Grape Breeding at the Minnesota Station*

By A. N. WILCOX

The purpose of the grape improvement project at the University of Minnesota Fruit Breeding Farm has been primarily to develop varieties of table grapes that are adapted to growing under Minnesota conditions. The principal characters needed in new varieties have been resistance to cold injury in winter, earliness of fruit ripening, and high dessert quality of the fruit. Resistance to fungous disease is becoming increasingly important.

Most Varieties Too Tender

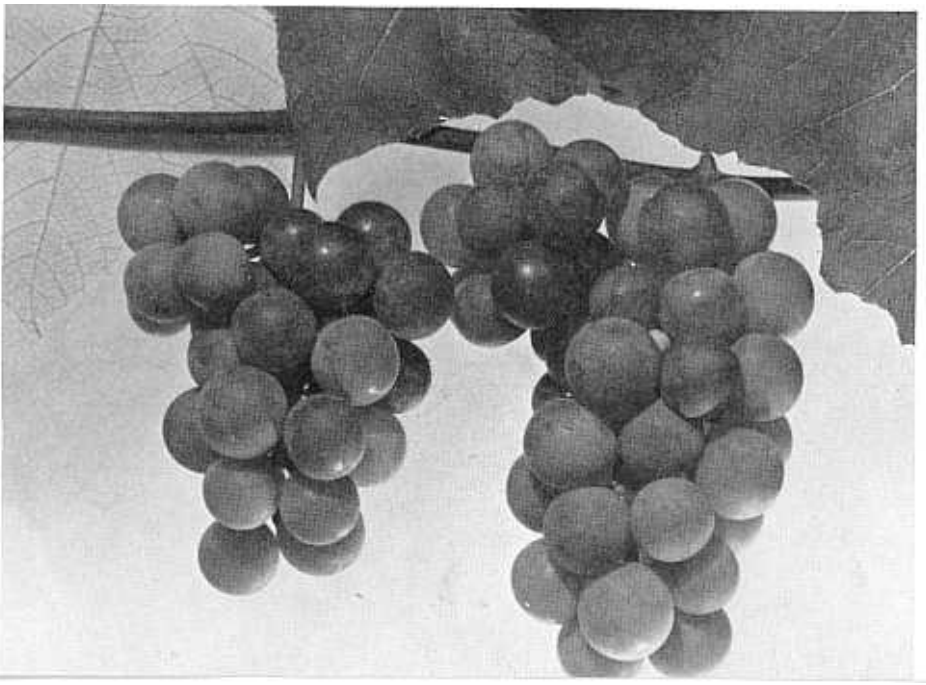
The list of grape varieties suitable for growing in Minnesota has been very limited. The Concord and the hardiest *labrusca-vinifera* hybrids are recommended for home gardens in southern Minnesota only, where, except in the more favorable locations, it is desirable that the vines be laid down and covered with soil for winter. Furthermore, in many seasons the fruit of Concord has not properly matured. For greater hardiness and earliness, Beta has been the standard variety. It is hardy without covering in central Minnesota and can be grown with some protection in the northern part of the state. The fruit ripens early, and although good for jelly and juice, is too acid for dessert.

Early Breeding Work

The Fruit Breeding Farm was established in 1908. From 1908 to 1920, Beta

*Paper No. 556 of the Miscellaneous Journal Series of the Minnesota Agricultural Experiment Station.

The Red Amber grape combines high quality for dessert with earliness and unusual hardiness. (¾ natural size)



was crossed with a number of varieties with better fruit, including at least Agawam, Campbell, Concord, Delaware, Jessica, Lutie, and Salem. About 200 selections were made for further testing. In 1944, four of these were named and introduced as new varieties. They are not intended for regions farther south, but for Minnesota and other northern regions they represent a worthwhile improvement in combining dessert quality with greater hardiness and earliness. Brief descriptions follow.

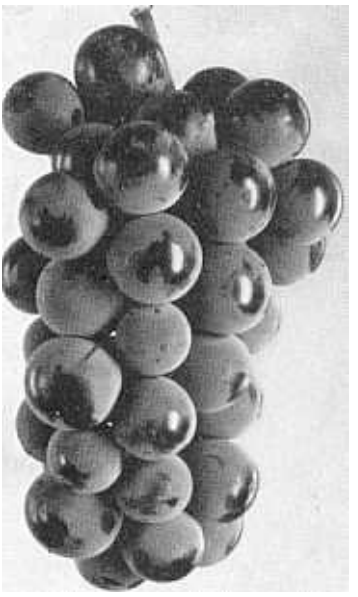
Named Varieties

Red Amber is an early, sweet, delicious red grape with medium size bunches and medium small berries. The vines are vigorous, healthy, and unusually free from mildew. The dessert quality is very high.

Moonbeam has berries of very large size, but few in a cluster. They are greenish-yellow, bland in flavor, and have very tender skins. The vines are vigorous but may not be much hardier than Concord.

Blue Jay has attractive, compact clusters of blue berries that are nearly as large as those of Concord. When first colored, the fruit is too acid for dessert, but if left on the vine for ten days longer it becomes less sharp. It is very good, however, for juice and jelly, for which the deep pigmentation is an advantage. The flowers have reflexed stamens.

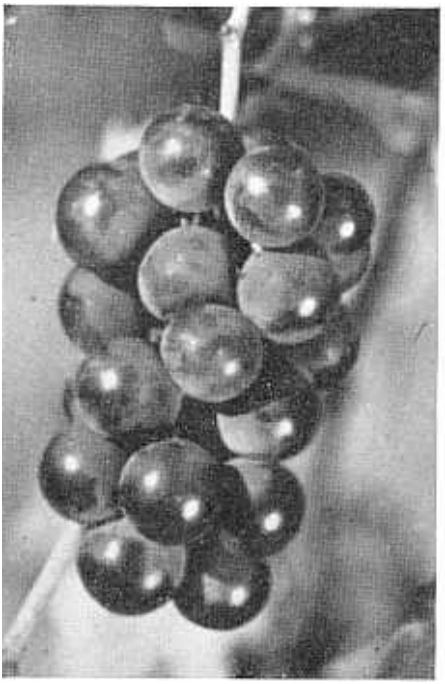
Bluebell has berries about the same size and color as those of Concord, but borne in looser clusters. The fruit is more sprightly than Concord but has a similar, pleasant, refreshing flavor. It is not only desirable for dessert use, but is also very good for juice and jelly, carrying a deep pigmentation similar to Blue Jay.



(¾ natural size)
The Blue Jay is suitable for dessert and is also very good for juice and jelly.

Additional selections may be introduced later. Of these the first will probably be Minn. No. 78, an unusually hardy, early-ripening blue grape that shows promise of providing dessert quality for northern Minnesota. It resembles Beta in appearance, but has a sweet and pleasant flavor.

Since 1922 the grape breeding project has involved: (1) the testing of selections from the Beta crosses, (2) their use as parents in crosses with *labrusca* and *vinifera*-hybrid varieties, (3) their use for intercrossing with one another, and (4)



(¾ natural size)

The Bluebell grape is used as a substitute for Concord where greater hardiness is necessary.

the inbreeding of Minnesota selections and several standard varieties. The grape breeding has been one of the less extensive fruit breeding projects. Fewer than 5,000 seedlings have been grown since 1922, and the mortality from various causes has been considerable. Furthermore, the available soil, a clay loam with heavy clay subsoil, is not ideal for grapes.

Present Breeding Program

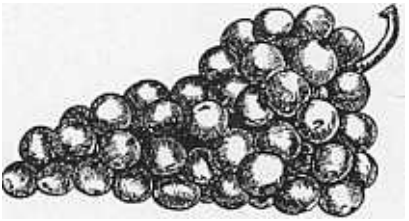
The breeding program has been planned to take advantage of the progress already made with the Beta hybrids. A dozen of the selections from these hybrids have been used for crossing with the varieties Delaware, Lindley, Diamond, Concord, Herbert, Brighton, Janesville, Moore's Early, Niagara, Portland, Salem and Winchell. A number of seedlings with very good dessert quality have been selected for further testing and information has been obtained for application to the breeding program. Minnesota selections which have been valuable in transmitting vigor and hardiness to their seedlings include Blue Jay, Bluebell, Nos. 54, 78, 111, 151, and 237, the last being a selection from Red Amber selfed. Among the so-called tender varieties that were used as parents, seedlings with high quality for dessert have been obtained especially from Delaware, Diamond and Lindley.

Intercrosses between Minnesota selections have not been emphasized, but deserve further attention. One such cross, between Blue Jay and No. 28, a *labrusca*-type variety with large, red, sweet fruit, has given an especially hardy and vigorous seedling population with a good percentage of desirable fruit.

The selfing program was undertaken for two purposes: to compare the breeding value of certain varieties and to develop, if possible, selections that would more nearly breed true for both hardiness and high quality. On the basis of returns to date, it appears to be entirely feasible to self-pollinate for either or both of these purposes. The self progenies have revealed appreciable differences between parental varieties in their breeding value with respect to vigor, winter survival, disease resistance, and sweetness and quality of fruit. The self progenies have been, in general, less vigorous than cross progenies, but in selfing as in crossing, some progenies are better

than others. Several one-generation-selfed seedlings have borne fruit but have not yet been used for further selfing or crossing.

All seedlings are left unsprayed to permit the unhindered expression of susceptibility to fungous and insect pests. The fruit of all seedlings is tested for dessert quality, and is also subjected to refractometer tests for the estimate of sugar content. These tests have revealed a considerable number of hardy seedlings with a sugar content between 20 and 23 per cent.



Varieties – Growers vs. Consumers

By C. W. ELLENWOOD
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One of the important and perennial projects of an experiment station, is the development and testing of varieties of fruits.

The very fact that so much time has been spent and still is being spent on this phase of horticultural work can be taken as evidence, that there are no perfect varieties. There is no doubt concerning the justification of the use of time and money in variety testing and fruit breeding projects.

Having thus established our horticultural orthodoxy we want from this point on to discuss certain aspects of variety testing, which we believe need examination. We recognize that natural conditions, such as climate, soil and related factors frequently determine the adaption of a variety to a given area. These restrictions are rather largely fixed and cannot within any degree of practicality be changed by the horticulturist or fruit grower. Fortunately enough, there are a good many varieties which do equally well over large areas and we are thinking of these varieties in this discussion.

Consider Consumer Preferences

We horticulturists, and for that matter fruit growers also, entirely too often, leave out of consideration two important factors in setting up values on varieties. One of these is the opinion of the consumer and the other is the productivity of the variety in terms of marketable fruit over the life of the orchard. Let's stick to one fruit in these observations, apples.