

The Effect of Spring Frosts on Fruit Blossoms

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One of the chief hazards to fruit growing is spring frosts. At this season the blossom buds and the blossoms are the most tender parts of the tree. When fully dormant, blossom buds are reasonably hardy. As the weather becomes warm and the buds swell and develop, they rapidly and progressively lose in hardiness. At the time of bloom the blossoms will generally withstand a temperature of about 28 degrees without damage.

Damage to Buds and Flowers

It is not true that blossoms are susceptible to frost injury only when they are open. After the buds have swollen, but before the flowers themselves have opened, they will withstand slightly lower temperatures than when they are open, but a severe freeze at this time will do considerable damage. Often the more advanced blossoms in the cluster will be killed, while the more backward ones will escape damage.

In 1946 much damage was done to the apple blossom buds in the Pennsylvania State College orchards by an April freeze when the temperature dropped to 20° before the flowers had opened. The crops of some of the earlier-blooming varieties, such as Delicious and Smokehouse, were practically wiped out by this freeze. Some other varieties, such as Baldwin and Stayman, suffered a heavy thinning, while later-blooming varieties, such as Rome Beauty, York Imperial, and Northern Spy, showed much less damage.

Even while they are in bloom, the blossoms lose in hardiness. In 1946, a freeze

with the thermometer down to 26°, occurred while a block of McIntosh and Stayman was in full bloom. The blossoms which had been out for a while and had been fertilized were killed, while many which had just opened survived and set fruit later.

The fact that the blossoms do not open all at one time is often a big help in the setting of a fruit crop. In 1941 it appeared that the entire crop at the State College orchards had been destroyed by a series of frosts during the period of bloom. Yet one block of about 30 acres produced 10,000 bushels of apples that year. It was estimated that about one blossom in four or five clusters had survived, and the set in these survivors was so good that a profitable crop resulted.

Young Fruit Very Tender

After the trees have set fruit, they are at the most tender stage. Temperatures



The Wealthy is one of our most hardy apple trees. This Wealthy tree produced a good crop of fruit in 1945 in an orchard where many of the varieties lost their crops through spring frosts.

FRUIT VARIETIES AND HORTICULTURAL DIGEST

below 30° will generally kill the young fruits. At this period no appreciable difference in hardiness exist among varieties. In 1938 most of the State College orchard crop was killed two weeks after an early bloom by temperatures ranging from 26° to 29°. A few apples survived where the minimum temperature was 29°, but the crop elsewhere was destroyed. The same temperatures occurring during the period of bloom in other years have left enough blossoms for at least a partial crop.

Considerable differences also exist among fruit species and varieties with respect to their hardiness to frosts. Peach buds, as compared to apples, are less hardy to low winter temperatures but more hardy at the time of bloom. Peach crops may be lost by spring frosts on ac-

count of their early-blooming habits, yet in some years, as in 1945, when spring frosts played havoc with the fruit crop in Pennsylvania, peaches set crops where the apples failed.

Sour Cherries Quite Hardy

The buds of Montmorency sour cherries are usually quite variable in hardiness. Some buds are often winter-killed or frost-damaged by temperatures which do not damage peach trees, while other buds on the same trees will be hardy enough to escape damage and to set fruit even when apple blossoms are killed by frost. In 1945 the only fruit that bore a crop in the State College orchards was the Montmorency sour cherry. 50 bushels of cherries were produced from a three-acre block.

Hardiness of Peaches

Peach varieties are quite variable in hardiness. At the Pennsylvania State College a block of Belle of Georgia and one of unnamed seedlings derived from Belle have consistently yielded heavier crops in years of winter damage and spring frosts than a block of Elberta and another of unnamed Elberta seedlings. In a test block of 18 new and standard varieties, Greensboro, Cumberland, Triogem, Rochester, and Belle of Georgia have been most hardy, while Elberta has been least hardy. The varieties Hardee, Golden Jubilee, Valiant, Summercrest, and Rio Oso Gem are among those of intermediate hardiness.

Hardiness of Apple Varieties

Apple varieties also differ considerably in hardiness, particularly in their ability to withstand spring frosts and



Peach trees sometimes stand more frost than apple trees. These Elberta peach trees produced a crop of fruit in 1945, while apple trees in the same orchard had no fruit.

still come through with a crop of fruit. Of the approximately 125 varieties under test in the orchards at the Pennsylvania State College, the following have been most successful in bearing crops in spite of unfavorable spring weather: Canada Red, Chenango Strawberry, Gallia Beauty, Golden Delicious, Maiden Blush, Wealthy, and Winter Banana. These varieties all produced full crops in 1946 in blocks where the crops of some other varieties were completely destroyed by frosts.

The following varieties have also been quite hardy to spring frosts and have often borne full or partial crops when tender varieties were seriously injured: Akin Red, Baldwin, Ben Davis, Close, Cortland, Early McIntosh, Esopus Spitzenburg, Gano, Gravenstein, Grimes Golden, Jonathan, Lowry, Macoun, McIntosh, Melba, Milton, Mother, Northern Spy,

North-western Greening, Rome Beauty, Wagener, Williams Red, Yellow Belleflower, Yellow Transparent, and York Imperial.

The apple varieties which have been only average or somewhat less so in their ability to withstand spring frosts are Duchess of Oldenburg, Early Redbird, Hubbardston, King David, Lobo, Red Astrachan, Rhode Island Greening, Smokehouse, Stark, Sutton, Turley Winesap, old Winesap, Wolf River, and Yellow Newtown.

The varieties which are most susceptible to spring frosts are Delicious, Fall Pippin, Ohio Nonpareil, Paragon, Roxbury Russet, Stayman, and Summer Rambo. Of these, Delicious and Summer Rambo are at the bottom of the list. These last two varieties are the ones that have most often suffered severe frost damage.

