

# Virus-Free Cherry

## budwood of sweet cherry varieties developed free from known viruses

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**Virus-free** budwood of sweet cherry varieties—Bing, Black Tartarian, Napoleon or Royal Ann, Black Republican, Deacon, and Lambert—have been propagated in experimental plantings at Davis. Sufficient fruit has been produced on the trees to determine trueness to variety. However, insufficient time has elapsed to obtain data on mature tree performance in California of the clones obtained from other states.

To compare the performance of virus-free budwood with that now generally obtained from commercial orchard trees, an experiment was conducted on the growing grounds of a large nursery in northern California. The results of a portion of the experiment are shown in the following table:

Variety	Source	Number of rootstocks budded	% misses	% crinkle and deep suture	% marketable trees
Bing	virus-free . . . .	100	5.0	0.0	95.0
	commercial orchard .	100	33.0	15.0	52.0
Black tartarian	virus-free . . . .	100	1.0	0.0	99.0
	commercial orchard .	100	37.0	18.0	45.0

The figures in the last column of the table indicate that the same number of trees could be produced—by using virus-free budwood of these varieties—on one half as much land as required for trees using budwood from other sources. Considering such costs as rent of land, rootstocks, budding, fertilizer, water, and insect control, the same number of virus-free trees could be produced at approximately one half the cost. However, not all commercial sources of budwood would produce such low percentages of marketable trees as are reported in the above table. Besides virus diseases and such diseases as crinkle and deep suture, high percentages of flower buds in budwood sources will also reduce the percentage of marketable trees.

Most of the factors that result in a low percentage of marketable trees can be overcome by using disease-free budwood produced in special scion or budwood

mother blocks. Such mother blocks can be planted to conserve space and reduce maintenance costs. Trees can be planted in rows 10' or 12' apart with the trees 5' or 6' apart in the row. Large quantities of budwood can be produced on relatively few trees if these are given good care and pruned severely to force vigorous vegetative growth. The advantages of this method of producing budwood are many. Cost of maintaining a budwood mother block is more than offset by the decreased cost of producing nursery trees. Also there is the assurance of trueness to variety, and the production of trees free from virus and viruslike diseases.

Virus and viruslike diseases probably are of greater economic importance in sweet cherries than in any other stone fruits in northern California. One or more virus diseases have been found in all of the sweet cherry orchards inspected during the past four years. Consequently, it is virtually impossible to propagate trees free from virus diseases if budwood is obtained from commercial orchards.

Once a tree becomes infected with a virus it will remain infected for the rest of its life. With most virus diseases all of the tissues become infected throughout the entire tree and buds or scions taken from a diseased tree will give rise to diseased trees. No method of curing orchard trees which have a virus disease has yet been developed. Therefore, the emphasis in a control program must be on prevention.

### Improvement Program

The first step in a budwood improvement program—initiated three years ago—was to obtain budwood free from the most harmful virus diseases. Orchards used as budwood sources were inspected and trees found to be affected were marked with paint to enable nurserymen to avoid them when collecting budwood.

Because it is impossible to detect all virus diseases by visual inspection it was necessary—to insure freedom from all diseases—to index the trees for virus content. The indexing method will indicate the presence of a virus even though there are no outward visible symptoms of the disease.

Indexing trees consists of taking buds or scions from those trees showing no

outward symptoms of disease and placing them in healthy test trees of various selected species. If a virus or viruses are present and the proper test trees have been used, the virus or viruses will produce characteristic recognizable symptoms on the test trees. This method has made it possible to find trees of several sweet cherry varieties that are believed to be free of all known virus diseases.

Research workers in Oregon and Washington Agricultural Experiment Stations supplied several varieties—found to be free of virus diseases by this method—and clean varieties from both the local and out-of-state sources were propagated and increased at the California Experiment Station at Davis.

Some trees may be infected with a latent virus and show no outward symptoms of disease. The same virus may be latent in one variety but cause a severe disease in one or more other varieties.

Trees that carry latent or unexpressed viruses constitute a definite threat to the industry. They act as unsuspected reservoirs from which the viruses are spread to surrounding trees by certain insects—insect vectors—or to nursery trees by propagation methods. If such latent viruses are eliminated from nursery trees they will not be introduced into orchards by the propagation method. It is possible, however, that insect vectors may carry some diseases into clean orchards from nearby contaminated orchards. Virus-free orchards have been established in several cherry districts and should supply some definite answers on this point.

Even though virus-free budwood is used, that fact, in itself, will not guarantee that all trees propagated from such buds will be virus-free, because the rootstocks may be diseased. It is possible to have infected rootstocks even when grown from seeds. Several viruses have been shown to be carried in the seeds of both the mazzard and mahaleb varieties.

An effort is being made in Washington and Oregon—where most of the rootstocks used in California are grown—to insure virus-free rootstocks. Considerable progress in this phase of the program has been made and the problem may be resolved in the near future as has been the problem of obtaining virus-free budwood.

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*The above progress report is based on Research Projects No. 974 and 1478.*

*The inspection of cherry orchards as part of the improvement program was by the Bureau of Plant Pathology of the California State Department of Agriculture.*

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