FRUIT BREEDING IN ARKANSAS

Our fruit breeding program was initiated in 1964 to provide new cultivars to stimulate fruit production for Arkansas. To date, 3 blackberry, 2 strawberry, and 1 grape cultivars have been released; peach, nectarine, and apple releases are planned in the near future, and several selections of these crops are in advanced stages of pre-release testing. The overall objective of the breeding program is to develop disease resistant, high quality, cultivars adapted to the soils and climate of Arkansas.

Strawberry

Arkansas is historically a fresh-market strawberry producing state. Thus, such characters as large fruit size, attractiveness, good dessert quality, firmness for shipping and long shelf life are important objectives. Plants are evaluated for high productivity and disease resistance, especially resistance to leaf spot [Mycosphaerella fragariae (Tul.) Lind.], leaf scorch [Diplocarpon earliana (Ell. & Ev.) Wolf], powdery mildew [Sphaerotheca macularis (Wallr. ex Fries) W. B. Cooke], and red stripe root rot (Phytophthora fragariae Hickman). Some effort is also being given to selecting for resistance to two-spotted spider mite (Tetranychus urticae Koch).

Recent objectives included in the program are breeding for adaptability to mechanical harvest, good processing quality, and high vitamin C content and also everbearing types. Approximately 10,000 seedlings are planted each year.

Two cultivars have been introduced: ‘Cardinal’ in 1974 and ‘Comet’ in 1975. Both are large-fruited, productive, firm, attractive, resistant to leaf spot and powdery mildew, and tolerant of two-spotted spider mites. ‘Cardinal’ produces very high yields of usable fruit in once-over mechanical harvest. ‘Cardinal’ and ‘Comet’ are superior to all others being grown in Arkansas and are rapidly becoming the leading cultivars here. The strawberry breeding program has been bolstered by concurrent genetic studies. Information has been developed on the inheritance of fruit color, vitamin content, and ease of calyx removal. Studies have also identified sources of disease resistance and large fruit size for use in further breeding.

Blackberry

The development of a mechanical harvester has stimulated interest in commercial plantings of blackberry. The introduction of ‘Cherokee’ and ‘Comanche’ in 1974, the first cultivars uniquely suited to mechanized harvest, has made an industry feasible. Both are very erect, productive, and produce high quality processed products. ‘Cheyenne’ released in 1977, is adapted for either mechanical harvest or “pick-your-own”.

While the development of additional cultivars adapted to mechanical harvest will remain a major objective, much attention is being given to developing erect, thornless cultivars for hand-picking operations and home garden use. Several undesirable characters closely linked to thornlessness have proved troublesome, but progress is being made in achieving this objective.

Inheritance studies have contributed to progress in blackberry breeding. The development of a scarification method to increase seed germination has expedited the breeding program by making large populations possible. In 1976 alone, over 30,000 hybrid seedlings were planted in the field for fruiting.

Grape

Arkansas ranks eighth among states in the U.S. in grape production. The entire crop is processed, about half for wine and half for juice, but there is interest in table grape production. Major emphasis in the breeding program is on developing high quality table and wine cultivars. In the table grape breeding program, emphasis is given to development of seedless clones. The first cultivar, ‘Venus’ released from this program in 1977 (see cover and Cultivar Release), has high quality seedless blue fruit.

The breeding approach has largely involved interspecific hybridization between Vitis vinifera L. and V. labruscana L., types in which the high fruit quality of vinifera is combined with adaptability and disease resistance of American bunch grapes. Diseases to which seedlings are screened include black rot [Guignardia bidwellii (Ell.) V. & R.], downy mildew (Plasmopara viticola Berl. & Toni), powdery mildew (Uncia nula necator Burr.), and anthracnose [Elsinoë ampelina (D. By.) Shear].

Over 10,000 seedlings are produced from controlled crosses each year and over 400 selections are now in various stages of testing. A collection of over 500 clones, including cultivars from 16 countries, provides valuable germplasm for the breeding program.

Peach and nectarines

The Prunus breeding program has two major goals: the development of adapted, high-quality, clingstone peach cultivars for processing, and the development of adapted, disease-resistant nectarines. Some effort is also now being given to breeding for peach rootstocks. From 3,000 to 5,000 seedlings are produced from controlled crosses each year. Several selections of both nectarine and clingstone peaches are in pre-release testing.

Apple

The major objective in the apple breeding program is the development of early season summer cultivars that will develop good color and quality in high temperatures. Presently about 3,000 seedlings are being evaluated.

Blueberry

A blueberry breeding project was initiated in 1976. Objectives of the project are the development of cultivars adapted to low organic upland soils and high summer temperatures, and tolerant to moisture stress. Interspecific hybridization between several native Vaccinium species possessing one or more of the needed characters and highbush (V. corymbosum L.) and rabbiteye (V. ashei Reade) cultivars constitute the breeding approach.

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