'Arapaho' Erect, Thornless Blackberry

James N. Moore¹ and John R. Clark²

Department of Horticulture and Forestry, University of Arkansas, Fayetteville, AR 72701

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Along-term goal of the Univ. of Arkansas, Fayetteville, blackberry breeding program has been to develop erect-caned, thornless blackberries (*Rubus* L. subgenus *Eubatus*) that do not require trellis support. The first such cultivar, 'Navaho', was released from this program in 1988 (Moore and Clark, 1989) and quickly became popular with home gardeners and commercial "pick-your-own" growers. 'Navaho',

however, has two shortcomings: it ripens very late in the season when summer temperatures are high and it produces new canes only sparingly from roots, a characteristic that delays fruiting-row establishment. 'Arapaho' is early ripening, erect, thornless, and quickly establishes a full fruiting row. It is expected to complement 'Navaho' and expand the harvest period for high-quality thornless blackberries.

Origin

'Arapaho', tested as Ark. 1536, resulted from a cross of Ark. 631 $\times$ Ark. 883 made in 1982 (Fig. 1). Both parents of 'Arapaho' are thorny but are heterozygous for recessive genes for thornlessness. These genes were obtained from the British cultivar Merton Thornless via 'Thornfree' (Scott et al., 1957). The erect growth habit of 'Arapaho' was contributed by the erect, thorny cultivars Darrow, Hillquist, and Cherokee. All cultivars and selections listed in the 'Arapaho' pedigree are tetraploids. The original 'Arapaho' plant was selected from a seedling field in 1985. It has been tested

at three locations in Arkansas and distributed for tests at several other state experiment stations.

Description

'Arapaho' fruit yields have been less than those of 'Navaho' at Fayetteville and Clarksville, Ark., but higher than those of 'Navaho' at Hope, Ark. (Table 1). The yield difference between 'Arapaho' and 'Navaho' was greater at Fayetteville and Clarksville in 1992 (a year of late spring freezes) than in 1991, perhaps indicating greater spring frost susceptibility of 'Arapaho'. Both thornless cultivars were less productive than the thorny cultivars Shawnee and Choctaw, except that 'Navaho' yielded as well as 'Choctaw' at Clarksville and was equal to 'Shawnee' and

Fig. 1. 'Arapaho' thornless blackberry pedigree.

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¹Distinguished Professor of Horticulture.

²Associate Professor and Resident Director, Fruit Substation.

Table 1. Yield and fruit weight means of 2 years (1991–92) of four blackberry cultivars at three Arkansas locations. Planting established in 1989 using root cuttings at 0.6 × 3.05-m spacing.

Cultivar	Fayetteville		Clarksville		Hope	
	Yield (t·ha ⁻¹)	Fruit wt (g)	Yield (t·ha ⁻¹)	Fruit wt (g)	Yield (t·ha ⁻¹)	Fruit wt (g)
Shawnee	14.5 a [*]	6.0 a	15.7 a	6.9 a	11.0 a	6.1 a
Choctaw	13.6 a	4.5 bc	10.6 b	5.0 b	12.9 a	4.3 c
Navaho	15.3 a	4.8 b	10.8 b	4.8 b	4.9 c	4.3 c
Arapaho	9.5 b	4.1 c	6.3 C	5.1 b	8.6 b	4.7 b

^{*}Mean separation within columns by Duncan's multiple range test, $P \leq 0.05$.

'Choctaw' at Fayetteville. 'Arapaho' fruit size, measured as average berry weight, compared with that of 'Navaho' was larger at Hope, of similar size at Clarksville, and smaller at Fayetteville. 'Arapaho' fruit were as large as or larger than 'Choctaw' fruit but smaller than 'Shawnee' fruit at all locations.

'Arapaho' fruit are short-conic and bright glossy black (Fig. 2). Fruit are firm, as estimated manually, similar to 'Navaho' and firmer than 'Shawnee' or 'Choctaw' (Table 2). We rated flavor as equal to that of 'Navaho' and better than that of 'Shawnee' or 'Choctaw'. Soluble solids concentration, determined with a hand-held refractometer, was high but slightly lower than that of 'Navaho'. An important positive characteristic of 'Arapaho' is its small seed size. Seeds are significantly smaller, i.e., lighter, than those of 'Navaho' and 'Shawnee' but slightly larger than those of 'Choctaw'. 'Arapaho' fruit storage performance was similar to that of 'Navaho' after 2 days of storage at 4°C but was slightly lower after 4 and 7 days of storage (data not shown). Both thornless cultivars stored significantly better than 'Shawnee' or 'Choctaw' at all storage durations.

A notable feature of 'Arapaho' is its earliness of fruit ripening (Table 2). It ripens ≈ 11 days earlier than 'Navaho' and 2 days before

'Shawnee' and is the earliest ripening thornless blackberry cultivar known to us at this time. The fruiting period of 'Arapaho' is concentrated into <4 weeks in contrast to the usual 5- to 6-week fruiting period of 'Navaho'.

'Arapaho' plants are moderately vigorous and very erect in growth habit (Table 2). Plants have good resistance to cold injury at temperatures as low as -24°C. No disease problems have been noted following a fungicide program consisting only of one application of liquid lime-sulfur at budbreak. No orange rust [*Gymnoconia nitens* (Schwein.) F. Kern & H.W. Thurston] has been observed on 'Arapaho' when grown in areas of high inoculum. The reaction of plants to rosette [*Cercospora rubi* (Wint.) Plakidas] has not been determined definitively, but no symptoms have been observed on 'Arapaho' after 2 years of fieldtests in an area of high inoculum at Calhoun, La. (B. Buckley, personal communication). 'Arapaho' is more prolific in producing primocanes from roots than 'Navaho'. In field tests, 90% of 'Arapaho' root cuttings produced plants compared to 75% for 'Navaho'.

The outstanding characteristics of 'Arapaho' are its thornless, erect, self-supporting canes, good fruit quality, earliness of ripening, and its ability to establish a full fruiting row

Fig. 2. 'Arapaho' blackberries.

quickly. 'Arapaho' will complement 'Navaho' in providing a long harvest season for high-quality, thornless blackberries. 'Arapaho' is expected to perform well in areas in which 'Navaho' is adapted.

Availability

An application for a U.S. plant patent has been filed for 'Arapaho'. A list of nurseries licensed to propagate and sell 'Arapaho' can be obtained from J.N.M., 316 Plant Science Bldg., Univ. of Arkansas, Fayetteville, AR 72701.

Literature Cited

- Moore, J.N. and J.R. Clark. 1989. 'Navaho' erect thornless blackberry. HortScience 24:863–865.
 Scott, D. H., G.M. Darrow, and D.P. Ink. 1957. 'Merton Thornless' as a parent inbreeding thornless blackberries. Proc. Amer. Soc. Hort. Sci. 69:268–277.

Table 2. Fruit and plant characteristics of blackberry cultivars at Fruit Substation, Clarksville, Ark.

Cultivar	Harvest date [*]		Fruit				Plant		
			Seed wt ^{*,x} (mg)	Soluble solids concn ^{*,x} (%)	Firmness ^{*,y}	Flavor ^{*,y}	Vigor ^{*,y}	Winter injury ^{*,x}	Erectness ^{*,y}
	First	Last							
Shawnee	5 June	10 July	4.0 a	8.7 bc	7.5 b	7.2 C	10.0 a	9.3 a	9.5 a
Choctaw	28 May	23 June	2.1 d	8.3 C	7.2 b	8.2 b	9.2 b	7.5 b	8.7 b
Navaho	14 June	25 July	3.6 b	10.8 a	9.3 a	9.8 a	7.2 d	7.9 b	7.8 C
Arapaho	3 June	1 July	2.7 C	9.1 b	9.1 a	9.3 a	7.7 c	9.5 a	9.0 ab

^{*}Means of 3 years, 1990–92.

^{*}Dry weight, 1992 data.

^{*}Mean separation within columns by Duncan's multiple range test.

^{*}Means of 6 years, 1987–92. Rating scale 1–10; 10= best.

^{*}Vigor rating based on plot fill and cane height.