Fruit Bud Hardiness of North Caucasus Seedlings and Other Foreign Peach Introductions

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Low temperatures, after peach fruit buds have begun to swell, are an annual hazard wherever peaches are grown. The spring of 1967 was a destructive one at the U. S. Plant Introduction Station, Glenn Dale, Maryland, insofar as cold damage to peaches is concerned. A complete loss of the Station's peach crop occurred, with certain exceptions. These exceptions were confined to a planting of North Caucasus seedlings[2] and a few screenhouse-protected specimens. The former have been kept in the Station's outdoor collection for many years, awaiting a so-called "test year" to evaluate their cold hardiness properly.

During March of 1967, a number of severe freezes, interspaced with periods of unusually warm weather, injured fruit buds on many stone and pome fruit trees at the Station. Although several hard freezes occurred, the most apparent time of bud injury was during the period from March 16 to 19, when temperatures dropped to 30°, 26°, 17°, and 8°F respectfully. This cold period had been preceded by almost a week of maximum temperatures in the 60's and 70's. Fruit buds lost their dormancy during these warm days and had begun to swell when the succession of severe freezes occurred.

A field survey in late March disclosed the general extent of fruit bud injury. Elberta, used as an indicator in our stone fruit virus indexing program, was represented by 80 three-year-old and 66 four-year-old trees growing under field conditions comparable to those of the North Caucasus collection. The survey showed that the cold temperatures had destroyed almost all fruit buds of the Elberta collection, as well as those of several virus-free foreign varieties (Von Riebeeck, Somervee, Walgant, North African #2, and Gialla Precoce Morettini). In protected areas the devastation of fruit buds was not as severe. Eight peach introductions, growing in isolation in our vijrus indexing screenhouse, which affords considerable protection from frost, showed less severe injury. Estimates of cold injury were as follows:

P.I. Number	Variety	Percent Injury
207671	Somervee	20
220051	Tokani	40
230624	(Fl(R1xS557)1)	100
234196	Maluti	100
237680	Gialla di Firenze	25
276181	Black Boy	40
277703	Super Madeleine Pouvet	60
285532	Sherbati	100

The field survey was followed, shortly thereafter, by a more detailed study of cold injury on the variety Elberta and 66 clones in the North Caucasus collection. Fruiting wood

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[2]The North Caucasus collection consists of 71 trees remaining from an original group of 365 seedlings, representing three basic populations of controlled crosses. Each cross uses P.I. 104315, a selection from peach seed collected at the northern limits of peach cultivation in the northern Caucasus region of the U.S.S.R. as one parent. P.I. 104315 was crossed in turn with two selections (P.I. 134400 and P.I. 134401) of an early Chinese peach introduction (P.I. 80089), collected at the Imperial Peach Orchards, and with the variety Elberta.

Table 1. Fruit bud survival and fruit characters of 66 clones of North Caucasus peaches as compared to Elberta—Spring 1967.

Clone	Fruit Bud: Percent survival	Fruit Bud: Bloom rate	Fruit Characters: Diameter (inches)	Flesh color	Quality	Stone
Elberta	3	0				
Y-90	19	2				
100	4	0	2⅛	2	2	2
101	19	2	2	1	4	1
103	18	1				
113	10	1	2¼	2	3	2
114	9	1	2	2	3	2
119	32	3	2	1	3	2
129	28	2				
130	25	2				
131	6	1				
134	0	0				
136	1	0				
139	50	3	2⅛	2	3	2
142	79	4	2⅛	2	3	2
144	16	1	2	2	3	2
146	20	2	2¼	1	3	2
160	6	1	1⅝	1	2	2
177	46	3	1⅞	2	3	3
185	18	2	2⅛	2	3	2
189	21	2				
225	22	2	2⅛	2	3	2
245	22	2				
246	33	2				
248	75	2				
249	7	1				
257	24	1	2	1	3	2
260	31	2	2⅛	1	3	2
290	20	1	2⅛	1	3	2
304	48	2	2¼	2	3	2
322	51	3	2¼	1	3	3
324	26	3	2	1	3	2
327	68	3	2½	2	2	2
328	50	3	2¼	1	3	2
335	59	3	2⅛	2	3	2
338	18	2	1⅞	1	3	2
344	2	0	2⅛	1	3	2
353	51	2	2⅛	2	3	2
374	0	0				
376	20	1	2⅜	1	3	3
378	40	2	2⅜	4	4	5
379	6	1	1¾	4	3	3
383	5	1	2½	1	2	2
390	1	0	2¼	2	2	2
398	4	2	1⅝	2	3	1
399	4	1				
401	9	1				
404	1	0				
407	1	0				
409	6	1				
410	3	1	1⅜	4	3	2
411	7	1				
414	4	0	1⅜	3	3	2
415	2	0	2¼	1	4	2
421	3	1	2¼	3	3	2
425	11	1	2	4	4	3
431	0	0	2¼	3	3	1
439	17	2				
441	10	2	2	4	3	2
451	45	2				
457	17	2				
461	62	3				
464	4	0				
465	3	0				
468	14	1				
469	45	2				
470	23	1				

Key: **Bloom Data:** 0. no crop; 1. light; 2. medium (average); 3. medium-heavy; 4. very heavy

Flesh Color: 1. white; 2. creamy white; 3. yellow; 4. golden yellow

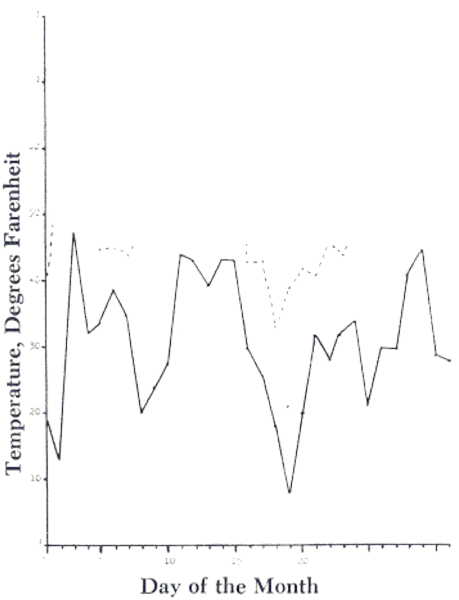
Quality: 1. very poor; 2. poor; 3. fair; 4. good; 5. excellent

Stone: 1. open free; 2. free; 3. semi-free; 4. semi-cling; 5. cling

of Elberta (as check) and each of the North Caucasus clones was gathered over a 5-day period, from March 30 to April 3; placed in cold storage (43°F); and examined for fruit bud survival in the laboratory from March 31 to April 6. Each fruit bud was sliced longitudinally with a single-edged razor blade, and the inner bud tissues were examined with a hand lens for discoloration. When the Elberta and North Caucasus trees came into full bloom later in April, each tree was given a bloom rating based on what should be expected for a normal commercial crop (Table 1).

Fruit bud survival counts among the North Caucasus clones were made on 12 to 15 scions from each tree, but the number of buds varied mostly from 100 to 300 per test. This variation resulted from wide differences in fruit bud set, also observed in previous "normal" years, and attributed to genetic differences among the various clones.

Figure 1. Maximum and Minimum Temperatures for March, 1967.



Fruit development during the season was also observed. Many of the North Caucasus clones bore medium to medium-heavy crops of fruit in the 1967 season. None of the trees bore crops heavy enough to warrant limb props or braces. Although Elberta showed 3% bud survival, none of the trees developed any fruit during the 1967 season.

Fruit bud survival counts among the North Caucasus clones varied from 0 to 79%. Twenty clones showed 25% or more bud survival, and 9 clones showed 50% or more survival. Fruit descriptions are also given where available. Only 8 clones have yellow-fleshed fruits; and of these, only 5 are freestones; quality is fair to good.

Budwood of all the North Caucasus clones mentioned in this aritcle is available from the U. S. Plant Introduction Station, Glenn Dale, Maryland 20769 upon written request.

McLemore Apple from Oklahoma

Twenty-one years ago, J. V. McLemore planted the seeds of a Delicious apple near his home in Muskogee, Oklahoma. Test trees of this seedling were propagated from the original tree in 1958 by horticulturists of Oklahomo State University when they recognized its potential. In 1968, the University released this promising summer apple, naming it "McLemore," after its originator.

McLemore ripens with Lodi. It is a medium-sized Delicious type fruit, has good dessert quality, makes excellent pies, and shows good potential for commercial processing. It has stored well in a refrigerator for six months.

Propagation wood of McLemore may be obtained from the Hort. Dept. of Oklahoma State Univ. at Stillwell.