Computerized Fruit Germplasm Resources Inventory

H. W. Fogle[1] and H. F. Winters[2]

The loss of some varietal collections and the severe depletion of many others poses serious problems for the fruit breeder and eventually for the entire fruit industry. Commercially grown cultivars represent only a minute portion of those described in the literature. This is well illustrated in apples where over eight thousand cultivars have been described, but less than two dozen are grown on a large enough scale to be reported by the various statistical services. The other clones are maintained in germplasm resource collections usually by institutional or private breeders. These collections are extremely important. A computerized inventory of them is proposed as an aid to planning for their continuance.

Virtually all present cultivars of peaches, nectarines, blueberries, and strawberries (and many cultivars of cherries, oranges, plums, apricots and grapes), are the results of controlled combination of, and selection from, the germplasm that was preserved in these collections. The search is constantly going on for new characteristics, such as pest resistance, high photosynthetic ability, dwarfness and self-fertility. The only place where the fruit breeder can find these characteristics is in a living germplasm collection. Unfortunately, increasing cost of maintenance, unavailability of labor, pressure for land, and lack of concern have resulted in the disappearance of clones from collections and in dangerous narrowing of the genetic base in each fruit species.

Geneticists working with several commodity groups have expressed concern over the loss of germplasm. Most fruit breeders are aware of the need to maintain a wide range of parental resources. The Peach Breeders Conference in Arkansas, July, 1973, voiced alarm at the loss of the plant introductions at Chico, California, and the general reduction in variety collections. The Fruit Breeding Committee of the American Society for Horticultural Science expressed similar concern at their meeting in North Carolina, August, 1973. Individuals like Dr. Robert Andersen of Michigan State University have been attempting to bring this matter to the attention of the industry, in an effort to reverse the trend to fewer and smaller collections.

Immediate positive action is needed to ensure the preservation of fruit germplasm. It is an expensive task. It is neither necessary nor desirable that each clone be represented in each collection, but it is imperative that precautions be taken that each clone is preserved in at least one suitable repository. If a clone is represented in only one collection, those who are concerned must make sure that it is not lost when orchards are sacrificed for highways, campus expansion, or higher priority research, as they sometimes are. This cannot be assured until there is an up-to-date census of what is available in each collection.

Lists of fruit clones in North American variety collections have been developed periodically and these have been useful for short periods. Herbert

[1]Fruit Laboratory, Agricultural Research Service, United States Department of Agriculture, Beltsville, Marryland 20705.
[2]Germplasm Resources Laboratory, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland 20705.

Fisher compiled comprehensive lists of apples, stone fruits, pears, nuts and other fruits in 1961 but these were becoming obsolete by the time they were published in 1963-64 (ARS-34-37, 1 to 3). Committees of the American Pomological Society also have compiled source lists of scionwood in United States and Cadanian collections (Fruit Var. & Hort. Digest—9:38-49, 1954; 11:6-15, 1956; 13:6-16, 1958; 16:2-11, 1961; 17:45-54, 1963; 18:23-27, 1964; 22:23-39, 1968; 24:12-17 and 75-83, 1970). Several amateurs have listed their collections of uncommon varieties in *Pomona* and *Fruit Varieties Journal.* Unfortunately, all of these became obsolete soon after publication.

To be useful, lists should be updated as the need arises. The only feasible way to keep a list up-to-date apparently is to have the information on computer. Printouts can be retrieved as frequently as necessary to reflect changes.

The Fruit Laboratory and the Plant Germplasm Resources Laboratory at Beltsville have initiated action to develop such computerized lists of fruit clones before more valuable time is lost. Initially, it may be necessary to concentrate on apple, peach, plum, cherry, pear and apricot clones but eventually all fruit species will be included. The help of fruit experts by specialties is needed to see that all collections are included and uniformly reported. The cooperation of those responsible for collections to report the necessary data is essential.

The lists will be useful only if everyone who maintains, or is responsible for the maintenance of, a collection supplies at least minimum information. Each entry will be uniquely identified by a combination of numbers which represent the location and the type of fruit (which will be assigned), and a chronological accession number and name of the clone (which the collector will supply). The cooperator also should supply a Plant Introduction number (if applicable), an indication of the size and/or condition of the specimen plants, virus status, and name of the person responsible for the collection. Several optional ratings or designations which would help other persons to assess the value of a clone will be available on the data sheets that we will distribute. As much information as possible should be supplied. Filling out the cards should require very little time per clone. In return for this cooperation, a printout will be furnished to each individual for all species of fruit he reports. Printouts of other species will be available for purchase.

Once the lists are completed, updating them will be a simple task. The computer will print the inventory of a given collection when updating is desired. The person responsible for the collection then will indicate clones which should be deleted and add new ones he has added to the collection. Since each entry will be separately identified in the computer, the list can be updated quickly and kept completely current.

Computer facilities for the inventory were made available by the Plant Records Center at the American Horticultural Society headquarters, Mt. Vernon, Virginia. This has the advantage that the fruit germplasm records will be kept at the same facility where other horticulturally important plants are also listed.

This listing will not obviate the need for future funds to preserve fruit germplasm that can only be maintained in living collections. To the contrary, it should survey what exists and help one realize what is needed to assure adequate future germplasm resources. To this end, the proposal has been discussed with members of ARS and National Plant Germplasm committees.

Computerized lists offer advantages fully justifying the time it will take to prepare and maintain them. They will give a ready access to budwood, seed, and pollen of many more clones than one individual can possibly maintain in his plot. As his objectives change, he can go back to clones he had discarded earlier to pick up characteristics not then considered important. He will have access to repositories where virus and other disease content is indexed and where heat treatment can be used to free accessions of viruses. Although present cooperation among breeders of such crops as peaches, pears, strawberries, and grapes is excellent, more intelligent use of the material available collectively to the group should be possible. The lists can aid agreement among those with common interests as to which clones of a given fruit each should maintain.

This project will not be completely successful unless all fruit growers and research personnel give full cooperation. Everyone who has a collection is urged to invest the necessary effort in assuring better germplasm resources for the future.

Com-Pact Redhaven

RICHARD G. VAN WELL[1]

'Com-Pact Redhaven' is a new variety of peach which bears fruit exactly like 'Redhaven.' The big difference from regular 'Redhaven' is in the tree structure. If this new variety were an apple, it would probably be called a spur-type.

The tree structure has more buds per unit length of wood. Its low, spreading profile bears heavily and is more dwarfing than regular peach trees. This unusual tree differs from other peach trees not only in size, but in the vigorous growth of the lateral buds along all terminal shoot growth. The growth of the lateral buds, particularly near the base of the terminal shoot growth, most often ranges in diameter from one half to three fourths of the diameter of the terminal shoots at its base. The growth characteristics of this variety permit the maintenance of excellent fruiting wood on the lower branches of the tree.

This variety was discovered by Lester Pratt at his orchard near Orondo, Washington. It has been observed and tested for several years, and was introduced for sale in 1971.

Mr. Pratt secured a plant patent number 3217 and assigned it to Van Well Nursery, Wenatchee, Washington. At this time two other nurseries have been licensed to grow and sell 'Com-Pact Redhaven.' They are Stark Bro's. Nurseries and Orchard Company, Louisiana, Mo., and Bountiful Ridge Nurseries, Princess Anne, Md.

[1]President, Van Well Nursery, Wenatchee, Wash. 98801.