rosborough,' 'Brazos' and 'Cheyenne' (Table 6). Of the total production, 58% consisted of the Indian-series cultivars developed by the Arkansas Agricultural Experiment Station (Shawnee, Cheyenne, Cherokee, Comanche, Navaho and Choctaw), 31% were Texas Agricultural Experiment Station developed cultivars (Rosborough, Brazos and Womack), and 8% was of 'Darrow' from the New York State Agricultural Experiment Station. Planting trends

Table 3. Production area % and trends in planting for trailing blackberry cultivars in 1990.

Cultivar	% of area	Trend[z]
Boysen	31	S
Gem	19	S
Thornless Boysen	12	S
Lucretia	7	D
Young	2	D
Other	29	-

[z]Trends are S = steady and D = decreasing productive area.

Table 4. Semi-erect cultivar production areas and planting trends in 1990.

Cultivar	Production area (ha)	Trend[z]
Black Satin	95	S, D
Chester	87	I
Hull	86	I, S, D
Dirksen	80	S, D
Thornfree	43	D
Other	20	-

[z]Trends are: I = increasing, S = steady and D = decreasing production area.

Table 5. Semi-erect cultivar production area % for regions of North America, 1990. States listed in the footnote produced semi-erect blackberries and are ranked from highest to lowest in production area.

Cultivar	Cultivar % distribution by region				
	Southwest[z]	Upper Southeast[y]	Lower Southeast[x]	Midwest[w]	Northeast[v]
Black Satin	28	18	41	24	24
Chester	3	28	17	25	15
Hull	2	31	17	9	13
Dirksen	67	19	6	25	20
Thornfree	0	4	16	9	19
Other	0	0	3	8	9

[z]Texas, Oklahoma.
[y]Virginia, Kentucky, North Carolina, Tennessee.
[x]South Carolina, Alabama, Georgia.
[w]Ohio, Illinois, Michigan, Kansas, Missouri, Iowa.
[v]Pennsylvania, New York, Delaware/Maryland, Eastern Canada, New Jersey, West Virginia.

indicated increased of 'Shawnee,' 'Navaho' and 'Choctaw'; increasing, steady or declining production of 'Rosborough'; and increasing or steady production of 'Womack.' Other cultivars had steady or decreasing production projections. Of the cultivars listed, only 'Navaho' is thornless (Table 6).

Production of each cultivar by region is presented in Table 7. 'Shawnee' was the only cultivar grown in all regions. 'Cheyenne' and 'Cherokee' were reported in four of the five regions. 'Rosborough,' 'Brazos' and 'Womack' were limited mostly to the Southwest while 'Darrow' was predominant in the Midwest and Northeast.

Promising Cultivars

Erect cultivars mentioned as most promising were 'Navaho,' 'Choctaw' and 'Illini Hardy.' 'Navaho' was listed most often as promising in states in most regions. 'Choctaw' was most promising in the Southern states and 'Illini Hardy' in the Midwest, Northeast and Upper Southeast. 'Lochness' was the only semi-erect cultivar listed as showing promise, listed by two respondents.

Harvesting and Marketing

All survey respondents indicated that harvests were done exclusively by hand-picking. The majority of the blackberries were marketed by the pick-your-own (62%), others by pre-picked fresh market (36%) and processing (2%).

Current Genetic Limitations to Production

Major genetic limitations listed by respondents included hardiness, rosette/double blossom susceptibility, fruit quality/storability and thorns. Hardiness was listed by 53% of the respondents, all in area north of 36° latitude. Rosette/double blossom was listed by 30% of the respondents, all south of 36° latitude. One-third of the respondents indicated a problem with fruit quality and storability, with tart flavor and lack of firmness as the specific problems. Seventeen percent of the respondents felt that thorns were a major limitation.

Table 6. Erect cultivar production areas and planting trends in 1990.

Cultivar	Production area (ha)	Trend[z]
Shawnee	272	I
Rosborough	111	I, S, D
Brazos	105	S
Cheyenne	98	S, D
Darrow	63	D
Cherokee	47	S, D
Womack	28	I, S
Comanche	21	D
Navaho	9	I
Choctaw	8	I
Other	20	-

[z]Trends are: I = increasing, S = steady and D = decreasing production area.

Table 7. Erect cultivar production area % for regions of North America, 1990. States listed in the footnote produced erect blackberries and are ranked from highest to lowest production area.

Cultivar	Cultivar % distribution by region				
	Southwest[z]	Upper Southeast[y]	Lower Southeast[x]	Midwest[w]	Northeast[v]
Shawnee	18	55	65	38	12
Rosborough	27	0	4	0	0
Brazos	28	0	0	0	0
Cheyenne	11	24	12	10	0
Darrow	0	1	0	38	88
Cherokee	4	11	9	6	0
Womack	8	0	0	0	0
Comanche	1	3	6	0	0
Navaho	1	1	2	3	0
Choctaw	1	4	1	0	0
Other	1	1	1	5	0

[z]Texas, Arkansas, Oklahoma, Louisiana.
[y]Tennessee, North Carolina, Kentucky, Virginia.
[x]Alabama, South Carolina, Georgia, Mississippi, Florida.
[w]Missouri, Ohio, Illinois, Michigan, Iowa,Kansas, Nebraska.
[v]New York, Pennsylvania, Delaware/Maryland, West Virginia, New Jersey.

Other limitations listed less frequently were low yields, small fruit size, season of ripening and insect and disease susceptibility. Limiting diseases other than rosette/double blossom were anthracnose, orange rust, other cane diseases, sterility and root rots. Insects such as the red-necked cane borer, strawberry weevil and tarnished plant bug were limiting.

Current Research Programs

Cultivar testing was ongoing in 13 states and at several locations within some states. Five locations reported breeding programs (Arkansas; USDA-Beltsville, Maryland; USDA-Poplarville, Mississippi; Illinois; and Maryland). Cultural studies were ongoing at six locations including trellising (Virginia, USDA-Kearneysville, W. Virginia), pruning (Alabama, Kentucky), nutrition (Kentucky) and mulching (Ohio). Physiological studies underway included photosynthesis research at two locations (Alabama, Arkansas) developmental physiology (USDA-Kearneysville and Kentucky) and winter hardiness investigations (Missouri, USDA-Kearneysville). Yield component analysis research was underway in Missouri, and mechanical harvesting research was ongoing at USDA-Kearneysville.

Conclusions

Blackberry production is a viable agricultural enterprise in North America east of the Rocky Mountains, and expansion of this crop should continue. The major limitations of hardiness in the North and double/rosette susceptibility in the South continue to be a problem as previously discussed by Moore (1980). Current breeding programs are addressing these problems to some extent, although germplasm is limited and the breeding programs addressing these problems are small.

Breeding of cultivars with higher quality and increased storability is possible and progress in this area should be present in recently released and future cultivars (J. N. Moore, personal communication). Likewise, breeding for improved erect, thornless cultivars is continuing and should contribute to an expansion in thornless blackberry production.

Blackberry cultural and physiological studies should contribute to the expansion of knowledge and cultural

systems and increase opportunities for production. These studies, in addition to cultivar developments, have the potential to facilitate the expansion of blackberry production.

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Raspberry Cultivars in Eastern Canada

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Introduction

Raspberries are a minor crop grown throughout eastern Canada. Similar cultivars are grown from Alberta in the West to Nova Scotia in the East, and as far South as Southwestern Ontario. Most of the red raspberries grown are summer-bearing, although there are a few hectares of fall-bearing cultivars in the warmer areas. There are essentially no commercial plantings of black raspberries.

In this paper, I will discuss: 1) plant production and markets, 2) regional variation in cultivars between 1980 and the present and 3) possible cultivar trends for the next ten years.

Plant Production and Markets for Fruit

Most of the plants are supplied through the Nova Scotia, Quebec and Ontario Plant Propagation Programs. However, a substantial number of plants come from nurseries in the Northeastern U.S. and an undetermined number from fruiting plantations.

Because of the large number of sources of plants, statistical data from various propagation and certification programs do not give an accurate picture of the cultivar trends. However, information from the Ontario Superior Stock Program shows clearly that raspberry cultivars have changed over the last ten years (Table 1).

The main outlet for fruit is the pick-your own market. However, in recent years an increasing amount of fruit has been shipped fresh into the various retail markets. This trend is expected to continue. Essentially, all processing of raspberries in Canada is done in British Columbia; very little fruit from Eastern Canada goes for processing.

Regional Cultivar Variation

The Maritimes

The hectarage of raspberries in the Maritime provinces almost doubled from 37.6 ha in 1980 to 72 ha in 1990. In 1980, Nova Scotia had the greatest plantings of red raspberries with 16.8 ha, followed by New Brunswick with 11.2, Prince Edward Island with 9.2 and Newfoundland with .04. By 1990, New Brunswick was the leading producer in the region with 42 ha; Nova

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