Peach Breeding by the United States Department of Agriculture

A. LEON HAVIS*
Beltsville, Maryland

The peach breeding program of the United States Department of Agriculture is a coordinated effort of workers at stations in Prosser, Washington, Fresno, California, Fort Valley, Georgia, and Beltsville, Maryland. Crosses are made and progenies evaluated at all of these locations. Pollen, seeds, seedlings and budded selections for testing and for use as parents, are exchanged between stations. The federal program is further coordinated through conferences and correspondence.

Cooperation between the federal workers and the state agricultural experiment stations is largely through informal conferences and exchange of breeding material and promising selections. U.S.D.A. selections are also tested by many state agricultural experiment stations that have no breeding programs. A special effort is made to send selections to stations in areas where they will probably be most valuable. Decisions on whether to name and introduce selections are based on federal and cooperator evaluations.

Varieties with limited suitability, but with particular, desirable characters, are sometimes introduced. It is important, however, that the limitations of such varieties be recognized. Earlihale, for example, was named and introduced for its value as a shipping variety for the Northwest. However, Earlihale is of limited value in many other areas because of its susceptibility to bacterial spot disease, and because it is pollensterile. These two faults, however, are not serious in the Northwest, where it is very promising.

The federal peach breeding program has several objectives. The Department has been trying to produce varieties to fill the most urgent needs throughout the country. An early primary objective was to lengthen the harvest season with larger, and more attractive, yellow-fleshed varieties. Additional objectives, such as disease resistance, freeness of the flesh at the stone, firmness, productiveness, and high quality remain prime considerations. Objectives based on specific needs in certain fruit areas are becoming more and more important.

The federal program started about 1922 at Palo Alto, California, to improve non-melting clingstones, and to lengthen the canning season. Fourteen clingstone and three freestone varieties originating from this effort were named between 1935 and 1950 (Table I).

Breeding for melting-clingstone and freestone varieties was initiated at Beltsville, Maryland, in 1936; at Fort Valley, Georgia, in 1937; at Fresno, California, in 1948; and at Prosser, Washington, in 1949. Dixigem, introduced in 1944, was the first variety from this phase of the program. Since then, six early maturing, melting-type clingstone, and 10 freestone varieties, have been introduced (Table I). In addition, Nemaguard, a nematode resistant peach rootstock, has been introduced. These 17 varieties have resulted from approximately 175,000 seedlings, or one named variety for each 10,000 seedlings. A few additional selections from these seedlings may yet be named. The federal peach-breeding investigations have been carried on principally by the following persons: F. P. Cullinan, H. W. Fogle, C. O.

*Crop Research Division, Agricultural Research Service, U. S. Dept. of Agr.

Table I. Peach varieties originated by United States Department of Agriculture, 1935–1961.

Variety	*Stone freeness*[1]	*Parentage*	*When named*	*Place of*[2]	
				Crossing	*Selection*
Ellis	C	Phillips × Linden	1935	Palo Alto	Palo Alto
Stanford	C	Hauss × Phillips	1935	Palo Alto	Palo Alto
Leeton	F	Leader (open-pollinated)	1935	Palo Alto	Palo Alto
Maxine	F	Unknown Sdlg. × Lemon Free	1935	Palo Alto	Palo Alto
Penryn	C	Maxine × Leader	1938	Palo Alto	Palo Alto
Nestor	C	Muir × Palora	1938	Palo Alto	Palo Alto
Farida	C	Sdlg. of Leader × Tuscan	1938	Palo Alto	Palo Alto
Corona	C	Libbee × Lovell	1942	Palo Alto	Palo Alto
Carolyn	C	Libbee × Lovell	1942	Palo Alto	Palo Alto
Amador	F	Elberta × Ontario	1942	Palo Alto	Palo Alto
Tudor	C	Libbee × Newkom	1941	Palo Alto	Palo Alto
Andora	C	Libbee × Lovell	1941	Palo Alto	Palo Alto
Fortuna	C	Sdlg. of Leader × Sdlg. of (Tuscan × Palora)	1941	Palo Alto	Palo Alto
Shasta	C	Sdlg. of Leader × Sdlg. of (Tuscan × Palora)	1941	Palo Alto	Palo Alto
Cortez	C	Palora × Halford I	1944	Palo Alto	Palo Alto and Davis
Dixigem	F	(Ad. Dewey × St. John) × South Haven	1944	Beltsville	Ft. Valley
Dixired	MC	Halehaven selfed	1945	Beltsville	Ft. Valley
Southland	F	Halehaven selfed	1946	Beltsville	Ft. Valley
Coronado	C	(Pratt-Low × Tuscan) × Leader sdlg.	1950	Palo Alto	Palo Alto and Davis
Vivian	C	(Maxine × Leader) × [(Tuscan × Palora)] × (Palora × Pratt-Low).	1950	Palo Alto	Palo Alto and Davis
Cardinal	MC	Halehaven selfed	1951	Ft. Valley	Ft. Valley
Ranger	F	Raritan Rose selfed	1952	Beltsville	Beltsville
Hiland	MC	Southland × (Hiley × Halehaven)	1952	Ft. Valley	Ft. Valley
Redcap	MC	Southland × Dixired	1952	Ft. Valley	Ft. Valley
Maygold	MC	Sunhigh × Southland	1953	Ft. Valley	Ft. Valley
Coronet	F	Halehaven selfed (FV 5–56) × Dixigem	1953	Ft. Valley	Ft. Valley
Redglobe	F	Sdlg. of Ad. Dewey × St. John (W3–16) × Fireglow	1954	Beltsville	Beltsville
Keystone	F	Newday × Southland	1954	Ft. Valley	Ft. Valley
Earlihale	F	July Elberta selfed	1958	Beltsville	Beltsville
Regina	F	Sunhigh × Sdlg. of W3–16 (Ad. Dewey × St. John)	1958	Beltsville	Fresno
Suncrest	F	Alamar × Gold Dust	1959	Fresno	Fresno
Earlired	MC	Redhaven × B3–674 [Halehaven × B3293 (Halehaven × Oriole)]	1960	Beltsville	Beltsville
Redtop	F	Sunhigh × Sdlg. of July Elberta	1961	Beltsville	Fresno
Nemaguard	MC	Unknown	1961	———	Ft. Valley

[1]Freeness of stone at usual harvesting stage: C, non-melting clingstone; MC, melting clingstone; F, freestone or nearly freestone.

[2]Locations of Federal peach breeding stations. Palo Alto, California (now discontinued); Davis, cooperative with California Agricultural Experiment Station (now discontinued); Plant Industry Station, Beltsville, Maryland; U. S. Horticultural Laboratory, Ft. Valley, Georgia; U. S. Horticultural Field Station in cooperation with Fresno State College, Fresno, California; Irrigation Experiment Station in cooperation with Washington Agricultural Experiment Stations, Prosser, Washington.

Hesse, Anna G. Meanley, V. E. Prince, L. A. Thompson, J. H. Weinberger, W. F. Wight, and the author.

Early maturing varieties developed by the U.S.D.A. which are clingstone when firm-ripe, but have melting flesh, are Dixired, Cardinal, Hiland, Redcap, Maygold and Earlired. All of these are attractive, of good quality, and fairly firm for their ripening season. Earlired is the first to ripen. It is followed by Cardinal and Hiland, which ripen together, and then by Redcap, Maygold, and Dixired, in about the same season. Maygold, with the lowest chilling requirement, is grown as far south as northern Florida. Hiland and Redcap have fairly low chilling requirements, and Earlired, intermediate; whereas Cardinal and Dixired require relatively high chilling, about as much as Elberta.

The earliest ripening freestone varieties developed are Leeton, Coronet, Dixigem, and Regina. Leeton has been replaced by firmer, more highly colored varieties. Coronet is attractive, has a low chilling requirement, and is grown mostly in the Southeast. Regina is firm, and especially attractive in California, where it is now grown commercially. Dixigem is being replaced by superior varieties. Slightly later ripening freestone varieties are Ranger, which is fairy resistant to bacterial spot; Keystone, large and attractive; and Redtop, firm, of high quality, and attractive, especially in California.

Mid-season freestone varieties introduced by the U.S.D.A. include Maxine and Amador, introduced in 1935 and 1942, respectively. Both have since been replaced by superior sorts. Southland, introduced in 1946, is an important commercial shipping variety in some parts of the Southeast. Its firmness, attractiveness, and low chilling requirement, are its chief merits. Redglobe is commercially important in some areas, especially on the West Coast, because of its firmness, beauty, and high quality. Earlihale seems best suited to the Northwest as an early J. H. Hale type peach for distant shipment. The new Redtop variety is promising as a firm, high-quality fruit to ripen just before the Redglobe in California. Suncrest, ripening just after Redglobe, produces large, firm, attractive peaches in California, where it is especially promising.

Nemaguard is a promising root-knot nematode-resistant rootstock. It appears to be resistant to both the cotton and Javanese root-knot nematode, the two species most common in peach orchards in the United States. Its resistance to other types and species of nematodes is not yet known. The fruit of this variety are small, white-fleshed, clingstone, and non-edible.

It should be emphasized that excellent peach breeding programs are being conducted by several state agricultural experiment stations. The federal work is closely coordinated with these through breeding conferences, correspondence, exchange of materials, and personal contacts.

The number of varieties introduced is, of course, not a good measure of the success of a breeding program. A more accurate measure is the degree to which it is meeting the needs of the industry and the consumer. There is much still to be done to improve peaches. Most of the present varieties should be replaced soon. Most needed, are varieties with resistance to disease, firmness, long shelf life, good flavor, and crop dependability. Varieties for specific purposes and for certain areas continue to be in demand. Some of these improvements can be expected in the next few years.