

Observations of Winter Injury in Peaches

TROY H. JONES AND B. S. PICKETT*

Knoxville, Tennessee

IN 1947 a peach variety trial suitable for the Highland Rim section was established at the Highland Rim Substation, Springfield, Tennessee. Three trees of each of eleven varieties, replicated four times, were set as the main block. Including border trees there was a total of 26 varieties under observation. All varieties in the test at Springfield were in our orchard at Knoxville.

The first two consecutive crops were completely destroyed by a series of spring frosts. With no fruit on the trees and a rather ambitious cultural program, the trees laid down an abundance of wood during 1948, '49 and '50. The trees were large and sturdy for their age.

In late November of 1950, just on the heels of a warm fall with ample soil moisture, the mercury slid to an official -5°F . The weather data reveals that October had a low of only 40°F . The temperature was above 70°F , 24 out of the 31 days during the month. During November and prior to the 24th, twelve days ran above 60°F . On November 23rd a high of 62°F and a low of 30°F was registered. On November 24 there was a maximum of 57°F with a minimum of 7°F . This drop of 50 degrees occurred in something over 12 hours. On November 25 there was a maximum of 18°F and a minimum of -5°F . On November 26 the mercury did not get above 29°F nor lower than 15°F . In other words it was "shockingly" cold during this three day period.

This sudden cold snap was undoubtedly sufficient to severely damage many peach trees, but this single attack was

not all that was in store for us. In February of the same winter, 1950-51, the temperature dropped to unprecedented lows in some parts of the state. To add to the damage, an ice storm accompanied the cold weather in the Springfield area. On February 1 the thermometer registered 9°F above as a minimum while February 2nd turned up with a -13°F at the official weather station. February 3rd showed a low of -5°F . It should also be said that December and January, between the first and second damaging freeze, were about normal for temperature and rainfall.

These two severe cold shocks, coming so close together, all but ruined the orchard for future variety testing, but it did afford an excellent opportunity to evaluate winter damage and breakage, etc., among our several varieties. Crotch, trunk and limb injury was not restricted to any particular side of the tree. By far the greatest amount of crippling damage was found in the crotches of the scaffold limbs. It ranged from complete girdling to small patches of dead tissue on top and inside of the crotch. Minor injury ranged from terminal killing to complete loss of small twigs and branches.

Before growth commenced in the spring of 1951 a goodly number of trees of several varieties were bolted together, with varying lengths of threaded bolts. In most instances the repair was performed on split-away scaffold limbs. At the close of the first growing season these bolted ruptured crotches were examined. Healing varied from zero to 100%. No varietal

*Association Horticulturist and Horticulturist respectively, Tennessee Agricultural Experiment Station.

difference could be detected in the healing process. The extent of cambial destruction was the deciding factor in the amount of repair that took place.

In March of 1953 and 1954 the orchard was scored (120 being perfect score) on basis of crotch and trunk injury, breakage and splitting, killing of branches and internal killing of the heartwood of scaffold limbs.

VARIETAL BEHAVIOR FOLLOWING COLD INJURY IN 1950-51

Variety (12 trees of each variety)	Variety Rating*	
	1953	1954
Golden Jubilee.....		120
July Elberta.....		113
Elberta.....		106
Redhaven.....		98
Sunhigh.....		100
Sullivan's E. Elberta.....		97
Triogem.....		91
Dixigem.....		71
Shippers Late Red.....		71
Belle of Georgia.....		35
Rio Oso Gem.....		14

*Scoring based on amount of crotch and trunk injury, breakage and splitting, killing of branches and internal killing of the heartwood of scaffold branches. 120 is perfect score, indicating freedom from injuries.

Trees with a rating above 90 appear to have a normal life expectancy and can be considered desirable orchard trees. Those with a rating of 50-90 are of doubtful value as orchard trees, while those rating 50 or less must be considered of no orchard value. A change of less than 10% between 1953 and 1954 rating probably represents no change in condition. Yield records were not tabulated during 1953 and 1954 but a commercial crop was picked each season. Some varieties even required fruit thinning. Whatever inconsistencies that occurred in yield in 1953 and 1954 appeared to be due to unpredictable spring frost damage to open blossoms rather than to the old winter injury of 1950-51.

After four full growing seasons following the freeze, a percentage of the trees of certain varieties in the main test block had died: Dixigem, 22%; Redhaven, none; Golden Jubilee, none; Triogem, 9%; July Elberta, none; Sullivan's E. Elberta, 9%; Elberta, none; Shippers Late Red, 15%; Rio Oso Gem, 83%; Sunhigh, none; Belle of Georgia, 50%. During the current year, and for the first time, wood rotting fungi have developed fruiting structures on the surface of many branches of badly damaged trees. This condition will probably become increasingly more conspicuous as the injured trees continue to wane in vitality and usefulness.

If ever the stage was set for a kill it was in the winter described above—late growing fall, insufficient conditioning of wood and not one "low blow" but two. This experience, which could definitely be classed as a test winter, points up the fact that peaches in general can take a lot of cold punishment on the Highland Rim without ruinous financial risk. Some varieties were affected more than others and might be questionable as future planting stock. Extremely low winter temperature does not seem to be our major peach problem on the Rim or in other parts of the state, but rather the devilish spring frosts that nip the blossoms and newly set fruit all too often. Until the plant breeder comes up with a variety that blooms late or some chemical will delay blossoming our most useful corrective measure is selection of superior, as near frost free sites, as possible.



The editor of this publication and the officers of the American Pomological Society take this opportunity to wish all of you a very happy new year, and to thank you for your support.