Fruit Varieties Journal 54(4):162-163 2000

'Navaho' Blackberry

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'Navaho' Blackberry was released by the University of Arkansas *Rubus* breeding program in 1989 (5). When this program was initiated in 1964, one of the objectives was to develop erect-growing thornless blackberry cultivars that produce self-supporting canes. 'Navaho' was the first such release from the program, and to our knowledge, was the first fully-erect thornless blackberry to be developed worldwide. The Arkansas program has also produced several superior erect-thorned cultivars: 'Cherokee' (1974), 'Comanche' 1974, 'Cheyenne' (1976), 'Shawnee' (1985), 'Choctaw' (1988), 'Kiowa' (1996), and 'Chickasaw' (1998). Also, two additional erect thornless cultivars have been released from this program: 'Arapaho' (1992) and 'Apache' (1998).

The donor of the genes for thornlessness used in the development of 'Navaho' (and 'Arapaho' and 'Apache') was 'Thornfree' which had obtained the gene for thornlessness from the British cultivar Merton Thornless (8). Thornlessness from this source is a recessive character, and only homozygous recessive genotypes express the thornless prototype. A complicating factor is that our material, as well as the donor 'Thornfree,' is tetraploid, which results in low numbers of homozygous recessive individuals in segregating populations. To increase the number of thornless segregates, we produce large numbers of seeds from crosses and use the pleiotrophy that exists between glabrous cotyledons and thornless canes (3) to identify thornless individuals in seedling flats. However, even with this procedure, thornless populations were often few in seedling number.

Another major complication in breeding for thornlessness that greatly slowed our progress is that our source genes for thornless canes were linked to several undesirable genes, including trailing growth habit, late ripening, tart flavor, winter injury susceptibility, and varying degrees of blossom sterility. Thus, several generations of crossing to erect thorny cultivars such as 'Darrow' and 'Cherokee' were required to achieve the desirable combination of characters. Erect thorny seedlings, heterozygous for thornless genes, were selected in each generation for use a parents in further crossing. 'Navaho' resulted from a cross of two such hybrids between thorny and thornless parents, Ark.. 583 and Ark. 631. Ark. 583 is a hybrid of 'thornfree' x 'Darrow,' and Ark. 631 resulted from crossing 'Cherokee' with Ark 550 (a thornless segregate obtained from selfing an F_1 plant of 'Thornfree' x 'Darrow').

'Navaho' was selected in a seedling field in 1980 and was subsequently tested as Ark. 1172 in three locations in Arkansas and at experiment stations in several other states. It was originally selected because of its strong, erect, thornless canes and excellent fruit flavor and firmness. It has consistently been rated higher for flavor and fruit firmness than other eastern commercial cultivars (4). 'Navaho' ripens 7 days after 'Shawnee' and 5 days earlier than 'Dirksen Thornless'. Fruit size is medium (5g) and quite firm. In storage and shipping tests, 'Navaho' has been outstanding (6) and has been successfully shipped to Europe (7).

'Navaho' is moderately resistant to anthracnose and has been reported to be resistant to rosette (double blossom) (1), but

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has shown susceptibility to orange rust. It has shown good hardiness to temperatures as low as –23°C. 'Navaho' appears to have a chilling requirement of about 750 hours below 7.2°C.

'Navaho' is being widely grown in the South and Southwestern U.S. and has recently become popular in Switzerland, where it is challenging 'Loch Ness' for supremacy (Markus Kobelt, personal communication). It's combination of thornless canes, excellent flavor, outstanding fruit firmness, and resistance to rosette disease make it popular in many areas.

While 'Navaho' is an outstanding commercial and home garden blackberry, its greater value may be as a parent in further breeding. It has proved to be a good parent in the Arkansas breeding program and transmits its desirable characters well to its offspring. In fact, 'Navaho' is one of the parents of the newly-released 'Apache,' a large fruited, erect, thornless blackberry with great potential (2).

Literature Cited

1. Buckley, B., J. N. Moore, and J. R. Clark. 1993 Blackberry cultivars differ in susceptibility to rosette disease. Fruit Var. J. 49:233-238.
2. Clark, J. R. and J. N. Moore. 1999 "Apache' thornless blackberry. HortScience 34:1291-1293.
3. Crane, M. B. and C. D. Darlington. 1927. The origin of new forms in *Rubus*. Genetics 9:241-278.
4. Moore, J. N. 1996 Erect Blackberry cultivars: Present status and future prospects. Proc. Ore. Hort. Soc. 87:126-130.
5. Moore, J. N. and J. R. Clark. 1989. 'Navaho' erect thornless blackberry. HortScience 24:863-865.
6. Perkins-Veazie, P., J. K. Collins, and J. R. Clark. 1996 Cultivar and maturity affect postharvest quality of fruit from erect blackberries. HortScience 31:258-261.
7. Perkins-Veazie, P., J. K. Collins, J. R. Clark, and L. Risse. 1997. Air shipment of 'Navaho' blackberry fruit to Europe is feasible. HortScience 32:132.
8. Scott, D. H., G. M. Darrow, and D. P. Ink. 1957. 'Merton Thornless' as a parent in breeding thornless blackberries. Proc. Amer. Soc. Hort. Sci. 69:268-277.

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APPLE

	M-9	M-9 (NIC 19)	BUD-9	M-9/EMLA 111	EMLA 26	EMLA 7	EMLA106	EMLA111	CG-16	SDLG
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