Peach Variety Blossom Bud Hardiness*

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Minimum temperature of −16°, −15°, and −11° F. during the winters of 1960-61, 1961-62, and 1962-63 offered an excellent opportunity to study blossom bud survival of a large number of peach varieties. The data here reported were secured from the variety test planting of the New York State Agricultural Experiment Station at Geneva, N. Y. Minimum temperatures were taken from a maximum-minimum registering thermometer located in the orchard.

The weather for the three winters in question was as follows:

In December of 1960 a maximum of 61° F. occurred on the 6th and a minimum of −8° F. on the 10th, with rather steady cold (no temperatures above 32° F.) for the rest of the month. Very little injury resulted from the December low. The maximum temperature in January was 50° F., and minima of −1° F. were recorded on the 22nd, 23rd, and 24th. Again, it was rather steady cold. On February 1st the temperature dropped to the winter low of −16° F., which resulted in most of the injury reported.

During December, 1961 a maximum of 53° F. and a minimum of 6° F. were recorded. There were no minimum temperatures above 32° after the 4th. January, 1962 had a maximum of 51° F. and a minimum of −1° F. It was a month of steady, but not severe, cold. In February, after a 3 day warm spell on the 3rd, 4th, and 5th (maximum-minimum temperatures as follows: 3rd, 38° and 25° F., 4th, 48° and 33° F., and 5th, 50° and 10° F.) the temperature dropped to −15 on the 11th. There was no severe weather after this date.

In December, 1962, after a high of 61° F. on the 1st, the weather turned cold and minima of −4° F. were recorded on the 21st and 31st. Low temperatures prevailed in January, 1963 with a minimum of −11° F. on the 24th, and 6 days during the month when the daily minimum was below 0° F. There were many high winds during this period. February was also quite cold, with a minimum of −8° F. on the 8th, and with 6 days below 0° F. Some injury to the peach buds resulted from the low at the end of December, more from the January 24 low, and still more following the −8° minimum on February 8.

A sample of ten or more shoots, 12 to 15 inches long, to give at least 200 blossom buds, was collected from the outside of the tree around the entire circumference. The blossom buds were examined by cutting with a razor blade to reveal the young differentiated flower. Any variation from the normal fresh, yellowish green color was considered to be injured. In most cases the same tree was sampled each year.

Exact yields were not recorded in this orchard, but the crop was estimated on a 0-5 scale in which 0 was no fruit, 1—a very light crop or few fruits, 2—a light crop, 3—a medium crop, 4—a full crop, and 5—overloaded.

Results and Discussion

The bud survival and crop records for 1960, 1961, 1962, and 1963 are presented in Table 1. The wide year to year variation in survival in certain varieties, such as VPI 40N from 16.2

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Table 1. Peach blossom bud survival and crop estimates for 1960, 1961, 1962.

Variety	% blossom bud survival			Crop estimate				Mean	
	1960-61	1961-62	1962-63	1960	1961	1962	1963	Survival	Rank
Babygold 5	6.6	5.7	9.1	0	2	1	4	7.1	53
Babygold 6	4.7	7.9	6.7	0	2	1	3	6.4	54
Babygold 7	12.1	0.8	19.0	0	2	1	4	10.6	51
Babygold 8	63.2	14.8	54.3	0	2	1	4	44.1	17
Ben Owens #1	61.9	63.3	64.8	1	3	3	4	63.3	4
B3-2510	21.9	27.7	65.1	1	4	2	4	38.2	24
B3-3169	52.4	28.4	45.3	3	4	2	4	42.0	18
Cardinal	3.8	8.9	.9	2	0	0	1	4.5	60
Coronado	10.3	23.9	21.2	1	3	2	4	18.5	43
Earligold	0.4	8.0	10.7	2	2	1	4	6.4	54
Earlired	3.8	4.7	8.6	0	2	0	3	5.7	58
Early Triogem	44.7	30.5	36.6	3	4	3	*	37.3	25
Envoy	62.3	44.4	42.7	2	2	3	4	49.8	11
Golden Jubilee	62.0	23.4	49.8	3	3	1	4	45.1	14
Hale Harrison Brilliant	23.7	7.5	3.7	3	2	0	2	11.6	50
Ill. #3	1.7	0.0	3.0	0	0	1	2	1.6	63
Ill. #4	1.4	4.2	32.6	0	0	1	4	12.7	48
Jerseyland	51.2	39.4	30.0	2	2	1	4	40.2	20
Lexington	82.5	56.6	61.5	2	3	4	4	66.9	3
Loring	17.8	0.0	7.0	4	0	0	2	8.3	52
Maybelle	80.7	31.7	45.8	3	3	1	4	52.7	9
Merrill Gemfree	26.6	13.3	36.9	0	2	0	*	25.6	34
Merrill '49er	53.7	1.3	18.3	3	0	0	*	24.4	37
Minn. Sdlg.	78.0	58.4	78.2	1	2	3	4	71.5	2
Mitterling	86.9	49.5	41.1	1	3	1	4	59.2	7
NHNC 3	24.2	36.8	56.8	0	2	4	5	39.3	23
NC 3	90.2	80.3	71.3	4	3	5	5	80.6	1
NJC 47	59.3	24.9	61.1	0	4	1	4	48.4	12
NJC 63	6.1	21.3	51.2	1	3	1	4	26.2	33
Panamint	14.7	16.3	17.2	4	2	1	*	16.1	46
PO 722	35.4	9.9	53.6	2	0	0	4	32.7	31
P 9-78	76.9	3.8	29.3	0	2	1	3	36.7	26
Ranger	46.1	9.6	17.8	2	0	0	4	24.5	36
Redcap	29.8	8.9	25.5	0	2	1	4	22.7	39
Redhaven	58.6	16.7	47.1	4	4	2	4	40.8	19
Richhaven	46.2	14.7	13.3	3	4	2	3	24.7	35
Robin	47.7	8.4	10.6	3	3	0	*	22.2	40
Royalvee	10.7	0.0	1.5	0	2	0	2	4.1	61
Southland	7.5	3.2	7.4	2	2	0	2	6.0	55
Suncrest	11.5	5.3	33.0	0	3	1	4	16.6	45
Triogem	80.2	15.8	36.8	5	4	1	4	44.3	16
Veefreeze	62.8	35.5	20.9	4	3	1	4	39.7	22
Veteran	64.2	60.6	14.4	4	1	1	4	46.4	13
V 39082	20.6	17.1	27.2	3	5	1	4	21.6	41
V 46081	36.7	5.4	30.9	0	3	1	4	24.3	38
V 46092	22.6	25.7	4.8	0	3	2	3	17.7	44
V 46093	46.7	51.5	11.0	1	4	3	4	36.4	27
Vivian	39.0	24.8	38.4	3	4	3	4	34.1	29
VPI 31	41.8	50.1	41.7	3	3	2	4	44.5	15
VPI 33N	60.1	63.6	62.8	4	3	1	4	62.2	5
VPI 36	17.8	5.4	35.6	2	2	1	4	19.6	42
VPI 40N	85.8	16.2	50.4	4	3	4	4	50.8	10
VPI 41N	10.3	12.7	17.3	3	2	1	3	13.4	47
VPI 42N	33.6	23.0	64.1	3	2	1	*	40.2	20
VPI 43N	4.7	4.0	8.6	2	2	1	1	5.8	57
NY 1466	30.4	18.9	59.4	4	4	2	4	36.2	28
NY 1952	63.8	15.4	21.1	1	4	2	*	33.4	30
NY 2602	3.5	2.1	1.9	4	3	1	2	2.5	62
NY 2603	88.0	30.9	45.3	2	2	1	*	54.7	8
NY 2604	10.3	13.8	11.3	4	2	1	4	11.8	49
NY 2622	7.1	3.3	6.6	4	4	1	4	5.6	59
NY 2610	84.8	31.6	67.8	3	5	3	4	61.4	6

'ree out in 1963.

to 85.8%, Babygold 8 from 14.8 to 63.2%, or Maybelle from 31.7 to 80.7% should be noted. It was thought that the size of the crop the previous summer might explain in a large part this variation, but the data do not show this to be so.

Secondly, although there is a positive correlation between bud survival and estimated yield, it was not as high as was expected. The correlation coefficient in 1960-61 was 0.058, in 1961-62—0.429, and in 1962-63—0.089. Some varieties, e.g. Redhaven, Richhaven, Triogem, N. Y. 2622, and N. Y. 2604, apparently have the ability to set fruit with most of the surviving buds, and produce a crop, even though they suffered a high bud mortality during the winter. Other varieties, such as Minn. Sdlg. and VPI 33N, that had a high bud survival, have not produced very heavily.

Little killing back of shoots occurred in the three winters in question, although there was fairly extensive wood injury as evidenced by the prevalence of black heart in wood two years old or older. However, these aspects of winter hardiness were not studied in detail.

Other comparisons of peach blossom bud hardiness have been made by Lamb and Way (4) and Joley and Bradford (3), as well as a report by Campbell and Hadle (1) on tree injury; but these have been reports of injury to varieties following a single severe winter. The observations here reported cover three consecutive test winters, and show the year to year variation in blossom bud survival, so that a more significant rating of varietal bud hardiness is obtained. The variation in results from year to year indicate the complexity of this one phase of "hardiness." Edgerton (2) showed the effects of thinning, nitrogen fertilization, and other cultural practices on blossom bud survival, which could influence varietal "hardiness" ratings as given here.

It is likely that differences in mean survival such as NC 3, 80.6%, and Cardinal, 4.5%, are largely the result of the genetic make-up of these varieties. Differences such as these would seem to be of sufficient magnitude to make a program of breeding for hardy peaches worthwhile.

Literature Cited

1. Campbell, R. W. and F. B. Hadle. 1960. Winter injury to peaches and grapes. Am. Soc. Hort. Sci. 76: 332-337.
2. Edgerton, L. J. 1960. Studies on cold hardiness of peach trees. Cornell Univ. Agri. Exp. Sta. Bul. 958.
3. Joley, L. E. and F. C. Bradford. 1943. Variations in blossom hardiness within a hardy group of peaches. Am. Soc. Hort. Sci. 43: 79-83.
4. Lamb, R. C. and R. D. Way. 1950. Farm Research XVI: 3:3.

Pears for Massachusetts

Among the pear varieties recommended by J. F. Anderson, of the University of Massachusetts in Fruit Notes for growers in his state are those commonly grown in the East, such as Bartlett, Clapp Favorite, Bosc. However, he also recommends for trail, several less common ones. One, *Early Seckel*, he describes as a seedling of Seckel, with fruit of good flavor, that keeps well for an early pear. It resembles its parent in coloring, but is larger, with a more distinct neck. Tree is vigorous, productive, and medium in size.

Devoe is an attractive pear with a bright red blush over a clear yellow ground color, and good quality. Tree is vigorous and productive.

Dumont is a medium to large, late-ripening pear of very good quality. It is obtuse-pyriform in shape, and has firm, juicy flesh. Tree is vigorous and productive.