An Unusual Winter Injury Effect in High Bush Blueberries

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Two instances of unusual performance have been observed in the test planting of highbush blueberries at the Virginia Agricultural Experiment Station during the last eight fruiting seasons. The varietal differences demonstrated in the planting with regard to this unusual behavior was so striking that a report on it seems in order. The unusual behavior of some varieties was characterized by profuse blossoming and heavy cropping but failure to produce the usual quantity of leaves, or no leaf development at all. This phenomenon was first observed in the test planting at Blacksburg in 1951 and again, though to a lesser degree, in 1959.

A planting of highbush blueberry varieties was established on the horticultural farm in 1946. Four plants each of fourteen varieties were planted in randomized locations. The soil on the site selected for the planting is a fairly heavy clay loam, deep and well drained. Its reaction was about pH 5.6, however, and the plants made rather scanty growth in 1946 and 1947. In early spring of 1948 the planting was given a complete mulching with at least 4 inches of sawdust. The plants responded quickly to the sawdust mulch and good growth followed. The only fertilizer applied was sulphate of ammonia. The rate of application was increased to about twice that generally recommended in blueberry growing areas, to reduce the chances for nitrogen deficiency as a result of competition for soil nitrogen by the bacteria which breakdown the sawdust. Two ounces of sulphate of ammonia were applied to each plant in 1948. The rate was increased to four ounces per plant in 1949, six ounces in 1950 and eight ounces in 1951 and has been held at that figure in succeeding years. Good crops of berries were produced in 1949 and 1950 accompanied by vigorous growth of the plants of most of the varieties.

In 1951 most of the plants blossomed heavily and a heavy crop of berries was set on all varieties. As the foliage developed there was a marked lag in the development of leaves on the bushes of Jersey, Atlantic, Pemberton, Scammell, and Weymouth. By late May, plants of June, Rancocas, Cabot, Pioneer and several others in full leaf, but Jersey, Atlantic, Pemberton, Scammell and Weymouth had very few to absolutely no leaves. The berries had developed in size and were only slightly smaller than berries on bushes of other varieties that had normal leaf development. It was obvious that the almost leafless plants would suffer severely if the berries remained on them. All of the berries were removed from the bushes so affected by cutting them back severely and by hand stripping. Bushes of Stanley, Concord and Burlington showed this condition to a moderate degree, but produced from one-fourth to one-half the normal amount of foliage. Bushes of these varieties were permitted to bear some fruit.

At the time of pruning there was no evidence that any of the leaf buds might develop. Buds were evident but they appeared to be dead. After the severe pruning, new growth and leaves developed from apparently dormant buds on older wood and from suckers

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developing at the crowns of the bushes. The season was a favorable one and the plants made good growth. They bore good crops of berries in 1952 and by the following year were as large, vigorous and productive as plants of the other varieties.

Similar behavior was observed in the planting in 1959, but to a lesser extent. Pemberton was affected as severely as in 1951, but Atlantic and Jersey were only moderately affected. Scammell and Weymouth had been discarded from the planting several years previously because of poor performance.

Table 1 lists the varieties included in the test and the relative rating for occurrence of this condition in 1951 and in 1959.

When this unusual behavior was first observed in 1951 it was diagnosed as a type of early winter injury, which appeared to have damaged the leaf buds much more severely than the blossom buds. Study of weather records of the preceding fall season afforded support for this theory. October and November of 1950 were probably milder than average temperatures for those months. No hard freezes had occurred prior to November 24, when a cold wave and heavy snowstorm moved into the Blacksburg area. On November 25 a low temperature of −3° F. was recorded in a weather box located about 400 yards from the blueberry plot. It was assumed that the mild fall accompanied by favorable soil moisture conditions may have stimulated growth late in the fall on bushes of some varieties; and this had prevented the leaf buds from hardening-off as they usually do before winter.

Weather records of October and November of 1958 revealed similar conditions. Frost occurred on October 7 with a low reading of 28° F. recorded in a weather box located about 400 yards from the blueberry planting; but, thereafter, the season was mild. The soil moisture level and heavy fertilization favored continued growth late in the season. A severe cold wave moved into the Blacksburg area on November 29, and a low temperature of 10° F. was recorded on November 30. Again it appeared plausible that plants of some varieties might not have hardened-off sufficiently to withstand such a sudden drop in temperature. This does not explain the survival of the blossom buds under temperatures that appear to have damaged the leaf buds, but it is possible that blossom buds become fully dormant earlier in the fall than leaf buds.

Table 1. **Failure of leaf development on highbush blueberry varieties at Blacksburg, Virginia, in 1951 and 1959.**

Variety	Degree of failure of leaf development	
	1951	1959
Atlantic		Medium to Severe
Burlington		None
Cabot		—
Coville		None
Harding		None
Jersey		Medium
June		None
Pemberton		Severe
Pioneer		—
Rancocas		None
Scammell		
Stanley		
Weymouth		
Berkeley		Medium
Bluecrop		Slight
Earliblue		Medium
Herbert		Slight
Rubel		None

Michigan Pear Selection No. 437 appears very promising for the south, reports N. F. Loomis, of U. S. Field Station in Meridian, Mississippi.