Morrow, a New Cane Canker-Resistant Highbush Blueberry Variety

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Named for the late Professor E. B. Morrow, of the North Carolina Agricultural Experiment Station, the Morrow blueberry originated from a cross of Angola x Adams made in 1945 by Prof. Morrow. It was selected in 1948 on a farm near Ivanhoe, North Carolina, by Prof. Morrow, G. M. Darrow and D. H. Scott. It has been under continuous test since then as NC 678, until introduced in December 1964. During 1960-1964 the Morrow was evaluated extensively by G. J. Galletta and J. M. O'Neal.

Morrow fruit ripens earlier than any other variety in North Carolina, being two to three days earlier than Angola. First harvest usually will be about May 15. Morrow ripens all of its fruit in a short interval, with more than 75 per cent of the crop harvested in the first two weeks (Table 1). The fruit characteristics of the Morrow, in comparison with other varieties, are given in Table 2, for the 1960-1964 seasons in North Carolina. The uniformly large size of fruit is a notable feature of the variety.

Plants of Morrow are resistant to cane canker (caused by *Botryosphaeria corticis*), a widespread disease, in the south-central region of the

TABLE 1. Time of ripening, yield, and fruit size of 5 varieties of cane canker resistant highbush blueberries in North Carolina, 1960-1964.

Variety	Mean percent of fruit harvested by weeks				Mean Yield pts./plant	Mean Size of fruit[1]
	1st week	2nd week	3rd week	4th week	No.	No.
Morrow	47	82	96	100	6.2	103
Angola	34	63	83	95	3.7	145
Wolcott	21	58	83	96	7.3	149
Croatan	16	50	80	95	13.2	112
Murphy	4	26	62	86	7.7	126

[1]Season average cup count (number of berries per ½ pint cup).

TABLE 2. Numerical ratings of some characteristics of 5 highbush blueberry varieties in North Carolina, 1960-1964. (10 = most desirable characteristic, 1 = least desirable, scores of 6 or more are in the satisfactory range).

Variety	Season[1] Days	Color	Scar	Firmness	Flavor	Fruit size	Canker Resistance
Morrow	—	8	6	7	7	8	7
Angola	3	5	6	6	7	6	8
Wolcott	7	7	7	7	7	6	7
Croatan	9	7	8	6	7	8	6
Murphy	12	7	6	7	7	7	8

[1]No. days later than Morrow for first harvest.

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ceptible varieties within three to five United States, which devastates susyears after exposure. Morrow bushes are characteristically medium-sized and rather slow-growing after the third year in the field. The bush is broad and round-topped, with several thick canes arising from the base of the crown. Fruit clusters are usually borne upright at the periphery of the bush so that picking is easy. Leaves are subject to Septoria leaf spot. Morrow cuttings usually root readily from either hardwood or softwood stems.

Morrow appears promising as a cane canker-resistant, very early variety for use in North Carolina and the Southeastern United States to replace Angola. The variety resulted from the cooperative blueberry breeding program of the Department of Horticultural Science, North Carolina Agricultural Experiment Station, and the Small Fruit and Grape Investigations Section of the U. S. Department of Agriculture.

Differences in Growth, Chemical Content, and Fruit Set Among Four Sports of Delicious Apple

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Previous reports (1, 2, 3) indicated a number of differences between Starking Delicious and a compact mutant of Starking. The mutant had longer fruits with redder skin, greener flesh, and matured later than Starking. It also had shorter internodes, thicker leaves, and fewer lateral branches. Leaves of the mutant contained more nitrogen and calicum, and more chlorophyll than Starking.

These several differences between two sports suggested that other sports of Delicious might also vary in important ways other than fruit color. This report indicates differences found among four sports of Delicious.

In 1963 Delicious sports Starking, Chelan Red, Starkrimson, and Idaho Spur on Malling-Merton 104 rootstock were planted at the Lewis-Brown Horticultural Research Farm at Corvallis, Oregon. During 1966 and 1967 xarious measurements were made and samples collected for mineral analysis. Chemical analysis procedures were done under the direction of Dr. O. C. Compton as previously described (3). Six single-tree replicates per strain were used, with 10 branch-units per tree being measured. Bloom and fruit set were obtained in 1967 only. Two limb units of about 40 clusters each per tree were tagged before bloom and percentage bloom and fruit set were determined (fruit set is expressed as fruits per 100 blossoming clusters). Cross pollination was provided by heavy flowering Golden Delicious trees one space away from the test trees.

The four mutants of Delicious differed in several growth characteristics (Table 1). Chelan Red was similar to Starking, but had slightly shorter internodes, indicating a tendency toward compact growth habit. Starkrimson and Idaho Spur were similar to each other, and showed the characteristic upright growth habit, thick stems, short shoots and internodes, which distinguish spur mutants from standard varieties.

Starking leaves contained significantly less N than other sports but had similar contents of P, K, Mg, B, Mn, and Zn (Table 2). In this case, Chelan Red was more like the spur types than Starking. As previously reported (3), Starkrimson leaves contained more Ca than did those of Starking. Idaho Spur was similar to

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